Design, Fun and Sustainability:
Utilizing Design Research Methods to Develop an Application to Inform and Motivate Students to Make Sustainable Consumer Choices

A Thesis
Presented in Partial Fulfillment of the Requirements for
The Degree Master of Fine Arts in the
Graduate School of The Ohio State University

By
Melanie Dreser

Graduate Program in Industrial, Interior and Visual Communication Design

The Ohio State University
2011

Master’s Examination Committee
Paul J. Nini, Advisor
Elizabeth B.-N. Sanders, PhD
Carolina Gill
Abstract

Nowadays, when we talk about sustainability or environmentally friendly practices, we try to convince groups or individuals to be good citizens or good people. Especially young people do not care deeply about pursuing an environmentally conscious lifestyle if it requires an effort on their part.

What if one uses fun to influence (i.e., motivate and inform) students about sustainability in their daily life? Would this approach be more successful in changing their behavior? Can sustainability even be considered to be fun? As we already know, behavior change requires motivation and fun could be used as a motivational factor. Proposing that we need to develop programs and concepts that make a sustainable lifestyle fun instead of perceiving it as a negative influence on our quality of life provides new opportunities for projects and interventions.

When we make sustainable practices fun, the likelihood to adapt such a new behavior increases.
Behavioral change results from a combination of three factors, namely, awareness, information and motivation, which is the most important starting point for fun.

This thesis addresses the difficulties in informing and motivating students to choose a sustainable lifestyle by focusing on their consumer behavior. With a fun and playful application, the user should be able to learn and inform herself or himself about a sustainable lifestyle and be motivated to integrate it into her or his own daily life.

By offering multiple choices of action as well as the opportunity to be and act as a part of a whole group (i.e., collective action), competition and therefore motivation should be raised. This results from the idea that fun can be experienced both individually or as a group. Design Research is the main tool to develop this informational and motivational application. Research on the target group, in combination with existing case studies in design and the psychological aspects of human decision making, will lead to a design application. The resulting methodology could be used for any target group.
Dedicated to my family:

My mother and my father, who both believe in me more than anyone else.

Everything I am, I owe them.
Acknowledgements

I would like to thank Paul Nini, my committee Chair, for guiding me through all the steps on this journey. He was open to my ideas and challenged my thoughts in order to constantly improve my thesis. Thank you to Dr. Elizabeth B.-N. Sanders, who inspired and helped me to develop my passion for design research. Her guidance and enthusiasm throughout the design research process made my thesis a success. And last but not least, I would like to thank Caroline Gill who embraced my topic by giving me thoughtful feedback and guidance.

A big thank you to my friends Ravi Somayajulu, Judith Freis and Franzí Schmid who helped me to stay sane, Marvin Brown who helped me to polish my thesis, and Karin Herndon who gave it the finishing touch.

A special thanks to Brian R. Stone who encouraged me at the beginning of this journey to keep pursuing my goals.

Finally, I would like to thank my brother Christoph Dreser and my sister Marina Dreser, who keep me grounded and make me laugh.
Vita

1985 Born – Bad Toelz, Germany

2009 B.A. Visual Communication Design,
University of Applied Sciences, Schwaebisch Gmuend,
Germany

2009-2010 Graduate Administrative Associate, The Ohio State University

2010-2011 Graduate Teaching Associate, The Ohio State University

Fields of Study

Major Field: Industrial, Interior and Visual Communication Design
# Table of Contents

Abstract .................................................................................................................. ii
Acknowledgements ................................................................................................. v
Vita ............................................................................................................................. vi

## Chapter 1

Introduction ................................................................................................................ 1
1.1 Problem statement ............................................................................................... 3
1.2 Goals .................................................................................................................... 5
1.3 Scope of the Study ............................................................................................... 7

## Chapter 2

Background Information ............................................................................................ 10
2.1 Sustainability ........................................................................................................ 10
  2.1.1 Definition ..................................................................................................... 10
  2.1.2 History ......................................................................................................... 12
  2.1.3 Environment, Economy, Society .................................................................. 17
  2.1.4 Sustainability and Design ........................................................................... 24
  2.1.5 Sustainable Lifestyle .................................................................................. 25
2.2 Media .................................................................................................................. 28
  2.2.1 Definition ..................................................................................................... 28
  2.2.2 History ......................................................................................................... 29
  2.2.3 Social Network Sites .................................................................................. 31
  2.2.4 Social Impact ............................................................................................... 43
2.3 Games .................................................................................................................. 45
  2.3.1 Definitions .................................................................................................... 45
  2.3.2 History ......................................................................................................... 49
  2.3.3 Types of Games ........................................................................................... 51
# Chapter 5

**Online Survey**

- 5.1 Purpose ........................................................................................................ 134
- 5.2 Approach ...................................................................................................... 134
- 5.3 Assumptions .................................................................................................. 135
- 5.4 Recruiting ...................................................................................................... 136
- 5.5 Participants .................................................................................................... 137
- 5.6 Method ........................................................................................................... 138
- 5.7 Data and Findings ........................................................................................ 141

# Chapter 6

**Participatory Workshop 1: Sustainable Awareness Study**

- 6.1 Purpose .......................................................................................................... 147
- 6.2 Approach ....................................................................................................... 148
- 6.3 Assumptions ................................................................................................... 148
- 6.4 Recruiting ....................................................................................................... 149
- 6.5 Participants ..................................................................................................... 149
- 6.6 Method ............................................................................................................ 150
- 6.7 Data and Findings ........................................................................................ 153
- 6.8 Implications for the Design Application ...................................................... 163

# Chapter 7

**Participatory Workshop 2: Information and Motivation Study**

- 7.1 Purpose .......................................................................................................... 166
- 7.2 Approach ....................................................................................................... 167
- 7.3 Assumptions ................................................................................................... 167
- 7.4 Recruiting ....................................................................................................... 168
Appendix

Appendix A. Consent Forms & Advertisement .......................................................... 253
Appendix B. Online Survey ..................................................................................... 257
Appendix C. Participatory Workshop 1: Sustainable Awareness Study .................. 280
Appendix D. Participatory Workshop 2: Information & Motivation Study .............. 315
Appendix E. Concept Greened U .......................................................................... 326
Appendix F. User Scenario Feedback ...................................................................... 334
List of Tables

Table 1. Game Characteristics: Roger Caillois .......................................................... 47
Table 2. Game Dichotomies: Chris Crawford ............................................................... 48
Table 3. Norms of Generation Y: Don Tapscott ........................................................... 68
Table 4. Guidelines Online Survey .............................................................................. 146
Table 5. Guidelines Sustainable Awareness Study ....................................................... 165
Table 6. Guidelines Information & Motivation Study ..................................................... 187
Table 7. Average Day, Chris Jones (Persona 1) ............................................................. 193
Table 8. Average Day, Vanessa Clark (Persona 2) ......................................................... 194
Table 9. Average Day, Joe Lopez (Persona 3) ............................................................... 196
Table 10. Average Day, Lindsay Brown (Persona 4) ...................................................... 198
Table 11. Guidelines for Application (Research Studies) .............................................. 203
Table 12. Guidelines for Behavior Change (Research Studies) ................................. 204
List of Figures

Figure 1. Thesis Outline ........................................................................................................2
Figure 2. Three Pillars of Sustainability .........................................................................12
Figure 3. Concept of Sustainability ..............................................................................17
Figure 4. Beyond the Boundary .................................................................................. 20
Figure 5. The Cost of Global Pollution .....................................................................22
Figure 6. Facebook Website .....................................................................................34
Figure 7. Foursquare Website ..................................................................................36
Figure 8. OneClimate Website ................................................................................38
Figure 9. Twitter Website ........................................................................................41
Figure 10. Research Setup .......................................................................................79
Figure 11. Maslow’s Hierarchy of Needs .................................................................92
Figure 12. Motivational Design ...............................................................................95
Figure 13. Map of Design Research Types: Elizabeth B.-N. Sanders, 2006 ..........99
Figure 14. Theories Informing the Framework .......................................................112
Figure 15. Behavior Change Model: Melanie Dreser ........................................115
Figure 16. Steps of Behavior Change ...................................................................116
Figure 17. The Fun Theory, 2011 ........................................................................117
Figure 18. The Piano Staircase, 2009 ................................................................. 118
Figure 19. The World’s Deepest Bin, 2009 ........................................................ 120
Figure 20. Bottle Bank Arcade, 2009................................................................. 121
Figure 21. Speed Camera Lottery, 2010 ............................................................. 123
Figure 22. Fun Tram Tickets, 2010 ................................................................. 124
Figure 23. The Wiki Traffic Lights, 2010 ............................................................ 125
Figure 24. Do One Thing, 2011 ................................................................. 128
Figure 25. Research Studies ........................................................................... 133
Figure 26. Online Survey – Gender & Year ....................................................... 137
Figure 27. Example Single Choice Question .................................................... 138
Figure 28. Example Open-ended Question ...................................................... 139
Figure 29. Example Multiple Choice Question ................................................ 140
Figure 30. Example Agree/Disagree Question ................................................ 140
Figure 31. Persona Lifestyle Cards .................................................................. 151
Figure 32. Persona Lifestyle Poster (Participant # 1) ......................................... 152
Figure 33. Persona Card Placement ............................................................... 154
Figure 34. Smartphone Analysis Setup ............................................................ 171
Figure 35. Coupon Book Analysis Setup ........................................................ 171
Figure 36. Facebook Group Analysis Setup .................................................... 172
Figure 37. Course Plan Analysis Setup ............................................................. 172
Figure 38. Green Spot ..................................................................................... 173
Figure 39. iRecycle ....................................................................................... 174
Chapter 1

Introduction

The introduction will give an overview of the thesis outline (Figure 1) that informed the problem statement, the goals and the scope of the study. The research started off with a problem that was influenced by the problematic of sustainability, current consumer behaviors and the lack of success of existing behavior change approaches. Out of the realization of this problem a research question was developed, which combined three parts, namely, design, consumer behavior and a sustainable lifestyle. In order to understand the complexity of behavior change better a literature review on different theories related to behavior change was conducted. The theories and approaches led into an updated behavior change framework focusing on a target group’s needs and characteristics. The framework raised more questions, which led to the development of three participatory studies to analyze the target group, college freshmen and sophomore students (belonging to Generation Y), better. These research studies were supported by a second literature review on Generation Y. The analysis of the study in combination with a third literature review on games and social media led to design guidelines which were used to develop a design application.
Figure 1. Thesis Outline
“Our enormously productive economy... demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption... We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing rate” (Victor Lebow, 1955)

1.1 Problem statement

Victor Lebow’s quote states the approach during the 1950s, which was used to boost the US economy after the Second World War in order to avoid another great depression as experienced after the First World War. Promoting consumption was one of the strategies used to keep the economy strong.

Nowadays, nobody needs to tell the Western World to consume. We consume more per capita than ever before. The increasing consumption in energy, water, food, products and services has led to an unsustainable cycle, which is mainly based on non-renewable resources. It is true that non-renewable resources can be renewed but not on a human time scale that is practical since it takes hundreds of thousands of years for these fuels to regenerate. So, when we run out they are gone, which means that our economy, which is currently primary based on non-renewable resources, would slow down or even collapse.
Western consumer habits are only one part of this complex problem. Some of the other factors that add to this unsustainable life cycle are the increase in the world population as well as the raising number of people adapting Western consumer standards. In summary, the demand for resources is high and infinite but the resources – those we mainly use in our current life cycle – are finite. Realizing this problem, governments and non-governmental organizations have tried to convince their citizens to choose a more sustainable way of living.

For years the usual framework for thinking about behavior change was to promote behavior change primarily through information and assume that people would react in rational ways to the new information. Many information-intensive programs think that if they discover an unsafe and unhealthy behavior and intervene by providing information to individuals, they will move to healthier and safer practices. For decades a lot of work and money has been invested to investigate and implement these types of behavior change approaches. However, the problem is that people are often irrational in their decision-making processes (Ariely, 2008).

The challenge is that behavior change is difficult. People do not know the consequences new behaviors might have and therefore are resistant to take a risk. Moreover, behavior change requires a high effort since it is hard work to unlearn common behaviors and learn new ones.
Carefully designed studies such as information-intensive campaigns suggest very logical and rational solutions and behavior change approaches, which make perfect sense. However, these interventions have one problem: A lack of success! It may seem intuitive that people’s behavior is linked to their attitude. The results of information campaigns and other studies showed that this link between behavior and attitude is in fact weak (Lehman & Geller, 2004; McKenzie-Mohr, 2000; Costanzo et al., 1986). Geller’s study demonstrated that there was no difference in homeowners who attended a 3-hour workshop on residential energy conservation and the ones who did not according to their likeliness to engage in pro-environmental behaviors (Geller, 1981). These approaches do not have an effect on the majority of the targeted group. Otherwise we would have observed major changes in how people consume and interact with the environment. The reality is that the average environmental footprint has increased, we produce more waste than ever before and consumption is sold as the solution to all problems – no matter if the economy is good or bad.

1.2 Goals

As mentioned in the previous paragraph, nowadays, when talking about sustainability or environmentally friendly practices, the goal has often been to try to convince groups or individuals to be good citizens or good people.
This holds true especially for young people who do not care deeply about pursuing an environmentally conscious lifestyle if it requires an effort on their part.

A better solution would be to rethink our current approach and try to integrate the target group’s needs, wants and values to design a more effective approach. Generation Y, born between 1977 and 1997, is characterized by specific needs. In his book *Grown Up Digital* John Tapscott publishes findings based on a research project from 2006 to 2008 investigating and interviewing nearly 6,000 people from Generation Y, the so-called Net Generation (Tapscott, 2008). Some of the findings include that Generation Y wants freedom of choice and freedom of expression as well as a need for collaboration and relationships. The most relevant finding for this study certainly is that they want entertainment and play in their work, education and social life.

Taking this need into consideration, what if one were to use fun to influence (i.e., motivate and inform) students about sustainability in their daily life? Would this approach be more successful in changing their behavior? Can sustainability even be considered to be fun? As we already know, behavior change requires motivation and fun could be used as a motivational factor. Proposing that we need to develop programs and concepts that make a sustainable lifestyle fun instead of perceiving it as a negative influence on our quality of life provides new opportunities for projects and interventions. When we make sustainable practices
fun, the likelihood of adapting such a new behavior increases and long-term changes can take place.

Behavioral change results from a combination of three factors, namely, awareness, information and motivation, which is the most important starting point for fun.

This thesis addresses the difficulties in informing and motivating students to choose a sustainable lifestyle by focusing on their consumer behavior. With a fun and playful application, the user should be able to learn and inform herself or himself about a sustainable lifestyle and be motivated to integrate sustainable behaviors into her or his own daily life.

This study argues that sustainable behavior change can and should be fun, and that design research can help to inform an application to achieve behavior change within a target group of college freshman and sophomore students.

1.3 Scope of the Study

In order to accomplish these goals, this study will identify, analyze, and interpret the research process behind the creation of an application for behavior change. The application in question is designed to inform college freshmen and sophomore students, as well as their friends and peers, about a sustainable lifestyle and motivate them to adapt sustainable behaviors into their own lives.
The study consists partly of secondary research on behavior change theories. This analysis informs a new, cyclical behavior change framework focusing on the target group and based on existing approaches. Furthermore, secondary research on games, social networks, and sustainability build the background information in order to analyze the problem. Starting with secondary research about Generation Y and then focusing on a more specific target group of college freshman and sophomore students at The Ohio State University through online surveys and participatory design workshops (Participatory Design [PD] is an approach to the assessment, design, and development of technological and organizational systems that places a premium on the active involvement of workplace practitioners [usually potential or current users of the system] in design and decision-making processes [CPSR, 2005].) created the necessary knowledge to develop a user-centered design application. Knowing the wants, needs and restrictions of the target group a concept for a digital application using game mechanics to inform and motivate its users was created.

This thesis shows the process of using design research to develop an idea for behavior change. At the beginning of this process only a problem that required design thinking and research existed. At that time there was no solution. Through research a design application based on game mechanics was conceptualized in order to address this problem. The study resulted in the development of an updated behavior change model as well as a concept for a game-based system.
guiding sustainable behavior change. The intention of the study was to let the
research inform the outcome rather than defining an outcome and then frame the
research around it.

This approach of participatory design research, which actively includes the
people that benefit from the design in the design process, can be used in order
to find possible solutions to problems for which we might not know the answer.
Furthermore, this thesis provides a behavior change framework that can be
implemented in other research approaches. And last but not least, the insights
about college freshmen and sophomores can help to inform other studies,
products or services catered to the target group.
Chapter 2
Background Information

In this chapter three concepts that are immensely important to inform the process and resulting design application of this thesis are introduced: Sustainability, Social Technology, and Games. The knowledge of all three areas contributes to the research setup and the development of a design application.

2.1 Sustainability

“We all know that buying less stuff makes good green sense. But some of us think this might cramp our style, or at least our fun. We all have needs, and most of us enjoy buying new things, so when we can’t buy less, we can at least buy smart.” (Steffen, 2008)

2.1.1 Definition

The Brundtland Commission at the United Nation conference on March 20th 1987 created one of the most popular definitions of the concept sustainability as the “development that meets the needs of the present without compromising the ability of future generations to meet their needs.” (United Nations General
Assembly, 1987). The word sustainability is derived from the Latin word sustinere: ‘sus’ meaning ‘up’ and ‘tenere’ meaning ‘to hold’. Looking back on the roots of the word ‘sustain’; ‘to maintain’, ‘to keep up’ and ‘to endure’ are only a few of the synonyms listed at the online Thesaurus (Thesaurus, 2011). Currently there is not one officially accepted definition of sustainability; moreover, there are several slightly different definitions due to the fact that sustainability is a very complex concept. The UN definition certainly sums up the essence of sustainability, however, for many people this definition is too abstract. They do not know what living a sustainable life means or how it can be performed. Other definitions such as “sustainable means using methods, systems and materials that won’t deplete resources or harm natural cycles” (Rosenbaum, 1993) and “sustainability integrates natural systems with human patterns and celebrates continuity, uniqueness and place making” (Early, 1993) give a better idea about what the concept of sustainability stands for. Yet each of these definitions seems to focus on the environmental side of sustainability. The perception that sustainability equates to the environment seems to have increased the last few years. The term became a buzzword amongst corporations, the news, and several other resources and has been misused and reduced to environmental issues.

Sustainability, however, integrates three different dimensions, namely, environment, society and economy. These so-called three pillars of sustainability (Figure 2) are the basis for this research. When talking about a sustainable
lifestyle all three factors should be integrated, so that we can sustain our world and meet our current needs without compromising future generations.

![Three pillars of sustainability](image)

Figure 2. Three pillars of sustainability (Sustainable-ED, 2005)

2.1.2 History

The concept of sustainability is as old as human history. In early human history nomadic hunters and gatherers did not have a huge demand of resources, however, research argues that the use of fire and the desire for specific foods began to change communities (Scholes, 2003). Once agriculture emerged in different regions of the world about 8,000 to 10,000 years ago, humans became more and more dependent on environmental resources in the areas that they settled. As soon as they exploited these areas they either moved on or the society collapsed such as the Mayan society or the Roman Empire (Diamond, 2005).
Later on the industrial revolution caused an immense growth in people’s need for non-renewable resources such as fossil fuels. Moreover, modern sanitation prevented populations from acquiring diseases (Hilgenkamp, 2005). While these developments, on the one hand, helped the population to grow thereby increasing the demand of fossil fuels until the present day, on the other hand, the individual demand of non-renewable resources also grew as a result of the vast energy demand of the new industry. As peoples’ wealth, health, and the overall population increased, human consumption increased as well during the industrial revolution in the 20th century (de Long, 2000). Starting in the 1930s economists developed concepts of non-renewable resource management realizing that the resources we are dependent on are not infinite (Hartwick, 1977).

After the depression of the Second World War, developed nations experienced a technology-driven growth resulting in an increased demand of resources (Robin, 2008). Starting in the 1960s books such as Silent Spring by Rachel Carlson (1962) and The Population Bomb by Paul R. Ehrlich (1968) started to raise public awareness of the problems that society causes when they consume at their current rates. In the 1970s environmental concerns about pollution, consumerism and the population explosion, which increased from a regional to a global scale, were spotlighted in publications such as Small is Beautiful by E.F. Schumacher, a British economist (1973). In 1972 the United Nation Conference on the Human Environment on international environmental issues
was held in Stockholm, Sweden (John & Smith, 2005). With representatives from 113 countries as well as several governmental and non-governmental organizations attending, this conference was the first big push to create global awareness about environmental problems. The so-called Stockholm Conference resulted in a declaration in which the world community agreed to collaborate on environmental protection. However, in the following years no impactful changes were made. In fact, problems grew even worse. The next eye-opener was released in 1987 by the Brundtland Commission, formally the World Commission on Environment and Development (WCED) of the UN (established 1983), which addressed growing concerns “about the accelerating deterioration of the human environment and natural resources and the consequences of that deterioration for economic and social development.” The report *Our Common Future* stated that development is important for our society, but it has to be sustainable development to ensure that the needs of the current generation are met without compromising the needs of generations to come. In 1992, the United Conference on Environment and Development (UNCED), also called the Earth Summit, was held in Rio de Janeiro including 172 governments and several governmental and non-governmental organizations (United Nations, 1997). The Earth Summit’s goal was to develop a global partnership for sustainable development as well as to decrease the gap between developed countries and developing countries. As a result, several documents including the Rio Declaration on Environment and Development and Agenda 21 were released. Critics have pointed out that even if
these agreements were made, not all of them were fulfilled within the next years. Another step was the Kyoto Protocol, released in 1997, aimed at fighting global warming. As of August 2011, 191 states have signed and ratified the protocol. The only major country that signed, but never ratified the Kyoto Protocol is the United States of America (The United Nations Framework Convention on Climate Change, 1997: “Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner”). Ten years after the Earth Summit in Rio de Janeiro, another Earth Summit was held in Johannesburg, South Africa, informally called “Rio+10”. Due to the fact that 190 representatives of different countries attended, it was the biggest UN conference up to that point with the goal to take a look at the progress of the participating countries and set new future goals (Earth Summit 2002, 2002). This development and the increased commitment and interest of countries from all over the world can be seen as a sign that sustainability is a serious concept. However, economical growth needs to be aligned with environmental and social well-being.

This realization led to the Decade of Education for Sustainable Development (DESD 2005-2014) released by the United Nations General Assembly in December 2002 driven by the belief that “education is an indispensable element of achieving sustainable development” (United Nations General Assembly, 2002).
The goal of the decade is to foster a mental change towards more sustainability. The member states of the UN pledged to anchor the mission statement of sustainable development in kindergartens, schools, and universities. This mission can help to increase the awareness of the importance of this topic throughout the world. Once people value sustainability as a concept and implement it in their daily lives, change can happen slowly. Moreover, the current educated and aware generation could educate their children promoting a legacy of awareness, so that sustainability can finally be achieved and the needs of future generations can be met and sustained. Since sustainability is a three-fold concept including influencers such as the government, businesses and individuals, this goal targets only one part of the three required areas of change.

In summary, the history of sustainability is as old as human history. However, starting with the industrial revolution, society’s resource consumption has increased immensely. Furthermore, as the human population grew, the demand for non-renewable resources and energy did as well. This development created a necessity to implement and reintroduce the concept of sustainability including all three dimensions, namely, society, environment, and economy as well as the three influencers – government, businesses and individuals – into this thought process (Figure 3).
2.1.3 Environment, Economy, Society

The three pillars of economic growth, environmental protection and social progress build the basis for sustainable development (United Nations General Assembly, 2005). Within the last few decades, national governments have created departments and minister positions related to the topic of sustainability. Businesses, step by step, have integrated concepts such as cradle to cradle, which defines a waste free product lifecycle, in order to decrease their environmental impact. In addition to all the foregoing a sustainable lifestyle has been spread to society through educational efforts in schools and universities as well as a public awareness created by informational resources such as news. All three areas are important to enable sustainability. However, none of them can create change on their own. All three areas need to do their part and also enable and
support each other. One example is that the government could provide the infrastructure, i.e. a public transportation network, for society to implement more sustainable behaviors. The social pillar in particular tends to be disregarded and sustainability tends to be reduced to the environmental concept instead of looking at it holistically: environment, economy and society.

Viewing the three dimensions separately helps to understand the complexity of sustainability. The environmental dimension consists of two approaches: environmental management and management of human consumption. The first approach, environmental management, involves the atmosphere, freshwater and oceans, as well as land use. Human-induced climate change is observed through analysis of the carbon cycle in order to reduce human impacts on the atmosphere including any form of air pollution. Since only 2.5% of the water supply is fresh water versus 97.5% salt water, managing the earth’s fresh water resources is crucial. Ismail Serageldin, the World Bank’s Vice President for Environmental Affairs and Chairman of the World Water Commission, stated bluntly a few years ago that “the wars of the 21st century will be fought over water.” Access to clean, safe water is critical for the survival of countries, states and areas. Land use is challenged by forestry and agriculture. Our needs for wood accelerated deforestation more rapidly than the regrowth of forests. Excessive farming and monoculture in agriculture has led to depletion of farmable land
and soil. Environmental management looks into these three areas and tries to minimize the influences, pollution, and depletion on a general higher level.

This thesis’ aim is not to summarize all scientific evidence for the urgency for action, but one paper compiled by a team of 29 scientists (Rockström et al, 2009) who identified nine boundaries, which must not be exceeded if we are to maintain an environment, which will safely support our existence (relatively), summarizes the environmental problems we are facing. Their benchmark paper identified a new approach for defining preconditions for human development stating, on the one hand, that crossing certain biophysical thresholds could have disastrous consequences for humanity and, on the other hand, that three of nine interlinked planetary boundaries have already been overstepped. The nine most important parameters for environmental sustainability identified by the team were: (1) Atmospheric aerosol loading, (2) Chemical pollution, (3) Ocean acidity, (4) Ozone depletion, (5) Freshwater use, (6) Change in land use, (7) Climate change, (8) Nitrogen & phosphorus levels, and (9) Biodiversity loss. Figure 4 shows which parameters are already overstepped and which areas are reaching the thresholds, which might have disastrous results.
Management of human consumption, in comparison, describes the impacts humans have through their consumption habits and patterns. This impact can be reduced by either consuming less or making wiser consumer choices by considering a holistic production cycle (from the production through use and to the disposal). Four areas refer to human consumption, namely, energy, water, food, and materials. Our transportation habits, our water and energy use as well as our eating habits are just a few daily examples of the impact individuals have on the environment. Besides the environmental dimension, one also needs
to consider the economic dimension as both are closely connected. One main goal in creating a sustainable economic growth is to decouple environmental degradation and economic growth. This means that economic growth should be ensured despite a growing world population and an increasing population with western consumer standards without leading to the exploitation of resources and destruction of the environment (Ruffing, 2007). Nature is an economic externality, which means it is a service without a specific price and, therefore, the tendency to overuse and degrade nature is created, also called the Tragedy of Commons (Hardin, 1968). One could argue that the influence and consequences economical production has on the ecosystem is one of the variables that define the price of a product or service. The question is what is the price of nature? Should we decide on a given price in order to avoid degradation? Juliet Jowit, an environmental correspondent, wrote an article in The Guardian Weekly stating that “the cost of pollution and other damage to the natural environment caused by the world’s biggest companies would wipe out more than a third of their profits if they were held financially accountable, a major unpublished study for the United Nations has found” (Jowit, 2010). The global bill for pollution by top firms would be $2.2 trillion. The following figure shows these costs of some economical sectors (Figure 5).
Figure 5. The Cost of Global Pollution (Jowit, 2010)

This leads to the third factor that affects the economical dimension: Economic opportunity defined as a chance to improve financial conditions. Sustainable economic and industrial practices can pay off, and mostly will in the long-term. For example, saving energy and water saves productions costs and reducing waste will save money once the waste needs to be disposed. Interface Inc., a flexible carpet company, is one of the main thought leaders on sustainable business practices today. The company’s economic success proves that sustainability and economic growth can go hand in hand. Their vision “to be the first company that, by its deeds, shows the entire industrial world what sustainability is in all its dimensions: People, process, product, place and profits — by 2020 — and in
doing so we will become restorative through the power of influence” shows that the company is determined to achieve sustainability as the main part of their organizational values (Interface Inc., 2008). Economic growth does not need to exclude sustainable practices; they can as well be an opportunity for success.

The last dimension is about people and responsible global citizenship. Peace, social justice and security are central concepts of social sustainability. Improved education, a better equity between rich and poor as well as equal use and access to resources prevents a global “resource war” (Cohen, 2006). Closing the gap between rich and poor demands a reduction of poverty.

Due to this problem part of the UN Earth Summit was the fight against poverty and global injustice. The Brundtland Commission report Our Common Future acknowledged that poverty is a main source of environmental degradation (World Commission on Environment and Development, 1987). Individuals living in poverty, on the one hand, rely on the ecosystem they live in providing food and other resources to them. On the other hand, however, they are forced to exploit their resources and sell them cheaply to other countries in order to earn a minimum wage that keeps them alive. A common viewpoint sees the people as the dominator of nature rather than living with nature. Murray Bookchin, an American libertarian socialist author, argues that “the plundering of the human spirit by the market place is paralleled by the plundering of the earth
by capital.” He is convinced that most activities that use energy and destroy the environment are senseless, because they contribute little to society’s quality of life and well-being. This view is opposed to the impression of many people that the earth serves us as a resource and that consumption increases our quality of life. Humans seem to have a loss aversion when it comes to consumption. Many assume that a sustainable lifestyle will limit their demand for consumption and, therefore, they do not want to change any of their lifestyle habits. The last societal impact is through human settlement. Through thoughtful urban planning cities can be designed in a way that their citizens, for example, can use public transportation and therefore avoid driving (Ewing, 2007).

 Sustainability has many dimensions, not only the obvious environmental one. Each individual has an impact on all three pillars; environment, economy and society. For sustainable behavior change it is indispensable to keep all three of these in mind, because one change can have an influence on one or more dimensions.

 2.1.4 Sustainability and Design

 Sustainable Design includes the “theories and principles for design that cultivate ecological, economic, and cultural conditions that will support human well-being infinitely” (Thorpe, 2007). In the free online encyclopedia Wikipedia sustainable design “is the philosophy of designing physical objects, the built environment,
and services to comply with the principles of economic, social, and ecological sustainability” (McLennan, 2004). This philosophy can be applied to all forms of design such as product design, graphic design, architecture, and interior design. For the last few decades, sustainable design has started growing as a reaction to the growth of the concept of sustainability. The rising demand of products and technology, as well as a growing world population, has created a need for sustainable design solutions to counteract the increasing environmental impact of products, services, and buildings.

Since our economy is based on consumption, designers need to find more sustainable materials and ways of manufacturing and supply chains in order to fulfill demand but keep the impact on the environment low. Besides that, design can also help to send messages and convince consumers to make sustainable choices in their daily lives. Finally, design can influence behaviors and lead to behavior change when executed thoughtfully. This latest touch point is the focus of this thesis. Design not only serves to produce products that use resources and materials, it can also help to create a shift in the society towards a more sustainable lifestyle.

2.1.5 Sustainable Lifestyle

Three major areas influence sustainability: the government, businesses and individuals. When looking at a sustainable lifestyle, governments can create laws
and restrictions as a support, businesses can “green” their production and supply chain, and individuals can either consume less or make wiser consumer choices. The free online encyclopedia Wikipedia defines sustainable living as a “lifestyle that attempts to reduce an individual’s or society’s use of the Earth’s natural resources and his or her own resources” (Ainoa et al., 2009). One can lower their carbon footprint by altering methods of transportation, energy consumption and diet. These lifestyle choices and decisions are a key factor for sustainable living.

After the Second World War, consumption was seen as the solution to boost the economy. Advertisements and campaigns were created to encourage people to spend money. Starting in the 1960s the term “conspicuous consumption” described the mindset of the majority of Americans. A conspicuous consumer mainly spends money on products and services to display wealth and income to maintain social status (Veblen, 1899). Victor Lebow, a retail analyst, described the situation as the following in 1955:

“Our enormously productive economy... demands that we make consumption our way of life, that we convert the buying and use of goods into rituals, that we seek our spiritual satisfaction, our ego satisfaction, in consumption... We need things consumed, burned up, worn out, replaced, and discarded at an ever increasing rate.”
Parallel to this major development, a minority in the society started a different movement. In 1954 Helen and Scott Nearing published the book *Living the Good Life* and started the movement of sustainable living. Since then other publications such as *Silent Spring* by Rachel Carson (1962) or *The Limits to Growth* by Donella Meadows (1972) lead to an increasing awareness of a sustainable lifestyle. In the mid 1960s the cultural lifestyle of Hippies were seen as promoting a nature and drug loving movement. Nowadays, sustainability is no longer a Hippie or tree hugger concept. It has now begun to be embraced by individual environmentalists and business alike. Moreover, another interesting form of a sustainable lifestyle can be found in the LOHAS (Lifestyle of Health and Sustainability). This demographic defines a market segment in the U.S. consumer market of about 30% composed of a relatively upscale and well-educated population (Rosen, 2002). This consumer segment tries to incorporate a meaningful sense of environmental and social responsibility into their purchase decisions. They are not averse to consumption, but rather align consumption with a sustainable lifestyle. The demographic segment of the LOHAS is expected to grow within the next years. This development creates an opportunity to implement a sustainable lifestyle as a wide spread concept in society. Sustainable living could become mainstream instead of representing a tiny percentage of consumer power. A need to change from conspicuous consumption to sustainable consumption is slowly being recognized and supported. This thesis investigates how to spread this lifestyle and how to support sustainable behavior change with the help of design.
2.2 Social Media

“Whether something brings them joy or pain, when people share and engage in communities, they form bonds and relationships with others who acknowledge their situation.” (Evans, 2009)

2.2.1 Definition

“A social network is a social structure made up of individuals (or organizations) called “nodes”, which are tied (connected) by one or more specific types of interdependency, such as friendship, kinship, common interest, financial exchange, dislike, sexual relationships, or relationships of beliefs, knowledge or prestige” (Social Network, 2011). Social Media is based on such networks and “refers to the use of web-based and mobile technologies to turn communication into an interactive dialogue” (Kaplan & Haenlein, 2010). According to Andreas Kaplan and Michael Haenlein, social media is “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of user-generated content” (Kaplan & Haenlein, 2010). Internet forums, social blogs, wikis, podcasts, and weblogs are just a few examples of social media. The one characteristic they all have in common is the concept of sharing. People share videos, messages, information, and pictures so that others can access them, read them, comment on them, and even share them further. Kaplan and Haenlein outlined six different types of social media: Wikipedia is a “collaborative project”, a site where everybody can
add to a body of knowledge and retrieve information. “Blogs and micro blogs” such as Twitter are another category. Typically, individuals share regular entries on a website in reverse-chronicle order, which means that the newest post is on the top of the list and, therefore, will usually be read first. YouTube and Flickr are examples of “content communities”. Users use them to share videos or images with other people. Facebook is one of the biggest “social networking sites”. Participants of such networks try to communicate with others they have a certain relationship with. In Facebook the relationship is defined by friendship. In another type, known as “virtual game worlds” such as World of Warcraft, users are connected to an online community of players in a computer-based simulated environment through which they can interact with one another. The last type is called “virtual social worlds” such as Second Life, in which people can interact with each other by creating an avatar and exploring the virtual world. The purpose is to meet other users (so-called residents), socialize, participate in activities and create and trade virtual properties and services with each other. All these categories share the characteristic that people will use digital tools to communicate and interact with others.

2.2.2 History
Forty years ago, in 1971, the very first email was sent from one computer to another that was literally right next to it. The content of the first email ever sent – QWERTYUIOP – is the top line of the keyboard. In 1978 Ward Christensen used
a bulletin board system (BBS) to exchange data over phone lines with other users. Geocities, one of the web’s first social networking sites, was founded in 1994 and users could create their own website based on one of six “neighborhoods” such as “Colosseum,” “Hollywood,” “RodeoDrive,” “SunsetStrip,” “WallStreet,” and “WestHollywood”. A year later Globe.com enabled users to personalize their online experience by publishing their own content and interacting with others with similar interests. In 1997 AOL Instant Messenger was launched and popularized instant messaging. In the same year, sixdegrees.com was launched, an early social media service allowing users to create profiles and list friends. The blogging service blogger.com launched in 1999. In 2000 the so-called “.com bubble” bursted and the web entrepreneur stock markets crashed. Two years later, in 2002, the first social network, called Friendster was created and grew up to three million users within the first three months. The following year MySpace and LinkedIn were established and both experienced a major growth in users. Facebook, the biggest social network to date, was launched in 2004 and first was restricted to Harvard college students and was step by step opened up, first for other US colleges, then for international universities and finally in 2006 to the public. In this same year Twitter, a text-based social media service, restricted to 140 characters per message, was created. Facebook overtook MySpace in popularity in 2008, and became the social network with the most users, and it has remained the most popular social network since then. Foursquare, a location-based social networking site for mobile devices that supports the idea that people
can use mobile devices to interact with their environment was launched in 2009. About a year later it was revealed that MySpace, Facebook and other social networking sites are sending user names and IDs to advertisers along with user URL data. In 2011, Google Plus launched its closed beta version and in only a little over two weeks more than ten million people had joined. In the same year the professional network LinkedIn overtook MySpace and is currently in second place for the total of monthly unique visitors behind Facebook, which is still in first place. In July 2011, Twitter celebrated its fifth birthday and currently delivers over 350,000,000,000 Tweets per day, a massive amount of information, which shows the impact of social media today.

2.2.3 Social Network Sites

According to Kaplan and Haenlein, Social Network Sites are one out of six categories – collaborative projects (e.g. Wikipedia), blogs and microblogs (e.g. Twitter), content communities (e.g. Youtube), social networking sites (e.g. Facebook), virtual game worlds (e.g. World of Warcraft), and virtual social worlds (e.g. Second Life) – of social media. An important characteristic of all of them is that they are communication tools used to share information with a group of people with whom one shares a certain interdependency. The amount of information shared in such groups has increased immensely due to the quick and easy approach of information sharing offered on such social networking sites. This movement increased once mobile applications for social network sites for
smartphones were developed. For college students a mobile phone is often the main information and communication technology used to stay in contact with family members and friends (Chen and Katz, 2009). Through mobile devices, social network sites are almost always accessible and the users are up-to-date on the go and have the possibility to share information whenever convenient. A main characteristic of communication on social network sites is that the communication is offline, meaning that one can communicate with friends even if they are not online. They will receive the message whenever they go online and answer. This way of communicating with different friends, family or people of other relationships is less pressing on an individual and more voluntary. The goal of social networks is to learn about and more easily make connections with others. Moreover, different social networks, e.g. Facebook enables users to connect with other social media sites, such as Foursquare, Tumblr, Flickr, and twitter and posts, images, updates or videos on these sites will automatically be posted on the Facebook wall and stream. The Facebook stream is the first page each user sees on the site. Updates, pictures, comments of friends and people on subscriptions (those with whom you are not friends, but whom you nonetheless receive updates on their posts) are listed as updates on this pages from the latest updates starting at the top of the page. In comparison to the wall the stream lists not only information about what an user posts on his or her own, where he or she has been “tagged” in, or other updates that are pointed directly to the user, moreover, it collects all the activities of ones’ “friends” and posts them in reverse chronological
order. This interconnectivity gives users the opportunity to spread information with one click throughout several channels to different friends and peers.

**Social Networking Site Examples**

This subsection will discuss four different social networking sites, namely, Facebook, Foursquare, OneClimate, and Twitter and cover the commonalities and differences of each social network.

**Facebook**

Facebook is one of the innovators of social networking and the site has kept information sharing at its core value. It is currently the social network with the largest number of users. According to Facebook’s official statistics, by July 2011 Facebook had reached more than 750 million active users. 50% of the active users log in on a daily basis (Facebook, 2011). The whole success story of Facebook started in 2004 when the Harvard University student Mark Zuckerberg developed Facebook, a website named after the original printed booklet that college students used to receive quick information about incoming freshmen students. The digital version was more high tech and also easier for students to, on the one hand, learn about their peers, and on the other hand, make social connections. In 2006 the successful social network was opened up to the public for everyone 13 years and older. The creation of an online profile, which could be shared with so-called friends on the network, enabled users to distribute
information easily. The developers of Facebook described the company as “... a social utility that helps people communicate more efficiently with their friends, family and coworkers”. The company’s “mission is to give people the power to share and make the world more open and connected” (Facebook Press Room).

Figure 6. Facebook Website

In 2006 the “Status”, a feature to let friends know what one was currently doing or thinking about, was introduced. The Status quickly became popular and users started sharing information, events, asked questions and even started discussions about certain topics. An updated Status is posted to an individual’s Wall (Figure 6), where their actions are posted. Friends can also post messages to the News Feed, which can be seen by all the friends of that individual as a current update right
after it was posted. Facebook users can find groups on specific topics, where they can share and exchange information with other group members. These features have changed the way information is shared and it has spread drastically. To see the latest news, updates and pictures, a Facebook user just needs to log into his or her account. This new form of peripheral social awareness has been called “ambient awareness” by social scientists. It is the omnipresent knowledge one experiences by using social media outlets, which enable users to stay in constant contact with friends and colleagues via social networks (Thompson, 2008).

**Foursquare**

This ambient awareness is also created through foursquare, a location-based social network site. Users always know where their friends are when they check in at venues nearby. Each check-in awards users with points and sometimes even “badges”. According to the foursquare promotion video, “users can unlock their world and find happiness just around the corner.” Once connected to their friends, who are also using foursquare, one can see a list of locations where friends recently checked in (Figure 7). The goal is to let your friends know where you are so that you can spontaneously meet up.
Furthermore, one can leave tips about locations for other users. The individual, who has checked into a location most frequently, is called the mayor and some restaurants or other locations offer special benefits to their mayors such as free drinks, which acts as a motivation for users to become a regular user of the site. This network of individuals amassed by foursquare, helps users to access suggestions and tips on what venues to see and avoid, based on other users and their personal friends. The badges can be unlocked based on how, where and how often one checks in. On foursquare.com each user can check his or her statistics including points and badges earned. The progress feedback offered on the website, as well as the specials some businesses offer to foursquare users, encourage individuals to get out of the house and check into different locations.
By April 2011 foursquare had counted over 10 million users worldwide and over 3 million check-ins daily. The success story started in 2007 when foursquare co-founders Dennis Crowley and Naveen Selvadurai met while working in the same office space for different companies. A year later, in 2008, they developed the first version of foursquare, which was launched later in 2009. Unlike Facebook, foursquare is not about personal communication. However, it focuses on letting friends know where you are so that they could join you and you can have a face-to-face conversation rather than online communication. Users can connect foursquare with Facebook and every time one checks into a venue a post on one’s Facebook wall will be created.

**OneClimate**

OneClimate, founded in the spring of 2006 in London, UK, is a nonprofit internet climate news, social activism and social networking site, and part of the internet portal uk.OneWorld.net. During the 2007 United Nations Climate Change and also during the COP15 event in Copenhagen, it received international media attention. The OneClimate team is part of the bigger organization OneWorld Group. The organization’s belief is that everyone needs to work together to “bring about a fairer and greener world”. To achieve this goal OneClimate proposes that people need to stop the denial and face the facts about climate change. Moreover, they argue that each individual needs to make voluntary changes to their lifestyle, especially to their consumption and pollution habits. On the website
the organization mentions that they “think that having access to a community - where everyone can honestly share their experiences of the ways in which they are trying (and sometimes failing) to make these voluntary changes - can make a key difference” (About, 2011). This social networking site is used as a tool to share information about ways and tips to change daily habits (Figure 7).

Figure 7. OneClimate Website

OneClimate’s mission is that “because no-one can change the world alone, we need community. In times of peril, people draw together not only for comfort but also to confront challenges more successfully. Together, we make a bigger
difference” (Community, 2011). This social networking site is purpose-based and uses the advantages of information sharing within a community to inform and motivate its members. Collaborative action is key to this concept. Members might feel empowered due to the fact that they do not have to tackle the complex and huge problem of climate change on their own and might see change happening when looking at the big picture of the community, instead of focusing on the small individual investments. In the beginning the organization focused on informing and educating its members and the world: “Since the mid-1990s, the OneWorld team, based in the UK, has tried to communicate the urgency and scale of the climate crisis. But people know that now (whether or not they want to hide from the unpalatable truth).” This role changed its approach from an informational and educational one towards motivation:

“So we are focusing our role more sharply now on pioneering media tools to support the climate movement. And that’s what OneClimate is. We are innovating new tools and platforms that make it easier for us all to share information, actions and experiences with one another, to help us hang in there and keep moving forward.”

One aspect of this new focus includes allowing users to share videos and experiences with each other and get inspired and feel as a part of a social network, a community that can enable a change towards a more sustainable lifestyle.
Twitter

Whereas, OneClimate integrates motivational aspects into its platform, Twitter is informational only. It “is a free social networking and micro-blogging service that allows users to send “updates” (text-based posts, up to 140 characters long) via SMS, instant messaging, email, to the Twitter website, or an application such as Twittrrific” (Twitter, 2011). Created by Jack Dorsey in July 2006 in San Francisco, California, as of March 2011 Twitter has counted over 200 million users and is generating over 200 million tweets per day. The platform allows each user to have a personal homepage, which shows only the news of the users that one chooses to follow (Figure 9). An important difference from other social networks such as Facebook and foursquare is that Twitter is not reciprocal. A user can be followed by another user, but does not need to follow this user. Individuals can choose exactly what they want to be informed of and whom they want to follow (Regan, 2009).
In August 2009 the market-research firm Pear Analytics examined 2,000 tweets and created six categories of tweets: Pointless babble, Conversational, Pass-along value, Self-promotion, Spam, and News. Even if the majority of tweets were identified as pointless babble; informational, conversational and educational tweets still add up to a vast amount of information considering that over 200 million tweets are sent each day. Twitter has two main features besides the standard tweets. One can reply or mention another user by adding the “@” symbol followed by the user’s twitter name. This enables user to directly communicate with specific individuals and keep a more conversational tone. The other feature, called “hashtag”, which is the “#” symbol followed by predetermined code such as #ecosys (a project to drive social innovation.
in complex social ecosystems [Healthcare, Education] through web based collaboration), allows users to form themselves into groups and tweet about the same topic or event independently. In a Time essay in 2009 technology author Steven Johnson described Twitter simply as

“a social network, (that) revolves around the principle of followers. When you choose to follow another Twitter user, that user’s tweets appear in reverse chronological order on your main Twitter page. If you follow 20 people, you’ll see a mix of tweets scrolling down the page: breakfast-cereal updates, interesting new links, music recommendations, even musings on the future of education.”

Conclusion
This section has covered four social networking sites, namely, Facebook, foursquare, OneClimate, and Twitter. All of them are communication tools used to share and exchange information, even if they all have a slightly different focus. The technology and concept of all four social networks will be of importance for the ideal information and motivation tool created later in this thesis. We can simplify their roles into the following: Facebook’s focus is communication and staying in touch; Foursquare tries to connect people face-to-face through a location-based service; OneClimate wants to improve the world’s current circumstances through community; and Twitter is about information seeking.
When connecting these sites with each other, their interconnectivity can help to reach, inform and motivate a huge amount of people around a certain goal such as sustainable behavior change.

2.2.4 Social Impact

In the previous sections, the enormous success of social media was discussed. Several million people use different social networks or other social media sites. They are constantly exposed to an immense flood of information. Facebook updates, Twitter news, foursquare check-ins, as well as traditional email and instant messaging. People process several parallel information streams, experience an overwhelming amount of choices, and decrease their attention span so that they can absorb as much information as possible. On the one hand, people have learned how to multitask and process a lot of information, on the other hand, they do not absorb the information, but skim through it more shallowly. As a result, while people do have access to a lot of information, some might be useful and some is very uninformative and senseless. However, when one can focus on the important pieces and extract what is valuable to them, the information flood is one of the most helpful outcomes of the social media age.

The Pew Research Center’s Internet & American Life Project decided to examine social networking sites (SNS) in a survey that explored people’s overall social networks use and how the use of these technologies is related to trust, tolerance,
social support, community and political engagement (Rainie, Purcell, Goulet, & Hampton, 2011). According to the survey 92% of SNS users are on Facebook, 29% use MySpace, 18% used LinkedIn and 13% use Twitter. One main social characteristic of a Facebook user is that they are more trusting. The more frequently one uses a social network, the more they agree with the statement “most people can be trusted” than the average American. This might have to do with the core of social networks to share personal information and not being afraid that others will misuse this information. The average American has just over two discussion confidants, or people with whom they discuss important matters. These discussion confidants act as social support to people. In comparison, someone that uses Facebook several times per day averages 9% more close social ties. Therefore, a Facebook user gets more social support such as emotional support, companionship, and instrumental aid than the average American, which can be very important when one tackles big issues such as behavior change. In November 2010 the results of a survey revealed that Facebook users are more likely to attend a political rally or meeting, persuade someone on their vote, and more likely to have said they would vote (Rainie et al., 2011). These traits of Facebook users can be very valuable for behavior change. Social support is a key for successful behavior change. A support group for discussions and sharing important matters and for personal encouragement creates the best conditions for effective, collaborative change.
2.3 Games

“You see, in every job that must be done, there is an element of fun. You find the fun, and snap! The job’s a game.” (Mary Poppins)

This section introduces the concept of a game. Since the final outcome of this thesis is a design application based on game mechanics, this sections gives a definition of a game as well as a short historical background. One subsection will describe different types of games in order to reveal the divers uses. The term game is not restricted to traditional table-top games, but includes other forms such as sports or video games. A scientific background will clarify why games are a powerful tool for motivation. Besides the motivational factor, a paragraph on educational games will reveal the information and teaching influences games have. The section will conclude with the connection between games and behavior change resulting in the main purpose this thesis focuses on: The fun of playing games as an educational and motivational tool for sustainable behavior change.

2.3.1 Definition

The word ‘game’ is defined differently by a variety of philosophers, intellectuals, game designers and many more. In the following paragraphs different definitions of a game will be introduced.
**Ludwig Wittgenstein**

The Austrian philosopher Ludwig Wittgenstein created one of the most memorable definitions of a game. In his publication *Philosophical Investigations* he mentions an experiment with the goal of coming up with a definition of the term ‘game’ and concludes that it is impossible to appoint one specific definition to the term. He argues that the elements of games such as play, competition and rules do not define the term in its core. Therefore, he reasons that we do not have an accurate definition, and yet, we also do not need one due to the fact that people are able to clearly identify the correct use of the term (Wittgenstein, 1953/2002). While this approach is certainly correct, there are certain elements that help define, or rather limit, the word ‘game’ to specific uses, and these elements can give us a better understanding of the complexity of this term.

**Roger Caillois**

Roger Caillois, a French intellectual, focused his physiological and sociological work partly on games. In his book *Les jeux et les hommes* (Games and Men) he listed certain adjectives that define the activity game (Table 1): Fun, separate (time and place), non-productive, uncertain, governed by rules, fictitious (Caillois, 1957). Some of these characteristics are discussed throughout this thesis. Yet Caillois approach seems limited when looking at games that are produced as simulations or for educational purposes and thus conflict with Caillois’ approach to define the game activity as non-productive, implying that
mere participation does not accomplish anything useful. At the same time, Caillois correctly labels games as fictitious due to the awareness of a different reality; however, the border of the real and the fictitious world of a gamer can become blurry.

**GAME CHARACTERISTICS (Roger Caillois)**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fun</td>
<td>The activity is chosen for its light-hearted character</td>
</tr>
<tr>
<td>Separate</td>
<td>It is circumscribed in time and place</td>
</tr>
<tr>
<td>Uncertain</td>
<td>The outcome of the activity is unforeseeable</td>
</tr>
<tr>
<td>Non-productive</td>
<td>Participation does not accomplish anything useful</td>
</tr>
<tr>
<td>Governed by rules</td>
<td>The activity has rules that are different from everyday life</td>
</tr>
<tr>
<td>Fictitious</td>
<td>It is accompanied by the awareness of a different reality</td>
</tr>
</tbody>
</table>

Table 1. Game Characteristics: Roger Caillois

**Chris Crawford**

The computer game designer Chris Crawford has defined the term game through a series of dichotomies (Crawford, 2003). Crawford’s dichotomies describe an interactive, goal-oriented activity (Table 2).
GAME DICHOTOMIES

1 Creative expression is art if made for its own beauty, and entertainment if made for money.

2 A piece of entertainment is a plaything if it is interactive. Movies and books are cited as examples of non-interactive entertainment.

3 If no goals are associated with a plaything, it is a toy. If it has goals, a plaything is a challenge.

4 If a challenge has no “active agent against whom you compete,” it is a puzzle; if there is one, it is a conflict.

5 Finally, if the player can only outperform the opponent, but not attack them to interfere with their performance, the conflict is a competition. However, if attacks are allowed, then the conflict qualifies as a game.

Table 2. Game Dichotomies: Chris Crawford

Katie Salen and Eric Zimmerman & Jane McGonigal

The game designers Katie Salen and Eric Zimmerman define a game as “a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome” (Salen & Zimmerman, 2003).

Jane McGonigal, another world renown game designer, narrows her definition of games down to a more general one, arguing that games share four defining traits: a goal, rules, a feedback system and voluntary participation (McGonigal, 2011). While both definitions are correct, this thesis is going to use the definition of Jane McGonigal since it integrates all different forms of games such as sports, board games and computer games. As mentioned earlier, the outcome of this thesis is a
concept for a behavior change application using game mechanics, however, it is not the traditional computer or table-top game one might think of when hearing the word ‘game’.

2.3.2 History

According to Greek mythology, the Gods invented games (Girardi, 1972). Games have been part of our society including social life and work life for centuries. The oldest set of gaming equipment ever found was the Royal game of Ur in 2600BC. However, dice and Senet, a board game from predynastic and ancient Egypt, go back even further to 3000BC (MacGregor, 2006).

According to the Dutch historian Johan Huizinga, games have served humanity in many diverse ways such as entertainment, education, exercise, conflict resolution, ritual and self-expression. In his book Homo Ludens, published in 1938, he states that “play is older than culture, for culture, however inadequately defined, always presupposes human society, and animals have not waited for man to teach them their playing.”

The early Romans played games for entertainment at several places such as baths, the circuses, and taverns. Herodotus wrote in his opening book of The Histories:
“When Atys was king of Lydia in Asia Minor some three thousand years ago, a great scarcity threatened his realm. For a while people accepted their lot without complaining, in the hope that times of plenty would return. But when things failed to get better, the Lydians devised of a strange remedy for their problem. The plan adopted against the famine was to engage in games one day so entirely as not to feel any craving for food... and the next day to eat and abstain from games. In this way they passed eighteen years, and along the way they invented the dice, knuckle-bones, the ball and all the games which are common (Rawlinson, 1861).

No matter if this story is 100% true or not, it teaches us one thing: Herodotus, who lived in the 5th century BC considered that games could be that immensely influential, enough so that it could possibly help the inhabitants of Lydia survive a famine for 18 years. It seems striking today that games were seen as a purposeful escape helping in extreme circumstances.

However, it seems as if not until the 20th century were games seen as a possible means to change behavior. This can especially be seen within “virtual reality”, which enables players to add an additional layer of information and content associated with the physical world around them. The virtual world can be connected with the physical world around us and this playful experience can add motivation to our daily life. As a result, games could be used as a powerful tool
if created in the right way. In 1997 Ronald Azuma described this phenomenon when he offered a definition of the term “augmented reality” in his work *A Survey of Augmented Reality*. As he states,

“a continuum across the Virtuality axis V includes reality augmented with additional information (AR), as well as virtual reality augmented by reality (Augmented Virtuality or AV). Unmediated AV simulations are constrained to match the real world behaviorally if not in contents.”

As one could read in the previous paragraph, games have a long history and served and still serve several purposes such as entertainment, education, and behavior change. This diversity that can be seen in the purpose of use of games can also be found in the wide variety of types of games.

2.3.3 Types of Games

A variety of forms of games exist such as tabletop games, competitive sports, video games, role-playing games, business games, and simulations. Each type is defined by slightly different characteristics.

Cities, schools and countries have competitive sport teams. Teams are classified by their game and within each category, such as soccer, they compete against each other. They all follow a set of rules to achieve a certain goal – for example,
to kick or head the ball into the goal protected by a goalkeeper. On the one hand, the players themselves enjoy the game, and on the other hand, spectators follow the game and feel as if they are with the players and team. They feel excitement, happiness, sadness, and disappointment; all feelings that participating and witnessing games can evoke.

The central tool of a tabletop game is a small, exerted area such as a board, which defines the setting. Within this setting players use other resources and track their progress in comparison to the other players. Card games, board games, dice games and pencil and paper games are just a few of the many subcategories of tabletop games.

Video games, in comparison to sports and tabletop games, are the first category of games, which create a virtual world mostly separate from reality. Computers or other microprocessors control video games. Once just reduced to a standard computer, now video games can be played on consoles, smart phones and many other microprocessors. Input devices such as a keyboard, a joystick, buttons or a mouse help the player to interact with the game. Since the rise of the internet many games are played online through a server. This enables players to play with each other and compare their own progress with that of others. The heads-up display of the massively multiplayer online game, World of Warcraft (WoW) shows players their improvement in real time and is all about making one’s own
resources more visible. Moreover, games enable players to express themselves in a new way and experience success, which might create a feeling of confidence and pleasure.

“The players of the game in the new century are now apparently expressing their profound self through the game. When they can play with their anonymous status, they are found to be more confident to express and to step out from the position they have never been out from. It offers new experiences and pleasures based in the interactive and immersible possibilities of computer technologies.” (EFreeOnlineGames.net, 2009)

According to Jennifer Grouling Cover in *The Creation of Narrative in Tabletop Role-Playing Games*, a role-playing game (RPG) is a game in which players assume the roles of characters in a fictional setting. Dungeons & Dragons, in which participants usually conduct the game as a small social gathering, is one example for a role-playing game. Players take responsibility for acting out these roles within a narrative, either through literal acting, or through a process of structured decision-making or character development (Cover, 2010). A strong storyline helps to create a narrative experience described through events, characters, and interactive and collaborative storytelling. As Steve Jackson mentions:
“...role-playing is not purely educational. It’s also one of the most creative possible entertainments. Most entertainment is passive: the audience just sits and watches, without taking part in the creative process. In role-playing, the ‘audience’ joins in the creation. The game master (GM) is the chief storyteller, but the players are responsible for portraying their characters. If they want something to happen in the story, they make it happen, because they’re in the story” (Jackson, Punch & Pulver, 2004).

Thus, the players are actively part of a fictional story, which is enacted in real life. Moreover, this can even create the feeling of being like real life. This approach combines the fictional story with the characters enacted by players in the real world.

Simulations re-enact activities to teach, analyze, predict and train players the tasks of the real life. The military uses such simulations, also called war games, effectively to train people in skills and teach them about theories of war. A simulation game attempts to replicate various activities in “real life” in the form of a game for various purposes: training, analysis, or prediction. Usually there are no strictly defined goals in the game, just running around, playing as a character (Jones, 1995). In addition to war games, there are business games, which can be interactive or function board games that serve the purpose of linking organizational performance and creating a group discussion to enforce team building within an organization (Andlinger, 1958).
2.3.4 Scientific Background

When we find a solution to a problem our brains release opioids, a set of chemicals also known as nature’s pleasure drug (McGonigal, 2011). The brain chemistry of gameplay distinguishes between pleasure and desire.

The neuroscientist Kent Berridge of the University of Michigan is an expert in affective neuroscience and studies pleasure and desire in the brain using the terms ‘liking’ and ‘wanting.

Berridge describes liking as the experience when opioids are released to a part of our brain called the nucleus accumbens. This chemical reaction is triggered by receiving rewards and can be described as pleasurable, another term for liking, according to Berridge (Berridge, 2003).

Wanting, on the contrary is stimulated by the neurotransmitter dopamine regulating motivation and desire. When we do not find what we are looking for dopamine is sending signals that we are craving something. The neuroscientist Jaak Panksepp from Washington State University researched mammals and destroyed the dopamine neurons of lab rats. When food was presented to starving rats, they did not make any effort to eat it, because their wanting system was destroyed and therefore their desire. The rats would rather starve to death than eat. Interestingly, the same rats ate the food once it was placed in their mouth due to the fact that they liked the food and opioids were released and this
pleasurable experience led to further food intake (Berridge, 2003). ‘Wanting’ and ‘liking’ are two different concepts that carefully need to be distinguished.

This has implications for the application of games. On the one hand, games need to trigger a desire; people have to want them to start playing them the first time. On the other hand, the playing experience needs to be pleasurable, because players will only continue playing games if they like them.

2.3.5 Games and Motivation

One thing games are very successful at is motivating players. It takes time and effort to play, fail, reach the next level, learn, adapt and solve problems. Players barely receive any extrinsic motivators such as money or grades when playing games. Moreover, they play for intrinsic motivators, such as the interest and joy of the task of playing itself. This kind of motivation is very powerful since gamers spend hours and hours solving problems and enhancing their skills. Research shows that by age 21, the average American will have spent more than 10,000 hours playing video games (McGonigal, 2011). These numbers exemplify the motivational potential of games since players play them voluntarily.

Nicole Lazzaro defines fun as hard and easy, both categories that can be found in gameplay. Hard fun occurs when players are challenged; yet find opportunities for strategy or problem solving. With hard fun players actually have to think
and work hard during the game. Easy fun in comparison is focused on the joy of intrigue and curiosity. Games will absorb the players’ attention and take them on an exciting adventure (Lazzaro, 2004). Lazzaro also states that “players use games as mechanisms for social experiences”. The social experiences of competition, teamwork, as well as opportunity for social bonding and personal recognition are phenomena that come from playing with others (Lazzaro, 2004).

Games can be played alone or with multiple players. However, the more players are involved in a game, the more feedback on ones own progress in comparison to others, one receives. This feedback increases motivation while playing.

Motivation and fun are intertwined. By making an experience such as a task at work or home fun, you are giving someone a self-contained motivation to participate (Carroll & Thomas, 1988). This self-contained motivation is intrinsic motivation; i.e. playing games for the fun and sake of playing rather than for extrinsic rewards (Malone, 1980). You do something because it is fun and often there does not have to be another reason. As John Carroll and John Thomas have noted, fun provides “intrinsic, self-generated motivation” which is more powerful than being rewarded (Carroll & Thomas, 1988). Video games, for example, are often complex, with difficult tasks and skills that need to be acquired first, along with having complicated solutions and a high possibility of failure. All these reasons, however, do not prevent gamers from playing over and over again, even if they fail at the task multiple times. There is no pressure on them to play the
game; it is a solely free choice of players if and how much time they will spend playing games. They receive nothing from the game, except for the fact that while they are playing they are having fun.

The previous paragraph discussed fun as a tool used in games to motivate players. In the article *Fourteen Forms of Fun*, Alexandre Garneau lists the following categories as fundamentally entertaining: beauty, immersion, intellectual problem solving, competition, social interaction, comedy, thrill of danger, physical activity, love, creation, power, discovery, advancement and completion, and application of an ability (Garneau, 2001). As some of these applications can be found in games, they will be integrated in the final application of this research thesis.

### 2.3.6 Educational Games

Educational games are games which have a playful action and with it the goal of inducing learning and communicating knowledge about certain topics or skills. In the science of gaming they are also called dialectical games (Warwitz & Rudolf, 2004). Raph Koster, the author of *A Theory of Fun for Game Design*, is of the opinion that “fun is about learning in a context where there is no pressure and that is why games matter” (Koster, 2005). He believes comprehension, mastery and solving problems are what make games fun and when games stop teaching they stop being fun.
A study on emotion and memory by Kevin LaBar and Roberto Cabeza shows that emotion “has powerful influences on learning and memory” (LaBar, 2006). When humans are in a positive state of mind, their brain does not focus only on one aspect, furthermore, it is more receptive to new and different ideas. This cognitive state aids better problem solving and helps players learn and retain the learned information more easily (Norman, 2004).

James Paul Gee sums up the importance of play and fun for learning: “When learning stops, fun stops and playing eventually stops... Play isn’t a way to make learning fun... play is learning” (Gee, 2008).

In his book *Children and Play: Understanding Children's Worlds* Peter K. Smith mentions that children invest time and energy in play, and there are opportunities for learning when they do play. His research findings suggest that play has developmental benefits. Benefits might be immediate, long-term, or both. However, the exact role of play in learning is still debated. A prevailing “play ethos” has tended to exaggerate the evidence for the essential role of play. Nevertheless, correlational and experimental evidence suggests important benefits of play, even if some benefits can also be obtained in other ways (Smith, 2009).
2.3.7 Games and Behavior Change

It has been proven that fun and playful learning has a huge influence on young peoples’ behavior. In making learning fun educators have the chance to increase young people’s enjoyment of the learning process. If it is not fun, it will be cast into the category of “boring” and may become less effective. Young people learn best when they are entertained (Coates, 2007). For years children have learned how to write, calculate and read in a playful way. Evidence has shown that fun and games increase the efficiency of learning and therefore motivate. Today’s student generation is used to a learning concept combining games, social media and fun. Educational games, whether they are digital or analog, have several advantages. Involvement, suspense and fun are only some of the motivational incentives. A widely held view argues that games could be useful in an educational and informational context (Sparrowhawk, 2002). Games are an efficient way of gaining information, because they entertain the user. One gets involved and is part of something. Challenges and rewards create curiosity and engagement.

Behavior change implies that we rethink common habits and get rid off them, so that we can introduce new ones. Behavior change has different effects on individuals, families and nations involved depending on the influences such as one’s situation, culture, and values. Effective programs for behavior change have been focusing on extrinsic incentives such as tax incentives, economical paybacks (monetary) and regulations, and laws (threat of punishment).
Given that, effective change emerges from the various ways we understand our own environment and then act within it. Therefore, it is important to target specific groups including their behavior, values and principles.

The usual framework for thinking about behavior change is to promote behavior change only through information and assume that people react in rational ways to the new information. Many programs think that if they discover an unsafe and unhealthy behavior and provide rational information about the negative consequences of this behavior, their targeted audience will move to healthier and safer practices. However, the problem is that humans are often irrational in their decision-making processes (Ariely, 2008).

Some programs promoting a sustainable lifestyle presume that behavior change only has to happen once. They do not consider that people do not just change once, but move back and forth between behaviors. Moreover, people do not change at the same time. Some are not ready to change when a new program intervenes in their lives.

Changing circumstances requires an adaptability of the new behaviors. The difficulty is that some approaches leave people uncertain about, on the one hand, how to change and therefore they maintain their behavior or, on the other hand, how to encourage others to change and accordingly produce only short-
term results. The last flaw of such programs is that they usually focus on either the individuals or the program itself, but rarely on the interaction between them. Thus, research usually considers an individual’s knowledge, values and attitudes, while programs focus on how to change behaviors of many individuals at once. The best method, in my opinion, is to target a specific group and consider their needs and behaviors when designing an approach to solving a problem. Besides providing information, it is significant to motivate people and sustain this encouragement to transform short-term habits into long-term behaviors.

Well-known motivational factors for behavior change towards a sustainable lifestyle are tax incentives, regulations and laws provided by the government, savings through cheaper products or services, and immediate improvements of one’s health and quality of life. Yet, for today’s younger generation another factor contributes to behavior change: Fun. This generations values are focused on individuals’ wellbeing and pleasure in daily life (Tapscott, 2008).

As discussed in the paragraphs above behavior change requires information and education, as well as awareness and motivation. All three factors are essential to change behavior and only work in combination with each other.

Games as discussed previously have the immense advantage of providing intrinsic motivation. They can teach us new skills and knowledge relevant to
behavior change. They motivate us to keep going even if we might fail a few times, even though behavior change is a high effort task. They can give us feedback on how we are doing compared to others and motivate us further by showing us our progress. Games are an ideal tool to educate and motivate. Therefore, a well designed and thought-through game can help trigger and lead to long-lasting behavioral changes (McGonigal, 2011).
Chapter 3
Target Audience and Research Planning

“This generation even thinks it’s cool to be smart, and they see themselves as an essential part of the world’s future success. Teens rank ‘scientists’ and ‘young people’ as the two groups that will cause the most changes for the better in the future.” (Don Tapscott)

This chapter defines the target audience as well as the research setup since the following chapter on behavior change, chapter 4, analyzes different behavior change theories and approaches in relation to Generation Y’s needs.

3.1 Generation Y

Generation Y, also known as the Millennial Generation or Net Generation describes the Generation that followed Generation X. Even now there is no agreement on when exactly this generation starts and ends. However, the birth dates range from mid 1970s to the mid 1990s. The authors William Strauss and Neil Howe defined the birth date range of Generation Y in their book *Generations: The History of America’s Future, 1584 to 2069* from 1981.
to 2000. The characteristics of the generation vary certainly depending on social and economic influences and backgrounds. Nevertheless, the majority of their properties are their increased use and familiarity with communication media and digital technologies. Don Tapscott’s book *Grown up digital: How the Net Generation is changing your world* is based on a $4 million research project from 2006 to 2008 investigating and interviewing nearly 6,000 people of Generation Y, the so-called Net Geners. He sets the birth date range of this generation from January 1977 to December 1997, about 21 years long. Approximately 81.1 million Americans belong to this demographic and represent 27% of the American population (U.S. Population in 2008 – 301,621,157).

For people in the category of Generation Y defining moments such as the O.J. Simpson trial, the Columbine school shootings, the Exxon Valdez oil spill and the Gulf War, have accompanied their growth into adults. Other important events that shaped this generation are September 11, the war in Iraq, AIDS, Band Aid, and Live Aid. Figures such as Tiger Woods, Bono, Lance Armstrong, Princess Diana, Bill and Hillary Clinton, George Bush, and Al Gore – first as the man who would be president and then as the campaigner against global warming and champion of environmental protection influenced this generation (Tapscott, 2008).

Generation X, the generation previous to Generation Y, accompanied the use of the internet mostly to view webpages, while the new generation has seen the
web expand in its use as a tool to communicate with their friends. For Gen Y new technology is “as natural as breathing”. This matter of fact is supported by Alan Kay’s (computer visionary) statement, that technology is “technology only for people who are born before it was invented”. MIT’s Dr. Idit Harel, a professor of epistemology agreed: “For the kids, it’s like using a pencil. Parents don’t talk about pencils. They talk about writing. And kids don’t talk about technology – they talk about playing, building a Web site, writing a friend, about the rain forest” (Tapscott, 1998). Technology is natural to Generation Y, they learn and adapt to technology quicker than previous generations. Technology is a tool, a means to an end. It is not about the technology itself; it is about what you are using it for. A Net Gener is more likely to turn on the computer and simultaneously interact with various software, text on his or her phone, do homework, listen to music, read a magazine, and watch television. As Don Tapscott pointed out, “the Net Geners don’t just take what they are given either. They are the active initiators, collaborators, organizers, readers, writers, authenticators and even strategists as in the case of video games. They do not just observe; they participate. They inquire, discuss, argue, play, shop, critique, investigate, ridicule, fantasize, seek, and inform” (Tapscott, 2008). The Internet helps youth to be and stay connected to friends and family all over the world. Global communication is seen as a given element to the Millennial Generation due to technology such as Skype, Facebook and Google+. They cannot only exchange information with their next-door friends, but also with people from
other states, countries and continents. As the New York Time columnist Thomas Friedman wrote:

“Yes, countries and regions will still have unique cultures and independent features, but increasingly young people around the world are becoming very much alike. As you will see, they have similar generational attitudes, norms, and behaviors.”

According to Tom Tapscott’s research this generation even thinks it’s cool to be smart and they see themselves as an essential part of the world’s future success. Teens rank “scientists” and “young people” as the two groups that will cause the most changes for the better in the future, showing that young people in North America care about the world (Tapscott, 1998). This generation is open, tolerant, and the least prejudiced generation ever.

In his book Grown up Digital Tom Tapscott lists eight norms that explains how this generation is changing work, markets, learning, the family, and society (Table 3).

The approach to focus on fun as a motivational factor rather than on negative motivation or the “do good” approach aligns with norm #5, which highlights the importance of play and fun for Generation Y in all areas of their lives. Moreover,
a study reported by John Beck and Mitchell Wade in *The Kids Are Alright* demonstrated that young frequent gamers had a much stronger belief that things could be made better in the future (Beck & Wade, 2006).

**NORMS OF GENERATION Y**

1. They want freedom in everything they do, from freedom of choice to freedom of expression.
2. They love to customize, personalize.
3. They are the new scrutinizers.
4. They look for corporate integrity and openness when deciding what to buy and where to work.
5. The Net Gen wants entertainment and play in their work, education, and social life.
6. They are the collaboration and relationship generation.
7. The Net Gen has a need for speed— and not just video games.
8. They are the innovators.

| Table 3. Norms of Generation Y: Don Tapscott |

In summary, Generation Y qualifies as a good target group for sustainable behavior change through a fun approach due to three main factors. First of all, they are generally interested in changes in order to better the future and believe in science and their own power to enable change. Secondly, they are technology-savvy and very proficient in sharing and exchanging information and
achievements through different media and digital channels. And last but not least, they consider fun and enjoyment as an essential factor in their daily lives.

### 3.2 Freshmen and Sophomores

There are several reasons why focusing on college freshmen and sophomores as the target group is effective. This young generation has not fully developed their behaviors as older generations might have. They are also entering into a new environment – the university – and therefore, they are in a period of transition. Sebastian Bamberg has pointed out in his publication *Is a Residential Relocation a Good Opportunity to Change People’s Travel Behavior? Results From a Theory-Driven Intervention Study* that “periods of transition, when routines are already in flux, provide useful opportunities to develop new, more sustainable habits. For example, an intervention in Germany that provided people with information and free tickets for public transportation shortly after they had moved was found to be particularly successful in increasing use of public transport services” (Bamberg, 2006).

For many college freshmen and sophomores, it is the first time that they are forced to make a variety of different consumer decisions after moving away from home. They start purchasing household products such as bathroom and kitchen supplies for the first time in their lives on a regular base. Developing their sustainable awareness during this first year, so that they are educated and
informed once they move out of the dorms will allow them to adapt this newly acquired routines in their daily life. Therefore, the focus of this research is on both college freshmen and sophomores. Additionally, they are receiving an education and thus are likely in a stage in their life where they are ready to gain new knowledge and learn new skills and behaviors.

Additionally, they belong to the technology savvy demographic “Generation Y” born between 1977-1997. Naomi Rockler-Gladen describes this generation in her article “Generation Y College Students” (Rockler-Gladen, 2006) as extremely comfortable with technology, cynical, more diverse than previous generations and used to chaos. Additionally, she mentions that they seem to have a non-existent attention span and love consumerism. Also, they are the first generation that cannot remember life without technologies like computers, cell phones, digital music.

The cynicism of Generation Y results from their disillusions. They have grown up during events like 9/11, the Monica Lewinsky scandal and therefore have little trust in government and other authority figures in comparison to the generation of their parents, the Baby Boomers (Rockler-Gladen, 2006). Remote controls, hyperlinks, Facebook, MTV and other endless hi-tech college student distractions lead to the low attention span of this generation (Yan, 2006). Furthermore advertisers love Generation Y because they are such a large demographic group.
and considering their media consumption easy to target. They will spend five times more money on consumer goods than their parents did (Yarrow & Donnell, 2009).

Due to globalization this young generation has grown up accustomed to racial and religious integration as well as a mix of race, ethnicity and homosexuality. Finally, Generation Y is constantly exposed to a confusing global economy, political crises and social transformation and therefore is used to chaos. They expect to have multiple homes, careers and social circles in their lifetime. The motto of the majority of Generation Y is “It’s the end of the world as we know it, and I feel fine”, the title of a famous song of the band R.E.M. (R.E.M., 1987). All these characteristics need to be taken into consideration when designing a behavior framework for this target group.

3.2.1 OSU Freshmen

In 2011 The Ohio State University (OSU) admitted 6,904 college freshmen (The Ohio State University: Office of Enrollment Services, 2011). The majority of these students lived in residence halls on campus since it is required unless they live locally with their family. At this time, The Ohio State University has 37 residence halls and several of these are dedicated to first year students. In terms of energy and water consumption it is challenging for students living in the dorms to track their personal usage. While the administration knows how much energy is used per dorm, specific numbers on how much energy each individual uses is not
available. This lack of knowledge on energy and water consumption is combined with a lack of motivation. The utility costs in the dorms are paid at a flat rate, which means that each student in the dorms pays exactly the same amount for utilities for the same room option no matter how much energy they use. This system, on the one hand, does not incentivize students’ efforts to save energy by saving them money, and, on the other hand, keeps them from establishing a relationship between their energy and water consumption behaviors and the fact that they are using expensive and important resources. Because most freshmen live on their own for the first time, they might not be aware of the effects that their behaviors – such as leaving the lights on in rooms when they are not there or taking excessively long showers – have on the utility bill.

Moreover, the freshman students living in dorms are not permitted to bring a car to campus. As an alternative, The Ohio State University provides its own public transportation. The ability to take the Campus Area Bus System (CABS) and the ability to ride the local Columbus bus system, the Central Ohio Transit Authority (COTA), for free when showing a student identification card (Buck-ID) makes it easy and cheap for students to get around on campus and in Columbus. The university offers several CABS bus routes running through the university campus area, nearby park-and-ride parking lots and even serves residential neighborhood areas close to campus. The CABS busses are free and run seven days a week with more frequent rides during official university hours when the majority
of students have classes and need to get around campus. Some CABS stops on campus are COTA stops at the same time so that students can easily access the COTA system. Riding the COTA busses is free for all Ohio State students since they pay a mandatory fee of nine dollars each academic quarter. Besides the public transportation available to students, staff, and faculty; they have access to the car sharing service Connect by Hertz. Ten cars are located all over campus and can be used by members, who pay a yearly fee for the right to reserve a vehicle on an hourly basis online. The advantage is that members do not have to worry about and pay for insurance, gas, and maintenance since it is included in the hourly fee. The last two options to get around campus are walking and biking. Many students choose to bike since it is faster than walking and they are independent of the bus system, and hence, avoid waiting times for busses and can directly go from one location to the other without any detour to a bus stop. Biking, however, is not thoroughly supported by the university. While the university provides bike racks and designated bike parking areas, it does not provide bike lanes. As many students ride their bikes, it can get dangerous on the street. For example, many drivers oversee bikers riding on the street, since they are not used to them. In addition some drivers do not respect bikes as road users and therefore pass them very closely instead of leaving them space to bike on the street which in turn forces bikers to ride on sidewalks, even if it is prohibited, posing a greater danger to pedestrians. Overall, the university offers many alternatives to driving a car.
These alternatives are highly demanded by freshman students since they are not permitted to have a car on campus.

Freshmen students living in dorms get also equipped with a meal plan for Campus Dining services. The Campus Dining service operates 28 locations all over campus. The options are diverse, ranging from grab’n go locations to dine-in locations. This variety, however, is only focused on the choice of location and their offer, but students do not have any choice in making their decisions based on the quality of food for example locally or organically grown. The meal plans are based on the amount of card swipes. Depending on their personal eating habits students can purchase different predefined options based on the swipe amounts. For example, the Grey Plus Dining Plan option includes 100 swipes per quarter, whereas, the Deluxe Plus option includes 250 swipes (University Residences and Dining Services, 2011).

Unfortunately, most of the dining locations use the convenience-dining model and serve their meals in disposable to-go containers. This system creates an immense amount of waste. If 7,000 freshman students eat out twice a day and receive a disposable cup for their fountain drink as well as a disposable container for their food, they will accumulate waste of 28,000 disposable cups and containers every single day.
In summary, freshmen at The Ohio State University have to face certain restrictions in their daily campus lives. Since they are required to live in dorms, they do not have any influence on the heating and cooling of the building and most of them face a disconnect between their utility consumer habits and the price they have for the university monetarily and environmentally. Moreover, since they are on meal plans, they cannot influence where the food comes from and how it is served, which is mostly in disposable containers. These are two major disadvantages freshmen have to deal with in their daily lives when it comes to sustainable behaviors. At the same time, since freshmen are not permitted to have a car on campus, they are forced to use public transportation, walk or bike.

3.2.2 OSU Sophomores

Although some second year students decide to stay in their dorms or live in another dorm on campus, the majority of them choose to move off campus and rent or lease an apartment or house. Most of the students living off campus pay their own utility bills monthly and therefore have regular feedback on their consumption habits. This feedback enables them to save money when changing their utility consumption habits. Their money acts as an incentive to watch one's personal energy and water consumption. Yet, living off campus not only increases the students' influence on their utility consumption, but also increases their demand for products such as cleaning supplies since they are responsible for cleaning their own apartment including bathrooms.
Sophomore students are also not required to purchase a meal plan option. They can choose from a wider variety of restaurants and cafes that are accessible to students and independent from the university. It is their decision where to buy food and therefore they are enabled to make consumer decisions based on where the food comes from or whether they offer china plates and silverware, recyclable or disposable containers. Since, in contrast to most residential halls, apartments and houses off campus are generally equipped with a kitchen, students can even cook their own food and have several options on where to buy food and the quality of food that they want. Thus off campus students must decide if they will go to a standard grocery store, an organic grocery store or a farmer's market.

Unlike freshman students, sophomores are allowed to bring a car to campus. However, a parking permit can be very expensive depending on the type of permit and usually parking is competitive since some parking garages fill up quickly in the mornings. Because some off campus housing opportunities are not close to campus, students might choose to drive and purchase a parking pass. However, students living in residential neighborhoods close to campus, in general seem to use public transportation or bike since it is the cheaper option compared to buying a campus parking permit.

Overall, sophomore students have a greater influence on their utility consumption and food consumption behavior than freshmen. This increased
impact is a great opportunity to develop sustainable consumer habits and foster behavior change towards a more sustainable lifestyle. Sophomores have more options to make wiser decisions and are not as restricted as freshmen.

This difference in the target group suggests two different approaches when planning behavior change initiatives. Freshmen can start to learn and accumulate information about a sustainable lifestyle and gain awareness that a sustainable consumer behavior is essential. Sophomores on the contrary can actually implement new behaviors that foster making sustainability in their daily lives easier. To label these two groups, most of the freshmen seem to belong to the group of “Information Seekers”, whereas the majority of sophomores are part of the group “Behavior Changers”. It is essential for effective behavior change to realize this difference and develop an application to enable behavior change that takes the two approaches into account.

3.3 Research Planning
The previous section described the students’ environment and the opportunities and restrictions they face in this environment. To investigate the target group of OSU freshmen and sophomores more in-depth, three different research studies were developed (Figure 10). The first study was an online survey (RESEARCH 1) that investigated what college freshmen and sophomores know about a sustainable lifestyle and what they do in their personal lives. The goal was to
reveal how the target group eats, lives, moves and consumes. 248 responses to
50 different questions in the online survey generated a good overview about the
freshman and sophomore student body of The Ohio State University. In addition,
the survey was used to recruit possible participants for the two participatory
workshops that describe the second and third part of the investigations.
The second study (RESEARCH 2) explored how the current generation of college
freshman and sophomore students is segmented according to their sustainable
awareness. This study aimed to get a better insight in the students’ actual
sustainable behaviors and the distribution of different awareness levels within
the first year and second year student body. 28 participants were interviewed
while they created a participatory poster on sustainable awareness. The last
participatory workshop (RESEARCH 3) researched how the target group
informs and motivates themselves in their daily lives. The workshop specifically
focused on tools that inform and/or motivate students to adapt more sustainable
behaviors. All three research studies were used to inform a behavior change
model and to inform the application for behavior change that was devised as a
result of this thesis.
In conclusion, the demographics of the student population at The Ohio State University, especially first year and second year students, provides a great opportunity to implement behavior change initiatives. Moreover, the university claimed in its Climate Action Plan endorsed on April 6, 2011 that:

“Sustainability efforts should be embedded into the full range of university activities and must tie directly to its founding mission. Integrating sustainability work and themes into the activities of students, faculty, and staff is a natural complement to Ohio State’s land-grant mission, its exceptionally broad range of teaching and research endeavors, and its historic action orientation.”
This statement shows that The Ohio State University is concerned about the issue and is working on actionable solutions. However, the majority of the solutions to achieve this goal have not been found yet. It seems as if no sufficient model on how to change students’ behavior towards sustainability has been proposed or introduced. The research described in this thesis can be a starting point for a possible solution or part of a solution to achieve successful behavior change within the student body. Besides investigating the different means and tools for behavior change as well as specifics of the target group, we will also explore the theory of behavior change. Understanding the psychology of human decision-making that influences sustainable behaviors and the theoretical frameworks that investigate the essence of behavior change are an important part of this thesis.
Chapter 4
Behavior change

“We will change our lives to save a child but not our light bulbs to save them all.” (Gilbert, 2011)

4.1 Introduction

“Behavior comprises the reactions and interactions of an organism to its environment and with other organisms” (Dusenbery, 2009). “Human behavior refers to the range of behaviors exhibited by humans and which are influenced by culture, attitudes, emotions, values, ethics, authority, rapport, hypnosis, persuasion, coercion and/or genetics” (Ardrey, 1970). These definitions are usually used to define behavior and human behavior, however, when thinking about behavior change in the context of this thesis another, easier definition of behavior, based on Aristotle’s quote “We are what we do repeatedly”, seems more applicable: Behaviors are the things we do repeatedly. Behaviors can be influenced by many internal factors such as feelings, values, and personality, but they are also displayed externally: Others can directly observe behaviors and our behaviors affect others directly. When a person does something once
it is an action, but when they start doing it repeatedly it becomes a behavior. Usually, things we do repeatedly are things that work best for us by bringing us a maximum amount of security, pleasure and fulfillment for a minimum amount of danger, pain and disappointment (Hawke, 2002). We spend our lives consciously and unconsciously forming and refining these behaviors. Some are even behaviors we do not like, but we might have formed them as defense mechanisms and started to adapt them as our usual behaviors. Internalization makes them part of us and our daily lives and, therefore, it is very hard to change or unlearn our behaviors. Hence, keeping old behaviors is easier than changing behaviors.

Another reason why behavior change takes a lot of effort is related to the tendency of humans to seek out things they enjoy doing and consequently avoid things they dislike. Our preferences guide our practices, and the more often we do something, the more proficient we become. There are certainly exceptions to this system, but overall this reinforcing system can be applied to behaviors. Moreover, we do not like to change due to the fact that changing our behavior is hard work. We might feel uncomfortable stepping out of our comfort zone and the possibility of failure threatens us.

At the same time behavior change can be simple in principle. Since behaviors are things we do repeatedly, we need to focus and be aware of our old and new behaviors. When we consciously make ourselves repeat certain behaviors
often in order to make them a natural part of our lives, we will have changed our behavior. While this sounds simple, it is very hard at the same time due to many factors that influence our behaviors. The challenge is to find ways to avoid counterproductive influences and enhance supportive effects.

4.1.1 Sustainability and Behavior Change

Tischner, a professor for Eco- and Sustainable Design at the Savannah College of Art and Design, USA, stated that 80\% of our daily choices are routinized behaviors. When people are used to buy a specific brand or product they do this automatically without thinking about it. It is a great challenge to make consumers aware that some of their routinized behavior patterns are unsustainable. To do this, consumers need on reflect about it, question it and then change their patterns towards more sustainable ones (Tischner et al., 2010).

The question is what kind of approaches help to change well-established behaviors? Behavior change in sustainability implies that one rethinks common habits, reduces waste and consumption, reuses materials and products, recycles used products, uses renewable energy sources and respects other human beings (social behavior change) and the earth (environmental behavior change). As a result we will minimize our individual footprint. The 5 R’s of Sustainability, namely, reuse, reduce, recycle, replace, and reinvent can help to guide people into achieving sustainability (Thibault, 2008).
A single method will not be able to induce behavior change on a scale that will address several issues in different settings. The approach needs to be a process, not a single event. The Transtheoretical Model of Behavior Change (Prochaska & DiClemente, 1983; Prochaska, DiClemente, & Norcross, 1992; Prochaska & Velicer, 1997) describes “research (that) has shown that up to 80% of people are not ready to go to action right away. It is something they have to work up to. In addition, not everyone moves at the same pace. People can resist the pressure to take action if they are not ready for it” (Prochaska & DiClemente, 2005). Moreover, the nature of sustainability is complex. In different settings the adoption of a sustainable lifestyle has different meanings for individuals, families and nations involved. For example, the United States of America will need to apply different strategies than Germany due to the fact that citizens in each country have a different culture, values and experiences in sustainability related issues. Even though it is a global problem, in some countries the effects seem to be more threatening than in others. India is severely exposed to the global waste production. Pollution through waste is visible in every Indian city, whereas this problem is not apparent in most American cities, even if the problem exists. In India one can see mountains of trash lined up along the road in cities and suburbs. In the United States of America people are used to dumping large amounts of trash in the dumpster which is picked up once a week and taken away to a landfill. These landfills are out of people’s sight and, therefore, do not create an awareness of how much trash people actually produce in their daily lives.
The concept “out of sight, out of mind” applies to the problem of waste. If one does not see it, it seems not to exist. In order to avoid this mentality it is important to create awareness that waste does not disappear magically, but affects our ecosystem and therefore it is important that each American citizen does his or her share to minimize his or her influence on the ecosystem.

A comparison of approaches from different nations has shown that the most effective programs are those that encourage and nurture change through tax incentives, economical paybacks, regulations and a high awareness of this problem within a society. One successful example is the recycling system of polyethylene terephthalate (commonly abbreviated PET; a thermoplastic polymer resin) bottles introduced in Germany. Now when purchasing PET bottles the buyer has to pay 25 cents in addition to the standard price of the drink. If the purchaser, however, returns the empty bottle to any supermarket he or she will receive this 25 cents back. In contrast, the least effective methods are those relying on people’s willingness to be good and do well. When sustainable issues are framed in a way to convince people that they should do good, the likelihood of behavior change is not very high. Keeping this in mind, one needs to frame behavior change differently by integrating people’s needs, wants and values and their priorities within their environment. Given that, effective change emerges from the various ways we understand our own worlds and then act within them. All the previous mentioned arguments call for a behavior change method.
that is specific for a target group and that includes peoples’ behavior, values and principles.

The usual approach for thinking about behavior change is to promote change only through information and assume that people will react in rational ways to the new information. This approach has had limited effects. Doctors dealing with people living with diabetes have been struggling for years with trying to change their patients daily behaviors or lifestyles so that they can manage their disease better by giving out information on healthy living. Many programs think that if they discover an unsafe and unhealthy behavior and intervene with individuals by providing information that the people will move to healthier and safer practices. The problem is that humans are often irrational in their decision-making process. Dan Ariely argues in his book *Predictably Irrational* that a greater understanding of previously ignored or misunderstood forces (i.e. emotions, relativity and social norms) that influence our economic behavior bring a variety of opportunities for reexamining individual motivation and consumer choice, as well as economic and educational policy (Ariely, 2008).

Another problem is that some programs promoting a sustainable lifestyle presume that behavior change only has to happen once. They do not consider that people do not just change once, but move back and forth between behaviors. Reintroducing new behaviors is essential to achieve a successful long-term change. Moreover,
people do not change at the same time. Some are not ready to change when a program intervenes in their lives.

In today’s world, changing circumstances require adaptability to the new behaviors. The difficulty is that some approaches make it clear that change is needed, but they do not provide advice and support on how to change and therefore leave people uncertain. This uncertainty leads to inaction or short-term results and does not encourage long-term changes. The last flaw of such programs is that they usually focus on either the individuals or the program itself, but rarely on the interaction between them. Thus, research usually considers an individual’s knowledge, values and attitudes, while programs focus on how to change behaviors of many individuals at once. The best method according to the Human-centered Behavior Change Design approach developed by the design consultancy IDEO is to target a specific group and consider their needs and behaviors when designing an application. Besides providing information it is necessary to motivate people and sustain this encouragement so that they can transform short-term habits into long-term behaviors. IDEO’s framework for systemic change has three overlapping components: (1) Tools, which are physical objects, the environments, and the virtual or physical platforms that allow for new forms of behavior to emerge. (2) Rules, which formalize or codify ways of behaving that people can know, and are articulated within society and norms. (3) Norms, which are the often unarticulated, taken for granted ways of behavior also called social or peer pressure (Mamut, 2010).
As discussed previously, well-known motivational factors for behavior change towards a sustainable lifestyle are tax incentives, regulations and laws provided by the government, savings through cheaper products or services, and immediate improvements of one’s health and quality of life. When these incentives are not provided one needs to think of new approaches to trigger behavior change.

Thinking of the characteristics of today’s younger generation another factor contributes to behavior change: Fun. This generation’s values are focused on individuals’ well-being and pleasure in daily life. “Fun and enjoyment are critical components of the workplace in this generation’s view” (Tapscott, 2008). In the following section the relationship of behavior change and fun and will be investigated.

4.1.2 Behavior Change and Fun
Fun and playful learning can have a huge influence on young peoples’ behavior (Papert, 2000). For several years children have been taught how to write, calculate and read in a playful way. Evidence shows that fun and games increase the efficiency of learning and thus help to motivate students (Piaget, 1999).
Today’s student generation is used to a learning environment combining games, social media and fun. Educational games, digital or analog, have several advantages. Involvement, suspense and fun are only some of the motivational incentives. Games are an efficient way of disseminating information, because they
entertain the user. One gets involved and is a part of something while challenges and rewards create curiosity and engagement (McGonigal, 2011).

As discussed in the paragraphs above, behavior change requires information and education, awareness as well as motivation. All three factors are essential to behavior change and each works in combination. Especially in the U.S.A. the use of information in our digital world is not a challenge. However, what information should we provide and in which ways should we visualize and present the information?

The more provoking question focuses on motivation. What makes people change their behavior? Fun could be such a factor, especially for students. If something is fun and pleasurable, people might change old habits because they enjoy the new ones more. In his publication *Positive Psychology* Charles R. Snyder states that “in Freudian psychology, the pleasure principle is the psychoanalytic concept describing people seeking pleasure and avoiding suffering (pain) in order to satisfy their biological and psychological needs” (Snyder, 2007).

### 4.1.3 Sustainability and Fun

Nowadays, when we talk about sustainability or environmentally friendly practices, we try to persuade groups or individuals to be good citizens or good people.
What if one uses fun to influence (motivate and educate) students about sustainability in their daily life? Would this approach be more successful than most of the current approaches in order to change behavior? The question is can sustainability be fun? As we already know behavior change requires motivation and fun could be used as a motivational factor. Knowing that we need to develop programs and concepts that make a sustainable lifestyle fun instead of perceiving it as a negative influence on our quality of life, provides new opportunities for projects and interventions. Unlearning old behaviors, learning new and sustainable ones, and having fun by doing so might be a successful approach to change behaviors.

The hypothesis is that when we make sustainable practices fun, the likelihood to adapt such a new behavior increases.

4.2 Concepts of Behavior Change

In this section the basics of behavior change are stated. In addition, different theories and influencers of behavior change will be discussed. Out of this assessment a new behavior change framework, which is informed by consisting theories, approaches and concepts, will be introduced. Through these concepts a new framework has been devised for a target group of college freshman and sophomore students in order to test how sustainability and behavior change work.
Behavior change seems to be most effective in periods of transition, when routines are already in flux. These situations provide useful opportunities to develop new, more sustainable habits. Three main factors lead to behavior change: Information/education, awareness and motivation. They need to be addressed as a whole. People need to be familiar with a certain topic like sustainability and be knowledgeable about the different influencers on the topic. Once they are educated, the next step is to create awareness that a problem exists and that current behaviors need to be changed to solve this problem. And finally motivation to change behavior closes the circle of behavior change. Behavior change is a high-effort long-term process, therefore, people need motivation to get rid of old behaviors and adapt new ones. Tischner and Stebbing defined four steps of behavior change oriented on Kanfer & Schmelzer (2005): Awareness about a problem and how the existing behavior relates to it, intrinsic or extrinsic motivation to change the behavior, opportunities to change and positive reinforcement such as rewards or affirmation by peers or other institutions.

Several other psychological theories analyze the steps and influences of behavior change. The following paragraphs will give an overview of five different theories and approaches that inform behavior change, namely, Maslow’s Hierarchy of Needs, Motivational Design, Human-centered Design, Consumer Behavior, and Environmental Risk Decision Making.
4.2.1 Maslow’s Hierarchy of Needs

Maslow’s Pyramid of Needs is a theory of human motivation that organizes needs into a hierarchical structure (Maslow, 1943).

![Maslow’s Pyramid of Needs](image)

The most basic needs are at the bottom part of the pyramid. According to Maslow there are deficiency needs (d-needs) and being needs (b-needs). The four lower levels of the pyramid of needs are d-needs or the fundamental levels that include physical needs such as breathing, food, and water, all essential for the human body to function. Security needs are the next level, they include security of employment, body and health; followed by love/belonging needs such as friendship, family, sexual intimacy. Esteem needs for instance self-esteem, confidence and respect of and by others are d-needs too, however, the human body is able to function even if these needs are not fulfilled, but without them
people usually feel anxious and tense. The highest level is self-actualization or the b-needs such as morality, creativity, spontaneity, and problem solving.

Maslow’s hierarchy of needs is very important to behavior change since the fulfillment of the needs enable or disable people to think and act on bigger issues such as sustainability. If basic needs are not fulfilled, people are unlikely to satisfy the higher need of self-actualization. For example if one needs to worry about food and their own safety, he or she will not worry about sustainability unless sustainability would help them to immediately satisfy these basic needs.

Looking at the demographics of the target group of American college students, usually they have the first three needs fulfilled. They have food, water and sleep which addresses the first level, physiological needs. The safety need including security of body, employment and health is generally met as well as the love/belonging need through family and friendship.

However, students may have unfulfilled needs on the two top levels of the pyramid, esteem and self-actualization. Self-esteem, confidence, achievement and respect of/by others are incredibly important to students. Their friends’ opinion is a major influence in their decision-making. Additionally, most of them go to college for self-actualization.
To summarize, a focus on the target group’s needs is essential for successful behavior change. Maslow’s hierarchy of needs investigates the difference and importance of a variety of human needs. The hierarchical structure of these needs requires the basic needs to be fulfilled so that one can achieve and wants to focus on the next higher level of needs. Since the basic needs of the majority of college freshmen and sophomores are satisfied, the opportunity to implement long-lasting sustainable behavior change exists. Being able to focus on the level of esteem and self-actualization offers the possibility to think about morality and sustainability problems and how to solve these problems, leading to the chance to change behavior.

4.2.2 Motivational Design

John M. Keller developed the ARCS model in 1988. The motivational design framework consists of four steps namely Attention, Relevance, Confidence and Satisfaction (ARCS) (Keller & Suzuki, 1988). As Keller states “the ARCS Model of motivation was developed in response to a desire to find more effective ways of understanding the major influences on the motivation to learn, and for systematic ways of identifying and solving problems with learning motivation” (Keller, 1987). It is an approach to create and sustain students’ motivation to learn.
### Figure 12. Motivational Design

<table>
<thead>
<tr>
<th>Attention</th>
<th>Relevance</th>
<th>Confidence</th>
<th>Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceptual arousal</td>
<td>Goal orientation</td>
<td>Learning requirements</td>
<td>Intrinsic reinforcement</td>
</tr>
<tr>
<td>Inquiry arousal</td>
<td>Motive matching</td>
<td>Success opportunities</td>
<td>Extrinsic rewards</td>
</tr>
<tr>
<td>Variability</td>
<td>Familiarity</td>
<td>Personal control</td>
<td>Equity</td>
</tr>
</tbody>
</table>

Attention is defined by perceptual arousal, inquiry arousal and variability. Perceptual arousal can be achieved by surprising or incongruous events. Curiosity and a need to gather information to solve a problem (inquiry arousal) and changing stimuli to keep the learner’s attention (variability) is key. Once attention is gained it is important to sustain the students’ interest and curiosity.

Goal orientation, motive matching, and familiarity guarantee relevance. Relating existing knowledge to new content and using familiar language helps to enhance familiarity. Additionally, the whole process needs to focus on goals the learner can achieve. These goals need to be consistent with the learner’s values and personal goals. Finally, if the learner feels that his or her needs for achievement and affiliation are fulfilled, motivation is increased. The integration of students’ interests, needs and motives helps to create an understanding why the information is relevant to them.
At the same time, learning requirements should allow an optimal level of challenge for different types of learners. Success opportunities and clarity about expectations lower anxiousness, and smaller goals towards success help learners to reach a bigger goal. Lastly, feedback on what needs to be improved and what the learner did well, can improve performance, because one can feel that they are in control throughout the whole process. These three factors raise confidence and therefore help to facilitate a successful learning outcome. When showing students that they are able to achieve a goal, anxiousness can be lowered and motivation to address a problem can be raised.

The final category, satisfaction, addresses intrinsic reinforcement like personal satisfaction and a feeling of fulfillment, as well as extrinsic rewards such as positive consequences to their new behaviors/skills. Additionally, equity, the comparison of how other people are rewarded, can be extremely motivating or demotivating as students realize the reasons why they were learning something.

Keller’s theory focuses mostly on learning, however, this theory can be adapted to behavior change. Behavior can be learned; therefore, raising motivation to learn new information and skills helps to learn new behaviors. Additionally, informing people about problems and helping them realize how their behavior affects certain things can contribute to motivate behavior change.
4.2.3 Human-centered Design

Human-centered Design is an approach that integrates multidisciplinary expertise towards enhancing human well-being and empowering people. It can lead to systems, machines, products, services and processes, which are physically, perceptually, cognitively and emotionally intuitive to use (HCDI, 2011). In human-centered design the designer attempts to take out his or her own personality and not impose his or her preference on a project, but, instead, try to research, understand and translate the needs and wants of people to create a design solution that perfectly serves the target user or audience.

According to IDEO, Human-Centered Design (HCD) is a process and set of techniques used to create new solutions for the world. Solutions include products, services, environments, organizations, and modes of interaction. This process is centered on peoples’ needs, dreams and behaviors. The designer tries to understand these by listening to people and as a result discovers their desires. Once people’s desires are identified, solutions are designed. These solutions need to be organizational and technically feasible and financially viable. The focus on humans is key to a successful behavior change initiative. Moreover, it is indispensable to translate the findings into actionable outcomes and solutions.

Elizabeth B.-N. Sanders takes the human-centered approach a step further. She proposes a shift from designing for people to designing with people.
This participatory design approach enables the designer to study a user’s true needs. The goal is to gain insights by what people SAY and DO, and additionally, by what they MAKE. So-called toolkits enable participants to express their needs and participate in the design process. They help to connect thoughts and ideas of people from different backgrounds and disciplines. “In participatory experiences, the roles of the designer and the researcher blur and the user becomes a critical component of the process” (Sanders, 2002). It is fundamental that both designers and researchers gain knowledge about each other’s process and methods.

Studying and getting to know the target group enables the design of a human-centered framework for behavior change and the implementation of an application for behavior change tailored to the target group’s specific needs, and including their needs can increase the likelihood to change behavior. In order to include the target group’s needs into the final outcome, the research applied the approaches of User-Centered Design and Participatory Design. As shown in the Map of Design Research Types (Figure 13), these approaches are focused on a participatory mindset rather than on the expert mindset.
4.2.4 Consumer Decision Making

Consumer Decision Making is a process by which consumers identify their needs, collect information, evaluate alternatives, and then make a purchase decision. These actions are determined by psychological and economical factors, and are influenced by environmental factors such as cultural, group, and social values (Hoyer & MacInnis, 2006). Three factors are central to the consumer decision-making process: Motivation, Ability and Opportunity (MAO). Motivation can be achieved and sustained through incentives, negative consequences, personal acquaintance, periodical reintroduction (to guarantee a long-term change),
immediate benefits (to avoid the feeling that all the effort does not have an outcome) and impact. The Ability component in MAO focuses on the knowledge one needs to have, the environment one is in, and one’s current situation. Lastly, convenience, ease of use and the breaking of old habits to develop new habits create the Opportunity for behavior change. All three factors, namely, Motivation, Ability and Opportunity affect one’s decision-making process. In order to change behavior people need to be aware of the their decisions and consider sustainability as one of the factors that impacts their decision.

4.2.5 Environmental Risk Decision Making

In this section the decision models that might explain consumer behavior with a focus on the prospect theory, a theory that describes decisions between alternatives that involve risk where the probabilities are known, will be discussed. Afterwards an overview of biases and heuristics, which have contributed to the unsustainable behaviors and decision, will be presented. Finally, a discussion will assess if failed risk communication efforts, a poor decision-making process or a lack of balance between science and value might have resulted in unsustainable consumer behavior.

**Prospect Theory**

One of the widely spread models of decision-making that can be applied to the problem of unsustainable consumption is Prospect Theory (PT). PT explains that
the value of gain or loss depends on a reference point. This reference point does not necessarily maximize net wealth in the end. Invariance in decisions is allowed based on how options are framed and their relation to the current reference point (Plous, 1993).

According to the theory, people are risk seeking towards losses and risk averse towards gains. This results from the tendency that one experiences the value of loss more intensely than the same value of gain. Nowadays consumers are not threatened by immediate losses, nor do they experience immediate negative effects due to their consumption patterns. Since they are comfortable living with their current consumption habits, they create a risk aversion towards gains in order to avoid potential losses related to a change in their consumer behavior.

Reference Point

A reference point in Prospect Theory can be friends, social groups, the status quo and our environment. The majority of consumer purchases show that they are unaware of the consequences for the environment. Unless we have friends or social groups, which consume sustainably, our reference point is not set towards environmentally friendly consumption.

For more and more people mass media is a relevant reference point. Especially commercials on television and the Internet influence consumers. Media images
of affluence, social trends and fashions affect our views of "normal" and ideal lifestyles and are then the engines behind modern consumption patterns. As we can see on the amount of product advertisement, the advertising expenditures of companies seem much higher than the budget of the government and Non-Governmental Organizations (NGOs). Consequently, people are mostly presented with unsustainable consumption lifestyles, which form their reference point and lead their desires.

**Status Quo Bias**

One tends not to change an established behavior. Instead he or she continues with the traditional or familiar way even when it is clear the old way is not ideal. Consumers often have the perception that it is okay when something bad happens, because he or she did not act, but that it would be worse when something bad happens because he or she took action. This means that it is perceived worse when taking action results in a negative outcome rather than inaction. This bias can be recognized in consumer decision-making.

Consumers are surrounded by large amounts of information that influence decision-making, but most of this information does not take into account the environment. This lack of information about the environmental impact of a product or service creates uncertainty. In the cases when this information is provided, consumers are confronted with the problem of unspecific and misleading information.
Environmental labels like Eco-labels should ideally present relevant and accurate environmental information about the product or service. However, there is confusion as some labels are created by the government or private non-commercial entities and others are self-declared by manufacturers or retailers. The multiplicity of labels, the challenge in comparing the different labels, as well as the complexity of some labels all lead to consumer confusion and frustration. The consumer is trapped in the status quo bias. The contradiction, confusion and weak credibility of labels demotivates environmentally friendly consumption and offers consumers an easy justification for not acting. Consequentially, they do not take action at all and take the risk of changing the established behavior to worse behavior.

Even when the information is well targeted and well communicated, so that the consumer easily assimilates it, it does not always result in a change in consumer behavior.

**Inconsistency in attitude and behavior**

What people say that they are willing to do (attitude) when they recognize a problem often differs from what they actually do (behavior). Self-interested motives like price, quality, individual taste, as well as lifestyle, and unselfish motives such as culture, self-identity, social pressure, as well as environmental and social concerns are competing criteria in our decision-making process.
When environmental and social values are included in a consumer's preferences and purchase decision-making, the equation becomes even more complex. The number of “green” consumers is increasing due to raising willingness and changes in attitudes to act, but environmental characteristics are rarely primary factors of purchase. This causes the low rate of behavioral change in the society. This inconsistency can be affiliated with the so-called fundamental attribution error.

**Fundamental attribution error**

The underestimation of situational factors (current circumstances) compared to dispositional factors (religiosity, values) describes the fundamental attribution error (Plous, 1993). Consumers might think that buying sustainable products is important for the environment (attitude, dispositional factor), but it is too expensive for them because they are students and cannot afford it (situational factor) or they do not have the time when they are in the grocery store to search for environmentally friendly products because they are in a hurry (situational factors). As a result they buy products that they typically purchase without thinking to change. Situational factors can strongly impact consumer behavior and minimize or obliterate their dispositional factors.

**Insignificant effect**

When a consumer makes the decision to pay a higher price for an environmentally
friendly good or service, he or she accepts that others will benefit from his or her own decision even if others do not change their own behavior. The cost for the individual results in a positive outcome for the public. The insignificant effect describes people’s unwillingness to pay more for environmentally friendly products or change behavior without perceiving direct and/or immediate positive personal benefits. The behavioral choice to consume organic food is more about the outcome for personal health than the environment. This difference in the perceived outcome makes organic food more likely a preferred purchase than other sustainable goods.

In comparison, when purchasing environmentally friendly furniture, the consumer pays the cost of a higher price, but society, not the individual, receives the positive outcome. Furthermore, many people have the perception that any change of their own behavior is insignificant if the rest of the consuming public continues business as usual.

**Environment as “common” problem**

Resources are shared by all, but owned by none. Many consumers might not feel that the protection of the environment is their responsibility. They think that the government, companies or NGOs are responsible to protect the environment. Additionally, consumers realize that companies can change their production systems, NGOs can coordinate activities and campaigns, and the government can
implement environmental protection policies. The consumer might be confused as to what action they themselves can take. These examples make it easy to justify no or only minor changes to consumption patterns. Consumers might assume that others are responsible and that they act of their own will anyway, so why should one consumer change his or her behavior.

**Time delay trap**

According to John Platt a behavioral trap “is a situation in which individuals or groups embark on a promising course of action that later becomes undesirable and difficult to escape from” (Platt, 1973). In 1980 John Cross and Melvin Guyer published a taxonomy of behavioral traps including five general categories, namely, time delay traps, ignorance traps, investment traps, deterioration traps, and collective traps (Cross & Guyer, 1980). A common behavioral trap in consumer decision-making, which is very frequent in environmental decision-making, is the time delay trap. Possible long-term effects are difficult to weigh against short-term costs (Plous, 1993). Consumers enjoy the short-term effects of their purchase and do not consider the long-term consequences of their actions. When someone purchases the latest electronic device, they experience the convenience this device brings to their daily life and may be happy about the cheap deal they made, but it is more difficult to think about the negative effects the product could have after it has served its purpose. The time invested to obtain credible information about a product or service is also perceived as a short-
term cost (time is money) and may be weighted against the possible long-term outcome for the consumer.

**Lack of scientific proof of causality between action and outcome**

A lack of scientific proof on the casual relationship between environmentally friendly consumption patterns and a positive outcome for the environment keeps consumers from changing their old consumption patterns. If they are not assured that their effort will result in a positive outcome, they are not willing to change. This skepticism is strengthened by changing expert predictions of the future impact of unsustainable consumption. It is difficult to predict the outcome of consumer's actions on the environment. Additionally, several experts have released different future prospects and the consumer is confused with what and whom to believe. This confusion counteracts with their willingness to change their consumer patterns.

**Conclusion**

“The pursuit of material wealth, by people with financial and capital power in largely unaccountable institutions, is having the effect of molding diverse cultures as well as natural and mental environments into a monoculture that serves the interests of the modern-day corporation. This grand experiment has employed the ideologies of corporate globalization and economic rationalism to concentrate power in a way that damages
Consumers within the Organization for Economic Cooperation and Development (OECD) countries are concerned about the environment and how their own actions contribute to environmental quality. However, trends in environmental impacts from household consumption patterns today show that such concern is usually not translated into consumer decisions and purchases.

Information is a potentially effective tool for empowering consumers to act in favor of the environment. Improved access to quality information can enhance public environmental awareness and give the public the opportunity to take account of environmental concerns in their everyday decisions. Through effective risk communication a better awareness of how consumer patterns can affect the environment can be created. Even more important is to counteract the biases and heuristics that contribute to the consumer behavior and poor decision-making process.

Both, the failed risk communication as well as the poor decision-making processes, are leading factors of unsustainable consumption. A balance between consumer education and motivation on environmentally friendly consumption is the key to behavioral change in consumer patterns.
4.3 Problems of Current Theories

All five of the previous theories are relevant to behavior change and each has a major influence in one or more parts of a behavior change framework.

Maslow’s hierarchy of needs describes the fundamental needs humans have. And if basic needs like water, food and shelter are not fulfilled, the likelihood of one addressing higher needs is very small. Maslow’s theory does not address behavior change though and, therefore, on its own it is not enough to build a framework for behavior change. Nevertheless, it is essential to integrate human needs into any model of behavior change since these needs can enable and disable behavior change.

The Motivational Design framework focuses on the four steps Attention, Relevance, Confidence and Satisfaction, which are important and essential for behavior change. However, when it comes to Generation Y, this framework does not include their learning and communication habits. Fun, which is an important driver for this generation is not necessarily included into the framework. Moreover, it does not address interaction between individuals and their peers. Taking into account this relationship is essential for behavior change. The process is not only about one learning experience, but long-term change.
Human-centered Design offers another key element. The process of changing one’s behavior needs to be aimed towards a specific target group. Each target group will differ in age, education, culture and values, therefore a specific approach is important. But this is not enough. Even if college freshmen and sophomore students at The Ohio State University have many things in common, when it comes to sustainable behavior, they have diverse levels of knowledge and awareness. This difference in perception must lead one away from a demographical approach to an even more specific approach that offers different groups within one demographic to find their personal role in the behavior change process.

Consumer Behavior Theory incorporates Motivation, Ability, and Opportunity. This process seems convincing, however, it is linear and does not take into account the irrationality of consumers. Besides that, Generation Y cannot be advertised to in the same manner as previous generations. Their focus on information sharing with friends and peers influences their consumer choices much more than the consumer behavior theory considers. In his book *Grown up Digital* Don Tapscott dedicates a whole chapter on Generation Y as consumers. According to him the four P’s of marketing (product, price, place, and promotion) do not affect Generation Y (also called Net Geners) as it did previous generations. At the same time, Net Geners use online social networks to see what their friends buy and 32% of teens say that they buy things their friends have. Also, 29%
of teens ask their friends for advice when they lack experience with a product (Martin, 2006).

Finally, environmental risk decision making reveals the main traps to behavior change that are specific to sustainable behaviors. All these problems need to be taken in consideration. However, since Generation Y focuses a lot on experiences rather than a future outcome, one should make the experience of behavior change much more enjoyable, so that this generation will engage in the process. Behavior change theories focus predominantly on the outcome, which in the area of sustainability means the successful implementation of a sustainable behavior, because it is better for the environment and the society. Yet, Generation Y focuses on the experience. Nearly three-quarters of Net Geners think that having fun with a product is just as important as simply using it. For the Net Gen, entertainment and playfulness are central to socialization and education (Keating, 2000). This insight can be transferred from consumption only behavior into other behaviors. Thus, creating a fun and entertaining experience and process of behavior change, rather than only focusing of the outcome implies the specific needs of the target group. Taking all these theories and their recommendations in consideration, a new framework, which integrates the complexity of the problem as well as the specifics about the target group, was created (Figure 14).
Figure 14. Theories Informing the Framework
4.4 Updated Framework

What if we use consumer decision-making knowledge to consume wisely? What if we use fun as motivation and create engaging and enjoyable information and motivation tools? What if we use design research to reveal the students’ needs and use their creativity to create solutions for problems? What if we recombine and update the known theories to create a student-centered behavior change framework? This section will explain the specific steps (Collective Action, Involvement/Effort, Behavior Change) that are shown in the newly developed behavior framework (Figure 15).

To use science, research and skills we already have, combine them and repurpose them to create solutions for daily problems, is the intent and background of the newly developed framework. It is based on collective action. If many individuals pursue a common goal, one can avoid feeling like a “drop in the ocean”. One wants to belong to specific groups and share opinions and their personal lifestyle with others in the groups.

The designer needs to identify college freshman and sophomore students’ culture, needs, lifestyle, education, awareness and habits to create a human-centered design approach. Carefully designed, well-targeted communications are an important method of promoting sustainable behavior, therefore, it is necessary to do research on the target group. Additionally friends, peers and the background
(i.e., parents) need to be investigated. These are the people that have influence on the target group and, therefore, can help in creating a collective action process. The next step is to create involvement due to the fact that behavior change is a high-effort challenge. Using fun as positive motivation and immediate benefits as well as reintroduction of the concept and on-going incentives to guarantee a long-term change instead of a one-time behavior change, increases the possibility of sustainable behavior change. Besides that students need to have the ability to change behavior, which is on the one hand information that is student-centered and, on the other hand, the environment and situation should enable them to adapt and practice a sustainable lifestyle. Last but not least, one needs to ensure that the students have the opportunity to adapt new habits and that this process is convenient, easy and cheap.

Once Motivation, Ability, and Opportunity (MAO) is accomplished, then behavior change can only happen if the target group experiences satisfaction and confidence with the process and the outcome, if they have a feeling of achievement and if the process and new behavior is relevant to their personal goals and lifestyle.

This framework is cyclical, due to the fact that individuals who change their behaviors successfully can act as peers and friends who collectively help to influence the behaviors of other students who go through this behavior change process.
To design an application with the new model, several steps (Figure 16) need to be considered. First, the designer needs to identify and know the elements of human motivation. An analysis of the audience, its lifestyle, values and restrictions are essential to the success, followed by an identification of the characteristics of information and the application and how fun can be incorporated as a motivational factor. The next step is the development of tactics for immediate benefits and a strategy for constant reintroduction. And finally, the concept and design need to be applied and evaluated. All these steps are important, and for successful behavior change, all five levels need to be incorporated in the process.
Figure 16. Steps of Behavior Change

4.5 Existing Behavior Change Initiatives

Keeping the new framework in mind, in the following section one can read about two existing behavior change initiatives and their advantages as well as disadvantages. Both initiatives, The Fun Theory and Do One Thing (DOT), focus on a playful and fun approach to behavior change.

4.5.1 The Fun Theory

The Fun Theory argues “that something as simple as fun is the easiest way to change people’s behavior for the better. Be it for yourself, for the environment, or for something entirely different, the only thing that matters is that it is change for the better.” This campaign initiated by Volkswagen consists of a series of experiments, captured on video, to investigate if making the world more fun can improve people’s behavior. In the following paragraphs the different ideas,
concepts and videos presented on the website (Figure 17) will be described, analyzed, and evaluated.

Figure 17. The Fun Theory, 2011

The Piano Staircase

It is common knowledge that using the stairs instead of the escalator or elevator will help people staying fit and healthy. Even if one reads or hears this several times, most people do not follow this advice even when they know that it will be to their benefit. Volkswagen’s aim was to develop a concept so that more people would take the stairs over the escalator by making it fun to do so (Figure 18).
In a subway station in Odenplan, Stockholm, a team created an installation on the stairs next to the escalator to motivate people to use the stairs. First, they videotaped the location without the installation and clearly most of the pedestrians used the escalator. Then they set up the stairs looking like a piano keyboard playing different sounds when someone touches the steps. Immediately the majority of people started using the stairs, because it was fun and a welcome change to the usual experience. Pedestrians started playing with the stairs going back and forth, up and down. They actually spent more time using the stairs for this uncommon adventure. People’s behavior changed for the better. This experience definitely worked.
However, the question is if this installation changes behavior once or twice or in the long run? The likelihood is high that the majority of the user will use the stairs a few times and then go back to their old habit, because it is more convenient to use the escalator and using the stairs might not be as fun after a period of time as it was the first couple of times. Commuters who visit the same subway station day after day might quickly return to their old habit.

People might need a new reason to be motivated to come back over and over again. For example, a weekly little prize for the user with the most interesting composition or a video published on a website with one user every day. This price or opportunity of one-day glory might motivate people to continue with the new behavior of taking the stairs instead of using the escalator.

**The World’s Deepest Bin**

A lot of people throw rubbish on the floor or in the grass instead of in the trash bin in parks or public places. It is definitely not hard nor does it take more time to properly throw away ones trash, but many people still do not use the trash cans provided in public areas. The question is, can this behavior be changed by making it fun to throw rubbish into the bin?

A team at Volkswagen prepared a bin so that by throwing something inside of the bin a long-lasting sound occurred. This sound imitated a long and deep drop of
the object that was thrown in the bin (Figure 19). This unusual experience caught peoples’ attention. They tried to look into the bin to discover the source of the sound and were encouraged to pick up trash from the ground to provoke the sound again.

The question again is if this experience can have a better chance to create a long-term behavior change? One pedestrian’s sound can motivate a total different walker to throw his trash in the bin. By observing and then trying it on your own this behavior can be spread from person to person. As the video proves, more than twice the amount of trash was thrown in the manipulated bin than in the common bin not far away. The interesting question is, if people usually would have thrown more trash in the other bin or would have just thrown the trash on the ground and litter the public space.

![Image of the World’s Deepest Bin, 2009](image)

Figure 19. The World’s Deepest Bin, 2009
Bottle Bank Arcade

Many people do not recycle glass. Some individuals might pay to use a private recycle company for the pick up. If they do not want to pay for a private company, they might bring their recycled trash to a recycling center. Yet, this practice is too inconvenient for many people. What reward besides money could motivate people to return glass to recycling stations?

Figure 20. Bottle Bank Arcade, 2009

By making recycling fun, the Volkswagen team tried to change this behavior. They rewarded recyclers with a little competition. A common recycling bin was modified into a kind of gambling machine (Figure 20). It had six holes with one light above each hole. After pressing start, a recycler can collect points by throwing bottles into the hole as a light flashes up. The speed and amount of
bottles recycled define the final score. Users of the bottle bank arcade can try to improve their own score by coming back to the bottle bank or can compete with friends or other recyclers at the machine. This game makes recycling fun and interesting, as the high numbers of users of this bin proved. This alternative-recycling bin was used almost 100 times in one day, whereas another bin not too far away was used only twice.

This concept proves to be effective. By changing the boring and inconvenient behavior of recycling glass into a game, people get engaged. As a result, they were rewarded by high scores, could compete and play with their friends and improve over time. This approach is likely to cause a long-term behavior change by engaging the user and rewarding him or her with fun and interaction. However, it is necessary to run “the experiment” over a year or more to know if the behavior change is permanent.

**Speed Camera Lottery**

Speed limits are ignored on a regular basis. Even if drivers risk a ticket they do not obey speed limits. Kevin Richardson (USA) developed a new concept using fun as a motivator to slow drivers down. The idea is to capture drivers who keep the speed limit on camera (Figure 21). Their photos and registration numbers are recorded and entered in a lottery. Winners would receive a cash prize out of the money collected from people who were caught speeding.
This reward is an effective concept to motivate drivers to obey a speed limit considering the possibility to win a lottery. By drawing a weekly or monthly winner this approach provides a long-term success. Not only will drivers be punished for speeding, but at the same time obeying speed limits will be rewarded with the chance to win a lottery. This concept transforms the problem of speeding into a win-win situation for all drivers following the speed limits.

However, this concept seems to have a major flaw. Capturing random drivers on camera who do not break the law by speeding and then entering their registration number in a lottery causes privacy issues. Some people might not appreciate the fact that their personal data and pictures are captured and used for a lottery unless they give permission to do so.
Fun Tram Tickets

Ollie Campbell (Australia) thought about the issue that people do not always buy tickets when they travel on public transport. To curb this problem, ticket inspectors are hired to check passengers’ tickets. This can be expensive. Additionally, these inspections may happen frequently, but are not part of every single trip.

If buying a ticket is fun, passengers might be more likely make a purchase. The idea is that every tram ticket is also a lottery ticket (Figure 22). By making the purchase, people also have an additional chance to win a lottery. This gambling opportunity is fun and encourages passengers to buy tickets. Every purchase opens up another opportunity to win the lottery and therefore this concept is targeting a long-term behavior change.

Figure 22. Fun Tram Tickets, 2010
The Wiki Traffic Light

Drivers sometimes do not respect a red light or try to cross an intersection quickly when the light already has turned from yellow to red. This behavior causes accidents and death. Osvaldo H. Bernal Sosa (Mexico) proposed the idea to fit the traffic light system with a screen that displays interesting facts when the light is on red (Figure 23). This way, the waiting time is more fun and therefore drivers are more likely to stop. By displaying different facts this concept can provoke long-term changes in human behavior, because these facts and information turn every stop at a red light into a new and fun experience.

Figure 23. Wiki Traffic Lights, 2010

There are two issues with this system. First of all not respecting a red light is not a very common problem, because drivers know that they could either get an expensive ticket or risk their own life and the life of others. Another problem
occurs, when the display distracts the driver from driving. By concentrating on reading the facts, even if the car is not moving, the driver's attention is totally deflected from the street and his environment. In fact, the street and intersection is not even in the field of vision if he looks up to the lights for reading. This might cause safety issues and one should consider this as a social factor of sustainability.

Conclusion The Fun Theory

Overall, the concept of The Fun Theory is working. As proven in the videos fun can change behavior. The challenge is to avoid a one-time change and create a long-term behavior change through engaging the user over and over again until the new behavior is imprinted and accomplished unconsciously. Some of the presented concepts only have a short-term or one-time impact on people’s behavior.

In a nutshell, Volkswagen’s approach to changing behavior by using something as simple as fun is a groundbreaking concept to provoke behavioral change in the daily lives of individuals. According to Volkswagen, the company uses this approach to encourage more people to drive an environmentally friendly car. They recognized the immense advantages that fun can have on people’s behavior and ultimately result in successful behavior change.
4.5.2 Do One Thing (DOT)

The campaign DOT (Do One Thing for Sustainability) was developed by the consulting firm Saatchi & Saatchi S and adapted by the College of William and Mary as a campus initiative. This project is based on a sustainability and community building concept that encourages students and staff of the university to make a small, public commitment to a more sustainable lifestyle practice (Figure 24). By having the opportunity to see what other members are doing, everyone will be educated about the various opportunities to live and work more sustainably. The purpose of the campaign is to motivate members to choose their own personal DOT and engage the campus community in brainstorming about how every individual can contribute to making the university a more sustainable enterprise and therefore cause long-term changes. Collective action is part of the fun strategy of this campaign. A DOT is one permanent sustainable change in one’s life. It can be social or environmental. Each member can chose one thing they are passionate about and make it more sustainable. The project goal is to create a more sustainable campus community. It does not only concentrate on a sensible use of natural resources, such as water, energy, air and biodiversity, but also considers public health, a strong community and long-term economic stability as essential factors.

The advantage of this concept is that one does not need to change everything in their life. Instead, by being part of a huge community, the impact happens...
through the participation of a large group of people. Several small changes can add up to a bigger change. Additionally, being part of a large community provides fun and encouragement.

Figure 24. Do One Thing, 2010

Step by step, one can change small behaviors and when these habits are internalized a new behavior can be targeted. This networking approach integrates the fun factor provided by social networks as when one is inspired by other group members, one’s motivation to change can increase. A DOT can be an individual behavior change task, but can also be shared and committed to by a team, a club, a class, a student organization or a family.
One can choose a DOT by finding a meaningful change that one can maintain. From drinking filtered tap water instead of bottled water, starting to recycle, bringing your own bags when shopping instead of using several plastic bags. Which habit each individual chooses is up to his or her own interest. Choosing something one is passionate about like a hobby and integrating a small change, can be very motivating, because it tends to be more rewarding and is more likely to stick.

Through the social network Facebook one can promote his or her own personal DOT. This exchange of ideas is fun and encouraging at the same time. Sharing one’s DOT can inspire other members and works as a rewarding factor. Additionally one becomes accountable to the public record. Seeing peers participating motivates some students to make a contribution on their own. Social science has shown that even small changes are easier to make with the support of a social network (Heaney & Israel, 2002).

More than a thousand people have already chosen DOTs since the campaign pilot in fall 2009 at the Mason School of Business at the College of William and Mary. The university president Reveley has chosen two DOTs: to print double-sided and to use non-disposable coffee mugs whenever possible. So have many other administrative, faculty, staff, and student leader members. Even some prominent alumni have chosen DOTs, including James Comey (’82), former Deputy Attorney General and now Senior Vice President of Lockheed Martin, who pledged to trade in his SUV for a hybrid in support of DOT.
Besides a DOT on the Facebook group page members can fill out a paper DOT on campus. These paper DOTs are collected and will be used for an installation artwork. Integrating the Art Department to create an exhibition out of students’ commitments raises the fun factor. Every individual with a paper DOT will become a part of the overall installation.

A third way of using fun to continue this campaign is a YouTube contest. Everyone is called upon to create a short video about his or her individual DOTs and post it on YouTube. This year’s winner was selected on Earth Day and the winning video was shown on campus.

The “Do One Thing” concept is not new, and the William and Mary initiative is adapted from a model developed by Saatchi & Saatchi S, an international sustainability-consulting firm. In the fall of 2009, the students of the William and Mary Net Impact chapter piloted DOT for the first time at the university level at the Mason School of Business. The success of the Mason pilot, which attracted 1000 participants over Facebook in only a few weeks, inspired the Committee on Sustainability to adopt the concept campus-wide. William and Mary thus became the first DOT University, with hopes that others will follow.
Conclusion DOT – Do One Thing for Sustainability

DOTs approach is based on collective action. By using social networks like Facebook and YouTube, fun is provided to student members. Being part of a bigger group and getting involved motivates a lot of people to change behavior. The public display of the individual DOTs serves as a motivator and inspiration.

Overall, the concept works really well. Some DOTs listed seem random and their effects can be debated. However, the general concept uses fun in several ways while combining it with other motivational factors to facilitate behavior change. Whether the whole concept works in the long run cannot be evaluated yet, because the project is still in its pilot year. The assumption is that some members might change their behavior back to the old one and others will keep continuing their new behavior and even create and adapt more sustainable habits. There is definitely the opportunity of a major impact.

4.5.3 Implications

When using fun for behavior change, it is essential to create long-term reinforcement until the new behavior is adapted into one’s life and, therefore, is executed unconsciously as a daily routine. On the one hand, people have to find an interest for trying a new behavior (wanting). On the other hand, they have to enjoy the new behavior in order to continue the new habit and internalize it (liking). Lastly, small single steps are more motivating than radical changes and
easier to realize and continue for individuals. The concept of reintroduction and actionable solutions to choose from are needed to achieve long-term change.
Chapter 5
Online Survey

Investigating college freshman and sophomore students’ awareness and knowledge about a sustainable lifestyle through an online survey

This chapter describes the first research study (Research 1), an online survey. A total of three different studies were created in order to inform the design application. The results of the online survey informed the sustainable awareness workshop and the information & motivation workshop (Figure 25).

Figure 25. Research Studies
5.1 Purpose

The goal of this thesis research is to develop a tool that can help students implement sustainable behaviors in their daily lives. To accomplish this goal, it is essential to know the target group. Since peoples’ daily behaviors vary significantly and cannot be categorized into a small number of items, a quantitative survey proved to be a great tool in gaining insights on the behavior of college sophomore and freshmen students as it relates to sustainable practices. Thus, a survey was conducted to investigate how much Ohio State freshman and sophomore students know about a sustainable lifestyle and what they say they do in their personal, private lives with regard to sustainable behavior.

The focus of this research survey was to find out how the current generation of undergraduate first year and second year students live, use transportation and consume in their daily lives and how they gained knowledge about sustainable practices. The research also explored their attitudes towards a variety of statements regarding the concept of sustainability in relation to their personal experience.

5.2 Approach

An online survey is an effective method to discover the characteristics of a large population. In comparison to a focus group or another qualitative method, surveys are relatively inexpensive and easy to distribute. Due to the fact that a larger sample size can be collected, the results can be statistically significant.
The concept of generalizability is easier to apply when a sufficient amount of data is collected, as it is through the survey, rather than when doing qualitative research. Since it is online, students are able to access the survey comfortably on their computers and seem to be more likely to answer a short online survey than filling out a printed version. This approach certainly does not guarantee a high response rate, however, it is more convenient and less effort than a printed version of a survey. Another benefit for an online survey versus a printed survey is the simple fact that it is more environmentally friendly to send out emails including a link to a digital survey than printing several surveys. Furthermore, the method of a survey alleviates the problem of having to ask many questions about a given topic. A survey in a digitized format enables an easier analysis. Finally, standardized questions ensure that similar data can be collected from the targeted group.

5.3 Assumptions
When designing the survey, the hypothesis was that most students know about the importance of sustainability, but are not motivated to change their behavior. This lack of motivation was assumed to result from a current motivational approach focusing on saving one’s conscience instead of enjoyment and fun. Resulting from this, another expectation was that students are motivated by their peers and through fun rather than monetary incentives or an environmental conscience. The prospect of students perceiving sustainability and environmental
concerns as less important than grades, their material satisfaction and joyful college years, is expected to influence their environmental decision-making. It was also expected that freshman students do have less opportunities to live a sustainable lifestyle due to their dependency on the meal plan and living in the dorms. A willingness to increase sustainable awareness during and after college was a desirable outcome. Lastly, the author expected the target group to be very technologically savvy and possessing a phone/smartphone or computer.

5.4 Recruiting

This research was conducted through the use of an online survey, which was disseminated and advertised throughout the university through fliers, posters and emails from different professors teaching General Education Curriculum (GEC) courses to their students from all over the university. The data collection began in spring 2011. The survey link was advertised through posters and fliers in several different departments on The Ohio State University campus. Additionally, emails were spread from multiple professors/lecturers and department advisers to freshmen and sophomore students, after they were contacted and the importance of the study was explained to them. The last question on the survey was: “I am interested in this study and would like to participate in a focus group for a $5 Chipotle gift card.” When interested the participants left their email address, so that they could be contacted for further research workshops.
5.5 Participants

Two-hundred-forty-eight students, 67% were female and 33% were male, from a variety of academic departments including the College of Arts and Humanities, the College of Engineering, the John Glenn School of Public Affairs as well as the Fisher College of Business answered the survey. 50% of the participants were sophomore and 50% were freshman students (Figure 26). All of the participants were able to skip questions if necessary.

Figure 26: Online Survey – Gender & Year

The responses to the survey are represented within this chapter but the full responses can be seen in Appendix B.
5.6 Method

The survey consisted of both closed and open-ended questions including four types of questions: Demographic questions (Type 1) which were general single choice questions (Figure 27) asking for information such as gender, college year, housing, transportation and meals; followed by open-ended questions (Figure 28) about their favorite stores when shopping for different products such as apparel, groceries, furniture or electronics and their reasons for shopping there (Type 2). This helped to define the consumer habits of the students and the most important factors that influence their consumer decisions.

**SINGLE CHOICE QUESTIONS (TYPE 1)**

**My Transportation**

How do you usually get around?

- Car
- Bike
- Walk
- Public transportation
- Other:  

Figure 27. Example Single Choice Questions (Type 1)
After that the participants answered multiple-choice questions (Figure 29) about sustainability (Type 3): Where did they learn about a sustainable lifestyle? How knowledgeable/informed are they about a sustainable lifestyle? They rated their environmental awareness on a seven-point scale from very aware to not aware: How was their environmental awareness in high school, how is it currently in college, how would they like it to be in college and after graduation? The intent was to investigate their knowledge and awareness about the topic. Finally, they answered agree/disagree questions (Figure 30) about topics related to sustainability and specifics about motivations for behavior change in their personal life (Type 4). The survey was comprised of 50 questions. This amount of data from one person was necessary to reveal patterns in the target group’s knowledge, awareness, and lifestyle in relation to sustainability. On the one hand, Google Docs helped to create simple charts which show the data of the multiple choice question, while on the other hand, the qualitative analysis
of the open-ended questions required the identification of patterns and major answer categories.

MULTIPLE CHOICE QUESTIONS (TYPE 3)

Where would I make changes in my own life for the betterment of the environment or society?
Check as many boxes as apply
- Food
- Clothing
- Hobbies
- Recycling
- Reuse
- Not buying
- Transportation
- Furniture
- Electricity
- Water
- I would make no changes
- Other: ______________________

Figure 29. Example Multiple Choice Questions (Type 3)

AGREE/DISAGREE QUESTIONS (TYPE 4)

Price is more important than quality when it comes to food.
Do you agree or disagree with this statement?
- Agree
- Disagree

Figure 30. Example Agree/Disagree Questions (Type 4)

Since the online survey was created in Google Docs, the whole data was automatically saved as an Excel document. The program automatically created
pie charts for questions with only one possible answer (single choice) or bar charts for questions with the possibility of selecting several answers that apply (multiple choice). After looking through the answers, connections and relations between different topics were determined in order to identify possible trends or discrepancies.

The open-ended questions required a more in-depth analysis. All the answers were read and evaluated individually. The goal was to identify categories within the answers. For example, when asked for their favorite store to shop for apparel and why they go to shop there, the participants gave an enormous variety of answers. The first step was to divide the stores up into categories such as department stores and luxury fashion stores. Then their reasoning was also categorized. Commonalities were answers related to topics such as price, convenience, or accessibility. These categories enabled a qualitative analysis of the open-ended questions. Additionally, uncommon or interesting connections between reoccurring responses were identified.

5.7 Data & Findings

The demographic questions revealed that out of 248 students, 62% of the participants live in the dorms, 20% in a house and 18% in an apartment. Moreover, 60% of the participants are on a meal plan, whereas only 28% cook their own food. These numbers show the restrictions the majority of the
participants face in their daily routines. They are not able to influence the heat or AC use in their dorms, nor can they cook a lot due to the fact that the kitchen-student ratio in dorms is very unbalanced, in some cases dorms do not even have a kitchen. Lastly, the participants do not have an influence on the food in the dining halls. The Ohio State University Sustainability Plan published an executive summary in October 2010 showing that only 18% of the food offered in the dining halls is locally grown or processed and no organic food is offered at all. 71% percent of the participating students use public transportation and 15% a car. These results are certainly related to the fact that freshmen students are not allowed to have a car on campus for their first year. The majority, 61% grew up in suburbs followed by 18% of the participants that grew up in the country and 18% in the city. 97% use a Laptop regularly, 64% a phone, 34% a smartphone and 21% a computer. These percentage quotations represent Generation Y and their technological savviness.

Due to the fact that the vast majority use technology regularly, digital or technological applications might be more attractive to students than analog applications like books.

The open-ended questions about shopping revealed both the stores college freshmen and sophomores at The Ohio State University go to as well as the factors that drive these decisions. The majority of participants buy their groceries
at Kroger, Giant Eagle or CVS. Two main reasons contributed to this choice. These groceries stores are close by and cheap. A smaller number of participants mentioned that they buy their groceries at Whole Foods due to the quality of the food. No clear answer could be given to the questions on where the majority of the target group shops for apparel. Some shop at inexpensive fashion stores such as H&M or Gap. Others focus on brands and shop at small boutiques or designer stores, whereas another group shops at second hand or thrift stores due to price and the ability to find unique pieces. Fashion and apparel shopping seems to be mainly influenced by taste and price, rather than any concerns about social or environmental influences of the production and distribution. The answers of the participants show that they buy electronics at retailers of consumer electronics such as Best Buy, because they offer a huge variety of brands and products, at brand stores such as Apple, because they are brand loyal or online on websites such as amazon, because they offer the cheapest prices. The majority of respondents indicated that they usually do not buy furniture. The ones who answered the question mainly listed IKEA and Target due to their prices and range of furniture.

The 248 responses to the online survey indicated that participants gained most of their knowledge about a sustainable lifestyle in a school setting and not from their parents or friends. The survey also indicated that participants said they are likely to change their behavior if they have good incentives (90%), that they are
able to make changes in their life for the environment (93%) and that they would recycle if it would be more convenient (79%). These findings helped shape the subsequent research and supported the idea that sustainable lifestyle changes are possible and could be effective if centered towards the characteristics and needs of the target group such as good incentives and convenience.

Additionally, because of the increasing interest in sustainability throughout all three parts, the government (the university), businesses and the community (individuals), awareness of students seems to constantly increase, as can be seen in the increase of students’ awareness during high school and now in college (Johnson Controls, 2010).

The majority of students learned about environmental awareness in school (67%) and 49% of participants tend to inform friends about environmental concerns. The university campus seems to be the perfect location to educate students about sustainability, because they are used to learning in this educational setting and they are amongst their friends and peers who would share information about this topic. When asked where freshmen and sophomores would make changes in their own life for the betterment of the environment or society, 77% say that they would recycle, followed by reusing (70%), electricity (66%), water (63%), transportation (52%) and food (50%). Just 4% would not make changes in any areas. Participants are less likely to change in areas such as hobbies (24%), furniture (19%) and
clothing (31%). This could be related to the tendency that students show and
develop their personality through fashion as well as interests and hobbies. Making
changes in this area might be seen as an influence to their personality.

The majority thinks that they are quite well informed and knowledgeable about
a sustainable lifestyle. 67% of the participants did experience lifestyle changes
that have affected their level of sustainable behavior. Some reoccurring lifestyle
changes are dietary changes like becoming vegetarian/vegan or a gluten free
diet. These changes where either caused by health concerns or a change of
mindset through information/education: “I’m a vegetarian and I know because
I don’t eat animals I am saving a lot of water, fuel from transportation, food,
and plastic and other packaging materials“ (Participant #13). Other changes
were caused by a change of living circumstance. The students were either
moving out of their parents home to their own apartment or a dorm. Financial
concerns about paying own water and electricity bills or the accessibility of public
transportation on campus or recycling helped to implement more sustainable
behaviors. The change of becoming a college students enabled participants to join
students group with environmental interest, gain knowledge and information
through resources such as books and courses as well as friends: “Since coming
to college I have recycled daily and taken a couple classes in consumer sciences
on sustainability. I read No Impact Man by Colin Beavan which made me way
more sustainability-minded than I have ever been before“ (Participant #186).
The additional information, accessibility and convenience in combination with fun and enjoyment resulted in these behavior changes. The environment of the campus and the restrictions students face when living in dorms and dining through a meal plan need to be considered when designing behavior change initiatives. For example, promoting sustainable and local foods might not be successful when students do not have any influence on what food is offered in the dining hall. College freshman and sophomore students can only change their behavior when they have the ability to do so. Considering their environment and their situation is essential to advocate new behaviors students are able to implement. Table 4 shows five main insights from the online survey that inform a possible behavior change application.

<table>
<thead>
<tr>
<th>Incentives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Convenience</td>
</tr>
<tr>
<td>Accessibility</td>
</tr>
<tr>
<td>Information Sharing</td>
</tr>
<tr>
<td>Peers &amp; Friends</td>
</tr>
</tbody>
</table>

Table 4. Guidelines Online Survey
Chapter 6
Sustainability Awareness Study

Investigating college freshman and sophomore students’ environmental consciousness about a sustainable lifestyle through persona cards

6.1 Purpose
The goal of this thesis research is to develop a tool that can help students implement sustainable behaviors in their daily lives. To accomplish this goal, it is essential to know the target group of students.

The focus of this part of the research, sustainable awareness study, was to find out how the current generation of undergraduate first year and second year students is segmented according to sustainable awareness. The purpose of this study was to investigate the target group and their knowledge about as well as their attitude towards a sustainable lifestyle. The research also explored a potential willingness to move along the spectrum towards a more sustainable lifestyle by adapting new environmentally friendly behaviors.
A toolkit study investigating students’ awareness of sustainable lifestyles proved to be a good way to gain insights about sustainable behaviors that college sophomore and freshman students practice in their daily lives. Therefore, lifestyle persona cards were developed to investigate how Ohio State freshman and sophomore students are spread out on a spectrum from very sustainably aware to not sustainably aware.

6.2 Approach

A participatory toolkit is an effective research method to gain in-depth insights from participants. The participatory approach helps participants to express themselves visually and verbally. This approach enables the students to get more involved in the research process and communicate their personal experience. Persona cards as a key part of the toolkit support and help them to trigger their thinking to verbalize their personal experience with friends.

6.3 Assumptions

The awareness study was designed to learn more about the segmentation of the target group. Therefore, certain expectations lead to its current design. The assumption was that the knowledge of the students is diverse meaning that there is a wide range, from students who are very environmentally conscious to others that are not. Overall, the belief was that the majority of college sophomore and freshmen students would be moderately conscious and able to improve
their lifestyle towards a more conscious one. Moreover, a general willingness to change their lifestyle to a more sustainable one was predicted, based on the target group’s demographics. Furthermore, a report from Johnson Controls revealed that 18-to 25-year-olds want evidence that their employers are going beyond the minimum levels of environmental compliance by embracing all things green on an everyday basis (Johnson Controls, 2010).

6.4 Recruiting
Potential participants were recruited through targeted advertisements (posters & flyers). It was specifically mentioned that only freshman and sophomore students were potential participants. Additionally, all recruitment materials were placed and handed out in dorms for freshman and sophomore students. This effort was combined with an email invitation as well as a Facebook event. The emails were sent out to the students through professors and department chairs due to their access to the department mailing list. The email included a brief introduction as to what the study was about and mentioned the incentive, a 5-dollar Chipotle gift card, for participation. At the same time, potential participants could use the link that was included to access a website that was used as a sign up tool. If one of the mentioned dates fit their schedule, they could sign up for the study online.

6.5 Participants
Twenty-eight students, 64% of whom were female and 36% were male, from
a variety of academic departments participated in the toolkit study. 50% of the participants were sophomore and 50% were freshman students. All the participants filled out the online survey (Research 1) before coming to the toolkit study and therefore were set in the right mindset for the study.

6.6 Method

The recruited participants filled out the survey before they were interviewed face-to-face. In the interview, they were asked to think about three college freshman and/or sophomore friends, roommates or peers at The Ohio State University who fit the description of one of three persona cards, namely, the very environmentally conscious persona: “The environment is very important to me. I do a lot in my daily life to minimize my own impact”; the moderately environmentally conscious persona: “I care about the environment but I won’t sacrifice my whole lifestyle”; and the barely environmentally conscious persona: “I love to shop and enjoy my life. I don’t want to be restricted by the environment.” After that they were asked to check statements on the cards that specifically applied to their friends and they had the opportunity to add additional characteristics to describe their chosen peer (Figure 31. Persona Lifestyle Cards).
Figure 31. Persona Lifestyle Cards
Furthermore, each participant received a fourth card to fill out. This card was empty and they could add statements that described themselves using the previous persona cards as examples. Finally, they were asked to arrange all the cards on a spectrum from very environmentally conscious to not environmentally conscious and indicate with an arrow where exactly the personas fit on the spectrum (Figure 32. Persona Lifestyle Poster).

![Persona Lifestyle Poster (Participant #1)](image)

Figure 32. Persona Lifestyle Poster (Participant #1)

As a last activity they were asked two questions. The first question investigated the placement of their persona card and their personal willingness to move along
the spectrum in one or the other direction. Furthermore they were asked in which areas such as transportation or food they would be able to make changes and what exact changes they could make. The second question asked them where they thought most of their freshmen and sophomore peers were located on the spectrum and how one could motivate them to change their lifestyle.

6.7 Data & Findings

All but one of the very environmentally conscious cards were placed on the very environmentally conscious half of the spectrum (Figure 33. Persona Card Placement). The majority were placed within the first quartile of the spectrum. No persona was on the very end of the spectrum: Very environmentally conscious, therefore, there is room to improve, even for this type of persona.

All of the moderate persona cards, but two, were located in the middle of the spectrum. The majority was in the center quartile of the spectrum. None of the persona cards were placed in the last quartile of the spectrum, implying that all the students have some level of environmental consciousness. Two personas were in the first quartile and therefore very environmentally conscious.

The last group representing the barely environmentally conscious students was located on the not environmentally conscious half of the spectrum. The majority defines the last quartile of the spectrum. Two personas were placed on the very
end of the spectrum: Not environmentally conscious. No persona cards (not even the participants themselves) were placed in the last quartile at all.

The participants placed themselves on the environmentally conscious half of the spectrum, with the exception of four participants. Three other participants placed themselves in the first quartile of the spectrum and therefore categorized themselves as very environmentally conscious. The majority was located in the second quartile and therefore overall more likely to be environmentally friendly than not. Overall, the participants were in between the very environmentally aware persona group and the moderately aware group. They all seemed to

Figure 33. Persona Card Placement
perceive their own lifestyle as more environmentally conscious than the average college freshmen and sophomore student.

In summary, all three personas exist along the timeline and each persona group is located around a specific area that is distanced from the other groups. These three groups are defined by different lifestyle choices and habits and therefore need to be addressed in various ways that fit their individual needs.

All twenty-eight participants were willing to move along the spectrum to a more sustainable lifestyle and indicated this with an arrow. However, based on their current behaviors and knowledge, approaches that are specifically geared towards the target group seem to be required to enable behavior change. It should be noted that the participants positioned the majority of college freshmen and sophomore students at OSU on the less sustainable conscious half of the spectrum. Therefore, the main target group will consist of the moderately environmental conscious group, because opposed to the non-environmentally conscious group, which seemed to avoid any restrictions to their lifestyle, they are willing to change as long as it is not too big of a sacrifice for their lifestyle.

The persona lifestyle cards were based on the participant’s knowledge of their friends or what they think their friends know and do. Therefore, it is based on what the participants say their friends do or do not do, but it is not proven that this is 100%
in conformance with their actual behavior. The intent was to let the participants
talk about other people, because this approach seems to improve the accuracy of the
behaviors indicated on the cards. This is related to the tendency of people to glorify
their own behavior, “Sure, I care about the environment”. As generally known, when
it comes to friends, especially if they stay anonymous, people seem to be very honest
and do not try to make their friends look better than they are.

Based on the results of the toolkit with lifestyle persona cards, three different
 personas can be identified: A very environmentally conscious persona, a medium
environmentally conscious persona, and a non-environmentally conscious persona.

77% of the very environmentally conscious personas were female. This high
percentage, however, might be related to the fact that the majority of the
participants were female. The lifestyle statements, that include the upper quartile,
75%-100%, are ‘I recycle everything’ (85%), ‘The environment is important to me’ (92%),
and ‘I use reusable bottles and bags’ (85%). Other statements that describe
the majority of the very environmentally conscious personas are: ‘I only buy
organic or local food’ (58%), ‘I save energy wherever I can’ (69%), ‘I only bike, walk
or use public transportation’ (73%), and ‘I only buy things I really need’ (50%).
The statement of organic food is not only related to the environment. Participants
mentioned that this lifestyle choice is certainly related to one’s health and the
benefits of vegetables and fruits that are not treated with fertilizers. “Even eating
in a lot is not only good for the environment but it’s good healthwise it’s good for your wallet and stuff like that” (Participant #7). Saving energy is on the one hand related to the environment, but on the other hand students who do not live in the dorms save energy to keep energy costs down. “They all keep the thermostat lower just to conserve energy, but also to keep the costs of the bill down”(Participant #2). Moreover, the percentage of students that grow their own food is very low (15%). Some participants mentioned that they or their friends would have interest in growing their own food, however, they do not have the necessary space or facilities on campus to pursue this interest.

The medium environmentally conscious personas are evenly divided into 14 females and 14 males. “I cook my own food a few times a week” is the only statement reaching the first quartile with 75%. Five other statements, however, were considered by the majority: “I turn off electronic appliances when not in use” (68%), “I buy green products when they are cheap” (68%), “I have a car, but do not drive every day” (64%), “I shop organic and local from time to time” (57%), and “I pay attention to my energy consumption” (54%). Additionally, to these statements participants mentioned that this persona recycles frequently or if convenient. “Making it a regular part of every day life, just like the recycle bins in the dorm rooms, it’s just so easy to drop it in. It is just right there. I think the convenience is huge for freshmen and sophomores in college, because they are just not going out of their way to help for a lot of people” (Participant #11).
The third persona lifestyle group consists of 71% female personas and 25% male personas. The high amount of females in this group as well as the very environmentally friendly group is possibly related to the fact that 62% of the participants were female. Many participants referred either to their roommates or friends when choosing personas; therefore, female participants mainly refer to female roommates. Four statements fell into the highest percentile of 75%-100%: “I own many electronic appliances” (93%) and 82% responded for the following three statements; “Consumption is part of my daily routine”, “I do not pay attention to my energy consumption” and “I shop a lot”. The majority of non-environmentally conscious personas seem to only wear clothes of the latest collection (64%), eat out every day (57%) and drive a lot (61%).

An interesting fact is that most of the participants knew college freshman and sophomore students that fit into all three categories. This proves that even within this specific demographic, many different states of sustainable awareness consist. After the participants had filled out the persona lifestyle cards, they were asked what they liked or disliked about the lifestyle and attitude of the friends they picked as their three personas. Is there something they admire or they are annoyed by? A reoccurring answer was that participants seem to be annoyed by very environmentally conscious friends or peers when they try to force their behavior on others: “Sometimes the environmentally conscious person can be pretentious, because they are so much about the environment they believe you
should be that much about the environment. I feel sometimes people can get kind of arrogant or full of themselves when they feel like they’re doing something that everyone else should be doing.” “... what bothers me is they’re the ones that are really in your face about it. I just want to be: ‘Just don’t bug me.’ If I want to do it, I’ll do it.” However, on the other side a majority of participants mentioned that they admire the dedication of their very environmentally conscious friends: “My one friend Jessie, she recycles all the time and she cares about the environment a lot and if she’ll see a pop can in the trash, she’ll take it out and recycles it. I think that’s something not a lot of people will do and that’s a really good thing.” Another participant mentioned: “I think it’s just good if you make simple steps every day. That way you can keep up with it. I think that’s a good way to look at it. I definitely admire the people who do a little bit every day” (Participant #7). Looking at the other end of the spectrum at the non-environmentally conscious persona, the general issue participants mentioned was the fact that these personas do not seem to recognize their own impact: “She can be self-absorbed sometimes. She is a good person at heart; she cares about people. It’s just she gets blinded sometimes by what she wants more than anything else. That’s just indicative of being materialistic.” In conclusion, all participants seemed to have issues with at least one extreme. “I think the extremes of both sides are just bad. The people who almost look down on others for not recycling or not eating or growing organic or stuff like that, I think they are almost creating more enemies than they actually helping their cause by doing stuff like that. But then I also think that people on
the other side of the spectrum who claim ‘I don’t need to recycle or I can eat out whenever I want just because I can’, I think that’s also bad. I think somewhere in the middle is probably the best.”

This moderate middle section is the area where most participants see the majority of college freshman and sophomore students at The Ohio State University. The majority seems to be willing to integrate small changes in their lives for the betterment of the environment and society, but they do not want to sacrifice their whole lifestyle. The average freshman and sophomore tends to be in the moderate part of the spectrum leaning slightly towards the non-environmentally conscious side: “I think most people are little bit more on the non-environmentally conscious side. It’s not on purpose. For most freshmen and sophomores it’s just because they live in the dorms and you can’t really cook your food every day, you have to go and get it from one of the buildings.”

When the participants circled the area on the spectrum where they think the majority of the freshman and sophomore students are situated, they were asked if they do have any ideas or recommendations for how one could motivate this majority to change their behavior. They also received a couple of hints including networking, money, fun, information, electronic devices, college courses, events, books, coupons, social network groups or smartphone applications. The answers seemed to be diverse, however, one trend was spotted: Make it fun and students
are more likely to do it: “I think events help a lot. Making it fun, obviously, if
you don’t realize that you are helping the earth and it is just part of your daily
life it is easier to make a change”. “Events that are fun and events where they get
free things, because that’s what people like apparently. But at those events have
information and education that teach them about green lifestyles. Almost through
having fun, not just educating them, but while they doing something fun.” This
fun approach “would be better, because as I said if you jump down my throat
about it and you really push onto me, that’s when I kind of... get bothered by it.
In that sense if you make it more fun like ‘Hey! You should recycle’ instead of like
‘Why didn’t you recycle that?’ I guess would be a better way of approaching it.”

Engagement is another main concept referred by participants: “I think behavior
change comes a lot from just engaging with it and being confronted with it...
I think stories change behavior and experience changes behavior. So the idea that
it would be something extra-curricular or capturing freshmen when they first
come in so an introduction to the dorm being this is how many pounds of trash
the dorms generates and over the course of the year you will generate this much
trash and this much can be recycled, something like that.” This quote also reveals
the importance of combining motivation with concrete and applicable data:
“I mean definitely any type of information whether it’s through an application or
just some type of seminar. I know that the problems are there but I don’t always
know how I can help the situation, so I think I want to help I just don’t know what
the best way to do it is. How to correctly go about doing these things.”
The target group of freshmen and sophomores was described as “oriented towards experiencing things and it needs to be fun and it needs to satisfy me right now and it needs to be really tangible to them”. “For freshmen and sophomores it would definitely be the idea it needs to capture them and stick with them... You need to make it sensational; as sensational as trash can be”. Other ideas and recommendations for behavior change, which seem to have very promising potential, are making “simple steps every day. That way you can keep up with it. I think that’s a good way to look at it. I definitely admire the people who do a little bit every day.”

Besides the general ideas and recommendations, participants were asked to create their own persona cards and give specific, personal information about their behavior.

The majority of participants rated their own lifestyle as more environmentally conscious than the average freshman or sophomore student. All of them were willing to move along the spectrum towards a more sustainable lifestyle, when asked if they are willing to move along the spectrum one or the other way and how far. None of them, however, moved all the way to the end point, very environmentally conscious. They predominantly oriented their intended change on their very environmentally friend and settled their want-to-be environmentally consciousness around this persona. Furthermore, they were asked how they would get to this stage of being more environmentally conscious: “In which areas would you make changes and what specific changes would you make?” All of
the participants were able to answer this question and name several areas and specific ideas they would be able to change. Two of the mostly named areas were cooking and recycling more. Especially freshmen mentioned that when they have an apartment, they want to make sure that they regularly cook their own food and only eat out one night a week. These are certainly doable changes. Consuming less and buying only things one needs was mentioned several times. This statement is open to interpretation due to the fact that everyone can decide on their own what they need and how much. The outcome could vary immensely. The participants on the one hand realize that they are able to make changes in their personal lives, on the other hand, “students in this demographic are so dependent on university services to be more environmentally friendly. It depends on the direction the university wants to go.”

6.8 Implications for the design application

All these findings offer several implications for the design application. On the one hand, different groups are spread throughout the university. They all have different needs, interests in a sustainable lifestyle and experience with the topic. The application should be flexible enough to incorporate several different user groups. The workshop suggests that the focus should be on the moderate group, because they seem to represent the majority of freshman and sophomore students at the Ohio State University. Moreover, freshmen do have more restrictions due to their living circumstances. The vast majority of freshmen live in dorms and are
on the meal plan. This situation restricts their influence in the area of food and energy consumption.

Additionally the findings propose a combination of accessible information and education in combination with actionable solutions, so that the students know exactly what changes they could implement: “I definitely think that not enough kids are made aware of A) the problem and B) what they can actually do.”

Furthermore, personal involvement and interaction are key concepts to engage and motivate this target group: “It would definitely help to have specific information like that. I do definitely think that some kind of network where you actually have a group of people together to better the situation would work, because if you do it on your own, your friends and family are going to be like ‘You’re weird, going Hippie type of thing. But if you have a core group of people who are all working towards the same goal; that obvious, social support is really key and keeping the habits.”

The following quote also adds an important element: “There is definitely a lack of knowledge and there is also the aspect that every time someone tries to talk about the environment, it just gets super preachy and almost smug telling someone how to live their life, which doesn’t really get far, that’s not the message people need to hear.” This argues that the application should not promote the do-good approach,
but encourage students through fun and an enjoyable experience. The analysis of the sustainable awareness study informed seven guidelines (Table 5).

And last but not least, feedback about personal actions and impact would enable users to rate and judge their own behavior and encourage competition against other users: “The real way to motivate someone to be more environmentally friendly is just the campus mentality.”

<table>
<thead>
<tr>
<th>Make it Fun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital</td>
</tr>
<tr>
<td>Challenges &amp; Projects</td>
</tr>
<tr>
<td>Share Information</td>
</tr>
<tr>
<td>Community</td>
</tr>
<tr>
<td>Convenience</td>
</tr>
<tr>
<td>Step-by-step</td>
</tr>
</tbody>
</table>

Table 5. Guidelines Sustainable Awareness Study
Chapter 7
Information and Motivation Study

Investigate how college freshman and sophomore students inform and motivate themselves about the topic of sustainability through the use of different digital and analog tools

7.1 Purpose
As identified in the research setup (Figure 10) the purpose of this third study is to investigate how college freshman and sophomore students inform and motivate themselves about the topic of sustainability. An investigation of their needs and values was included in this process. The goal of the information and motivation study was to investigate how students inform and motivate themselves about sustainability in their daily lives. An investigation about the advantages and disadvantages of using digital and analog tools by this target group was the main goal of this study. Furthermore, in a participatory activity the participants developed their own “ideal tool” for information and motivation.
7.2 Approach

A participatory toolkit proved to be an effective research method to gain a comprehensive understanding of participants’ preferences. This method helps participants to express their interests through the use of visual images. This method enabled students to become more engaged in the analysis of the presented example tools and communicate their individual preferences. Printed images of the tools helped to connect the qualities of the tools with the participants’ preferences and verbalize their personal likings and dislikes.

7.3 Assumptions

The information and motivation study was designed to learn more about the information and motivation behavior of the target group. Therefore, certain existing tools were selected and helped to design the study. The assumption was that the students might have a preference of either a digital or an analog tool. For that reason they analyzed both so that they have a direct comparison. The selection of tools also included tools with two different foci, either motivation or information. The hypothesis was that tools are good at either motivation or information for different reasons, but that students would like to receive both. Overall, the belief was that the evaluation would trigger certain desires about what an ideal tool could and should be able to achieve. Also, a general tendency towards digital tools was predicted, based on the target groups’ demographics, which define them as the digital generation (Tapscott, 2011).
7.4 Recruiting

Potential participants were recruited through targeted advertisements (posters & flyers). The recruitment process for the awareness study, described previously, and for the information and motivation study were the same. It was specifically mentioned that only freshman and sophomore students were potential participants. Additionally, all recruitment materials were placed and handed out in dorms for freshmen and sophomore students. This effort was combined with an email invitation as well as a Facebook event. The emails were sent out to the students through professors and department chairs due to their access to the department mailing lists. The email included a brief introduction as to what the study was about and mentioned the incentive, a 5-dollar Chipotle gift card, for participation. Potential participants could use the link that was included to access a website that was used as a sign up tool. If one of the mentioned dates fit their schedule, they could sign up online for a focus group until the sessions were filled.

7.5 Participants

Five participatory workshops consisting of four to one participants, 38% of whom were female and 62% were male, from a variety of academic departments, participated in the study. The first focus group consisted of a group with three males and one female participant, the second one of four males, the third one of two females, the fourth one of one female, and the fifth and last focus group
consisted of one female and one male. All 13 participants were either college freshman or sophomore students.

7.6 Method

A participatory toolkit workshop turned out to be a useful method to examine the students’ demands on such an information tool. Therefore, current information and motivation tools were provided so that students could evaluate these examples and create an ideal tool after they determined the assets and drawbacks of each of the current tools.

There are two parts to this project; an analysis of current tools and the development of a new tool concept. The participants were introduced to four information and motivation tools about living a sustainable lifestyle. After investigating the tools, the participants were split up into two groups and each group analyzed the positive and negative aspects of two of the tools putting their summary on a poster and then presented these posters to each other. After that they created their own ideal tool for information and motivation as one group.

The recruited participants filled out the online survey (see chapter 5) before they took part in the participatory sessions. Some of them were also part of the awareness study (see chapter 6), which was conducted two weeks earlier. After a short introduction to each other and an overview on what the sessions would be
about as well as how it fit into the bigger picture of the research, the participants were divided into two groups. Each group assessed two tools for information and motivation; one analog tool and one digital tool, which adds up to four different tools total per session. Group one analyzed three smartphone applications (digital tool) on a smartphone that was provided to them (Figure 34) and a printed version of a coupon book (Figure 35). The second group analyzed a Facebook group (digital tool), which they could access on a computer (Figure 36) and two course plans (analog tool), which they received printed versions of (Figure 37). For the evaluation the participants first investigated, tried out and explored the tools, then they created one poster for each tool. Their assignment was to list up to three pros and up to three cons for each tool on the poster. Moreover, it was specifically mentioned to them that they should focus on how these tools help to inform people and how they motivate people to act.
Figure 34. Smartphone Analysis Setup

Figure 35. Coupon Book Analysis Setup
Figure 36. Facebook Group Analysis Setup

Figure 37. Course Plans Analysis Setup
All of the four tools are intended to inform and/or motivate users about sustainability and a sustainable lifestyle.

The smartphone had three applications, namely Green Spot, iRecycle, and Gen Green Life. Green Spot is an application where interested users can find podcasts, news, and tips about sustainability; an application to stay up-to-date on current events and topics (Figure 38). iRecycle helps people find places to recycle a range of products from car batteries to yard waste. iRecycle provides access to more than 800,000 recycling and disposal resources for more than 240 materials, plus the latest in green news to match your lifestyle (Figure 39). The third application, Gen Green Life, is a resource to find local green businesses, products, and services near you. It supports people who want to live a locally-focused, environmentally conscious lifestyle (Figure 40).

Figure 38. Green Spot
The Coupon Book, “Klimasparbuch” (translation: “climate savings book”) was an example from Germany targeted towards inhabitants of Munich. This coupon book consisted of two parts. An informational part on sustainability and how much money and CO2 a sustainable choice versus the standard consumer choice.
would save. It, for example, shows how much money and CO2 one can save when buying local, in season food and where one can find seasonal food in Munich. Furthermore, a seasonal calendar helped to identify what is in season and what is not. The second part of the booklet provided the user with about 50 coupons worth 500 dollars that can be used in locations such as local, organic bakeries or city bike rentals. The information section and coupon section are divided into five color-coded topics, i.e., food, consumption, transportation, living, and building/renovation. The user can find tips, information and coupons in all five areas of interest (Figure 41).

Figure 41. Coupon Book
The Facebook group, Do One Thing (DOT) from the college William and Mary, is an initiative that encourages students, faculty and staff at the college to start with one small change in their daily life for the betterment of the environment and/or society. Change one habit you are passionate about, share it with the rest of the community and get inspiration as well as feedback on your progress. The participants might only change one small thing at a time, but the collective action of the whole group adds up and all these small changes together have a huge influence. The Facebook group provides interested members with a video about the mission of the initiative. Besides that, users can post and share their DOTs on the wall, can access further resources on the information page, and post as well as share images and videos with other members on the page (Figure 42).

The last tool, the course plan, consisted of two different course outlines. The first course plan gives a more in-depth overview of very specific topics such as Biomimicry, Sustainable Materials, and Climate Change. The topics will be learned through readings and class discussion of theory and case studies. This approach is focused on teaching the students diverse concepts of sustainability in different areas rather than actually relating it to their lives (Figure 43. Course Plan).
Figure 42. DOT Facebook Group
**Course Plan**

**Melanie Dreser, Focus Group**

### Course Example 02: Introduction to Sustainability

Introduction to Sustainability will cover sustainability definitions, assessment & actions from a multidisciplinary perspective to help learners create a personal definition that will inform their actions. It will teach students how to understand the complex confluence of social systems, environmental economics & ecological literacy. Themes of pluralism, resource conservation and systems thinking will provide the framework to analyze how to meet one’s basic needs of food, water, shelter, energy & transportation. Students will have the opportunity to work on hands-on projects.

Draft of course:

- Journal: What does sustainability mean to you? How do you define sustainability right now?
- "What is sustainability?"
- Get ready for ACTION! Sign up for student activities.
- What has OSU already done? What’s next? How can students become/stay involved?
- Foundations of sustainability: Systems Theories & Practices. What are they & can we change systems?
- What is home water conservation: Residential tips on video
- Effective communication: fiber of the social fabric of sustainability. Practice strategies OUTSIDE!
- Economics, Peace & Globalism
- Calculate your own eco footprint
- Sustainability Assessment: how do we know sustainability when we see it?
- Sustainability Assessment: Tools & Methods
- GO OUTSIDE! Work together on project outside: Garden?
- Social fabric: power & privilege. How are power & privilege connected to social & environmental justice?
- Meeting basic needs: water. Rainwater harvesting presentation & tour. Rainwater Harvesting System
- Meeting the world’s food needs: can fishing & aquaculture meet the need for protein sustainably?
- Activities: HOMEWORK: Eat local for one week.
- LCC Energy Management Program
- Reuse, "waste" & recycling
- Ecological planning & design. Student-led lecture??
- Student Project Updates / Presentations (own sustainable project)

<table>
<thead>
<tr>
<th>Journal: What does sustainability mean to you?</th>
<th>Student Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition: “What is sustainability?”</td>
<td>What has OSU already done?</td>
</tr>
<tr>
<td>How can students become/stay involved?</td>
<td>Foundations of sustainability: Systems Theories &amp; Practices</td>
</tr>
<tr>
<td>What is home water conservation?</td>
<td>Effective communication: fiber of the social fabric of sustainability.</td>
</tr>
<tr>
<td>Economics, Peace &amp; Globalism</td>
<td>Calculate your own eco footprint</td>
</tr>
<tr>
<td>Field Trip</td>
<td>How do we know sustainability when we see it?</td>
</tr>
</tbody>
</table>

Figure 43. Course Plan

178
The course example 2 proposes a more general overview of sustainability. Students will receive a general explanation as to what sustainability is and learn, through hands-on projects and student activities, how sustainability relates to their own lives. Examples of topics the students would work on in the class are “a journal: What does sustainability mean to you? How do you define sustainability right now?”, “Calculate your own eco footprint”, and “Homework: Eat local for a week.”

In addition to the actual tools to be evaluated, the participants received a toolkit including sharpies in various colors, glue and scissors, as well as copies of photos of the tools, so that they can use them for their posters. They had the possibility to both write down their thoughts and/or use the images to refer to specific parts of the tool they were talking about.

Once the tool evaluations were done, the groups presented their boards to each other (Figure 44). They started off with a short explanation about the tool, followed by their personally investigated advantages and disadvantages. Once both groups learned about all four tools, all the participants formed one large group to create a board describing an ideal tool for information and motivation about a sustainable lifestyle. For this task the group received another toolkit consisting of an empty board, several sharpies, different forms and shapes of colored paper, glue and scissors, as well as all the images from the four tools. The group had another 15 minutes to work on the ideal tool, before they presented it (Figure 45).
Figure 44. Examples of Tool Evaluations

Facebook Group

- Easy to access the number of participants
- Can post events
- Anyone can contribute to the page

- Time consuming to post and keep up-to-date
- Not easy to keep track of discussions

iPhone App

- Go Green Life App:
  
  - Good idea where it makes it easy for a user to search what they are looking for based on industry, type, and distance based on type of transportation.
  
  - I would be more willing to look up sustainable things if I realized how close they were, especially things that are within walking and biking distance.

- Recycle App:
  - Many types of recyclable materials are in the database, more than I knew could even be recycled.
  - I also like how places you can recycle events about sustainability, and articles relating to the environment are all in one convenient place.

- Green Spot:
  - User friendly and easily organized based on issues, daily life, etc.

- Go Green Life App:
  - Many of the searches I did did not turn up any results which was frustrating after a while.
  - Also, one of the results was misleading in the way that it did not give me what I was expecting. (Lei Chipotta as a farmer’s market)

- This application is only articles.
  - While articles may be informative and interesting, there is usually no practical application associated with it.
Figure 45. Examples of Ideal Tools
7.7 Data & Findings

The qualitative research with a total of 13 participants gave some unanimous opinions. Overall, the digital tools in comparison to the analog tools were the preferred tools. All five of the five focus groups mentioned that one advantage of the smartphone applications is that they are very easy to use. Besides being convenient and a versatile resource, the iRecycle app covers an elaborate list of items and products that can be recycled. In iRecycle “many types of recyclable material are in the database, more that I knew could even be recycled...” (Session #5). However, participants mentioned that the apps did not provide any motivation to change, they were only informative. “Unless you are very interested in green products, recycling etc. I don’t know how many people would use it on a regular basis” (Session #4). Moreover, students mentioned that some information was not up-to-date and that some searches did not end in a result. A participant from Session #3 noticed that the application did not list any places on campus to recycle, even if she knew that there are options available. Up-to-date and well-organized applications that were well facilitated by the owner are important to the user.

The coupon book appealed to all participants of the focus groups by being “well organized” and offering monetary incentives, coupons, as well as information about how much CO2 and how much money one can save by making one choice versus the other. The coupon book was perceived to be very “informative” and,
also, motivational. “Both the coupons and the money saving information for
every topic are good motivators.” (Session #4) Participants also acknowledged
the fact that the book was inexpensive and very detailed. The fact that the coupon
book is tied to a city caused both positive and negative responses. Some students
thought this would motivate people more since the information is more accurate
when based on a specific city. Other participants, however, thought that a more
universal book would be more appealing to the masses. The concept of a book
generated doubts in the mind of some focus group participants. They believed
that a digital version would be more appealing to their demographic; more
convenient, because one would have everything on their phone, for example, and
always with them; and more sustainable due to the fact that no paper is wasted.

The second digital tool, the Facebook group, appeals to the main demographic.
Facebook is a large community of people hence a huge number of students could
join the group. Supportive videos are seen as descriptive and entertaining. People
are encouraged to make small changes and steps, which is easier to follow and
not overwhelming for participants. “It has lots of suggestions on simple things
people can do for sustainability” (Session #2). The importance of sharing ideas
and accomplishments was mentioned throughout the focus groups. “I like how
this website uses the public’s opinions and ideas. This page serves as a forum
to discuss and share” (Session #4). The magnitude of comments and ideas,
however, creates confusion and makes it hard to keep the page well organized.
The perception of Facebook is not always professional and convincing. “Facebook isn’t always taken seriously. It is also a lot easier to “like” or join a group or post than to actually do something.” The commitment to fulfill one’s own goal is lower in Facebook groups than in actual communities, where people meet up in the real world. Finally, the main message “Do One Thing” (DOT) was hard to find on the page, but without this central piece Facebook members might not understand the whole concept.

The course description of example #2 mentions that “students will have the opportunity to work on hands-on projects.” This characteristic was defined as the preferred learning experience by all five focus groups. “When it comes to the topic of being sustainable, hands-on activities would be a much more effective learning tool (than lecture and information based courses). For example, field trips, projects, eating locally, calculating my eco footprint sounds much more informative and exciting than writing a paper. When people learn and do green things, they are more likely to do them on their own” (Session #4). As described by the participant of Focus Group #4, all students seem to be more receptive towards hands-on activities and projects. Besides these activities the definition “What is sustainability?”, the journal “What does sustainability mean to you?”, and the questions “What has OSU already done?” as well as “How can students become/stay involved?” are reoccurring important parts of course example #2. It “appeals to the general student population” versus course 1, which is depicted
as “good for majors geared toward sustainability” (Session #1). The disadvantage of the course example #1 is the fact that it mainly includes abstract ideas, which are informative, but hard for students to apply. Topics such as sustainable buildings, sustainable engineering, sustainable industry and businesses, and sustainable cities are certainly informative, but do not get students motivated which is important to get them involved or to change their lifestyle.

All five focus groups decided independently that the ideal tool would be digital due to the fact that it appeals the most to the targeted demographic of college freshman and sophomore students. They suggested a combination of a website with the opportunity to share information and activities and a smartphone application so that one is permanently able to access incentives such as coupons. “So the iPhone app is there if you are interested. It is not forced down your throat or shoved down your throat. It is definitely a resource you can use if interested. That was my idea: It is easy, accessible, free and you can have every little part that was cool in the course plan, the Facebook group and the coupon book all in one. It was there if you wanted it. It was my ideal tool” (Session #4). The participants insisted on a connection of information and motivation. It was mentioned unanimously that tools that focus on either only motivation or information and leave out the other part will not be able to change behavior effectively. Moreover, they liked the idea of a tip of the day or one small change that can be implemented. Besides these specific ideas, participants agreed on
a couple of more abstract ideas that an ideal information and motivation tool should incorporate: Technology based, community & sharing, convenient & easily accessible, information & activities, and incentives. In addition to all the ideas the participants came up with, they still have concerns whether a tool for information or motivation can really influence their daily lifestyle and therefore their behavior. “It sounds interesting and I’d learn a lot, but I don’t know if I would go back and create a building that would be sustainable. I keep it in mind and would make small daily choices, but I don’t know if that would impact me in the long run” (Session #4).

In summary, the participatory sessions revealed that students need information to be able to change their daily behaviors to a more sustainable lifestyle, however, at the same time they want to be motivated. Without motivation the likelihood to change is very low. It also revealed that technology is a central component to participants’ lives and therefore offers the best integration possibilities for an information and motivation tool. Lastly, convenience, the integration of friends and peers, ease of use, and incentives are all traits the tool should offer according to the participant’s opinion. The following table (Table 6) lists guidelines for a possible design application that could be identified through the information & motivation study.
<table>
<thead>
<tr>
<th>Make it Fun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Involvement</td>
</tr>
<tr>
<td>Social Support</td>
</tr>
<tr>
<td>Interaction</td>
</tr>
<tr>
<td>Network</td>
</tr>
<tr>
<td>Actionable Solutions</td>
</tr>
<tr>
<td>Feedback</td>
</tr>
</tbody>
</table>

Table 6. Guidelines Information & Motivation Study
Chapter 8
Design Application

“Games don’t distract us from our real lives. They fill our real lives with positive emotions, positive activity, positive experience, and positive strength.” (Jane McGonigal, 2011)

Literature reviews, a new behavior change model, as well as design research and analysis informed the development of a design application for behavior change.

Figure 46. Components Informing the Design Application
The three studies revealed a lot of interesting facts that need to be taken into consideration when designing an application for college freshmen and sophomores. The research on behavior change, the needs of the target group and workings of motivation suggest the use of a digital application for behavior change using fun as a motivator. Game mechanics can motivate people to try new things and implement them into their daily lives. This approach will be discussed later in this chapter.

8.1 Why a game?

In previous chapters the problems and hurdles that are needed to change in order to enable successful behavior change were analyzed. The fact that new behaviors are hard to learn and old behaviors even harder to unlearn, led to the conclusion that a behavior change approach needs to be engaging and long-term, rather than a one-time intervention. Game-like mechanics can help to achieve this long-term engagement while making it fun and enjoyable to learn new behaviors. One main advantage of games is that they are motivating. We play games because we like to. Usually we do not get paid to play games. We are intrinsically motivated, because we like the engagement of games, the feeling of achievement, the challenge and competition.

We enjoy the experience of playing itself. We do not only focus on a potential goal or outcome. The study participants expressed the same need. They were willing
to change their behavior, however, the process of doing so should be fun and engaging. One participant phrased it like this: “... making it fun, obviously, if you don’t realize that you are helping the earth and it is just part of your daily life, it is easier to make a change.”

Game-like mechanics are only one method to create a fun and joyful experience for behavior change. The investigation of the target group revealed that many people of Generation Y play games. Most of them are even exceptional gamers due to the fact that they have spent ten thousand hours playing games before the age of twenty-one. Moreover, they articulated a need for a digital tool for behavior change.

When talking about games, it is important to keep in mind that games are not only traditional computer games such as *World of Warcraft*. These traditional examples of games that we often think of are games based on so-called games mechanics. Game mechanics are a set of rules that construct an enjoyable game. However, this set of rules can be applied to events in our daily lives, to social networks or to tasks or experiences at work or our homes. As a result, game mechanics have potential application into other parts of our lives while giving the advantages of traditional games.

In summary, games are an ideal tool for behavior change for three main reasons: They can engage people in the long-term and can therefore be used to create
several opportunities to change behavior. Games are fun and engage players in a joyful experience. Generation Y is used to playing games and they do not need to be convinced to participate in digital or virtual games.

8.2 Personas

In order to develop a successful game concept it is essential to develop personas that show how different users would use and interact in the game. The secondary and participatory research on the target group helped to define four personas. The sustainable awareness study led into the development of personas, characters that describe different types of people, that might use the design application. These personas differ in their level of a sustainable lifestyle as well as their year in college (either freshman or sophomore). Depending on their year in college, they each have the opportunity to make more or less consumer and lifestyle choices. Their level of an environmentally friendly lifestyle determines if they are possible targets for behavior change.

The awareness study gave evidence that three different groups of environmentally friendly lifestyles exist for OSU college freshman and sophomore students. Furthermore, the students in these groups have restricted influence on their own lifestyle due to the fact that the vast majority of freshman live in dorms and are on a meal plan whereas the majority of sophomores are not. Chris Jones, a freshmen is the first persona. He lives a moderate environmentally friendly lifestyle. Lindsay
Brown, also a freshman, in contrast to Chris carries out a non-environmentally friendly lifestyle. Another persona with a moderate environmentally friendly lifestyle is the sophomore student Vanessa Clark. Joe Lopez, the second sophomore student performs a very environmentally friendly lifestyle.

**Chris Jones**

Chris Jones (Figure 47) is 19 years old and majors in international studies. He grew up in an urban environment in Pennsylvania. Chris gained most of his education about sustainability in high school. Since he is a freshman and his willingness to change only includes small changes, Chris will mainly look for information about sustainability. His role in the game application will be the “Information Seeker”. The best approach is to inform and educate him. For his sustainable habits, he usually turns off electronics when not in use and shops organic or local from time to time.

Chris leads a moderately environmentally friendly lifestyle. He does not go out of his way for the environment or society, however, he implements simple and easy sustainable practices in his daily life. Since he does not have any influence on the food offered in the dining halls, he does not really worry about where it comes from or if it is grown organically or not.
CHRIS JONES

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:30am</td>
<td>Breakfast at the dining hall: Bagel and Milk</td>
</tr>
<tr>
<td>08:15am</td>
<td>Takes Cabs to school</td>
</tr>
<tr>
<td>09:00am</td>
<td>International studies class</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Dining Hall for lunch: Pizza &amp; Gatorade</td>
</tr>
<tr>
<td>01:00pm</td>
<td>Studying in the library</td>
</tr>
<tr>
<td>02:30pm</td>
<td>Meet friends for a recreational basketball game outside</td>
</tr>
<tr>
<td>03:30pm</td>
<td>International studies class: Chocolate bar</td>
</tr>
<tr>
<td>04:30pm</td>
<td>Play xbox with friends</td>
</tr>
<tr>
<td>07:00pm</td>
<td>Dinner in dining hall: Burrito &amp; fruits</td>
</tr>
<tr>
<td>08:00pm</td>
<td>Facebook, chat and watch movie on netflix</td>
</tr>
<tr>
<td>11:00pm</td>
<td>Unplugs his electronics and go to bed</td>
</tr>
</tbody>
</table>

Table 7. Average Day, Chris Jones (Persona 1)

Figure 47. Persona Card “Information Seeker”
Vanessa Clark

Vanessa Clark (Figure 48) is a 21-year-old sophomore student majoring in design. She grew up in rural Ohio and learned about sustainability mostly from her parents. Vanessa is willing to incorporate moderate changes in her daily behavior for the environment. She recognizes the importance of sustainability, however, she is sure that she will not turn into a complete environmentalist or hippie and give up her current lifestyle at all. Her role in the game is the “Behavior Changer”.

Vanessa is moderately environmentally friendly in her daily behaviors. She does her share for the environment and implements moderate changes; however, she is not willing to sacrifice her whole lifestyle. Since she lives in her own apartment she usually cooks her own food and pays attention to her utility bills mainly to save money.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:30am</td>
<td>Cereals in my apartment</td>
</tr>
<tr>
<td>08:30am</td>
<td>I walk to classes</td>
</tr>
<tr>
<td>09:00am</td>
<td>Design classes</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Lunch: Leftover pasta I cooked last night</td>
</tr>
<tr>
<td>01:00pm</td>
<td>Design classes</td>
</tr>
<tr>
<td>04:30pm</td>
<td>Yoga class</td>
</tr>
<tr>
<td>05:30pm</td>
<td>Studying in the library: Bring own water bottle</td>
</tr>
<tr>
<td>07:00pm</td>
<td>Meet friends for dinner: Salad &amp; dessert</td>
</tr>
<tr>
<td>09:00pm</td>
<td>Work on design project</td>
</tr>
<tr>
<td>10:30pm</td>
<td>Prepare tea, facebook and chat</td>
</tr>
<tr>
<td>11:00pm</td>
<td>Shop retro books online before heading to bed</td>
</tr>
</tbody>
</table>

Table 8. Average Day, Vanessa Clark (Persona 2)
Joe Lopez

Joe Lopez (Figure 49) is a 20-year-old engineering major in his sophomore year. He grew up in several different countries due to his father’s job. Since he experienced different cultures and sustainable lifestyles, he learned early on that taking care of the environment and social sustainability are very important. He already lives a very sustainable lifestyle, but is still willing to change more for the environment. He is involved in college clubs, which focus on sustainability. Due to his high level of knowledge about the topic and his exemplary sustainable lifestyle, he acts as an “Adviser” or “Advocate” in the game and helps to inform other people and answer questions.
Joe is very environmentally friendly. On the one hand, he considers the effects of his actions and behavior on the environment and, on the other hand, he even acts as an advocate and tries to inform and help other people. As the president of the “Sustainable Campus” club he organizes meetings and events to encourage other students to develop more sustainable lifestyles. He shares an apartment with two roommates and they all pay attention to their energy and water consumption.

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00am</td>
<td>Toast with jam in my apartment</td>
</tr>
<tr>
<td>08:30am</td>
<td>I bike to classes</td>
</tr>
<tr>
<td>09:00am</td>
<td>Engineering classes</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Meeting with “Sustainable Campus” club committee for final planning for evening session</td>
</tr>
<tr>
<td>01:00pm</td>
<td>Lunch sandwich prepared at home this morning</td>
</tr>
<tr>
<td>01:30pm</td>
<td>Studying in the library</td>
</tr>
<tr>
<td>03:30pm</td>
<td>Engineering classes</td>
</tr>
<tr>
<td>06:00pm</td>
<td>“Sustainable Campus” club event: Scavenger hunt “sustainable behaviors”</td>
</tr>
<tr>
<td>08:30pm</td>
<td>Dinner with roommates: Cook pasta with veggies</td>
</tr>
<tr>
<td>10:00pm</td>
<td>Studying, facebooking, and socializing with roommates</td>
</tr>
</tbody>
</table>

Table 9. Average Day, Joe Lopez (Persona 3)
Lindsay Brown

Lindsay Brown (Figure 50) is a 19-year-old marketing student. She grew up in the suburbs of Columbus, Ohio. Lindsay did not learn about sustainability from her parents or in school. Since her willingness to change is very low, the approach for her is realization. Unless she is made aware of the influences she has on the environment, behavior change is very unlikely to happen. Lindsay does not take a starting role in the game application. The latest fashion is part of her lifestyle. Furthermore, Lindsay owns a lot of electronic appliances.

Lindsay is not very environmentally friendly. Her personal lifestyle is more important to her than the environment. Therefore, she does not want to be restricted by the environment. Consumption is part of her daily routine. She is a
freshman and does not have a big influence on utility and food since she is on the meal plan and lives in a dorm.

Three of the personas will have specific roles in the game application depending on their behavior and opportunities to implement behavior changes. For the game development and criteria, the overall target group will be taken into consideration. However, different users will be able to use the game differently due to it being a flexible system.

**Lindsay Brown**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00am</td>
<td>Breakfast at the dining hall: Bottle of orange juice &amp; ready-made oatmeal</td>
</tr>
<tr>
<td>08:30am</td>
<td>Friend is giving me a ride to the business school for class</td>
</tr>
<tr>
<td>09:00am</td>
<td>Marketing classes: check emails on smartphone</td>
</tr>
<tr>
<td>12:00pm</td>
<td>Dining hall for lunch: To-go box with food &amp; bottled water</td>
</tr>
<tr>
<td>01:00pm</td>
<td>Marketing classes: Mini-trail mix</td>
</tr>
<tr>
<td>02:30pm</td>
<td>Meet friends for a cup of chai latte at coffee shop to study</td>
</tr>
<tr>
<td>03:30pm</td>
<td>Gym at the treadmill: Bottled watter &amp; mp3 player</td>
</tr>
<tr>
<td>04:30pm</td>
<td>Ride to mall with friends: Room decoration &amp; new shirts</td>
</tr>
<tr>
<td>07:00pm</td>
<td>Dining hall for dinner: Too much food; throw away left overs</td>
</tr>
<tr>
<td>07:30pm</td>
<td>Finally in my dorm room: Oops, left the light on during the day</td>
</tr>
<tr>
<td>08:00pm</td>
<td>Watch TV in my bed until I fall asleep</td>
</tr>
</tbody>
</table>

Table 10. Average Day, Lindsay Brown (Persona 4)
Games as discussed previously have the significant advantage of providing intrinsic motivation. They can teach us new skills and knowledge relevant to behavior change. They motivate us to keep going even if we might fail a few times, even though behavior change is a high effort task. They can give us feedback on how we are doing compared to others and motivate us further by showing us our progress. Games are an ideal tool to educate and motivate. Therefore, a well designed and thought-through game can help trigger and lead to long-lasting behavior changes. They can be designed with different building blocks or elements. While in one game resistance is used as encouragement or to promote change, in another game competition is used to motivate players. Hence, different games use different elements to guarantee successful game play. This section will
explore four main elements that will be used in the game concept: Competition, Community, Rewards and Creation.

8.3.1 Competition
Competition is the driver of success. Having grown up in an environment that promotes the survival of the fittest, we are used to competing and even enjoy challenges and a feeling of success once we achieve something. The integration of this natural tendency into games is essential. The ultimate goal of a game is to work towards a desired outcome to win and achieve, therefore, competitiveness can be seen as a tool in achieving this goal. Players can compete against the game itself or against other players.

8.3.2 Community
The community of players is another important element. We can compete against individuals or groups within the players’ community. We can also team up with them and work together towards a goal. The community of players also acts as a network that can execute social pressure. Individuals’ achievement can be seen as benchmarks for other players. Being part of a community that works towards a common goal is rewarding in itself. The tendency of people to share their success with others and exchange information drives the need of being part of a group or community.
8.3.3 Rewards
Rewards are essential for successful gameplay. When working hard towards a certain outcome, we want to be recognized for our efforts. These rewards can come in many forms. They can be changes in status, or specifically, an increasing level of status. Recognition by others such as other players or friends can be rewarding. Extrinsic rewards could be money, a trophy or grades. Competition usually gives its own extrinsic reward since it encourages a player to win and beat others. However, the experience of the competition or the game is an intrinsic reward. When somebody enjoys the activity of doing something, then this experience is intrinsically rewarding. It might turn into an extrinsic reward when the player competes for the cheers of others rather than the joy of the experience itself.
Successful games provide both intrinsic and extrinsic rewards to motivate players.

8.3.4 Creation
Creation is one of the characteristics that distinguish Generation Y from previous generations. They do not only want to play or use something, they want to create or add to the system. These intentions require certainly more effort than just participating, but they are strong motivators. Being able to contribute to and improve a game is a powerful motivator for gamers.

These four elements are the driving concepts for the game. Throughout the gameplay they will be addressed in various occasions.
8.4 Actionable Outcome

The three studies revealed several expectations the target group of college freshman and sophomore students have in an application for sustainable behavior change (Table 11).

They expect incentives such as coupons. Moreover, they want the ability to share information and ideas with peers and friends and discuss and express their own opinion. They also believe that a network or group of people is more successful than individual behavior change. They do not only want information, but also actionable solutions. Furthermore, these solutions should be convenient and possibly implemented step-by-step. However, they do not need to be easy. Projects and challenges would satisfy their need for competition. They expect feedback on their behavior to be able to improve and compare. Flexibility is another driving factor. Being able to access the application whenever they want to is important to them. To do so, they demand a digital application since it resonates with their current lifestyle.
The participants also mentioned requirements for successful behavior change (Table 12). They stated that their likelihood to change is high if they feel a real commitment and engagement. Personal involvement is key for change. Moreover, they do not want to be pushed and they prefer freedom of choice. They would rather focus on a joyful experience than the outcome. This experience ideally should be versatile and provide social support. They believe that they can change if clear, well organized and information is available, so that they can understand the overall concept and their impact. But this is not enough, actionable solutions and motivation is key to apply this knowledge.

Table 11. Guidelines for Application (Research Studies)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Make it Fun</td>
</tr>
<tr>
<td>2.</td>
<td>Social Network</td>
</tr>
<tr>
<td>3.</td>
<td>Incentives</td>
</tr>
<tr>
<td>4.</td>
<td>Digital</td>
</tr>
<tr>
<td>5.</td>
<td>Interaction</td>
</tr>
<tr>
<td>6.</td>
<td>Information &amp; Motivation</td>
</tr>
<tr>
<td>7.</td>
<td>Actionable Solutions</td>
</tr>
</tbody>
</table>
Table 12. Guidelines for Behavior Change (Research Studies)

1. Don’t push
2. Don’t preach
3. Enjoyment
4. Engagement
5. Simple Steps
6. Social Support
7. Freedom of Choice

In summary, the research suggests a game as a tool for sustainable behavior change. But it does not need to be a game in the traditional sense. Moreover, the functions of a social network, such as sharing information and ideas, communicating with friends and interacting with others should be integrated. The game should not only be virtual, but actionable solutions for the reality need to be integrated. Tying the fun games offer into the digital application and then connecting it to the real world is the crucial factor for the success or failure of the application.

8.5 Concept

Taking all these expectation and requirements into consideration, an application following game mechanics was created. “Greened U” (possible URL: green.
edu) is a massively multiplayer online game (MMOG). The game is capable of supporting hundreds or thousands of players simultaneously and is played on the Internet through the personal computer, a gaming console or even a smartphone. All the players interact in one network. The game is designed for freshman and sophomore students that want to have fun with friends and peers, meet new people, and compete in engaging challenges while doing good.

When starting, a player signs up and creates a profile. The profile consists of a player name (which does not need to be the real name of the person, but could be any nickname), the college year (freshman or sophomore), and sustainable interests such as food, transportation, and consumption. Moreover, the student player can indicate at which university they are studying and in which dorm they are living, and their major. This information helps to create groups for group competitions. Additionally, players can connect their “Greened U” profile to Facebook.

Once the player has signed up and completed the profile he or she starts in the first level (yellow) and receives his or her first badge “Newby”. The reward system of the game is partly based on color-coded levels (Figure 51). A total of ten levels, with ten (black) being the highest level and, therefore, the level all the players in short or long term want to achieve. To advance from one to another level the player needs to fulfill challenges. Each player can select challenges from a list of quests in different categories related to sustainability; from food to energy to
waste & recycling. The player does not need to pick challenges in a specific order. He or she rather can choose depending on his or her interest and which quest he or she wants to start with. However, once a challenge is selected the player needs to stick with it and fulfill it in order to earn points. Depending on the challenge the player can earn between one and three points. When a player continues one of the challenges over time and integrates it as a repetitive behavior, he or she will continue earning points over the time. Additionally the player has the chance to receive a bonus. A bonus is a very high amount of points (between ten to twenty points) for one single challenge if the challenge is continued over time. The interesting concept of the bonus is that the player never knows when he or she will receive a bonus. They will randomly appear and be a pleasant element of surprise since these extra points might help the player to continue from one level to another faster than intended. The point requirements to progress from one to another level will increase from level to level. Furthermore, other requirements and specifics will be added in order to constantly stimulate the competitive nature of the player and to avoid boredom over time.
Figure 51. Game Levels

For example, to advance from the first to the second level, the player needs to earn 25 points in at least three challenges in two different categories. On the one hand, players learn and experience a wider range of activities when completing challenges in different categories, while, on the other hand, they are forced out of their comfort zone when completing challenges outside of their area of interest or expertise. However, the experience of accomplishing a challenge that one did not even think of being able to complete, can create a feeling of fiero. Fiero describes an emotional high we experience when we triumph over adversity. According to scientists at the Center for Interdisciplinary Brain Sciences Research at Stanford it is “a craving for challenges that we can overcome, battles we can win, and dangers we can vanquish”. They define fiero as “a rush unlike any other rush,
and the more challenging the obstacle we overcome, the more intense the fiero” (Hoeft, 2008).

Besides achieving in the game by reaching the next level, the player can also earn badges. Badges can be earned when one, for example, checks into a farmer’s market, uses public transport or fulfills other activities. A player can verify these activities by using his or her phone to check into locations. Badges only exist for activities or challenges that are addressing sustainability and are pre-selected by the gaming system (Figure 52). Collecting badges motivates players for several reasons. Receiving badges for their actions provides immediate feedback. Moreover, they can show all the badges they have collected to other players through their profile and, therefore, share their achievements with others. For some players earning badges could become the main driver of participating in the game rather than leveling up. This approach offers the players different opportunities to succeed.
When the players take on a challenge, complete a challenge or achieve another level in the game this performance will be posted on their personal profile wall. Other players can see these achievements and comment on it, congratulate them or give them tips. Besides the publishing of actions in the game system itself, the actions will also be posted on their Facebook Wall if the players have connected their account to Facebook. Getting encouragement and personal feedback from their social network on Facebook can be a huge motivator for players to tackle further challenges and create a feeling of accomplishment when rewarded with words of respect from friends and peers.

When selecting challenges from the game's list, the players use the system, but do not create it. However for many Net Geners, there exists the will to contribute to
the system and create or design the system. Players can help to design the system by introducing new sustainability challenges. They need to explain the challenges and then publish them in the gaming system or world. In order to ensure that the challenge will be added to the list, other players need to vote for the challenge. The most successful challenges then will be added to the system. This opportunity encourages player to not only play, but to think of behaviors or actions related to sustainability. Once they come up with a great idea and are able to sell it to other users, they will receive the reward of being contributors to the system and can always access the “fruits” of their work in the challenges list with a reference to their name. Furthermore, have players the possibility to share this achievement on their facebook page.

The points collected by players can, on the one hand, be used to reach other gaming levels, whereas, on the other hand, they can be redeemed as coupons. Sustainable and local businesses, that have been carefully selected, offer coupons to players. This concept is a win-win for both sides, since the players save money and the businesses attract new potential customers, who are on their way to changing their lifestyle towards a more sustainable one. Depending on the players’ motivations, the points can be used as monetary savings (extrinsic) or to succeed in the game (intrinsic).
With increasing levels, the requirements to proceed to a higher level advance. One of the requirements is to participate in a group challenge. These challenges vary in scale. On a big scale a group challenge could be one university against another university, in a medium scale it could be one dorm against another or on a small scale it could be a circle of friends against another one. The players have multiple options. Besides earning points, winning a group challenge is rewarding in itself. Group members can discuss strategies or ways to successfully fulfill the challenge. This encourages discourse and exchange of knowledge, ideas and information between the different members of one group. The collective power a group has is certainly higher than the power of each individual. And lastly, the social factor to play, spend time and interact with friends or peers is highly encouraging.

A further requirement to level up introduced along the way is to read articles or tips of players or watch videos related to sustainability that other people posted. In addition players can ‘like’ such posts and need to rate or comment on them in order for the system to recognize that they read the article or watched the video. The rating system is relatively simple, but enables players to contribute their opinion. They have to choose from a list of adjectives such as inspiring, fascinating, persuasive, informative, practical, adaptable, unrealistic, complicated or boring depending on if the post is a tip, idea or article (written, image or video). Taking this system a step further, at a higher level, players need to post information (written, images or videos) and collect a certain amount of “likes”
in order to move onto the next level. This encourages the social aspect of taking a look at other players’ resources and ideas, interacting with each other and informing oneself further about sustainability.

In order to achieve the two highest levels, silver and black, players need to accumulate followers. Followers are other users in the system who value the ideas, experiences and information of the person they follow and receive updates once this person has posted something new. The game enables players to develop an expertise in one of the areas of interest. Players will group around other players in different areas in order to be mentored and motivated by these people’s achievements. One player can follow another player for his or her contribution to food and a different one for his or her knowledge in education about sustainability. The players have the freedom to focus on whatever topics they are interested in.

To stay at the black level players need to contribute to the domain knowledge. They can do this by posting and informing other players. Furthermore, black level players are the advisors or mentors that other players might turn to for questions and advice. On the one hand, the player profile consists of basic information such as name, university, and interests, on the other hand, it serves as a feedback system. The user (and other players) can view his or her points, amount of followers and articles as well as a collection of earned badges. Additionally, a
bar chart visualizes the progress of the player with the starting point being the current level to the next level so that the player exactly knows how many more points he or she needs to reach the next game level.

In summary, the game is based on traditional levels as used in computer games. In addition to these levels, players can collect badges through their actions. The players have several options to use the points they earn in challenges. They can use them to count towards the next level or to redeem them for coupons from businesses. Players can choose their personal, individual challenges or group challenges that encourage collaboration and information exchange. The ability to post articles, experiences and ideas increases the social interaction between the players since they can comment on each others’ posts, like them or even rate them. The final main drive for the game is the feedback system, which lets the players know exactly how they are doing and how far they are from achieving the next level which might encourage them to accept another challenge.

8.6 User Scenario

Chris is a 19-year-old international studies student at The Ohio State University. He lives a moderate environmentally lifestyle, meaning that he cares about the environment but won’t sacrifice his lifestyle. As a freshman he lives in “Morrill Tower” one of the resident halls on campus. Furthermore, he is on a meal plan and eats in one of the dining facilities on campus during the week. On
weekends, however, he usually eats out at restaurants around campus. Chris uses Facebook and twitter every day to stay in contact with his friends and to share information. Lately, he discovered foursquare. Since some of his friends were using the smartphone application, Chris started to use it to in order to stay up to date where his friends are. Yesterday, Chris logged into his Facebook account. On his Facebook wall he saw a post that he was invited to a group challenge at “Greened U”. Chris joined Greened U, a multiplayer game focusing on social participating, when he started studying at The Ohio State University. Since Chris has been a fan of computer games for a long time and since this game enabled him to connect with people and actually apply this game skills in real life, he signed up immediately once he received the invite. At the beginning it served as a tool to meet new people at the university since Ohio State is really huge. When signing up he filled out a profile including information such as his university, the dorm he is living in and some of his interests related to sustainability. With this information he automatically became part of some groups such as the “Morrill Tower” group or groups related to his interest food and transportation. The invite for the challenge Chris received included the following information:

“Join us for our mission to beat “Drackett Tower” in our water consumption challenge. Your mission, as part of the “Morrill Tower” group, is to conserve water for the next week. The challenge will start tomorrow at 8 am in the morning and will last for one week. Let the water games begin!”
After reading the mission, Chris logged into his Greened U account in order to get more information on the challenge. In the group list he could see that two of his friends, also living in Morrill Tower, already joined the challenge. Besides that he will earn one point for participating in the challenge and could earn ten more when they win the challenge. By checking the feedback channel in his user profile he realizes that he only needs eight more points to achieve the next level in the game: the orange level. Chris joined the group challenge since he could earn 11 points within a week and reach the next level while having a fun challenge with his friends. To earn two more points in order to reach the next level he searched the list of challenges. He likes this concept a lot since he can decide on his own which challenges best fit his interests. He feels in control of his progress. Scrolling through the challenges in the food section Chris sees the farmer’s market challenge:

“Check out one of the farmer’s markets in your area this week. See the variety of fresh and local food. Once you are at the market log into the location to verify your visit and upload one photo of the most inspiring part of the visit to share it with your friends.”

Chris hasn’t been to a farmer’s market before, but recently one of his friends told him about his experience and that he really liked it. The map provided by the system lists locations of farmer’s markets close to his resident hall as well as
the weekday the farmer’s market is going to take place. With the possibility of earning three points for fulfilling the challenge Chris signs up.

The next day Chris goes to the farmer’s market on 15th and High, which takes place every Thursday. He’s impressed by how many vegetables and fruits are grown around Columbus. After he logged into the location he takes a look at all the food the vendors offer. He always thought that locally grown or organic food is very expensive, but after he sees the inexpensive prices he buys eggplants, peaches and apples since these are offered in season at the beginning of September. Proud of his colorful purchase, he takes a picture of it with his phone and posts it on his Greened U wall.

Once he arrived back home and checked his Greened U point scale, which increased by 3 points since he fulfilled the challenge, he recognizes that a couple of his friends “liked” his picture and one even commented on it:

“Hey Chris, this looks delicious. Next time you go to the farmer’s market let me know and I’ll join you.”

Thinking about his purchase Chris decides to cook this Saturday with some of his roommates and one of his best friends. The only problem, he never prepared eggplant before. He bought it because he liked it, but usually his mom prepared
dishes with eggplant at home. Logging back into Greened U he posts on the “food tipster’s” wall. “Tipsters” are players in the network which have reached at least level nine or ten, the silver and black level. They are experts in at least one of the sustainable interest areas and usually the people to go to for questions or for inspiration. Chris posts his question on the tipster’s wall since, these experts have a lot of followers and it’s more likely that different people can give him feedback and advice, including the tipster him- or herself:

“Hey! I just bought some eggplant at the farmer’s market and since I never prepared eggplant, I’d need some tips how to prepare it or even recipe recommendations. Thanks!”

Since today is the start of the group competition Chris sees that his group started a discussion on their group site in order to work on the best challenges to conserve water, because all the participants want to win the challenge and beat the other residential hall. Some of the comments are:

“I think we should all pledge to take short 10 minute showers this week. I recently read an article and it made me realize that we use a lot of water when showering for 20-30 minutes. Heather”
“Great idea Heather. We should also make sure to turn off the water while brushing teeth instead of letting it run. We can do this, guys. I’m pretty sure our team is more organized.”

Chris skims through the discussion posts and immediately gets a better idea on what he can do to help the team succeed.

The next day Chris receives a text message on his phone that he just unlocked the “Local Food Badge” since he visited the farmer’s market. Proud of his newest achievement he logs into Greened U. In his feedback panel all his previous badges (a total of 5) are listed and his new one. Now he has one more badge than his desk mate from math class. Yes! Looking at his feed a video post from the girl in his biology lab attracts his attention:

“Building a school from recycled plastic bottles: 1800 children in Guatemala collected 2.5 tons of trash and over 10,000 plastic bottles and used them to help build a school for themselves.”

After watching the video Chris rates it as “inspiring”, thinking that the next challenge he could pick can be about recycling. At the same time a new post pops up. One of his group challenge members wrote:
“Yes! We are leading in our water challenge. Check out the usage bar on the group challenge site. Keep up the good work. If we continue conserving water, we can win this competition. Go, Morrill, Go! ;)

Thinking that he never guessed that being sustainable could be that engaging and fun, Chris had an idea for another challenge he can propose, since each week there is a network challenge where players can post ideas for new challenges and vote. The winning challenge will be added to the challenge list. When winning this contest, Chris would earn another 20 points and would be one step closer to the next level, the green level.

At the end of the week Chris received the message that they won the group challenge. Yay! What a fun week. Being sustainable is not that hard!
Figure 53. Storyboard User Scenario: Part 1
8.7 Concept Feedback

This user scenario was visualized as an animation to explain how the game Greened U would work and how a possible user interacts with the system and other players. In order to evaluate the concept by possible users, a blog was created (http://greenedugame.blogspot.com/) to collect feedback. A link to this website was sent to 35 study participants. The email included three questions the participants were asked to answer:

(1) What do you like best about the concept?
(2) Can you imagine to participate/play such a social participation game?
(3) Any other comments or thoughts?

The participants could either leave a comment on the blog site or send an email answering the questions.

Within a week feedback was collected. As of November 29, 2011, 105 people watched the video uploaded on youtube and two “liked” it. Even if it is not a guarantee that the visitors watched the video, by November 29, 2011, 275 people accessed the blog Greened U, which included the video and the questions. A total of five people answered the three questions. All the answers agreed in one point: They liked the idea of combining sustainability with fun. The possibility of creating one’s own competitions was evaluated as the best idea a few times.
The participants stated that they think that this concept encourages students not only to take part, but also think of and create possible solutions themselves. The majority of the feedback comments mentioned that they would play such a game since it is fun and they could connect with people at the same time. The concept of competition was mentioned to be a good motivator.

The feedback also drew attention to restrictions of the game: If somebody does not have a smartphone they cannot log into locations or take picture with their phones and upload these to Greened U.

One participant raised the concern whether players would continue their behaviors after the game or fall back into old habits. Moreover, others asked valuable questions such as: “Is the game only designed for people at the same university? Could non-students also participate? Would the Water Consumption Challenge work only between two dorms? ” These questions as well as some suggestions from participants such as “It would be nice if the others could ‘like’ your achievement. If you receive many clicks you will earn the next badge” led to suggested refinements.

8.8 Suggested Changes and Recommendations

This concept is certainly a work in progress. The future goal is to think of strategies to expand the system from social networks for just one university to
an open network for all universities or even the public. Furthermore, the system should be flexible enough to integrate new challenges and incorporate new ways of interaction and reward collection. The suggestion to earn points through receiving ‘likes’ on personal posts is one of several ideas to keep the system as interactive as possible.

When the concept is able to reach popularity within the majority of freshman and sophomore students, students who are not environmentally conscious could be drawn into the system. By reading updates on friends’ Facebook walls, these individuals might get interested and sign up just to be part of the community and the game rather than to do good.

Strategies to enable a smooth transition and access for incoming freshman students as well as players that might stop playing the game is important to avoid periods of low engagement.

Besides work on the concept itself, the animation would also need some refinements. A professional reader as well as professional audio recording would help to avoid the echo the reader voice creates. Another possible idea is to have two readers: One storyteller and another reader who reads posts on the network. A dialogue would make the video more dynamic and therefore engage the target group more. Other, very specific changes in the animation are to change the
suggested time for showers to save money from ten minutes, which is very long, to two or three minutes.

Overall, the game concept was evaluated as a great idea and system to motivate students to change their behaviors to more sustainable ones, which is the main purpose of the whole concept.

Whether the concept is successful in changing behaviors in the long-term, however, can only be determined in a long-term study that observes students’ behaviors within a couple of months or even a year. Moreover, it should be tested whether players keep the changed behaviors once they stop playing the game. Until then, the players can use, modify and add to the system and enjoy the development of a more sustainable lifestyle while having fun.
Chapter 9
Conclusion

“People ignore design that ignores people.” (Frank Chimero)

9.1 Project Summary and Objectives

The goal of this research was to utilize Design Research methods to develop a design application to inform and motivate students to pursue a more sustainable lifestyle. The concept of sustainability, meaning to meet present needs without compromising the ability of future generations to meet their needs, has become a focus in governmental, economical and individual efforts. The problems our consumer society poses for the environment and the society cannot be neglected anymore and demands action to change this development.

Currently, a variety of behavior change approaches exist, however, the majority of people have not adapted a more sustainable lifestyle. There is much apathy and inaction currently characterizing the general response to global warming and other severe crises.
In order to support individuals to change their behavior, a target-group-focused behavior change framework has been developed in this thesis. The framework has been informed by a literature review in the areas of sustainability, Generation Y, behavior change theories and approaches, games and social networks. This human-centered approach represents the starting point for an investigation of the target group of college freshman and sophomore students.

To further explore the knowledge, needs and expectations of the target group, research was conducted regarding the students’ awareness about a sustainable lifestyle and their daily behaviors and habits. Moreover, another participatory study to explore information and motivation behaviors of the target group was held to inform the development of a design application based on game mechanics that helps students to implement more sustainable behaviors. Finally, a concept for a game-based application has been developed. This system, operating on game mechanics, was a result of the integration of several paths of research in this thesis. The behavior framework, literature review, design research studies and their analysis as well as the translation of the research data in actionable outcomes have led to the development of a gaming concept.

9.2 Conclusion

From the literature review it is known that the Net Generation wants entertainment and play in their work, education, and social life. It is also known
that this generation shares ideas, knowledge, and achievements with friends and peers through various social networks. They are highly influenced by their social networks and crave social support from these networks. Furthermore, the participatory research has shown that college freshmen and sophomores at The Ohio State University say they are willing to change their behavior towards a more sustainable lifestyle in a reasonable way. Another result of the design research study is that this target group wants a fun and engaging experience: “And make it engaging and make it really relevant, because freshmen and sophomores are more oriented towards experiencing things and it needs to be fun and it needs to satisfy me right now and it needs to be really tangible to them” (Participant #16). These needs in combination with the target group’s expectation that a tool for behavior change should be digital and always accessible, enable them to communicate and share with their friends and combine information and motivation as well as give easy tips and goals that can be implemented. This research resulted in the design of a concept for a game-based behavior change tool. The main advantage of the game is that it is first and foremost fun and engaging. Besides that it also works as a social network enabling users to exchange information, ideas and achievements. Lastly, players can contribute to the system by adding information or challenges and engage with it rather than just use it.

Focusing on the target group’s needs that were revealed by participatory research, it was possible to develop a different approach for sustainable behavior
change that focuses on a positive experience rather than on the outcome. The premise is that the outcome will follow naturally if the user enjoys the experience and therefore continues to use the application. The behavior change framework developed in the thesis was used to inform the development of the design application (Figure 55).

![Figure 55. Evaluation of Behavior Change Model]

The participatory design workshops informed the section about the target group. To enable involvement motivation was established through game mechanics, a connection to reality helped to inform the ability of the target group and step-
by-step changes created opportunities to implement new behaviors. Whether behavior change is accomplished in the long-term, however, can only be proven through the development and long-term study of the game application.

9.3 Future Work

The next step would be to test the gaming concept with possible users in order to improve the system and the game mechanics it provides. User feedback is important in order to fulfill the users’ needs and increase the possibility that people will start playing the game and then stick with it. The concept testing then informs the application itself and leads to its final design. One main hurdle when thinking about the game concept is to find a user base to start with. Social networking and social change do not work without a big enough network. Furthermore, other considerations need to be taken into account. Collaboration between sustainable businesses and the game need to be established. Moreover, it is important that the game stays well organized and facilitated and enough challenges and information are provided so that players have a broad enough base to start with.

Questions about the general research also appear. What are other applications that embrace the research findings and that can help to motivate and inform students about a sustainable lifestyle and guide behavior change? Are there other forms of engagement that use fun but are not based on game mechanics?
Is Generation Y the only generation that would change their behavior through an engaging fun approach or can this concept be extended to other generations or user groups? Would seniors use the concept to stay engaged and entertained? Would it add another purpose to their lives? Would the “FarmVille” (a farming simulation social network game on Facebook) network play such a game and get as invested? What if people would play more social participation games that connect the virtual game world with reality and result in actual benefits for society and the environment? This research creates many more thoughts and questions that can be investigated. Some are related to a change of the target group whereas others are focusing on a general approach for behavior change. But the framework of behavior change focusing on the target group informs all of them. This framework can also be used to create behavior change in other areas such as health related topics or social engagement.

9.4 Relation to Design

This thesis used several concepts that are practiced in the field of design.

9.4.1 Participatory Design Research

Participatory design research activities were conducted in order to determine the target group’s needs, wants and their daily lifestyle. It was important to invite the students to create and share their thoughts and ideas since they are the ones that have the best insight in what they want and would use. The involvement of
the target group in a participatory process revealed insights no literature review or interviewer would be able to create. The analysis revealed the students’ unmet needs, which were then translated into guidelines that informed an actionable outcome, a social participation concept based on game mechanics.

9.4.2 Systems Thinking

Knowing about the target group’s wants and unmet needs, however, is only part of the effort. The design researchers profession is to analyze these insights and connect the dots in order to create a solution for this complex problem. Systems Thinking is an approach to problem solving that looks at problems as part of an overall system. This research involved many inter-related systems such as individual’s behavior, infrastructure offered in their environment (university), and the options businesses provide. A key element of working towards a solution was to take all these systems into consideration while focusing on the target group’s needs. As one participant mentioned: “Honestly I don’t know, (how to motivate students to adapt a more sustainable lifestyle), because if I did know this guy here (not environmentally conscious) would be at least here (moderately environmentally conscious). I guess making it fun would be a good way to increase environmentally friendliness, but I’m not sure how you would do that (Participant #13).” In part, this thesis’ use of design research methods was helpful in translating the findings into guidelines and a design application that incorporates the target group’s needs, wants and situations and behavior change principles in order to support successful behavior change.
9.4.3 Design Application

The last piece relating to design is the design application, a game concept. The
design effort here focuses on game design. Understanding the principles of game
design and applying them in order to develop a concept is the first component.
Moreover, the designer needs to know about technology to determine what is
technologically feasible and can be implemented.

This thesis incorporates many skills a designer and design researcher should
posses. At the same time this is the most interesting fact about, both, the
profession of a designer and design researcher: Learning about people’s needs,
wants and desires; gaining and applying knowledge from other areas such as
sustainability and behavior change and then investigating a problem in order to
find a solution. That’s the beauty of design.

The design application based on game mechanics applied many of the skills a
designer and design researcher should poses to find a solution for a complex
problem. The learning process about Generation Y and more specifically about
the wants and unmet needs of OSU college freshman and sophomore students
created the basis for the application. Furthermore, the problem statement of
current unsustainable consumer lifestyles in combination with the threats of the
changing ecosystem informed the purpose of the application. And last but not
least, the knowledge about the effectiveness of games and social networks led to
an application in order to change behaviors of people that caused the problem in the first place. This research amongst other things combines design, science, storytelling and philosophy in order to reach a deeper level of understanding of the problem and a possible solution.

“Design is in everything we make, but it’s also between those things. It’s a mix of craft, science, storytelling, propaganda, and philosophy” (Erik Adigard, 2001).
Bibliography


Evolutionary Sources of Order and Disorder. New York: Atheneum


The Ohio State University: Office of Enrollment Services. (2011). *Highlights*


Appendix A. Consent Forms & Advertisement

Advertisement Poster: Sustainable Awareness Study

SUSTAINABLE LIFESTYLE STUDY

WHAT DO YOU KNOW ABOUT A SUSTAINABLE LIFESTYLE?

Are you a freshman or sophomore student and want to be part of a design study? Light refreshments are provided!

The sessions will be at Hayes Hall (next to the oval). Go to bit.ly/sustainablelifestyle to schedule your appointment. If you have questions email: dreser.1@osu.edu.

A study by Melanie Dreser advised by Paul Nini, Dr. Elizabeth B.-N. Sanders, and Carolina Gill
Department of Industrial, Interior and Visual Communications Design
MOTIVATION
INFORMATION
STUDY

HOW WOULD YOU INFORM AND MOTIVATE YOURSELF ABOUT SUSTAINABILITY?

Are you a freshman or sophomore student and want to be part of a design study? Light refreshments are provided!

The sessions will be at Hayes Hall (next to the oval). Go to bit.ly/motivation to schedule your appointment. If you have questions email: dreser.1@osu.edu. Please invite freshmen & sophomore friends to join our study!

A study by Melanie Dreser advised by Paul Nini, Dr. Elizabeth B.-N. Sanders, and Carolina Gill Department of Industrial, Interior and Visual Communications Design
Consent Form: Sustainable Awareness Study

Department of Industrial, Interior, and Visual Communication Design

Hopkins Hall
128 North Oval Mall
Columbus, OH 43210
dreser.1@osu.edu

Consent Form – Sustainable awareness and lifestyle

Investigators: Melanie Dreser Professional advisor: Paul Nini, Liz Sanders, Carol Gill
Interview sustainable awareness and lifestyle, The Ohio State University, Design Development

PURPOSE and BENEFITS
This activity is being used as study for a Master’s thesis in Design Development at The Ohio State University. My goal is to investigate the target group of college freshmen and sophomore and their knowledge about as well as their attitude towards a sustainable lifestyle. There are two parts to this project; a survey and an interview.

PROCEDURES
Participants in this study will participate in an interview about a diagram they will work on. They will be asked to fill out the survey before they are interviewed face-to-face. There, I will ask them to choose 3 persona cards, describe a person they know for each persona (by checking statements on the cards) and place them on a diagram. After that, the participants will be asked to fill out one more card about themselves and place it on the diagram. Hopefully they enjoy the experience.

RISK, STRESS, or DISCOMFORT
This study will not expose its participants to risk, stress, or discomfort beyond that normally encountered in using a device such as a computer, or taking a test.

OTHER INFORMATION
No personal financial or credit information will be collected during this test. Once the results of these studies have been tabulated and reported, the names of the individual participants will be destroyed in order to ensure both anonymity and confidentiality. No one other than the investigators’ names above will be informed of or have access to data on the performance of individuals.

We hope that you find this an enjoyable exercise. This particular project may be included in part of a larger graduate research study, so your participation is very valuable and appreciated. Please feel free to contact the administrator of the study with additional questions.

You are free to refuse to participate in the study and may withdraw at any time without penalty.

Signature of Investigator                                      Date

The study described above has been explained to me, and I voluntarily consent to participate in it.
I have had the opportunity to ask questions and understand that future questions I may have about the research or about subjects’ rights will be answered by:
Melanie Dreser
Sustainable Awareness & Lifestyle: Design Development
The Ohio State University
dreser.1@osu.edu

Signature of Participant                                      Date

(Please print name)
CONSENT FORM – INFORMATION AND MOTIVATION STUDY

Investigators: Paul Nini & Melanie Dreser,
Focus Group Information & Motivation, The Ohio State University, Design Development

Subject rights: This activity involves research, participation is voluntary. You are free to refuse to participate in the study and may withdraw at any time without penalty or loss of benefits.

Purpose of the study: This activity is being used as a study for a master’s thesis in Design Development at The Ohio State University. The goal is to investigate how students inform and motivate themselves in their daily life. There are three parts to this project; a workbook, a survey and a focus group. You are being asked to participate in this research study because you are either a college freshman or a sophomore student and your ways of information gathering and motivation are critical insights for the theory and design development for a master's thesis.

Study tasks or procedures: You will be asked to complete a workbook before the Focus Group session. At the session you will fill out a short survey about your motivation and information habits as well as a few general questions. After that you will participate in a Focus Group discussion about four different tools for information and motivation. You will be asked to investigate the tools in a group and take part in a discussion afterwards. The session will be audio and video recorded for evaluation purposes. You will be provided with light refreshments and will hopefully enjoy the experience. All procedures that are being performed are solely for research purposes. No records will be accessed. This study will not expose you to risk, stress, or discomfort beyond that normally encountered in using a device such as a computer, or taking a test.

Duration of subject's participation: The Focus Group session including the survey as well as the creation and presentation of the posters/boards will take about an hour.

Confidentiality: No personal financial or credit information will be collected during this test. Your information will be kept completely confidential. Every participant will receive a number and this number will be used as a reference. Audiotapes and videotapes will be transcribed and analyzed and deleted afterwards. Once the results of these studies have been tabulated and reported, the link between the participant numbers will be destroyed in order to ensure both anonymity and confidentiality. No one other than the investigators’ names above will be informed of or have access to data on the performance of individuals.

Contacts and Questions:
For questions, concerns, or complaints about the study contact:
Paul Nini: nini.1@osu.edu or Melanie Dreser: dreser.1@osu.edu
Phone: +1 614 688 3242, Topic: Information & Motivation: Design Development The Ohio State University
Office address: 100 Hayes Hall; 108 N. Oval Mall; Columbus, OH, 43210
For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

Incentives: $5.00 chipotle gift card. Everyone will be provided with light refreshments.
Sponsor: No funding. No sponsors

Signature of Investigator   Date
____________________________
The study described above has been explained to me, and I voluntarily consent to participate in it. I have had the opportunity to ask questions and got all question answered perfectly.

Signature of Participant   Date
____________________________
(Please print name)
Appendix B. Online Survey

Online Survey Questions

<table>
<thead>
<tr>
<th><strong>Sustainable lifestyle</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Thank you for taking a few moments to participate in this survey. I am an MFA Design Development student at The Ohio State University researching how design and fun can be used in order to develop college freshmen and sophomore students' awareness of a sustainable lifestyle. By answering the following questions you will help provide me with valuable feedback for my research studies. By filling out the survey you agree to be part of this MFA study. Please remember, no answer is a wrong answer, and you are not obligated to respond to any question that may make you feel uncomfortable. This survey is anonymous - Thank you again for your time and opinion.</td>
</tr>
<tr>
<td>* Required</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>My Gender</strong> *</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Female</td>
</tr>
<tr>
<td>☐ Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>My Year</strong> *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please let me know which year you are in. (This survey is only for freshmen and sophomore students.)</td>
</tr>
<tr>
<td>☐ Freshmen</td>
</tr>
<tr>
<td>☐ Sophomore</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>My Housing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Apartment</td>
</tr>
<tr>
<td>☐ Dorm</td>
</tr>
<tr>
<td>☐ House</td>
</tr>
<tr>
<td>☐ Single room</td>
</tr>
</tbody>
</table>
My Meals
What are your food habits? Are you on a meal plan, do you usually eat out, or do you cook your own food or do your friends or family usually cook for you?

- Meal plan
- Eat out
- Cook my own food
- Family/friends cook
- Other: ____________

My Transportation
How do you usually get around?

- Car
- Bike
- Walk
- Public transportation
- Other: ____________

My favorite Grocery Store
Where do you usually buy your groceries? Why do you shop there?

My favorite Apparel Store
Where do you usually buy your clothes? Why do you shop there?
My favorite Furniture Store
Where do you usually buy your furniture? Why do you shop there?

My favorite Electronics Store
Where do you usually buy your electronics? Why do you shop there?

Who is paying for your college education? Does this influence/affect your lifestyle? If yes, how?

Where I grew up
- City
- Suburbs
- Country
- Other: ___________
Where would I make changes in my own life for the betterment of the environment or society?
Check as many boxes as apply

☐ Food
☐ Clothing
☐ Hobbies
☐ Recycling
☐ Reuse
☐ Not buying
☐ Transportation
☐ Furniture
☐ Electricity
☐ Water
☐ I would make no changes
☐ Other: __________________________

Where did I learn about environmental awareness?

☐ School
☐ Scouts or other group activity
☐ Parents
☐ Friends
☐ Other: __________________________

Environmental consciousness in High School
Rate your environmental consciousness. How environmentally conscious were you in high school?

1 2 3 4 5 6 7

Very conscious ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not conscious

Environmental consciousness in College: Now
Rate your environmental consciousness. How environmentally conscious are you right now in College?

1 2 3 4 5 6 7

Very conscious ☐ ☐ ☐ ☐ ☐ ☐ ☐ Not conscious
Environmental consciousness in College: Would like to be
Rate your environmental consciousness. How environmentally conscious would you like to be in College?

1 2 3 4 5 6 7
Very conscious ☐ ☐ ☐ ☐ ☐ ☐ Not conscious

Environmental consciousness after Graduation
Rate your environmental consciousness. How environmentally conscious would you like to be after you graduate?

1 2 3 4 5 6 7
Very conscious ☐ ☐ ☐ ☐ ☐ ☐ Not conscious

How knowledgeable/informed are you about a sustainable lifestyle?
Rate yourself.

1 2 3 4 5 6 7
Very informed ☐ ☐ ☐ ☐ ☐ ☐ Not informed

Can you think of any lifestyle changes you have experienced, that have affected your level of sustainable behavior? How?
Give reasons. Please be as detailed as possible.

What technology do you regularly use?
Check as many boxes as apply.

☐ Computer
☐ Laptop
☐ Smartphone
☐ Phone
☐ ipad/kindle
☐ GPS
☐ Nothing
☐ Other: __________________________
Organic/Sustainable concepts are only related to food. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I turn the water off when brushing my teeth. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I like to take long showers and/or baths. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I turn the water off when doing dishes. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I unplug electronic equipment when not in use. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I would make sustainable changes in my life if I had good incentives. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I turn off the lights when I leave a room. Do you agree or disagree with this statement?
☐ Agree
☐ Disagree
I leave the AC on when I am not home.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I do not know where to find organic products.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

During the day, I leave all the blinds closed and prefer to turn on the lights.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I run the dishwasher only when it is full.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

Each day I would rather take my own car to school/work than use public transportation.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I do my part to recycle.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

My parents helped me to understand how our home uses energy.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree
My parents helped me learn how to live sustainably. Do you agree or disagree with this statement?
- Agree
- Disagree

Environmental concerns will not have an impact unless the government regulates more heavily. Do you agree or disagree with this statement?
- Agree
- Disagree

If I see a stranger littering I am likely to say something to him/her. Do you agree or disagree with this statement?
- Agree
- Disagree

I tend to inform my friends about environmental concerns. Do you agree or disagree with this statement?
- Agree
- Disagree

I turn off all electronic equipment when not in use. Do you agree or disagree with this statement?
- Agree
- Disagree

I usually go everywhere by car. Do you agree or disagree with this statement?
- Agree
- Disagree

Price is more important than quality when it comes to food. Do you agree or disagree with this statement?
- Agree
- Disagree
I would recycle if it would be more convenient.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

I am not able to make changes in my life for the environment.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

Global warming does not exist.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

I want to work for a sustainable company.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

I wash clothes when needed, even if the washing machine is half empty.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

The whole green movement is too exaggerated.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree

I do not know how to make changes in my lifestyle to help the environment.  
Do you agree or disagree with this statement?  
☐ Agree  
☐ Disagree
I am concerned about trash in landfills.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I put all electronic equipment in standby mode when not in use.
Do you agree or disagree with this statement?
☐ Agree
☐ Disagree

I am interested in this study and would like to participate in a focus group for a $5 Chipotle gift card.
If you are interested just type in your email address below or email me at drser.1@osu.edu. I will contact you. Thank you!

Submit

Powered by Google Docs

Report Abuse - Terms of Service - Additional Terms
Analysis: Online Survey

248 responses

Summary

My Gender

- Female: 166 (67%)
- Male: 82 (33%)

My Year

- Freshmen: 125 (50%)
- Sophomores: 123 (50%)

My Housing

- Dorm: 153 (62%)
- House: 49 (20%)
- Apartment: 44 (18%)
- Single room: 2 (1%)
My Meals

- Meal plan: 148 (60%)
- Eat out: 10 (4%)
- Cook my own food: 70 (28%)
- Family/friends cook: 14 (6%)
- Other: 6 (2%)

My Transportation

- Walk: 176 (71%)
- Car: 36 (15%)
- Bike: 10 (4%)
- Public transportation: 17 (7%)
- Other: 9 (4%)

Where I grew up

- Suburbs: 151 (61%)
- City: 45 (18%)
- Country: 44 (18%)
- Other: 8 (3%)
Where would I make changes in my own life for the betterment of the environment or society?

- Food 123 (50%)
- Clothing 76 (31%)
- Hobbies 60 (24%)
- Recycling 190 (77%)
- Reuse 172 (70%)
- Not buying 104 (42%)
- Transportation 128 (52%)
- Furniture 48 (19%)
- Electricity 160 (65%)
- Water 130 (53%)
- I would make no changes 9 (4%)
- Other 6 (2%)

People may select more than one checkbox, so percentages may add up to more than 100%.

Where did I learn about environmental awareness?

- School 165 (87%)
- School or other group activity 9 (4%)
- Parents 22 (9%)
- Friends 10 (4%)
- Other 42 (17%)

Environmental consciousness in High School

- Very conscious
  - 1 6 (2%)
  - 2 30 (12%)
  - 3 63 (25%)
  - 4 64 (28%)
  - 5 41 (17%)
  - 6 32 (13%)
  - 7 - Not conscious 10 (4%)

- Not conscious
  - 1 6 (2%)
  - 2 30 (12%)
  - 3 63 (25%)
  - 4 64 (28%)
  - 5 41 (17%)
  - 6 32 (13%)
  - 7 - Not conscious 10 (4%)

269
What technology do you regularly use?

- Computer: 52 (21%)
- Laptop: 239 (97%)
- Smartphone: 85 (34%)
- Phone: 159 (64%)
- iPad/Kindle: 20 (8%)
- GPS: 41 (17%)
- Nothing: 1 (0%)
- Other: 64 (25%)

People may select more than one checkbox, so percentages may add up to more than 100%.

Organic/Sustainable concepts are only related to food.

Agree: 16 (6%)
Disagree: 231 (93%)

I turn the water off when brushing my teeth.

Agree: 211 (85%)
Disagree: 37 (15%)
I like to take long showers and/or baths.

Agree 136 58%
Disagree 107 42%

I turn the water off when doing dishes.

Agree 147 59%
Disagree 100 41%

I unplug electronic equipment when not in use.

Agree 88 35%
Disagree 160 65%

I would make sustainable changes in my life if I had good incentives.

Agree 224 90%
Disagree 23 10%
If I see a stranger littering I am likely to say something to him/her.

- Agree: 38 (15%)
- Disagree: 210 (85%)

I tend to inform my friends about environmental concerns.

- Agree: 122 (49%)
- Disagree: 126 (51%)

I turn off all electronic equipment when not in use.

- Agree: 148 (60%)
- Disagree: 97 (39%)

I usually go everywhere by car.

- Agree: 55 (22%)
- Disagree: 192 (77%)
Price is more important than quality when it comes to food.

- Agree: 91 (37%)
- Disagree: 156 (63%)

I would recycle if it would be more convenient.

- Agree: 196 (79%)
- Disagree: 48 (15%)

I am not able to make changes in my life for the environment.

- Agree: 16 (6%)
- Disagree: 231 (93%)

Global warming does not exist.

- Agree: 36 (15%)
- Disagree: 211 (85%)
I want to work for a sustainable company.

<table>
<thead>
<tr>
<th>Agree</th>
<th>182</th>
<th>73%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>62</td>
<td>25%</td>
</tr>
</tbody>
</table>

I wash clothes when needed, even if the washing machine is half empty.

<table>
<thead>
<tr>
<th>Agree</th>
<th>54</th>
<th>22%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>193</td>
<td>78%</td>
</tr>
</tbody>
</table>

The whole green movement is too exaggerated.

<table>
<thead>
<tr>
<th>Agree</th>
<th>54</th>
<th>22%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>192</td>
<td>77%</td>
</tr>
</tbody>
</table>

I do not know how to make changes in my lifestyle to help the environment.

<table>
<thead>
<tr>
<th>Agree</th>
<th>43</th>
<th>17%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disagree</td>
<td>202</td>
<td>81%</td>
</tr>
</tbody>
</table>
Criteria for Application: Online Survey
Appendix C. Participatory Workshop 1: Sustainable Awareness Study

Participant Posters: Sustainable Awareness Study

![Posters showing sustainable lifestyle examples and self-assessment scale]

Sustainable Lifestyle
Participant # 01

Melissa
I don’t think it’s possible to be very conscious with the resources we have. I try to save energy, but I have limited funds.

Jordan
I care about the environment, but I don’t think my actions make much of a difference.

Demi
I try to live sustainably, but it’s not easy in a college dorm.

Very environmentally conscious

Not environmentally conscious

Majority of freshmen

My willingness to change
Analysis: Sustainable Awareness Study

29 responses

Summary

<table>
<thead>
<tr>
<th>Participant #</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

01) Very environmentally conscious choices

- Female
- Male
- I recycle everything
- I only buy organic or local food
- I save energy whenever I can
- I only bike, walk, or use public transport
- I only buy things I really need
- I cook almost every day
- I grow my own food
- I spend most of my time outdoors/in nature
- The environment is very important to me
- I use reusable bottles and bags

People may select more than one checkbox, so percentages may add up to more than 100%.
(02) Medium environmentally consious (choices)

<table>
<thead>
<tr>
<th>Choice</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>I cook my own food</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>I pay attention to my energy consumption</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td>I have a car, but do not drive every day</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>I shop with paper bags</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>I turn off electronic appliances when not in use</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td>I shop organic and local from time to time</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>I buy green products when they are cheap</td>
<td>19</td>
<td>19</td>
</tr>
</tbody>
</table>

People may select more than one checkbox, so percentages may add up to more than 100%.

(03) Not environmentally consious (choices)

<table>
<thead>
<tr>
<th>Choice</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>I shop a lot</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>I only wear clothes of the latest collection</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>I eat out every day</td>
<td>16</td>
<td>17</td>
</tr>
<tr>
<td>I do not pay attention to my energy consumption</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>I drive a lot</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Consumption is part of my daily routine</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>I have more than one car/motorbike</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>I own many electronic appliances</td>
<td>26</td>
<td>26</td>
</tr>
</tbody>
</table>

People may select more than one checkbox, so percentages may add up to more than 100%.
Example 1: Interview Transcript – Participant #11: Female

Very Environmentally Conscious
Okay, so the first one is the person who is very environmentally conscious. This is my roommate. She is very environmentally conscious. She rides her bike basically everywhere. She grows her own food. She actually harvests honey from bees, that’s one of her hobbies. Yes, I would say she is very environmentally conscious.

Not Environmentally Conscious
‘I like to shop and enjoy my life. I don’t want to be restricted by the environment.’ So this is the other end of the spectrum. This is actually one of my other roommates, because I have four of them or three of them. She doesn’t really pay attention to any of her energy consumption. She does not recycle. As far as where I put her on the line, I would say she is not totally against the environment. If there is a recycle bin there, she probably would throw it in there, but she doesn’t really go out of her way to make a difference.

Moderate Environmentally Conscious
My brother. He cooks his own food, which is a shock, I know. He would probably basically be in the middle, because he makes an effort, but not that much of an effort.
Majority Of Freshmen & Sophomores

The majority of freshmen and sophomores, I would say they are probably more not environmentally conscious than they are, because with time restrictions and where their focus is at that point, I would say that they are not exactly going out of their way to make a difference.

Participant

As for me: I recycle. I grow my own food over the summer. I use my bike whenever I can. Between that and the price of gas, why not. I reuse water bottles all the time. I unplug... I would put myself about 3/4 up the way, because I do try my best, but sometimes I’m busy and it’s not always the most convenient thing to do, but on campus they have really made an effort to make it the easiest they can for students.

Willingness to change

I would be more willing in transportation. I use the car on a regular basis, but being on campus I use the bus a lot, because it is convenient and it helps the environment. It makes sense. Over the summer I like to ride my bike a lot. Obviously if it’s cold, it just doesn’t work as well. Gas is a huge pollution and it makes it cleaner. Also in second hand clothing. I mean it makes sense. It’s an easy change.
Knowledge, Awareness, Behavior

I think that knowledge is directly contributed in it. If they don’t really realize how much of an impact they are having, then they are probably not going to change their behaviors in many ways. If they personalities have a lot of to do with it. If they are really stubborn, maybe they won’t be as willing to make the effort. It takes a very willing person to make a change. To maybe make it a little less convenient for themselves to help out the environment.

Motivation To Change

I think events help a lot. Making it fun, obviously, if you don’t realize that you are helping the earth and it’s just part of your daily life, it is easier to make a change. The convenience factor is huge. Making it a regular part of every day life, just like the recycle bins in the dorm rooms, it’s just so easy to drop it in. It is just right there. I think the convenience is huge for freshmen and sophomores in college, because they are just not going out of their way to help for a lot of people.
Example 2: Interview Transcript – Participant #17: Male

Moderate Environmentally Conscious

‘I cook my own food a few times a week.’ ‘Pay attention to my energy consumption.’ This one, I know a few people who have a car, but they don’t necessarily drive it every day; sometimes try to walk to campus. (Interviewer: Can you think of one specific person?) Yes, I can think about one specific person. She likes to buy organic food and tries to keep a very clean, very healthy living. She does notice energy consumption. If things a plugged in, turned on all day, that kind of bothers her, she thinks it’s wasteful. All I know is she’s pretty healthy living, doesn’t necessarily go out of her way to go clean up, but does she does her own part to keep from adding to it. So somewhere in the middle.

Very Environmentally Conscious

I’m trying to think of someone I know... I feel like I know someone. Not this one extreme. Extreme wasteful person, I’m having a harder time with. But I think I know someone who’s environmentally conscious. They definitely buy there clothes second hand, because it’s kind of a nifty thing. You know if you have someone who buys a scarf second hand are really proud of it, thinks it’s really cool. She does like to cook organic food. She cooks whenever she can as well, but it’s just a little harder on campus.
Not Environmentally Conscious

Let me try think of this person; try to get a break from that one. For the most part I think most of the people I know are moderate, but let me just try... I’m just going through my mind thinking who can I think of, is there anyone I know. I think I cannot think of anyone who necessarily fits these.. kind of this persona. I think of people that aren’t environmentally conscious, but they do not necessarily go shopping or wear only the newest clothes for the most part. I can think of guys who aren’t environmentally conscious... they don’t have the newest clothes, they don’t shop a lot. This kind of do their own thing every once in a while. Just drive more than most people, just throw away more stuff than they recycle that kind of thing.

Participant

I don’t buy my clothes second hand, but I don’t go shopping all the time, so I only buy things when I need them. I don’t recycle although I wish I could recycle. It’s just I live off campus in an apartment, so it’s more trouble to try to recycle because it’s hidden and it’s further away from where I am. So I don’t recycle. I’m very mindful of electronics and driving the car. I try not to drive as much as I can, not just for the environment, but for my own sake, because it’s so expensive to drive. When I’m on campus, I only use public transit and walk everywhere. I don’t drive on campus, I only drive if I go to work or when I go home. So if I can I like to – I think it’s the best way to word it – I use public transit and bike whenever possible. I don’t have any reusable bottles and bags, but I try to reuse bottles, just so that I
not throwing it away and getting a new one and throwing it away. Because I know, I don’t recycle, so I might to minimize the amount of bottles I’m throwing away. Let’s see what he does. (Looking at the non-environmentally conscious.) I do have many electronic appliances. I don’t eat out every day, but I do eat out. I cook when I can, but I do eat out just because it’s harder to cook. I do like to spend a lot of time outside whenever the weather is nice. Not nice out today. I do turn off my electronics when I’m not using them. That’s something good, right? And if I notice that there’s something being used or something is turned on and no one is using it, I try to turn it off. I also heard, if you just leave chargers plugged in that it still carries a charge and uses electricity, so I try not to leave any of my chargers plugged in when I can.

I couldn’t think about anyone that filled this one (non-environmentally conscious).

**Like & Dislike**

Sometimes the environmentally conscious person can be pretentious, because they are so much about the environment that they believe you should be that much about the environment. That would be the only thing. I feel sometimes people can get kind of arrogant or full of themselves when they feel like they’re doing something that everyone else should be doing.
**Knowledge, Awareness, Behavior**

I think almost everyone at this point has some sort of idea that something should be done and that the environment needs people to change and right now, I don’t know if everyone is willing to do it. There are people who do the extreme and try to do as much as possible and then I feel like most people just try to a little bit, because it not only helps the environment and it helps them, because in general things are more expensive than it used to be, so it’s a win-win to help the environment and if it’s right next to you. Like if recycling is right next to you and throwing away trash is right next to you then you are more likely to recycle. If they are both in the same area. Kind of like the recycling bins out on campus right next to the trash cans, I think that’s really good. Although people hold on to their things, I know I personally hold onto some things until I see a recycling bin, just because they are everywhere, so I just can recycle rather than check in that it’s been a long way out. I think most people want to do better, everyone always wants to help the environment it’s just a little more difficult than they anticipate. (Interviewer: Why do you think it’s more difficult?) Just the way at what we’re used to. People grew up on electronics and had a cell phone when they where young or something like that. The idea of not having that is really difficult for them. Even if it’s for a short duration. But even if it’s not that extreme. It’s like recycling everything instead of throwing it away. At first it’s just hard to make that habit and recognize what is recyclable or what isn’t recyclable. Taking the bus instead of driving. It’s less convenient, you have to wait around for the
bus and driving getting there at your own pace and when you need to be there, you have to wait on the bus and you have to wait on it picking up everyone else and all that. And it just requires more time. I think when the weather is nice it makes it easier to do the right thing. Not when it’s really hot like in the middle of summer, but when it’s like fall 70s-80s. It’s just easier to be outside easier to leave everything turned off. You wanna be outside, you wanna enjoy that weather. I think people want to be outside more and they want to be that person. But it’s just a little difficult. Maybe I’m naive, but I think everyone wants to do the right thing though. I think we grew up right when everyone was realizing how bad things were for the environment. The whole green house gases and the ozone, the ice bergs melting that all happened in the late 90s or early 2000. Everyone started to become more environmentally conscious and looking around and Haiti this isn’t what should be happening. It’s getting hotter, it’s getting warmer. This aren’t the way they are supposed to be. And we are starting to make that shift as a society towards greener environment. We’ve seen more and more people try to buy organic and be more health conscious. They try to buy fast food less and things like that. Things that are easier, try to skip out on them and just trying to do what’s right. I think it’s just one of these things, we need to... were it just becomes a normal thing and then everyone does it. It’s making it’s way, I think it’s getting pretty normal, not only certain people recycle or certain people do the right thing. I think it’s pretty normal.
Willingness To Change

I am willing to move towards being environmentally conscious. I would say around here. And for me this spot would be giving up or beyond this spot over here in this last quarter would be like not driving and maybe not taking a plane ever and working against it actually, going out and actively cleaning the environment. That’s what would be in this last section for me. (Area of change:) Immediately it would probably be actively recycling and then it’d be maybe clothes, because I buy them less and sell them, for food it’s just more on the expensive side. As a college student it’s not feasible to go and buy organic food. I know it’s the right thing to do and I understand it, but it’s a little pricey for me. Specifically, it would be to recycle, buy clothes second hand or try to buy things second hand. Try not to have as many electronic devices. I feel a lot of people are tied down by them. And I know I have a lot. I understand that it drains a lot on the environment. It ends up becoming you. A lot of people can’t leave a week without being on facebook and they are becoming all their electronic devices. I’d rather move away from that. I like being outside, that’s nice. I don’t like sitting inside and staying on the computer all day. It’s just a waste of a beautiful day.

Motivation To Change

I think most people are little bit more on the non-environmentally conscious side. It’s not on purpose. For most people it is, I think, just... for most freshmen and sophomores it’s just because they live in the dorms and you can’t really cook
your food every day, you have to go and get it from one of the buildings. They do
walk and ride their bikes everywhere, which is really good. There’s lot of... I don’t
know if there’s much information-wise the campus can do. They campus offers a
lot of information. There’s recycling everywhere. There is a book for campus that
all the incoming freshman students were supposed to read. A book on recycling
and the impact of waste of daily consumption. I can’t remember what the title
of the book was. (Interviewer: No Impact Man) No Impact Man, yes. We had to
read No Impact Man. And I think the campus does as much as they can to inform
and keep the students informed. It’s just an individual level. Each person has
to consciously say ‘Okay, I’m going to make a change. I’m going to do this.’ So I
think it’s just a matter of everyone individually saying to themselves, we are going
to do this. And as you continue to do that, maybe you influence someone around
you. Maybe you’ll start going thrift shopping and someone will see and kind of
‘Can I come with you?’ and they’ll do it too and things like that. I just think, that’s
something that start on an individual level and grows at a communal level.
Example 3: Interview Transcript – Participant #28: Male

Not Environmentally Conscious (Male)

Someone who’s not environmentally conscious. My friend Kyle, he lives across the hall from me. So male. ‘I like to shop and enjoy.’ I imagine he shops a lot. He buys what he wants to. He sees some things he likes. ‘I only wear clothes from the latest collection.’ If I picked a girl I would have said yes. I don’t know if it’s a bad stereotype thing or not. But I feel like he is kind of trendy with his clothes. ‘Eat out every day.’ As a freshman or sophomore; living in the dorms which he does, I mean you have to, you are on the meal plan. There is a kitchen in my dorm that houses many, many more people than what that kitchen could have the capacity of. Next year, when I live off campus I plan to eat in my own room or own house a lot more than I do now. ‘Energy consumption’ He’s never really, not particularly. He leaves the TV on and those sorts of things. He has his car. I guess right now he doesn’t drive a lot, but when he’s not at school. When you are on campus there is no real way to drive around between classes especially without a super costly parking pass. ‘Consumption is part of my daily routine.’ Yes. The lifestyle right now is so fast paced. Like I said, you’re on the meal plan, you have to eat out all the time and that’s a major source of consumption. And then you spend a lot on the weekends. Every now and then he and his roommate just buy random things because they think they’re cool or funny. They just bought a air humidifier that looks like a penguin and spills out mist. It’s like ‘Are you really bothered by the
humidity in your room or do you just want a moisture. ‘I have more than one car or motorbike.’ I don’t think that’s the case. ‘My electronic appliances.’ I think that’s a relative term, but I’ve been to his house once and it was pretty wired up. It’s got a lot of gadgets and several TVs. It’s certainly a high energy house. I don’t know if it’s ... it is probably relevant, but certainly his family is at the high end of the income. They have the money to throw down on anything they want. I feel that if you just wanna enjoy my life. This quote ‘I love to shop and enjoy my life.’ It’s more just, I love to enjoy my life and don’t want to be cramped on by the environment. So I scratch out the shopping, but he does purchase a lot of things and a lot of materials. Other comments: Money does not concern me. There is a fiscal environmental combination, I think you tend to be more environmentally conscious if it is really expensive to buy gas to go from point A to point B. I don’t want to hurt the environment and it’s expensive. If money doesn’t concern me, it doesn’t strike home that if you have enough money to drive somewhere and the impact of it. And there is more impact of it, when you understand scarcity or something. The impending scarcity.

Very Environmentally Conscious (Female)
‘The environment is very important to me. I do a lot in my daily life to minimize my own impact.’ I can think of a lot of people who would say this but don’t necessarily back it up. It depend on how I wanna go with this. Somebody who says this or someone whom this quote describes. I go with that one, someone who
actually does this. I’ve got a friend Kelly, who’s a girl. She is very environmentally conscious. I would say: ‘I recycle everything that’s recyclable.’ I’ve always wondered though. I feel like often times we throw things away that can be recycled, but I also think we try to recycle things that really aren’t recyclable. And I’ve always wondered maybe of the logistics of what happens if you do that. There is always an argument that paper cups; the paper you can recycle, but the plastic film on the inside prevents it from being recycled and I’ve heard arguments for both. And frankly I would like to just ask someone at a plant: ‘What do you do if you come along these cups. Do you throw them into the burner? Or different conveyor belt. Do they actually recycle? I feel like in general, that recycling something that’s almost misunderstood. Lack of education there as far as what can be recycled and what can’t. ‘All my clothes are second hand/thrift store.’ Definitely not true. I can’t think about anyone that is so environmentally conscious, to just keep on wearing clothes from the past. I just think, if you.. at the same time I don’t like to buy cutting edge. I just buy clothes as I need them. If I needed a new pair of jeans, I don’t think I could just thrift them. For me it’s my skinny size, I don’t know if that’s another problem. If you’re really skinny person living in a country which such a large BMI on average. It’s hard to find things. My feet are so narrow, I can only wear certain things and that’s kind of a though thing in middle school and everyone was getting these cool shoes but I couldn’t get them, because they were too fat for my feet. Not every thing. I can imagine her buying some things. Some clothes. ‘I only buy organic or local food.’ She’s very...
She definitely pushes for organic but she is not exclusive. I would say more: I try to or frequently. ‘I save energy wherever I can.’ I would think so, she would. If she can bike somewhere instead of drive somewhere, I think she would. If she had to buy a car, she would buy one with good emissions. ‘I only bike, walk, use public transport.’ Again, when you’re at school you’re pretty much limited to biking, walking and public transportation. But I don’t think she drives her car too much at home. She does own a car, but it’s actually her parent’s family car. ‘I only buy things that I really need.’ I think that’s true. It has to be practical. I couldn’t image her buying a penguin humidifier, for example. ‘I cook almost every day.’ I don’t know if she cooks. Maybe. Actually, she still lives on campus and is on the meal plan. I would say ‘try to cook, when I can.’ ‘Grow my own food.’ Again, she lives in a dorm so she gets her own dorm garden plot. So I’d say I’d like to. For the bike, walk and use public transport, I’d say often. ‘Spend most of my time outdoors in nature.’ I mean she is a student so I think she spends most of her time in the classroom but she’s also a crop science major, so I’m sure she spends a lot of her time outdoors. Plenty, she spends plenty. ‘The environment is really important to me.’ True. ‘I use reusable bottles and bags.’ I would think so. Two other things that describe her: She’s a crop science major. For Kyle I put business major. I try to be stingy with money.

**Moderate Environmentally Conscious (Male)**

‘I care about the environment, but I won’t sacrifice my whole lifestyle.’ I do my
friend Zach. He seems kind of moderate. ‘I cook my own food a few times a week.’ Again, no, because he lives in the dorms. I know he wants to. He always talks about it. ‘I want to cook my own food, when I live of campus.’ ‘I pay attention to my energy consumption.’ No, he has a car. He doesn’t drive it every day, I guess I can fill that one out: ‘I have a car, but don’t drive it every day. But I still drive it in a couple of questionable times.’ Shop with paper bags. No. ‘I turn of electric appliances when they are not in use.’ No. He cares, but he just thinks he’s a drop in the bucket as far as anything he does would just be a negligible difference. ‘I shop organic or local from time to time.’ Sure, he does. ‘I buy green products when they are cheap.’ Certainly if they are cheap. He doesn’t particularly have a high income. Low income, but still likes to spend his money eventually. Mainly cigarettes. I don’t know if you count those on carbon emission or not. He smokes enough to register. He thinks he pays attention to his energy consumption, but I don’t think he actually does. Recycles when convenient.

**Participant (Male)**

Don’t buy organic. I’d like to buy more local. I’m a big consumer of milk and milk products. I like to buy just from Ohio dairy farms. My friends are talking about this one. And in Ohio I try to look forward it in supermarkets or even smaller markets like I don’t know if you’ve ever been to Rife’s over in Grandview. They are a smaller venue; local. So that’s a place, I’d like to start seeing if they have milk there. I remember when I went over to Germany with my neighbor to visit their
family, the milk there definitely tastes different. Is that just lack of chemicals or do you know what would constitute the difference of taste? (Me: I think a lot cows are only fed with grass and here a lot of cows are fed with corn. I think that this might be the difference.) So that results in the difference in taste. Some people like my sister they didn’t like it. She was disgusted. I kind of got used to it. A different good taste. I’m a big milk drinker myself. If something tastes difference, I adapt. I don’t know if saying I really like milk is a worthy bullet point. I’d like to buy more local. I recycle as much as I can, but I’d like to know the logistics. If I ever bought a car, I’d want it to be efficient. Not particularly. I try to be pragmatic with clothing purchases. Big believer in fresh water conservation. That’s something we kind of overlook a lot. How water is just a simple resource, but if we put too much stress on our limited supplies then we have more trouble than we’d ever had. Phoenix, Arizona, just the entire city is just sapping up water where we shouldn’t ... there shouldn’t be out there. It is kind of dangerous to think if there is a dry spell. Water is just so precious, they say the next major war will be upon water. There are people that are thirsty. You’ll kill for water if you have to, I guess. That’s a component in welfare. We are derived to go to wars if you can’t get your water. There is some unrest with the dame in the Mayo river. It’s a source of contention for places that are upstream. I try to, at least in the summer take cold showers, so that I’m not in too long. I like to not have air conditioning in my house. It’s so nice, but it’s a major energy hog. And expensive to keep up. You can leave without it. When I was in Haiti for a mission trip, it was hard to get used to it. It was an
extreme, but even then you eventually do adapt. In the dorms where I live in there is no air conditioning. I try to take cold showers, that I don’t shower too long. I take it in 2 minutes... in summer. It’s harder for me to turn down a nice long, warm shower in the winter, but that’s me being selfish I guess. I personally believe that sustainability is something that can’t be completely achieved on a personal level, but more on an infrastructural level. Infrastructure change over personal change. I also think that sustainability is even more important – I don’t want to say on a political – but a national level or environmental level. If you can be self-sufficient and manage your resources well, then you don’t have your arm bent around the world. You don’t have to boss anyone around and no one has to boss you around. How much we depend on oil in the middle east and all our consumer products to outsource places like China, Mexico. We, A, don’t need to purchase that many things, that’s a weird thing about the economy, how goods driven it is. If you don’t purchase then things start to go to hell as far as people losing jobs. There is such a dependency urging people to purchase things. Apparently saving your money is bad, it stunts the economy, but then you’re also taught to save you’re money, don’t just blow it on anything. You almost got conflicting forcing points. Sustainability is more important on fiscal, political level. That are just my personal thoughts. Infrastructure needs to change. For what it’s worth I am a chemE major and I work in a solid oxide fuel cell lab, which kind of, I don’t know if that makes me biased. But I do want to work in sustainability and energy consumption as a line of work. True sustainability, there needs to be change on
the industrial side of things. I read an article in the economist and they where
talking about how when you’re comparing... it shows the change in countries.
There is two ways to look at it: How much more carbon emissions you has since
they did the study. They did the study in 1990s, 2000 and now and if you look at
it one way how many resources you are consuming. The United States has still
increased some. And the European countries have decreased in carbon dioxide
output, noxes (poison) and those sorts of things. But the idea was, if you look at
just judging so ones carbon foot print on not just what they produce but also on
where you are getting your resources from. All the clothes, everything, all the
goods that we produce from China and we can say ‘Oh, we are so sustainable if we
get all our stuff from there.’ But there the environmental standards are nowhere
near as high. I am sure you heard about at the Beijing Olympics; they had to turn
off all their factories a month in advance just so you could see clear. Just to create
the illusion that there are clear skies. But after the Olympics it goes back to full
production and the smog’s in. But if you look at the industry of things, we’re still
astronomically increased in our carbon footprint. So I think the industry needs to
change. But I think that are tough ramifications to deal with.

Let’s say for my environmentalist friend, she’s very focused. I think she knows.
She does her stuff since she’s a crop science major. She has her own things that
she likes. She is not so environmentally conscious as to be no impact man.
Let's go with Mr. business major. I think he cares about the environment, but I don't think he knows about the ramifications. I think he doesn't personally believe that he can make a difference. So why bother or even try to make one. I would say he's environmentally conscious, but apathetic.

My friend, he's kind of the moderate here. He's really, all things considered, he's not really much better than this friend (not environmentally conscious one). But at least he likes to think he's a good person. I don't know if he does it to be a good person.

It's tough to categorize me because I think that we need a sustainable lifestyle, but I am not necessarily environmentally conscious, if that makes sense. It's more about managing our resources rather than the effect what happens when we use our resources. For example, don't drive a car not because you're globally warming the earth, but because we won't always have oil. You can't just be living a phantasy of having something you don't really have. That's something that won't always be there. It's just a cold wake up call. I stick myself a little bit ahead of my friend (moderate environmentally conscious), but I don't think I'm so particularly environmentally conscious as to buy organic. After a certain threshold I don't take a bike ride. I don't ride my bike if takes more than half an hour and those sorts of things. At the same time though I definitely do have some feelings that we have to take care about our environment. There are certainly bad things we release in our
emissions like all the noxes and sulfides and sort of things. I put myself here, but I don’t think I am particularly better than anyone else. I’d like to think so, but it’s probably not true. I do my share of using electronics, a lot of electronics. I’m on the internet all the time doing work.

**Willingness To Change**

I definitely wanna go in to the environmentally conscious direction. I would like to buy things more locally; support my local farmers. I do keep bees. If I had my own house I would like to have a sustainable house. But I think it’s almost more for the novelty of it and less that I don’t particularly think that I’d make that huge of a difference.

But I at least like to say it. In the future, once I’m. It’s hard to necessarily be, to say you’re sustainable in college just because you depend on so many other things that you’re out of control. For example you have to live in the dorm so you have to go by their energy standards. The university is trying to be environmentally friendly, they just got, they’re just digging the geothermal wells in the south campus area. But I’ve still have to eat of their meal plan and I don’t know where they get that food from and those sort of things, but I have to eat out of it. But once I’m at the point of my life where I’ve my own job, have my own funds, maybe it will be harder to, because it’s not really you’d put your money where your mouth is. Are you gonna actually buy a hybrid car or you just gonna go with the cheaper option of the 1991 Ford Turis. Or get the
cool car that drives from gas station to gas station. But I guess I would like to move up a little bit more. I fall a little bit short of there (very environmentally conscious card).

**Interviewer:** So you are more likely to change, to achieve this goal, in the area of food and traveling?

**Participant:** Yeah, food and transportation. I don’t know what else. I mean clothing or general consumerism, just purchasing what I have to. Purchase only things cleanly made, I don’t know if that’s possible.

**Knowledge, Awareness, Behavior**

**Interviewer:** If you especially think of your three friends, do you think there is a connection or disconnect between their knowledge about sustainability, their awareness that it might become a problem, and their actual behavior?

**Participant:** Yeah, I think there is this mentality. Actually two kinds of mentalities. One is on this end of the spectrum, like everyone knows that there is an issue on hand, but on one end this guy is like, we may be running out of fossil fuels, but it won’t happen during my lifetime, I’ll be gone by then, what do I care? And then on this end it’s like, we’ll be out of oil within my lifetime if this is trying to keep on going and we have to be the generation to rise up and solve this
problem. Let’s start now, because life won’t be like this 50 years from now. We have to change something. I think right here, the moderate, is quasi aware, he’s like, yeah, we need to do something, but in baby steps. And by baby steps I mean we have to recycle this can of coke and then run on the fan in my house. There is definitely a lack of knowledge and there is also the aspect that every time someone tries to talk about the environment, it just gets super preachy and almost smug telling someone how to live their life, which doesn’t really get far, that’s not the message people need to hear.

Motivation To Change

Interviewer: Do you have any ideas or recommendations how one could motivate these people (majority of freshmen and sophomores to make changes in their lifestyles. And a few hints are incentives like money, more information through courses, events, books, coupons, social network groups, applications that tell you what’s right or wrong, fun.

Participant: It’s hard to say whether money would motivate or not. At this point being a freshman or sophomore in college is a bizarre point in your life, because on one hand you’re poor, because you are so far in the can with the tuition and fees and stuff like that. You are on loans. On the other hand you put on the back burner, and your like ‘I am so far in depth what’s bending a little bit more gonna hurt me.’ So it’s hard to say whether a realistic amount of money would help. On
the other hand, students in this demographic are so dependent on university services to be more environmentally friendly. It depends on the direction the university wants to go. If they advertise that their food is all local or if you had an all local food option, that would help. There’s the convenience of even getting to somewhere that would have sustainable food sources. You have to travel of campus and I think it’s just easier to walk across the street to the market place and grab whatever they have there. I think to motivate the people to be more environmentally conscious, requires more education on the university’s part. I think of all sorts of sessions, how to be a successful student. As far as freshmen in survey classes have to attend these success seminars. You talk about... there’s one about ‘Sex and Protection’. They have all these sorts of ridiculous categories. If we could have more sessions on recycling and similar issues. I think that would help. I feel like there are a lot of cars just around campus to drive around. I just wonder if there would be any way to reduce that. I don’t know. It’s tough to say because so many professors live not near campus, they live up in Worthington, Upper Arlington. The real way to motivate someone to be more environmentally friendly is just the campus mentality.

**Interviewer:** Do you think that, because you mentioned it’s easier to go to the market place, convenience is a big issue?

**Participant:** Oh yeah, yeah. Always. I mean if... let’s say if 9 out of 10 times if
you can drive somewhere versus walk somewhere a lot of people would drive. Just because it is a thousand times more convenient to just cross the street and get market place food than look for locally grown food. It’s more convenient to... it’s easier to leave the TV on in your room than just turning it off.

Criteria for Application: Sustainable Awareness Study

[Image of a workshop board with notes on sustainability and behavior change]
Criteria for Application: Sustainable Awareness Study

- The environment is very important to me, I do a lot in my daily life to minimize my daily impact:
  - Everyone, but one persona, is on the very environmental conscious half of the spectrum
  - The majority defines the first quartile of the spectrum
  - Nobody is lower than average
  - No persona is on the very end of the spectrum: Very environmental conscious
  - There is still room to improve, even for this type of persona

▲ I care about the environment, but I won't sacrifice my whole lifestyle:
  - Everyone, but two personas, is in the middle of the spectrum
  - The majority is in the center of the spectrum
  - Nobody is in the last quartile of the spectrum and therefore not very environmental conscious
  - Two personas are in the first quartile and therefore very environmentally conscious

★ I love to shop and enjoy my life, I don't want to be restricted by the environment:
  - Everyone is on the not environmental conscious half of the spectrum
  - The majority defines the last quartile of the spectrum
  - Two personas are placed on the very end of the spectrum: Not environmentally conscious
  - No other persona (not even the participants themselves) are placed in the last quartile.

● That’s me: Participant card
  - Everyone, but three participants, placed themselves on the environmental conscious half of the spectrum
  - Three participants are placed in the first quartile of the spectrum
  - The majority is in the second quartile.
  - Overall, the participants are in between the very environmental aware persona group and the moderate aware group.
Criteria for Application: Sustainable Awareness Study

Very environmentally conscious

Moderate environmentally conscious

Not environmentally conscious

Participant
Appendix D. Participatory Workshop 2: Information & Motivation Study

Focus Group #1: Tool Analysis

- Coupon Book
  - Pros: low-risk, fun, paper-based, allows for different doors.
  - Cons: low stakes, paper-based, challenging to implement.

- Course Plan
  - Pros: quick, easy to create, aligns with students' interests.
  - Cons: difficult to change, lack of real-world application.

- Facebook Group
  - Pros: engaging, interactive, accessible.
  - Cons: confusing, lack of clarity, low engagement.

- iPhone App
  - Pros: engaging, interactive, accessible.
  - Cons: confusing, lack of clarity, low engagement.
Focus Group # 2: Tool Analysis

Coupon Book
- Monetarily incentive for everyone.
- Qualitative value on well-done.
- Intentional, well-thought-out design.
- Location-specific.
- Well designed, colorful, appealing.
- Personal quote.

Course Plan
- Need connection of broccoli
- Map of green places around.
- Location specific.

Facebook Group
- Easy to access.
- Engaging.
- Informational.
- Easy to share.

iPhone App
- Convenience.
- Informational.
- Easy to incorporate.
- Information is thorough.
- Great scope.
- Great source of info.

Focus Group # 3: Tool Analysis

Coupon Book
- Well organized.
- Patient.
- Put everything in a card.
- Local to bucks.

Course Plan
- Allows students to find their own projects that promote sustainability.
- They can implement in their own life.
- Course 1: Alcohol awareness.
- Course 2: Environmental awareness.
- Course 3: Health awareness.
Focus Group #4: Tool Analysis

**Facebook Group**

- Always works by default when you are alone, but you are removed in a group chat, it does not work. You can ask the group to remove you.
- Facebook's privacy options are good, but they can be confusing.
- It's easy to lose track of what's going on in a group chat.
- Not very actionable, especially in groups.

**Course Plan**

- Both courses have different requirements, but they are both interactive and engaging. It's important to have a clear understanding of the requirements.
- The courses are well-organized, with clear deadlines and milestones.

**Coupon Book**

- Well organized, very useful! I felt organized and helpful.
- The book is easy to follow and contains important information.
- The book is easy to carry and read.

**Facebook Group**

- I have seen that Facebook users are not active on Facebook daily.
- People don't like to put their personal information on Facebook.
- Facebook is more vulnerable to identity theft.

**Course Plan**

- Both courses are interactive and engaging. It's important to have a clear understanding of the requirements.
- The courses are well-organized, with clear deadlines and milestones.

**Coupon Book**

- Helpful because it only costs a few dollars for a sustainable lifestyle. It gives you advice on how to conserve energy and money.
- The book is easy to carry and read.

**Facebook Group**

- I have seen that Facebook users are not active on Facebook daily.
- People don't like to put their personal information on Facebook.
- Facebook is more vulnerable to identity theft.

**Course Plan**

- Both courses are interactive and engaging. It's important to have a clear understanding of the requirements.
- The courses are well-organized, with clear deadlines and milestones.

**Coupon Book**

- Helpful because it only costs a few dollars for a sustainable lifestyle. It gives you advice on how to conserve energy and money.
- The book is easy to carry and read.

**Facebook Group**

- I have seen that Facebook users are not active on Facebook daily.
- People don't like to put their personal information on Facebook.
- Facebook is more vulnerable to identity theft.

**Course Plan**

- Both courses are interactive and engaging. It's important to have a clear understanding of the requirements.
- The courses are well-organized, with clear deadlines and milestones.

**Coupon Book**

- Helpful because it only costs a few dollars for a sustainable lifestyle. It gives you advice on how to conserve energy and money.
- The book is easy to carry and read.

**Facebook Group**

- I have seen that Facebook users are not active on Facebook daily.
- People don't like to put their personal information on Facebook.
- Facebook is more vulnerable to identity theft.

**Course Plan**

- Both courses are interactive and engaging. It's important to have a clear understanding of the requirements.
- The courses are well-organized, with clear deadlines and milestones.
Focus Group # 5: Tool Analysis

**Coupon Book**

- **Pros:**
  - Very practical
  - Very organized
  - Easy to follow

- **Cons:**
  - Limited information
  - Not very detailed

**Course Plan**

- **Pros:**
  - Clear and concise
  - Easy to understand

- **Cons:**
  - Limited information
  - Not very detailed

**Facebook Group**

- **Pros:**
  - Lots of people use FB
  - Great for networking
  - Easy to use

- **Cons:**
  - Not very detailed
  - Limited information

**iPhone App**

- **Pros:**
  - Convenient and easy to use
  - Easy to find information

- **Cons:**
  - Limited information
  - Not very detailed

Focus Group # 1: Ideal Tool

Focus Group # 2: Ideal Tool
Focus Group # 3: Ideal Tool

- Digital
- Free (everything)
- Have Apps Available for download
- Access to digital coupons
- Forum for event notification and postings
- Articles section
- Way to suggest to friends
- Nuts for green businesses
- Locally available product section (farmers markets, locally grown seeds)
- Locations tab for finding things in your area

Focus Group # 4: Ideal Tool

I would be able to...
- Learn about different green goods/products/food
- Order and purchase my groceries
- I would be able to calculate how much money I can save by buying it in bulk
- View details by viewing a certain product, rather than clicking
- Compare & compare different products
- Recommendation brand/vendor for trusted & reliable companies can be created so it will be personalized
- Detailed, where I can read what other people are saying
- All in one, I can view the app, book
- Write in interest about how people something if I can't get it from an app
- Product description should be easy to understand, presenting whether I can trust it, would name it?
- Be user-friendly, because the product is expensive, are not signaling paper
- Have everything that I can use the coupon here, learn it, how to know the different market programs in my area. This way, not would as much to research them together
- You can't view it as separate, the same time in the same screen? I don't have to click on the other screen as to make
- They would use it for information, if it saves a step
- Not helpful, what you don't like about changing the interface in your opinion.
Focus Group # 5: Ideal Tool
Example: Interview Transcript – Focus Group #1

Participant 01: iphone App

First thing we did was iphone app or a couple of different ones and there were kind of pros, they were convenient, because it is just on your phone and you can take it wherever you want with you. They mostly provided different places you can recycle or go that were green friendly. They were a good source... you could kind of search based on whatever you needed, what you wanna recycle. So the apps, they were convenient and they are really thorough with all the information they included. This kind of goes along with good scope. They weren’t just food, they weren’t just batteries, there was a whole bunch of different kind of things. And just a good source of information; they had articles about being green. Cons were, they don’t really motivate you being green necessarily, you have to be motivated in order for them to be effective. One of them provided a general, like a daily tip for being green. And we thought you should be able to scroll through previous days tips. It doesn’t integrate much in your life, it wasn’t things you can necessarily do from home. They were all like if you go out to do something.

Participant 02: Coupon Book

Our analog one was the coupon book and that one basically the first part had a bunch of information about sustainability, how different things impact the environment or didn’t to be better or worse. The second half had coupons for ...
and restaurants etc. So like about it that kind of throughout the book they had this pictures of how much either money you are saving or carbon emissions you are reducing by doing this suggestions opposed to other things. For instance eating local food as opposed to out of season food. So it’s kind of motivation, also it’s well design, but also the nice thing since it’s a book and you have it in your house you can share it with other people. People who might not have thought about it initially would see it and get some ideas. The cons: It is a book, so it is not necessarily something you would bring with you, you kind of plan ahead, if you want to use the coupons you probably have to put them out before hand and bring with you. It is something you have to update if you change location or a year later because it only applies for that place and time. Unlike the other one that just gives you information what’s around, it requires in terms of implementation it requires cooperation of the business that can give coupons.

**Participant 03: Facebook Page**

For this application, it’s like a Facebook page for one organization called DOT (Do One Thing), so basically because it is a Facebook group everyone can join, which means has no limit of numbers of the participants, which means a lot of people can join. Whoever has interest in sustainability can join the page. The second one does have a video post on the Facebook page which can give people a lot of motivation on what people can do for and why to improve for sustainability. And also they were a lot of simple steps. Do because it says do one thing one
day it is not challenging for members to participate in this program. So there is one tip, so do one good thing every day. It is a physical page, there is not much interaction in between members. For example on all posts of this page there are zero comments on each post, which means there is almost zero interaction between members. There is only one video post online and there are only three photos online, which makes this website not very interesting to all the members. And the third one (cons) is that obviously there is no strong leadership of this organization. For the past three month there is only one post by the page itself. It also means that they do not organize a lot of activities. In this case, people who want to learn something about sustainability they just an go to this page, but if they want to do something like a book project it is going to be hard for them to interact with each other.

**Participant 04: Courses**

The second one, there were two course examples, they each had different content we only had good things to say about the second example. And we only had bad things to say about the first example. The first example contained information that would be more appealing to engineering students and science students, because there are topics such as ecological footprinting, sustainable buildings, sustainable engineering. They are more abstract ideas as compared to the second example which was more hands-on experience. There is a field trip. The second example seemed more interesting because there were student activities and
relatable material to everyday life. Whereas the first example, there were no student projects, so it would be hard to relate the material to everyday life. These abstract ideas in the first example will be harder to comprehend for a wider range of students compared to the second example, which was things that anybody could do or anybody would be interested in learning about. Course example two would be preferred due to its hands-on experience, just because everybody could have a better understanding of sustainability compared to what seems history and more in-depth content of sustainability and course example one.

Criteria for Application: Information & Motivation Study
Appendix E. Concept Greened U

Storyboard User Scenario

MELANIE DRESER
DESIGN, FUN & SUSTAINABILITY
MFA DESIGN DEVELOPMENT

MAKE A SUSTAINABLE LIFESTYLE FUN
INSTEAD OF TELLING PEOPLE TO DO GOOD OR TO CARE ABOUT SOCIETY & THE ENVIRONMENT.
Greened U
A social participation game
HAVE FUN
WHILE
DOING GOOD

SOCIAL PARTICIPATION

NETWORK

PROFILE

COMPUTER
GAME

MEET PEOPLE

OHIO STATE UNIVERSITY
MORRILL
MEAL PLAN
GROUP CHALLENGE

JOIN US FOR OUR MISSION
TO BEAT DRACKETT TOWER
IN OUR WATER CONSUMPTION
CHALLENGE.
LET THE WATER GAMES BEGIN, MORILL TOWER!

Greened U
A social participation game
HAVE FUN WHILE DOING GOOD

BADGES

LEVEL 1
LEVEL 2
PERSONAL CHALLENGE

CHECK OUT ONE OF THE FARMER'S MARKETS IN YOUR AREA THIS WEEK.

ONCE YOU ARE THERE
1. LOG INTO THE LOCATION
2. UPLOAD A PHOTO
Hey! I just bought some eggplant at the farmer's market and since I never prepared eggplant, I'd need some tips how to prepare it or even recipe recommendations. Thanks!

10 minute showers

Turn off water while brushing teeth.
YES! WE ARE LEADING IN OUR WATER CHALLENGE. CHECK OUT THE USAGE BAR ON THE GROUP CHALLENGE SITE. KEEP UP THE GOOD WORK. IF WE CONTINUE CONSERVING WATER, WE CAN WIN THIS COMPETITION.

GO, MORRILL, GO!

BUILDING A SCHOOL FROM RECYCLED PLASTIC BOTTLES.
Appendix F. User Scenario Feedback

Example 1: User Feedback

I really like the idea of combining sustainability with fun. I think the game can make people think about environmental issues which were unfamiliar to them before. Especially, the competition creator function is great. It makes the students think about possible solutions themselves. Consequently, they will be more aware of sustainability in their daily lives.

If I was a freshman in college I definitely would participate in this game, since I am really concerned about the environment. As a result of participating you also get involved in a social group or get to know new people (which is always important when you move somewhere new) who also care about the environment.

Example 2: User Feedback

I think this is an awesome idea!! What I like best about it is that it teaches students how to be sustainable and environmentally friendly in a fun and simple way. Unfortunately, young people in our society tend to care more about themselves than the health of the planet, but I think this app can get the ball
rolling for students to know how to live more environmentally friendly lives after they graduate. Hopefully the issues they learn while laying the game will carry over into the rest of their lives. I also think the spirit of competition created in this game is an important motivator. I can definitely see myself playing this game...I just need to get an iPhone first :) 

**Example 3: User Feedback**

What a fun idea about a serious topic! I enjoyed all the little details of the presentation as well as of the game itself. My favorites are the Farmers’ Market and the Challenge Creator Badge. Here are a few questions that I have: Is the game only designed for people at the same university? Could non-students also participate? Would the Water Consumption Challenge work only between two dorms? It’s a fantastic concept either way because even if you’re not playing the game, just hearing about it still makes you think about the environment. Keep up the great work!