



Ecological Literacy Evaluation of The University of Iceland Faculty, Staff, and Students; Implications for a University Sustainability Policy

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**Faculty of Earth Sciences
University of Iceland
2010**

Ecological Literacy Evaluation of The University of Iceland Faculty, Staff, and Students; Implications for a University Sustainability Policy

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60 ECTS thesis submitted in partial fulfillment of a
Magister Scientiarum degree in Environment and Natural Resources

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Bibliographic information:

Mary Frances Davidson, 2010, *Ecological Literacy Evaluation of the University of Iceland Faculty, Students, and Staff; Implications for a University Sustainability Policy*, Master's thesis, Department of Earth Sciences, University of Iceland, pp. 149.

Reykjavik, Iceland, March 2010

Abstract

In celebration of its centennial in 2011, the University of Iceland will introduce a new sustainability policy. As the world recognizes the need to transition toward a more sustainable society, many higher education institutions are aiming to become models of sustainability. One step in creating a policy is to assess cultural values and attitudes on campus.

This thesis explores the levels of ecological literacy of the University of Iceland community, and suggests ways this information can be used when creating and implementing the new sustainability policy. As David Orr (1992) explains, ecological literacy is a term used to describe the art of living well on our spaces. This ability is based on our knowledge, values, behaviors, and on our general understanding of how our actions impact larger systems.

Data was collected through an email survey of the University of Iceland community. In general, environmental values were positive, while behavior and background knowledge about sustainability issues need improvement. The data also shows trends of ecological literacy in different groups on campus. With this information about the culture at the university, policymakers are better equipped to design a policy and implementation strategy that meets the specific needs of the campus community at the University of Iceland.

If ecological literacy improvement is the goal, then implementing education for sustainability is a tool to achieve the goal. The University of Iceland can learn from existing programs and strategies from other universities to integrate education for sustainability into its educational framework.

Útdráttur

Í tilefni af aldarafmæli sínu árið 2011 mun Háskóli Íslands koma á fót nýrri sjálfsbærnistefnu. Á tímum þar sem nauðsyn þess að skapa sjálfbærara samfélag er viðurkennd leitast menntastofnanir við að leggja línurnar hvað sjálfbærni varðar. Stórt skref í sköpun árangursríkrar sjálfbærnistefnu er að móta hana í takt við núverandi viðhorf og gildi í háskólasamfélaginu.

Meistararitgerðin kannar vistfræðilegan skilning í samfélagi Háskóla Íslands og leggur til leiðir við gerð og framkvæmd nýrrar sjálfbærnistefnu. Eins og David Orr (1992) segir þá er vistfræðilegur skilningur hugtak sem notað er til þess að lýsa þeirri list að lifa vel á sínu svæði. Þessi hæfileiki byggist á þekkingu, gildum, hegðun og skilningi á hvernig hegðun okkar hefur áhrif á stærri kerfi.

Gögnum var safnað með könnun sem send var út til allra þátttakenda í samfélagi Háskóla Íslands. Almenn séð voru umhverfisleg gildi í hávegum höfð á meðan hegðun og þekkingu er varðar sjálfbærni þarf að bæta. Gögnin sýndu einnig mun á vistfræðilegum skilningi innan ákveðinna hópa í háskólasamfélaginu. Með þessar upplýsingar um háskólamenninguna til hliðsjónar er háskólinn betur í stakk búinn til þess að skapa og framkvæma sjálfbærnistefnu sem hentar Háskóla Íslands.

Ef aukinn vistfræðilegur skilningur er markmiðið þá er aukin fræðsla um sjálfbærni leið að því markmiði. Háskóli Íslands getur nýtt sér aðferðir annarra háskóla við að finna sjálfbærnimennt betra stað innan veggja skólans.

Dedication

For Kolbeinn Tumi and Elsa María.

From the bottom of my heart, thank you for the support and motivation.

Preface

This thesis is the final 60 ECTS project for the Environment and Natural Resources program at the Univeristy of Iceland. The research is the result of an interdisciplinary collaboration between the School of Education and the School of Engineering and Natural Sciences.

Table of Contents

List of Figures	xiv
List of Tables.....	xv
Acknowledgements	xvii
1 Introduction.....	19
1.1 Project Context	19
1.2 Aims of the Project	21
1.3 Research Plan, Methodologies.....	22
1.4 Structure of the thesis	22
2 Academic Framework	23
2.1 Introduction.....	23
2.2 Education for Sustainability; An Overview	23
2.2.1 Participation as a Tool to Empower Students	25
2.2.2 Education for Sustainability and Value Creation.....	26
2.2.3 Action-based Approach and Student Empowerment Through Education for Sustainability.....	27
2.3 Education for Sustainability in Iceland.....	28
2.3.1 Green Flag Schools in Iceland	29
2.3.2 Action ESD: Research Project in Iceland	31
3 Literature Review	31
3.1 Sustainability on Campus	31
3.1.1 Higher Education and Sustainability	32
3.1.2 The Talloires Declaration.....	32
3.1.3 What is a Sustainable University?	33
3.1.4 Potential Obstacles and Roadblocks to Campus Sustainability	36
3.2 Successful Campus Sustainability Initiatives	37
3.2.1 Introduction.....	37
3.2.2 The Process of Policy Development	38
3.2.3 Content of Successful University Sustainability Policies.....	38
3.2.4 General Features of a Successful University Sustainable Policy.....	41
3.2.5 Conclusion: The University of Iceland's time to shine	42
3.3 Fostering Sustainable Behavior	43
3.3.1 Recycling as a Case Study of Sustainable Behavior.....	43
3.3.2 Recycling Behavior and the Campus Community; Motivations and Barriers.....	43
3.3.3 Possible Approaches to Foster Sustainable Behavior on University Campuses	45
3.4 Ecological Literacy	45

3.4.1	What is Ecological Literacy?.....	45
3.4.2	Systems Thinking and Ecological Literacy	48
3.4.3	Ecological Literacy and Higher Education.....	49
3.4.4	Ecological Literacy Evaluation.....	49
3.5	Research Questions.....	51
4	Methods	52
4.1	Participants	52
4.2	Instrumentation.....	52
4.2.1	Demographics Section	53
4.2.2	Environmental Attitudes Section.....	53
4.2.3	Sustainable Behaviors Section.....	53
4.2.4	Priorities and Vision for the University Section.....	53
4.2.5	Environmental Knowledge Section	54
4.2.6	Piloting and Potential Methodological Obstacles.....	54
4.3	Procedure	55
4.4	Data Analysis.....	55
5	Results.....	57
5.1	Participants	57
5.2	Introduction to General Results	58
5.3	General Responses to Attitudes and Values Section	58
5.3.1	Attitudes and Values and the PISA Study	59
5.4	General Responses to Environmental Behaviors Section.....	60
5.5	General Responses to the University Action Section	61
5.6	Knowledge.....	63
5.7	Introduction to Results by Group	65
5.8	Results by Gender.....	65
5.8.1	Responses by gender to the attitudes and values section.....	65
5.8.2	Responses by gender to the environmental behaviors section.....	66
5.8.3	Responses by gender to the university action section	66
5.8.4	Responses by gender to the environmental knowledge section.....	67
5.9	Results by Age.....	67
5.9.1	Responses by age to the attitudes and values section	67
5.9.2	Responses by age to the environmental behaviors section.....	68
5.9.3	Responses by age to the university action section.....	69
5.9.4	Responses by age to the environmental knowledge section	69
5.10	Results by Nationality	70
5.10.1	Responses by nationality to the attitudes and values section	70
5.10.2	Responses by nationality to the environmental behaviors section	70
5.10.3	Responses by nationality to the university action section	71
5.10.4	Responses by nationality to the environmental knowledge section	72
5.11	Results by Role at the University of Iceland.....	72
5.11.1	Responses by role to the attitudes and values section	72
5.11.2	Responses by role to the environmental behaviors section	72
5.11.3	Responses by role to the university action section	73
5.11.4	Responses by role to the environmental knowledge section	74
6	Discussion	75
6.1	General Survey Results	75

6.1.1	Attitudes and Values	75
6.1.2	Environmental Behaviors.....	75
6.1.3	University Action.....	76
6.1.4	Background Environmental Knowledge.....	76
6.1.5	Summary of general results	77
6.2	Trends in Groups of Respondents.....	77
6.2.1	Trends in gender groups.....	77
6.2.2	Trends in age groups	78
6.2.3	Trends in nationality groups	79
6.2.4	Trends in role at the University of Iceland groups.....	79
6.2.5	Summary of trends within groups at the University of Iceland	80
6.3	Applying survey results to the University of Iceland	80
6.4	Identifying low hanging, bland, and toxic fruit	81
6.5	School Nuances.....	83
6.6	Monitoring Progress Towards Sustainability	84
6.7	Using Foreigners as Resources	84
6.8	Identifying Areas for Improvement	85
7	Conclusions.....	88
7.1	Incorporation of ESD into University of Iceland's Educational Framework	88
7.2	Whole person, whole school approach	88
7.3	Use of existing successful programs.....	89
7.4	Looking ahead.....	89
	References.....	93
	Appendix A: English Questionnaire, Sustainability and Our University	99
	Appendix B: Icelandic Questionnaire, Sjálfbærni og háskólasvæðið okkar	108
	Appendix C: Complete Results	117

List of Figures

Figure 1. Proposed role of higher education institutions in society with respect to sustainability (adapted from Ferrer-Balas et al., 2005).	35
Figure 2. Ecological Literacy Pyramid, adapted from the NEETF Report on Environmental Literacy in America (Coyle, 2005).	46
Figure 3. Hines model of behavior change through environmental education (adapted from Hines et al. 1986/7, in Benedict, 1989, p. 29)	48
Figure 4. Roper Classification System of US population segments based on interest in the environment, Adapted from Green Gauge 2002: Americans' perspective on environmental issues: Yes ...but. (Roper, 2002)	51
Figure 5. Survey respondents' roles within the University of Iceland	57
Figure 6. Relative percentages of survey responses from each school at the University of Iceland	58
Figure 7. Responses to question asking participants to rank their level of environmentalism	63
Figure 8. The distribution of respondents who scored each number of correct responses on the environmental knowledge quiz.	64
Figure 9. Representation of which questions most respondents answered correctly	64

List of Tables

Table 1. Education for Sustainability in order to reach specific educational objectives	24
Table 2. Common principles of sustainability in policies and declarations (adapted from Wright, 2002).....	39
Table 3. Survey respondents' levels of agreement to statements about environmental attitudes and values.....	59
Table 4. Percentage of respondents who agree or strongly agree with a statement indicating a willingness to take responsibility for sustainable development (adapted from OECD, 2007, p. 160).....	60
Table 5. Survey respondents' frequency of action with respect to their environmental behaviors.....	60
Table 6. Survey respondents' levels of agreement with respect to action the University of Iceland should take to work toward sustainability	61
Table 7. Percentage of respondents who answered each environmental knowledge question correctly, incorrectly, and marked 'Don't Know.'	64
Table 8. Statistically significant responses by gender to the attitudes and values section	65
Table 9. Statistically significant responses by gender to the environmental behaviors section.....	66
Table 10. Statistically significant responses by gender to the university action section.....	67
Table 11. Statistically significant responses by age to the attitudes and values section	67
Table 12. Statistically significant responses by age to the environmental behaviors section.....	68
Table 13. Statistically significant responses by age to the university action section	69
Table 14. Statistically significant responses by nationality to the attitudes and values section.....	70
Table 15. Statistically significant Responses by nationality to the environmental behaviors section	70
Table 16. Statistically significant responses by nationality to the university action section.....	71

Table 17. Statistically significant responsesby role to the attitudes and values section	72
Table 18. Statistically significant responses by role to the environmental behaviors section.....	73
Table 19. Statistically significant responses by role to the university action section	73
Table 20. Summary of trends between groups participating in the survey for each section.....	80

Acknowledgements

I would like to thank the University of Iceland for sponsoring this project, and for taking the initiative to develop a campus sustainability policy.

In addition, I thank my advisors, Allyson Macdonald and Kristín Vala Ragnarsdóttir for their support throughout this project. The wealth and diversity of knowledge brought to the project by these two fantastic women made for an intellectually rich and exciting research experience.

I would like to thank Karen Pálsdóttir and Kolbeinn Tumi Daðason for help translating into Icelandic. Also, thanks to Amalía Bjornsdóttir for all her help with the methodology and statistics involved in the research portion of the project. I would also like to thank The Education for Sustainability Research Group, including Caitlin Wilson Brötzmann, Auður Pálsdóttir, Stefán Bergman, and Allyson Macdonald.

Finally, thanks to all my family and friends who have fostered my sense of curiosity about the world around me, and who planted in me the love of learning.

1 Introduction

1.1 Project Context

In 2011, the University of Iceland is planning to present a new campus-wide sustainability policy as part of its centennial celebration. This affirmation of a true commitment to sustainability on campus is a critical step in developing a capable and informed citizenry who will work toward a sustainable future in Iceland. In developing and implementing this policy, the largest educational institution in Iceland has a unique opportunity to lead the nation into an era in which sustainability is essential.

Developing a sustainability policy is a complicated process, particularly in an academic community. The University of Iceland is ideally situated to take on this challenge for two reasons; first, there is a plethora of well-defined examples of campus sustainability policies from all over the world dating back to the time the Brundtland Commission published *Our Common Future* in 1987. In that report, the term sustainable development is explained as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (*Our Common Future*, 1987). Secondly, since other universities have incorporated sustainability into their policies for over twenty years, the University of Iceland cannot afford to dawdle any longer on the formation of its own policy.

In the past, the University of Iceland has taken steps towards fostering more sustainable behaviors within the campus community. In 2001, the university initiated a recycling program in cooperation with a private waste collection agency. Recycling is often used as an indicator of environmentally responsible behaviors, since it is a relatively simple step to take and a measure that has a significant impact on reducing waste in landfills when executed correctly. “It [recycling] is visible, noncontroversial, and inherently reduces waste” (Barlett & Chase, 2004, p. 19). While there were top-down efforts to encourage recycling on campus, the program has had little success taking hold in the community. This recycling program can serve as an indicator of the campus culture and the lack of connection between policy and action. Despite some efforts on the part of the university to educate people about how to recycle correctly, people still put non-recyclable waste into the recycling bins, and use waste bins for recyclable material. This presents a problem because once recyclable materials are mixed with conventional waste products the whole bin needs to be thrown away. It can be frustrating for policymakers when programs fail because people do not change their behaviors to adapt to new environmental situations. Still, the University of Iceland’s difficulties in implementing a successful recycling program so far can teach us valuable lessons about how to effectively implement programs that foster sustainable behaviors in the future.

Sustainability demands changes at all levels of a system; these changes could be synchronized in such a way that it benefits the institution as a whole. In a university context, the administrative regulations and policies are a top-down approach, while student

initiatives and campaigns within the community are bottom-up. At the University of Iceland, there has been action on the part of the administration, and a growing interest in the environment on the part of community members. For example, *Gaia*, the organization representing the students of the Environment and Natural Resources graduate program at the university, aims not only to promote social connections between students, but also to increase awareness of environmental issues on campus through events and activities. For the past two years, *Gaia* has hosted a weeklong event on campus in the spring called 'Green Days.' During these events, daytime and evening activities were planned that encouraged environmental awareness and responsible environmental behavior. The success of *Gaia* and the 'Green Days' events are a promising signal that sustainable change is possible within the campus community from the bottom up.

Despite efforts made by both the top and bottom to spread environmental awareness and improve the recycling system on campus, and attempts from student groups to promote environmentally responsible behavior, the University of Iceland has shown surprisingly little progress towards sustainability when compared to many other universities. This failure represents a case of ecological illiteracy; the people the program was meant to serve did not have the background knowledge, values, or ability to participate effectively in the recycling efforts. Program administrators are accountable for their failures to adapt the program to meet the needs of the community. Previous attempts to implement a recycling program at the University of Iceland highlight the lack of connection between the intentions of policymakers at the top, and the knowledge, attitudes, and behaviors of the larger community at the bottom. This is why communication between the administration and the community and a holistic approach to sustainability management are so vital to the success of a sustainability policy, and why policymakers need to consider the culture of the campus when drafting a new policy. University of Iceland policymakers may have had greater success in encouraging people to recycle, for instance, if they had identified barriers and motivations within the community that could hinder or help people engage in this environmentally responsible behavior.

As an educational institution, the University of Iceland has a special responsibility to teach students and other members of its community about modern global issues like sustainability that affect everyday life. For the purposes of this project, an academic framework born out of environmental education called Education of Sustainability (or Education for Sustainable Development) will be used to examine how the University of Iceland might effectively teach the members of its community about sustainability. Education for Sustainability is growing in importance on an international scale. In December 2002, the United Nations General Assembly proclaimed the years from 2005 to 2014 the Decade of Education for Sustainable Development. According to the UNESCO website, "Education for sustainable development is a dynamic concept that utilizes all aspects of public awareness, education and training to create or enhance an understanding of the linkages among the issues of sustainable development and to develop the knowledge, skills, perspectives and values which will empower people of all ages to assume responsibility for creating and enjoying a sustainable future" (UNESCO Decade of Education for Sustainable Development, 2005). Governments from around the world have been invited to strengthen their contribution to sustainability through a focus on education. The goal of the United Nations Decade of Education for Sustainable Development is to "integrate the principles, values, and practices of sustainable development into all aspects of education and learning" (UNESCO, 2004). It is the hope of these agencies that the

educational effort will “encourage changes in behavior that will create a more sustainable future in terms of environmental integrity, economic viability, and a just society for present and future generations” (UNESCO, 2004). The University of Iceland has an opportunity to participate in the UN Decade of Education for Sustainable Development, and capitalize on the increased international attention to issues of education for sustainable development.

Creating a successful sustainability policy in a diverse community is a complex challenge; particularly considering the multitude of values, attitudes, and backgrounds found in a university setting. *Ecological literacy evaluation* is a tool that can be used to paint a picture of this diversity so that policymakers and the community will be better informed when developing a policy that meets the unique needs of the university community. A good campus sustainability policy will build on the community’s strengths while improving areas of weakness. Through this research project, information will be compiled from a variety of areas, including examples of success in campus sustainability, ecological literacy, education for sustainability, and environmental behaviors. Theories and practices in all of these areas offer valuable information when formulating a sustainability policy for the University of Iceland.

1.2 Aims of the Project

As University of Iceland policymakers work to develop a sustainability policy, they should pay special attention to ensure that the policy is feasible, comprehensive, and effective. To realize such a policy, it is crucial to first have a solid understanding of the community context in which the policy will be implemented.

This project set out to establish a baseline level of ecological literacy of the University of Iceland faculty, staff, and students. Using an email survey sent to the university community, information was collected on three areas critical for ecological literacy: environmental knowledge, values, and sustainable behaviors. This survey also aimed to establish cultural feelings about campus sustainability. Information collected through these surveys can inform the direction of the forthcoming University of Iceland sustainability policy. Analyzing trends in the ecological literacy of the University of Iceland community will provide policymakers with a credible snapshot of strengths and weaknesses that exist on campus. This study will allow policymakers to develop a robust understanding of the university community’s interests and levels of existing knowledge and behavior with regards to sustainability.

The information collected in this study can help policymakers identify areas of environmental comprehension among faculty, staff, and students, and develop a sustainability policy that meets the interests and values of members of the campus community. Furthermore, analyzing ecological literacy on campus will provide information about knowledge gaps within the community, which will aid policymakers’ decisions about where to most effectively direct a campus-wide sustainability initiative. Finally, this report includes some recommendations for how to proceed in the development of a sustainability policy based on the review of relevant literature and data collected from the email surveys.

1.3 Research Plan, Methodologies

This project took place in three distinct phases: introduction and literature review, research development and delivery, and data analysis and discussion. The literature review began in June 2009. The data collection phase of this project took place during the fall semester of 2009. Data analysis and discussion took place during the spring semester 2010, with a final presentation of findings at the end of that semester.

1.4 Structure of the thesis

The thesis structure parallels the research plan. The thesis will begin with a section explaining the academic framework of the project. This section will explore education for sustainability. The literature review will provide a broad context of the project in the areas of higher education and sustainability, environmental behaviors and motivations, and ecological literacy. The next section will outline project methodologies, followed by sections detailing the results, discussion, and project conclusions.

2 Academic Framework

2.1 Introduction

In February 1995, the Education Committee of the President's Council on Sustainable Development held a conference in Essex, Massachusetts to discuss education for sustainability in the context of higher education. The conference was attended by many leaders in the fields of education and sustainability, including representatives from universities with successful sustainability programs, such as David Orr from Oberlin College and Donella Meadows from Dartmouth College. The conference also included representatives from the private sector, including Fritjof Capra, from The Center for Ecoliteracy, and Karl-Henrik Robert, who works with The Natural Step in Sweden. The resulting report, entitled *The Essex Report: Workshop on the Principles of Sustainability in Higher Education* (1995), was developed by the nonprofit organization *Second Nature*, which works toward supporting sustainability in higher education. The report identifies the failures of the modern education system in preparing people to live in healthy ways within their environment. As the *Essex Report* explains, "Despite the efforts of individual programs at a number of universities and colleges, education and research about the interdependence of humans with the environment is not a priority in higher education. ... As a result, the general public has little awareness that a healthy natural environment is essential to our very existence -- not only providing clean air, water, and food, but all the raw materials that feed the economy. We see ourselves as separate from the natural world" (*Essex Report*, 1995, p. 5). The report elaborates upon the failure of the modern education system to foster the very basic and simple environmental awareness and attitudes needed for humans to interact in a healthy way with the natural world. Primarily, "the general public has little idea that it is not just industrial enterprise, but the aggregate of all human activities -- all the individual and the collective daily decisions -- that are irreversibly changing the earth, or that environmental degradation can be both a cause and a consequence of poverty, especially in the poorest countries" (*Essex Report*, 1995, p. 5). An educational approach that adapts to the dynamic nature of modern global issues and humanity's role on Earth is a critical component in fostering sustainability and an ecologically literate citizenry.

2.2 Education for Sustainability; An Overview

If higher education institutions would benefit from a new approach that works toward fostering an ecologically literate generation of citizens, what should that approach look like? Education for Sustainability (or Education for Sustainable Development) is an area of study that attempts to address this question. It can be said that if ecological literacy is the output, then Education for Sustainable Development (ESD) is the input. As Orr explains, "The goal of ecological literacy implies a different kind of education and a different kind of

educational experience that develops the art of living well in particular places” (Orr, 1992, p. 84). Such an educational experience should be possible to create in a formal educational institution like the University of Iceland by adopting practices in pedagogy that help support the knowledge, critical thinking, creativity, and mindsets necessary to work toward sustainability. Duailibi elaborates, “The challenge of educators that adopt this pedagogy is to train people so that they acquire practical, analytical, philosophical and ethical skills; awakening a sense of admiration and respect for nature, in order that they can re-design human presence in this world” (Duailibi, 2006, p. 66). The field of education for sustainability was born out of environmental education to work toward solving this very challenge. The following sections will explore some of the primary objectives of education for sustainability, and the pedagogical techniques used to achieve them.

Table 1 presents a simplified approach to some of the objectives and learning experiences called for in education for sustainability literature. The contents of the table are synthesized from information in the sections below.

Table 1. Education for Sustainability in order to reach specific educational objectives

Educational Objective	Learning Experience
Student Empowerment	Student-led, learner focused instruction, allow students to explore their own interests
Value Creation	Reflective, build personal connection to subjects, personal relevance to issues, invoke a sense of place, practice compassion
Actions to Support Sustainability	Project-based work, community activities that create tangible changes, frame-of-mind approach

In 2005, a document entitled *Quality Criteria for Education for Sustainable Development in Schools* was published as a collaboration between two groups; the European COMENIUS III network called ‘School Development through Environmental education’ or SEED, and the ‘Environment and Schools Initiative’ or ENSI. SEED is a group of educational authorities and institutes that promote environmental education as a driving force for school development. ENSI is an international network that supports collaboration and research in the areas of educational development, environmental understanding, and active approaches to teaching and learning. Both groups are primarily active in Europe, but the report contains information collected from other areas of the world as well. The *Quality Criteria* is one resulting report from a research project between SEED and ENSI that was a comparative study on Eco-School development process in 13 countries between 2003 and 2004. The participating countries in this report were Australia, Austria, Belgium, Denmark, Finland, Germany, Greece, Hungary, Italy, Korea, Norway, Spain, and Sweden (Morgensen and Mayer, 2005). Much of the information in the following sections is drawn from the *Quality Criteria for Education for Sustainable Development in Schools*, and thus provides an international focus on education for sustainability. In the report, the *Quality Criteria* are broken into three main groups, and further divided into fifteen categories. Primarily, the criteria are grouped as those that relate to teaching and learning, school policy and organization, and the school’s external relations (Breiting et al., 2005).

2.2.1 Participation as a Tool to Empower Students

According to the *Quality Criteria*, “Participation is to take part, to share responsibility and be involved in joint actions—all matters which help prepare students in the basic fabric of social life” (Breiting et al., 2005, p. 30). Education for sustainable development research puts a strong emphasis on the importance of group work and participation so the “students become experienced in democratic, participatory process” (Breiting et al., 2005 p. 30). Group work and other projects that give students experience in the democratic process are important because of the connections of participation with student-centered learning, empowerment, compassion, and action-based approaches. In the university setting, students could have the opportunity to participate in some important decision making processes and have a clear understanding of how their actions have caused a certain result. There are many benefits to group work in a university setting, especially in the context of ESD. Working collaboratively gives students a chance to practice problem solving, critical evaluation, and consider points of views that differ from their own. These are important skills for citizens in a culture of sustainability.

As explained in the *Quality Criteria*, “[The sustainable future]...requires active, creative and critical citizens that are good at overcoming problems and concepts in co-operation, and able to combine theoretical knowledge with practical innovations and ideas” (Breiting et al., 2005, p. 14). This vision of a sustainable future provides interesting insight as to how educators should engage their students, and what types of skills students should develop. The quotation covers several underlying concepts about how to engage students in a way that is conducive to ESD, including that the approaches should be student led, action-based, and cooperative.

According to ESD pedagogy, students participating in the class should be given the freedom to explore their own interests and the educator should work to adjust content towards the student’s choices. As Coyle explains, “Real change usually emerges from educational strategies that give the learner a sense of involvement and ownership” (Coyle, 2005, p. xi). Student participation as a critical component of teaching for sustainability is born from the idea that the role of the teacher is not simply to pass knowledge on to the students, but rather to act as a facilitator and supporter of their own discoveries. In theory, giving students the freedom to explore topics they are interested in will deepen the quality of learning, since the student is personally engaged in their work. While educators often have a specific agenda, the ESD perspective argues for transformative rather than transmissive educational practices (Sterling, 2001, p. 59). This means that the primary goal of the educator should not be to transmit factual knowledge to the students, but rather to create a space for students to make discoveries about the subject on their own and transform their understanding.

This is a complicated transition for educators who are used to working within a more traditional system, since it requires them to be flexible enough to adapt to students’ unique values and interests and creatively adapt curriculum to meet each student’s interests. The incorporation of student interests is one area that is theoretically easier to achieve in higher education than in primary schools. At the university level, students take classes that they find interesting, or that they see as necessary for their education.

2.2.2 Education for Sustainability and Value Creation

As the *Quality Criteria* states, “Values are an important part of the culture of complexity and construction of critical thinking... (ESD’s) important message is that if we share the value of having respect for the diversity of human beings, we must practice this value accepting the existence of other values...Values can neither be simply transmitted nor easily changed” (Breiting et al., 2005, p. 26). Values are a very complex and interesting component of education for sustainability. Diverse and complicated, they are continually evolving throughout a person’s life. While educating for sustainability, recognition and development of personal values is absolutely critical. According to a former Director General of UNESCO, Koichiro Matsuura, sustainable development is a “moral principle as much as it is a scientific concept ... (it is as linked to) the ideas of peace, human rights, and equity as it is to ecological theories and global warming. Although, without a doubt, it belongs in the fields of the natural sciences, economics and policy, it is more than anything a cultural issue’ (Schreiner and Hendriksen, 2005, p. 6). This implies that people educating for sustainability have a special role to facilitate learning for the whole individual, not just in the academic sense. Educators should know how to help students identify and develop their own values, while appreciating and respecting the values of others.

Personal connection to issues through interests or values is important when approaching sustainability. As Hodson explains, “Those who act are those who have a deep personal understanding of the issues (and their human and environmental implications) and feel personal investment in addressing and solving problems. Those who act are those who feel personally empowered to effect change, who feel they can make a difference, and know how to do so” (Hodson, 2003, p. 650). In other words, the issues must reach their hearts. Empowerment and feelings of personal connection to relevant issues can be fostered through helping students develop their own values.

In addition to developing their own values, one primary and critical objective of ESD is allowing students a safe space where they can practice compassion. This concept is central to all other learning that takes place when working towards sustainability. When people are able to empathize with the experiences of others, they more easily adapt a frame of mind that puts their actions in the context of a global community. To move towards a more compassionate, community-based perspective, the educational system needs to make a conscious effort to shift away from educating for competition. The modern educational model has essentially created a system where, “teachers are constructed as ‘providers,’ principals as ‘managers,’ parents as ‘employers,’ and students as ‘consumers,’” (Smyth and Shacklock, 1998, p. 77). Or, as Orr (1992) writes, “Colleges and universities have become over-managed and under-led institutions operating more like businesses with customers” (p. 2). Under this system, the ultimate measure of success, put simply, is to graduate and make more money than your peers. This does not allow space for people to appreciate one another if the structure is one of constant competition and assessment.

As McMillin and Dyball (2009) remind us, “the learning experiences of students are influenced by more than what is taught in the classroom’ (p. 58). In the university context, this applies to more than doing laundry and paying bills. This learning refers to those years at university when people explore their individuality; they are developing concepts of themselves as adults and identifying the type of person they want to become in society. University educators can provide frameworks that help students reflect on and refine their values while also fostering compassionate understanding for other points of view.

Educators can work toward value development and compassion through a variety of strategies and approaches to teaching. Group work and collaboration can give students a chance to practice working with diverse views and opinions. Also, if students are challenged to argue from a position that they do not necessarily agree with, they are essentially practicing empathy and compassion by putting themselves in the viewpoint of someone else. Another strategy to help students develop their own values is to include time for structured reflection. When students are given a chance to review the evolution of their ideas over the course of their university experience, they can connect their values with what they have learned in school and develop action strategies in their personal lives.

2.2.3 Action-based Approach and Student Empowerment Through Education for Sustainability

The *Quality Criteria* state, “The action perspective means that students decide together with their teacher to take action to solve or counteract the sustainable development problem they are working with, and subsequently reflect on the action process. An action is thus targeted at change: a change in the students’ personal lifestyle and/or the students’ local and global living conditions” (Breiting et al., 2005, p. 28). This approach allows students and teachers to work with hands-on projects in their community or in their own lives, and then see the kinds of differences they can make by translating theories into actions. Central to this approach is the concept of empowerment, and that people have the ability to make positive changes in the world.

According to Schreiner et al., “Empowerment is a prerequisite for action and includes content-specific knowledge and cognitive skills, motivational patterns and personal value orientations. An empowered person feels capable of taking appropriate action to achieve what s/he aims for, and combines his/her cognitive resources (knowledge and skills) with affective resources (motivation, attitudes, hope and visions)” (Schreiner et al., 2005, p. 8). If educators take the time to create activities for students that link to their existing interests it will help them feel personally motivated to participate and they will be able to see the power they have to work on the issues they are learning about at university.

Action-based education has to do with more than just empowering students; it provides them with action skills and strategies they can use later on in their lives. Essentially, an action-based approach is a step beyond simply educating about facts. As environmental education research has shown, knowing about environmental problems alone is not enough to inspire action. As Benedict (1989) states, “knowledge of environmental issues and good attitudes are not in themselves enough to cause students to change their behavior” (p. 29). In addition to knowledge, people need to be personally inclined to act. In the case of environmental events on campus, this would mean that students should have some personal interest in environmental issues before they choose to engage with the activities. Students also need to have knowledge of possible types of action, which are identified in environmental education literature as ‘action strategies’ and how to apply these strategies in a given context, which is referred to as ‘action skills’ (Benedict, 1989, p. 29).

In relation to the translation of theory to action, one goal of ESD is to create a new frame of mind in the students, not to simply make people aware of facts. Huckle states, “ESD should primarily seek to develop such a frame of mind rather than develop ‘positive’ attitudes and behavior” (Huckle, 2006, p. 18). There is a subtle but important distinction

here; the aims of education for sustainability imply that people gain an understanding of ecological principles that develop into values and actions that foster sustainable actions in everyday life. For example, teaching people to recycle should not simply consist of lessons on how to sort trash, but should incorporate a greater context for *why* we recycle. If people can understand the reasons we recycle, aside from just because we are told to, they will have a better frame of mind for further action towards sustainability. According to Huckle, “Such a frame of mind is committed to the co-evolution of human and non-human nature and seeks relationships within and between bio-physical and social systems which allow their mutual development to take place in sustainable ways” (Huckle, 2006, p. 15-16). An ecologically literate frame of mind is adept at critical thinking and flexible enough to incorporate new information and change behaviors accordingly.

2.3 Education for Sustainability in Iceland

In parallel with international initiatives that call for quality education for sustainability, Iceland has demonstrated its own commitments to fostering sustainability through education. In 2004, the Icelandic Ministry for the Environment published a report entitled, *Welfare for the Future: Framework for Sustainable Development in Icelandic Society, Priorities 2006-2009*. This report is the first official update of the Icelandic government’s strategy for sustainable development that was originally published in 2002. The major function of this report is to identify and describe the major priorities facing Icelandic society with regards to sustainable development in the coming years. As the report states, “a strategy of this kind can make it easier for governmental authorities, non-governmental organizations, and the general public alike to gain a comprehensive view of the primary goals of resource protection and resource utilization, and to identify the most important work that has been done in order to achieve them” (Icelandic Ministry for the Environment, 2004, p. 2). It is clear from this report that the Icelandic government, is attempting to make Icelandic society more sustainable.

The *Welfare for the Future* report identifies not only the priorities for sustainable development in Iceland in the coming years, but also several specific policy instruments that will be used to achieve the goals for these priorities. One of these tools is environmental education. The report states that, “A general understanding and knowledge of environmental and societal issues is a prerequisite for democratic discussion and decision-making aimed at implementing sustainable development as a policy” (Icelandic Ministry for the Environment, 2005, p. 6). With this clear statement of the benefits of environmental education for the goals of sustainable development, the Icelandic government recognizes the need for and importance of quality environmental education.

At the end of 2009, the Ministry for Education and Culture created a new educational framework that embraces sustainability as one of the five pillars of the primary and secondary school education system in Iceland. The report from the Ministry for Education will be called *Grunnþættir og viðmið í nýrri menntastefnu* (Basic elements and standards in a new education policy) and is due to be published in 2010 (Ministry of Education website, Mar 11, 2010).

The Ministry for the Environment in Iceland has also put some effort into constructing an environmental education scheme that will be a useful piece of a strategic plan for sustainable development within the society, but there is still much work to be done to

integrate education for sustainable development into the Icelandic school system. In the *Welfare for the Future* report, there is only one existing non-governmental program mentioned that is doing this work in Iceland. The program concerned with environmental education in Iceland, called Eco Schools, or the *Green Flag* program.

2.3.1 Green Flag Schools in Iceland

The Eco Schools program identified in the *Welfare for the Future* report operates internationally. The *Green Flag* is an award that is given to schools that participate in the Eco Schools program and meet its requirements. According to the program's website, "Eco Schools is an international program that certifies schools based on their achievement of environmental education and management standards" (Eco Schools, 20.10. 2008). This program was created as a mechanism to implement Local Agenda 21, which is essentially a strategy for applying sustainable development concepts on a local level (UNDESD, 1992). The Eco Schools program is funded internationally by an organization called the *Foundation for Environmental Education* (FEE). "FEE is a non-governmental, non-profit organization promoting sustainable development through environmental education ... (FEE) actively promotes and delivers environmental education through international programs, which aim to deliver Agenda 21 commitments and involve people of all ages and nationalities through formal school education, training of staff and general awareness raising" (FEE, 2007). In Iceland, the Eco Schools program is administered by Landvernd, the Icelandic Environmental Protection Association. Landvernd is a member of FEE, which is how it receives funding to implement the Eco Schools program and assesses performance necessary for a school to earn a green flag. As of March, 2010, there are 169 schools participating in the Eco Schools program in Iceland (Jonsson, 2010). Of these, 77 are play schools, 79 are primary schools, 8 are compulsory schools, 3 are universities, and 2 fit into another category.

It is entirely possible that the University of Iceland could be certified as an Eco School, and there would be several benefits to choosing this course of action. The Eco Schools program offers a consistent, step-by-step model of how to implement sustainable changes. A school that wishes to participate in the Eco Schools program submits an application and goes through seven distinct steps before being awarded a *Green Flag*, which it can fly on the school campus as a symbol of the school's commitment to environmental values and the work it has done toward sustainable development. By creating a process instead of a curriculum, the FEE has developed a system that can potentially be implemented all over the world, regardless of the location, community, language, or environmental situation of the participating school. Also, since the *Green Flag* program calls for a general process, it can be implemented at any level of the educational system, from kindergarten to higher education.

The seven-step process for a school to earn a *Green Flag* is the same no matter where school is located, or the level of instruction. The first step is for the school to select a committee to work on the green flag project. This committee is typically comprised of teachers, students, and local community members. According to Orri Páll Jónsson who administers the *Green Flag* program in Iceland for Landvernd, the formation of the committee is one crucial component that sets the Eco Schools program apart from other environmental education programs (Jónsson, 2008). The aim of this first step is to ensure that the students of the school are actively involved in the process of working towards a

Green Flag certification. By involving students at the earliest stages of the project, the Eco Schools format is designed to create a true bottom-up model in which students are empowered to share their ideas and work democratically to solve them. This is an essential step if the aim of the scheme is to promote sustainable development at a local scale. It is logical to assume that not only will the familiarity with the democratic process help students become responsible citizens in the future, but by witnessing their actions make a difference to others around them, they will be empowered to take action again in the future.

The formation of a committee strongly reflects the value of student-led education discussed previously that is a key component of education for sustainability. Likewise, by creating a committee that represents the diversity of the larger community, the *Green Flag* program ensures that the actions taken by the committee will reflect the cultural context of the institution. The second step in the Eco Schools process is to complete a detailed checklist of the existing conditions at the school. This checklist was created by FEE and is the same all over the world. The list requires that the school establishes a baseline for environmental factors such as how much energy is used in the school buildings, how much water the school uses, how much waste is produced, and so on. This checklist step of the process mimics in many ways the establishment of baseline values for key environmental factors in an environmental impact assessment (Glasson, 2005). This is yet another example of how the Eco Schools process uses environmental education as a means to reach sustainable development. When the baseline values are established, the third step in the process is for the school's environmental committee to design a plan for how to improve upon the baseline values established in the checklist. For example, if the checklist indicated that the school was using excessive amounts of paper, the plan for how to solve this problem would be designed around encouraging people to use less paper. The fourth step of the Eco Schools process is to monitor the progress of the plan designed by the school's environmental committee. This step is critical in relationship to education for sustainable development. Sustainable development includes a temporal element that is subject to change depending on the definition and the context in which the term is used, but it is nonetheless an effort to ensure the needs of people in the future can be met. For this reason, educating students about the importance of ongoing involvement through monitoring is an essential lesson within the context of both environmental education and education for sustainable development. This step can help students learn that their actions can have a more long-term impact, and if the monitoring demonstrates that the project has been unsuccessful, this step provides an opportunity for students to experience the valuable lessons of trial and error. The fifth component of the Eco Schools process is the implementation of environmental education school-wide. This ensures that the rest of the students, not only those on the committee, receive the background environmental education necessary to understand what the school community is doing to earn a green flag, and why it is important that this is done. The sixth step in the process is to explain the project to the community. This step is important because it gives students a chance not only to share their accomplishments with the surrounding area, but as well to raise awareness of environmental issues within the community. It is possible that if people see the value students place on stewardship within the community, they will change their own behaviors in a way that is more environmentally considerate as well. Finally, the environmental committee needs to agree on a statement of values with regards to the environment to be awarded a green flag. The seventh step in the process, this statement, serves as a reminder and a mission for the school to remain committed to the environment. When these seven

steps are completed and approved by a representative from the FEE, the school is ceremoniously awarded a green flag (FEE, 2008).

2.3.2 Action ESD: Research Project in Iceland

In the spring of 2007, a research project began with the aim to strengthen multidisciplinary research and develop an integrated approach to educating for sustainable development in Iceland. This project, called ActionESD, was to use the concepts of action research and action competence to examine specific educational action that schools in Iceland could take to incorporate the concepts of sustainable development. The project listed three primary objectives; to assess the status of ESD in Icelandic schools in relation to Icelandic and international policies, to develop, implement and evaluate action research projects in eight Icelandic schools, and to disseminate the results from the research and development work in Iceland and abroad. The project was to take three years, and will conclude in 2010. This research is important not only because it aims to make real action-based changes towards ESD in Icelandic schools, but it also provides a framework for conceptualizing both sustainability, and education for sustainability that can be useful when attempting to integrate ESD in higher education institutions like the University of Iceland.

The ActionESD project identifies three primary principles for action within the project: knowledge, respect, and responsibility. As we will see later, these action principles directly parallel the three levels of ecological literacy used in this research project. In the context of the ActionESD project, the primary principle, knowledge, implies that actions for teaching and learning should enable teachers and students to improve their knowledge about natural resources and sustainable development. The second principle, respect, means that actions within ESD schools should encourage a respect for values, democratic processes, and social inclusion. Finally, the concept of responsibility means that actions in the schools should nurture a sense of shared responsibility for our common future while encouraging schools and local organizations to work together (Action ESD project proposal, 2008). These principles of action for ESD create the framework in which the rest of the ActionESD work took place, and they also correlate to the three levels of ecological literacy, knowledge, attitudes, and action that will be used in this project as a framework for ecological literacy evaluation of the University of Iceland community.

3 Literature Review

3.1 Sustainability on Campus

Higher education institutions have a unique role in creating societal change. As breeding grounds for the world's future workforce, colleges and universities have a special responsibility to encourage stewardship and work towards creating a conscious citizenry. Many people also recognize that the pressures humanity has put on our Earth cannot

continue; that we must adopt a more sustainable way of life for the sake of present and future human wellbeing. As we learn more about the problems that face the world, from climate change, and energy security, to poverty, lack of social justice, lack of equity, overpopulation, and hunger, it is clear that we need a new kind of thinking to combat these complicated global issues. To develop this new consciousness to solve the problems of the present will take significant effort on the part of influential institutions such as universities.

3.1.1 Higher Education and Sustainability

Institutionalizing sustainability presents a complex challenge for higher education institutions all over the world. As the United Nations Education Scientific and Cultural Organization explains,

The challenge for higher education in the context of Decade of Education for Sustainable Development is to innovate traditional learning environments and learning processes in such a way that they not only support the learning process of children and young adults in formal education, but life long learning, training, and informal learning as well. Higher education institutes are challenged to co-operate together in networks that constitute a supportive infrastructure for life long learners ... universities and higher educational institutes will have to be active in international/national/regional networks with other partners such as primary and secondary schools, vocational education, science centers, small and medium sized companies, chambers of commerce, NGO's, national and regional governments, etc. (Holmberg & Samuelsson, 2005, p. 9).

This collaborative and innovative approach calls for higher education institutions like universities to adapt their role in society to address the dynamic problems of the 21st century.

3.1.2 The Talloires Declaration

The Talloires Declaration was created in 1990 at an international conference in Talloires, France. It is the first official statement made by university presidents, chancellors, and rectors of a commitment to environmental sustainability in higher education. The Talloires Declaration provides a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities. As of February 9, 2010 the declaration has been signed by 414 university leaders in over 50 countries (ULSF website, Sep 2, 2010). These universities include, to name a few, Oberlin, Rice, and Brown in the United States, The Australian National University, and the University of Canberra, The University of Glasgow and the University of Manchester in the United Kingdom, and the University of British Columbia and McGill University in Canada (ULSF website, Sep 2, 2010). While many universities embark on sustainability projects without signing the Talloires Declaration, it can be a tool to bring people together to work on a common project. The declaration states, "Universities educate most of the people who develop and manage society's institutions. For this reason, universities bear profound responsibilities to increase the awareness, knowledge, technologies, and tools to create an environmentally sustainable future" (Talloires Declaration, 1990, on ULSF website, Sep 2, 2010).

While there are many international agreements and policies that address sustainability, the Talloires Declaration is the only one that is focused on implementing sustainability in higher education. This is a voluntary agreement that states a commitment to develop and create sustainability projects by incorporating sustainability and environmental literacy in teaching, research, operations and outreach higher education institution. The ten-point action plan outlined in the Talloires Declaration is:

- 1) Increase awareness of environmentally sustainable development
- 2) Create an institutional culture of sustainability
- 3) Educate for environmentally responsible citizenship
- 4) Foster environmental literacy for all
- 5) Practice institutional ecology
- 6) Involve all stakeholders
- 7) Collaborate for interdisciplinary approaches
- 8) Enhance capacity of primary and secondary schools
- 9) Broaden service and outreach nationally and internationally
- 10) Maintain the movement

In part to measure the effectiveness of the Talloires Declaration, the “Campus Environmental Sustainability Survey” was conducted in 59 universities in the United States that had signed the Talloires Declaration to analyze ways in which it was being implemented in practice (Sriberg and Tallent, 2003). The study concluded that the major barriers to making the Talloires Declaration a success are competing priorities within the institution and a lack of integration across the campus. This might mean that even if a university signs the Talloires Declaration, it still might need to make a more significant implementation plan to guarantee that it will be successful. As the report states, “Using the Talloires Declaration to envision institutional sustainability, garner support, and coordinate efforts could be a powerful means of linking good intentions and concrete change” (Sriberg and Tallent, 2003, p. 6). An example of the extra effort needed to make the Talloires Declaration a success can be seen at the Australia National University. After signing the Talloires Declaration, the Australia National University created an implementation plan that outlines specific actions the university will take to meet each of the ten points outlined in the Declaration. In this way, the Australia National University can organize and track the efforts made on campus to fulfill the commitments of the Talloires Declaration (ANUgreen, Mar 4, 2010). If the University of Iceland is to sign the Talloires Declaration, it would be a good idea to follow ANU’s example and simultaneously create a strategic implementation plan to guarantee its success.

3.1.3 What is a Sustainable University?

As the Talloires Declaration implies, universities have a special obligation to lead the world towards a more sustainable future. While it can be a good first step signaling a university’s commitment to sustainability, a sustainable campus requires more effort. Expounding upon this idea, Goudie writes,

If university campuses become models of sustainability, immersion in a sustainable campus experience (living in green buildings, eating locally produced foods, and absorbing daily messages about environmental conservation) will produce just the kind of graduates we need to make our governments, our businesses, our schools,

and our neighborhoods models of the growing green economy. Their take-home lesson should be clear: sustainability is no longer an option and no longer someone else's responsibility (Goudie, 2008, p. 4).

These statements convey the urgency and seriousness of adopting a more sustainable lifestyle, but it should not be ignored that this transition can, and should, be fun for the people involved. The transition to a more sustainable society involves changes throughout the whole society, the whole cultural norm. Not only should universities invest in green buildings, the people who use them should understand why the building is special, and feel proud to be a part of a community that values sustainability. Sustainability has a clear role in academia in the twenty-first century, partly because, "no other concept seems to compare to it [sustainability] in terms of its ability to cut across virtually all disciplines and in its fundamental importance to the human enterprise" (Uhl et al., 1996, p. 1308). Furthermore, sustainability is a concept that all people should have the capacity to appreciate and believe in at an essential level; we ought to all agree that if there is a way to act in the present that means people in the future will be able to meet their needs, we should see the value in acting that way.

While signing an international commitment such as the Talloires Declaration can be an important first step toward creating a more sustainable university campus system, the real work begins when crafting a specialized policy to fit the unique needs of a particular campus infrastructure and culture. One of the first challenges to address in this process is to create a consistent vision for what campus sustainability should entail. According to the group *University Leaders for a Sustainable Future*, which is the Secretariat for signatories of the Talloires Declaration,

'Sustainability' implies that the critical activities of a higher education institution are ecologically sound, socially just and economically viable, and that they will continue to be so for future generations. A truly sustainable college or university would emphasize these concepts in its curriculum and research, preparing students to contribute as working citizens to an environmentally healthy and equitable society. The institution would function as a sustainable community, embodying responsible consumption of energy, water, and food, and supporting sustainable development in its local community and region (ULSF website, Aug 5, 2009).

The *University Leaders for a Sustainable Future* statement conveys the wide range of actions that a university can take to work towards sustainability. As suggested in the statement, sustainability relates to all 'critical activities' of the institution, not just those that have a clear and direct environmental impact. It also touches on an important role of higher education institutions as paradigms for larger society where people should have the chance to learn and practice living in more sustainable ways. As Uhl points out, "...universities are like entire societies in miniature - they have their food systems, their energy systems, their water system, their transportation system, and so forth" (Uhl, in Barlett & Chase, p. 32). By using existing systems, universities have a special opportunity to create learning experiences within the campus community about sustainability and how their actions can affect the wider society. As envisioned by the *Essex Report*, sponsored by the group *Second Nature*, "By using the campus as a laboratory, students learn to analyze complex multidisciplinary problems, develop real solutions and focus on their institution's and their own behavior -- skills that are critical for the realities of the 21st century. By "practicing what it preaches," engaging in environmentally just and sustainable practices in

its operations, purchasing, and investments, higher education helps reinforce desired values and behaviors in all members of the academic community” (Essex Report, 1995, p. 3).

There are several clear themes emerging when visioning a sustainable university. First, universities play a special role within the context of the larger society. They can capitalize on this role by ensuring connections within the larger society and by attempting to model sustainable societies in miniature. Secondly, universities are complex institutions with a wide variety of functions and goals. For sustainability projects to succeed, universities need to work across these complex divisions and work together in innovative and collaborative ways. Finally, if universities can succeed in their sustainability projects, both the institution and the surrounding community will be stronger and more prepared to take on challenges of sustainability in the future. To help solidify this vision, an example of how a higher education institution may function in the context of the larger society with respect to sustainability can be seen in Figure 1. This figure is adapted from an article written by Ferrer-Balas et al. (2005) who are part of the team working on the Technical University of Catalonia’s sustainability program. This article was written as part of their contribution to the United Nation’s Decade on Education for Sustainable Development (Holmberg & Samuelsson, p. 28).

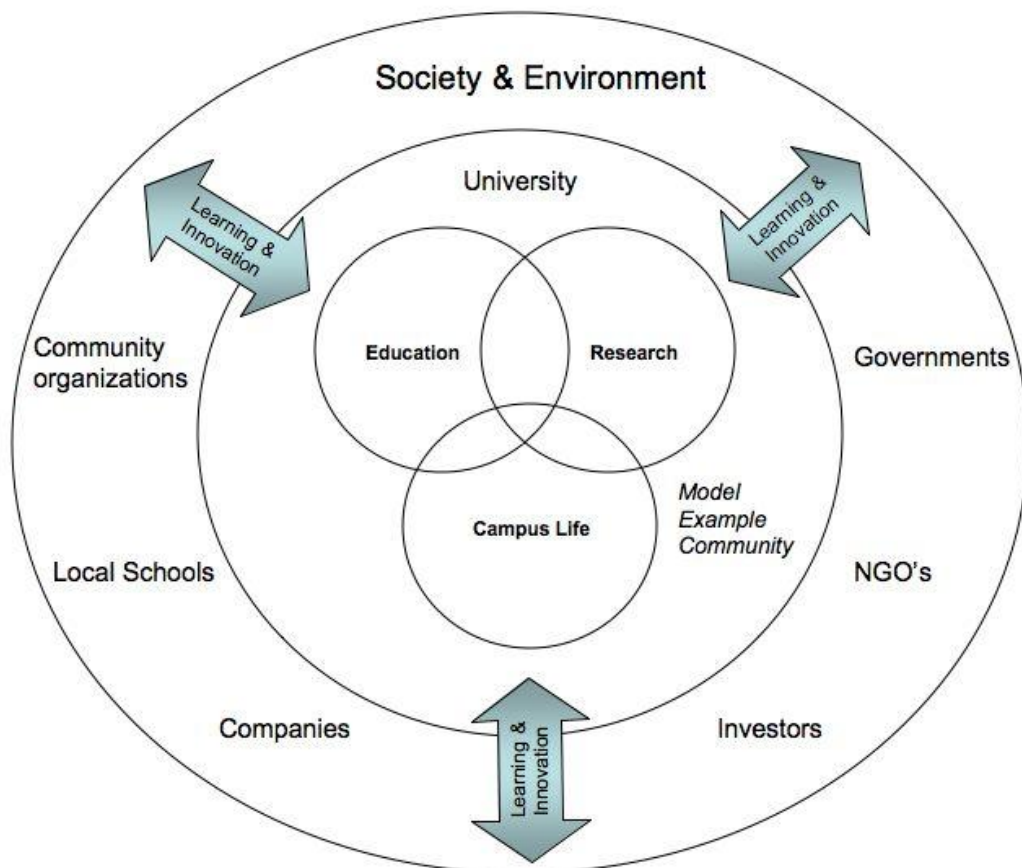


Figure 1. Proposed role of higher education institutions in society with respect to sustainability (adapted from Ferrer-Balas et al., 2005).

Figure 1 illustrates the role of the university as a part of the greater society while identifying distinct roles within the university community itself. The specialty areas of the university include education, research, and campus life, all of which are important to daily

university functions. While many people only operate within one sphere of this picture, they are all clearly essential to the operations and success of the university community. Each sector within the university has its own place with respect to working towards sustainability, and each is responsible for communicating with one another and the larger community to exchange information and innovations. This illustrates one way that the university can be seen in the larger context of society to function towards a more sustainable society. The figure is a potential model from which to work when envisioning University of Iceland's role in fostering sustainability within the larger society.

3.1.4 Potential Obstacles and Roadblocks to Campus Sustainability

As demonstrated above, the concept of campus sustainability extends across management and operations of the institution into educational practices and connecting to the context of the larger community. Taking on such a pervasive task can create challenges for academic communities that do not traditionally work towards interdisciplinary objectives.

One of the first potential challenges in forging a successful campus sustainability policy relates to the structure and standard practices of academia. As described in the *Essex Report*, "Designing a sustainable human future requires a paradigm shift toward a systemic perspective which encompasses the complex interdependence of individual, social, cultural, economic and political activities and the biosphere. This shift emphasizes collaboration and cooperation, while current higher education stresses individual learning and competition, producing managers ill-prepared for cooperative efforts" (*Essex Report*, 1995, p. 4). Complexity, when paralleled with the large scale needed to make campus-wide changes toward sustainability, can be a huge hurdle to overcome. In addition, university activities are typically fragmented, and collaboration across schools and disciplines towards a common goal can be a difficult challenge.

Since universities are divided into separate schools or faculties, with their own leadership, practices, goals, and strategic plans, it can be challenging to bring these diverse sub-communities together on a shared project. The University of Iceland, for instance, is organized into five schools and twenty-five faculties (hi.is, 19.8.2009). Such a separation is necessary to offer the wide range of academic programs available at the University of Iceland, but this structure itself can hinder campus-wide collaboration needed to develop a successful sustainability policy for the whole university. As Barlett and Chase explain, "Using a metaphor borrowed from systems thinking, we note that academic culture tends to be organized into silos—insulated vertical units with little cross-flow of information" (Barlett & Chase, 2004, p. 11). Within these silos develop, "...numerous sub-cultures of decision-making styles, time constraints, priorities, and experiences" (Sharp, 2002, p. 132). This can be a barrier for people working towards collaboration, since there is little experience in the culture of the institution working together towards a common goal.

Another challenge to starting sustainability programs in a university context has to do with disciplinary boundaries (Barlett & Chase, 2004, p. 10). As Barlett and Chase write, "Sustainability issues make for messy, complex research problems, requiring new professional skills and new criteria of evaluation. Thus, the reward structure of higher education, which is linked directly to departments, often discourages faculty members from researching the broader issues involved in steps toward sustainability" (Barlett & Chase,

2004, p. 11). Usually, funding and other resources in academia are linked to specific disciplines, and there are intricate reward systems in place for faculty members who excel in their specific subject areas. There are not as many incentives for people to work across disciplines; the type of work sustainability would require. Reward structures lead to another potential roadblock to sustainability programs on campus; the ever-present problem of prioritizing finances. If sustainability is not a core value of the institution, it may be difficult to argue that it should receive funding when there are other expenses that have traditionally taken priority. Finally, it is important to consider the transient nature of the population on campus. While faculty and staff tend to stay in the same place for many years, students are coming and going every term; bringing with them new cultures of background knowledge, values, and behaviors.

3.2 Successful Campus Sustainability Initiatives

We know that there are hundreds, if not thousands, of universities that are implementing sustainability policies and programs, but surprisingly little research has been done about how to do this most effectively. It is not the aim of this research project to analyze sustainability implementation in higher education and determine best practices that can be applied to the University of Iceland. Rather, this analysis will focus on research and reports that have already been conducted that synthesize information about what some successful sustainability programs look like so that the University of Iceland can be better prepared to design its own policy.

3.2.1 Introduction

According to Moore, (2005) “A large literature exists on sustainability declarations and signatories but only a few studies (e.g. Leal Filho, 1999, 2002; Shriberg, 2002; Wright, 2002) have examined their implementation” (p. 538). As universities attempt to respond to the calls for sustainability, few studies provide in-depth understanding of what is involved in the process (Moore, 2005).

The *Essex Report* states that, “Meeting basic human needs now and in the future requires a major shift in the thinking, values, and actions of all individuals and institutions in their relationship with the natural environment ... It will require comprehensive short- and long-term educational change, necessitating unprecedented leadership and commitment by colleges, universities and professional schools” (Essex Report, 1995, p. 3). As mentioned above, many colleges and universities across the world have instituted sustainability policies and programs since the *Our Common Future* report. The University of Iceland is in the fortunate position of being able to learn from successful strategies from these institutions while avoiding approaches that have shown to fail. The challenge here is to find specific best practices that can be effectively applied in the Icelandic context. By analyzing characteristics of successful approaches to sustainability on campus, the University of Iceland is better equipped to take on the task of developing its own policy. To analyze this effectively, it is helpful to look to examples of successful sustainability policies with three questions with the University of Iceland in mind:

- 1) Who should be involved in the process of policy development?

- 2) What content should be included?
- 3) What general features should the policy have?

3.2.2 The Process of Policy Development

University sustainability projects can originate from any community of people in the academic setting. For instance, the Pennsylvania State sustainability policy was born out of a student's curiosity of the ecological footprint of her dorm room (Uhl, in Barlett & Chase, 2004, p. 33) and Emory University's program was started by an interested professor (Barlett, 2004, p. 67). The University of Bristol's sustainability program was born out of a combination of academic interest and an existing environmental management office looking to incorporate sustainability (University of Bristol, 05.04.2010). Michigan State University found significant interest in sustainability after a course about how humans relate to nature (DeLind & Link, in Barlett & Chase, 2004, p. 122) while Illinois Wesleyan University put together a 'Green Task Force' to create their university policy (Jahiel & Harper, in Barlett & Chase, 2004, p. 50). Despite these differing origins, there are a few common characteristics with regard to how successful sustainability initiatives were developed in a university setting.

To begin with, these programs include input from many members of the community. For a policy to be effective in creating change in an entire community, the students, faculty, and administration staff could be included in the process from the very beginning stages of policy development. As discussed previously, the transdisciplinary nature of sustainability has the unique capacity to bring diverse members of a university community together, and this should be manifest throughout the process of policy development. Additionally, as Barlett explains, it may be helpful to "coalesce around one coherent and visible project" (Barlett, in Barlett & Chase, 2004, p. 71). This strategy would help to kick-start a larger sustainability program. Using one visible, campus-wide program that requires engagement at the top and bottom, such as recycling, may help raise the profile of sustainability issues on campus and lead to more changes in the future. Some sustainability programs begin with measurement (Barlett & Chase, 2004, p. 19) and attempt to identify the "low hanging fruit" so that programs can make tangible difference at little cost to the institution. Also, since one of the barriers institutions face in successfully implementing sustainability programs has to do with funding problems, it is important to develop a creative funding strategy from the very beginning of the project. One example of this is at the University of British Columbia, where a staff member calculated how much money it would cost to retrofit a few buildings on campus to be more energy efficient. This staff member then calculated how much money the university would save in energy costs if the changes were made. When administrators agreed to the project, the money the university saved went to fund a new 'Office of Sustainability' to pursue more sustainability projects on campus. This office has been in operation for eleven years, and has made many significant changes on campus (Sieb, 2009).

3.2.3 Content of Successful University Sustainability Policies

While every university campus has its own unique concerns, there are a few key practices that help any campus demonstrate a real commitment to sustainability. Wright (2002) synthesizes all the large-scale policies and declarations that have been created to work

towards sustainability in higher education, as well as some select university policies and compares their content. Wright's findings are displayed in the table below. By incorporating these specific content areas into a sustainability policy, or by developing a policy that matches the university's priorities, the University of Iceland would be well on the way to the transition to a sustainable campus.

Table 2. Common principles of sustainability in policies and declarations (adapted from Wright, 2002).

Policy/ Declaration	Moral Obligation	Public Outreach	Sustainable Physical Operations	Ecological literacy	Encourage sustainable research	Partnership with Government, NGOs and Industry	Inter- disciplinary Curriculum	Inter- University cooperation
<i>Talloires Declaration</i>	X	X	X	X	X	X	X	X
Macalaster College	X	X	X	X	X	X	X	X
U of British Columbia	X	X	X	X	X	X	X	X
George Washington University	X	X	X	X	X	X	X	
<i>Kyoto Declaration</i>	X	X	X	X	X	X		X
Tufts University	X	X	X	X	X	X		X
<i>Swansea Declaration</i>	X	X	X	X	X			X
University of Hertfordshire	X	X	X	X	X		X	
Dalhousie Environmenta l Policy	X	X	X	X		X	X	
<i>Tbilisi Declaration</i>	X	X		X	X	X		
University of Southern Carolina	X	X	X	X			X	
<i>CRE Copernicus Charter</i>	X	X		X	X	X		
<i>Thessaloniki Declaration</i>	X	X		X		X	X	
University of Waterloo	X	X	X		X		X	
McGill Environmenta l Policy	X		X	X	X			
University of Wales Swansea	X		X		X			
U of Buffalo Environmenta l Policy	X	X	X					
University of Toronto	X	X	X					
Queens University	X		X					
<i>Stockholm Declaration</i>	X	X						

According to a document published by the *Campus Earth Summit* in 1994,

A green campus is one that integrates environmental knowledge into all relevant disciplines, improves environmental studies course offerings, provides opportunities for students to study campus and local environmental problems, conducts environmental audits of its practices, institutes environmentally responsible purchasing policies, reduces campus waste, maximizes energy efficiency, makes environmental sustainability a top priority in land-use, transportation, and building planning, establishes a student environmental center, and supports students who seek environmentally responsible careers (Heinz Foundation, *Blueprint for a Green Campus*, 1994. p. 2).

While taking on all of these areas sounds like an enormous challenge, a quality campus sustainability policy could be comprehensive and flexible enough to incorporate all of those areas. A specific list of indicators of a sustainable campus was developed in 1994 at the *Campus Earth Summit* held at Yale University. This gathering brought together 450 faculty, students, and staff delegates from 22 countries across the globe with the aim to develop the *Blueprint for a Green Campus*, a set of recommendations for higher education institutions all over the world to work toward an environmentally sustainable future. If a campus such as the University of Iceland is looking for how to begin to formulate a sustainability policy, then the *Blueprint for a Green Campus* is a good place to start.

The *Blueprint* report is fairly comprehensive in its recommendations for how to develop a sustainable university, but new approaches have emerged since it was developed. Sustainability policies have become almost commonplace among universities in the United States, and are growing in popularity all over the world. While the *Blueprint for a Green Campus* provides a vision for how to begin the process of developing a campus sustainability policy, a later study of campus sustainability analyzes characteristics of successful practices in sustainability in higher education. The Association for Advancement of Sustainability in Higher Education (AASHE) published its *Digest 2008*, a report that identifies trends in sustainability and higher education in the United States and Canada. According to that report:

- more than 66 sustainability-focused academic programs were created the previous year
- at least 13 sustainability-themed research centers opened and plans for 33 more were announced
- nearly 300 signatories of the *American College and University President's Climate Commitment* publicly reported their greenhouse gas emissions (GHG - submitting over 400 GHG inventories)
- over 130 campus green buildings were planned, started, opened, or awarded Leadership in Energy and Environmental Design (LEED) certification
- over 50 sustainability-focused community engagement initiatives were announced by US and Canadian institutions (AASHE, 14.09.09)

These trends identify several specific areas in which universities are choosing to focus their sustainability efforts. These trends parallel the 'vision of a sustainable university' discussed in the previous section. More universities have focused on academic programming, and sustainability aimed research projects, while it seems many have also measured their greenhouse gas emissions and set reduction targets. There has been a commitment to building more environmentally friendly buildings on campus. In the United States and

Canada, the US Green Building Council's Leadership in Energy and Environmental Design (LEED) program is growing in popularity, a prime example being the Environmental Studies center at Oberlin College, which aims to be a zero-energy building (United States Department of Energy, Apr 5, 2010). similar to the BREEAM program in Europe (BREEAM, Apr 5, 2010). According to the AASHE report, universities are also experiencing increased participation with the surrounding community. All of these areas could be part of a comprehensive sustainability policy at the University of Iceland.

A report similar to the AASHE *Digest* was published in 2008 by the National Wildlife Federation and the Princeton Survey Research Associates International. This report was entitled, *Campus Environment 2008: A National Report Card on Sustainability in Higher Education*. This document is the result of a national survey designed to "track the trends and advance the knowledge about environmental stewardship, sustainability activities and related curricular offerings in higher education" in the United States (Campus Environment, 2008, p. 4). With 1,068 campuses throughout the country participating, this is the largest and most comprehensive study of its kind. The information presented in the Campus Environment Report Card can be helpful when identifying general features of successful campus sustainability policies. Similarly, in Europe, the Bologna process is nearly completed, with an estimated end date in 2010. The main goal of the Bologna process is to offer a common framework for European Higher Education to allow the mobility of all the academics involved, students, researchers, teachers and graduates (Rahola, 2009). Once it is complete, the Bologna process will be a useful tool for higher education institutions that are looking to implement sustainability successfully.

3.2.4 General Features of a Successful University Sustainable Policy

The Campus Environment Report Card in 2008 is divided into three areas of analysis: management, academics, and operations. For each of these areas, the report details major trends and identifies characteristics of exemplary schools. A previous study was conducted in 2001, so all the trends are compared on that seven year timeline. Since this study is specifically interested in policy trends, we will focus on the management section of the report. By identifying the successes of other universities, the University of Iceland can highlight strategies that might be applicable on its own campus. The illuminating key findings of the Campus Environment Report Card in 2008 with regards to the management portion of the analysis are as follows:

Management

- a. Environmental and Sustainability Programs Align with Campus Culture, Values
- b. Setting and Reviewing Environmental and Sustainability Goals is Widespread
- c. Put That in Writing - More Colleges and Universities Have Done So!
- d. Increased Commitment to Hire Environment and Sustainability Professionals
- e. Leadership in Place, plus Improvement in "Green" Orientations for Students and Staff

f. Environmental and Sustainability Programs Still Face Roadblocks

Translating these trends into practical applications for the University of Iceland identifies a few key characteristics that policymakers should aim to achieve when drafting the new sustainability policy. First of all, it is important that the policy the University of Iceland creates is compatible with the culture and values of the people on campus who will be affected by it. While the policy may include plans to influence the culture on campus to be more sustainable, establishing a policy that people do not care about will have little real impact. Perhaps by having community members sign a pledge or commitment in writing to behave in a more sustainable way, the university can begin to encourage the necessary changes on campus. Good policies have support from the top, and are active on the bottom, so it is crucial that the whole community work together to find common ground. The University of British Columbia, while larger than the University of Iceland, has an Office of Sustainability that consists of eleven staff members (Sieb, 2009). According to the AASHE report, hiring sustainability professionals is an increasing trend in campus sustainability practice. This presents a problem for the University of Iceland, since as of now, there is no one person of office or unit on campus that is responsible for overseeing environment or sustainability projects. Creating a management structure to oversee the implementation of campus sustainability efforts is one method the University of Iceland could use to ensure the sustainability policy is implemented effectively. Also, it is important for the University of Iceland to keep track of its progress towards its goals. By setting realistic targets and monitoring progress, the university can ensure that the policy remains an important component of the community over time. The best way to do this is by working as a group of stakeholders to establish indicators that can be measured over time. As the International Institute for Sustainable Development (IISD) writes,

Navigating the sustainability transition requires good instruments that orient us and tell us where we are, where we may be headed and what our options are. There are instruments that can help set goals and targets, others can be used to monitor and report on progress, while some are useful in exploring alternative futures. All of them are essential for effective sustainable development strategies and adaptive management, and inform political discourse about economic, social and environmental goals (IISD, Apr 5, 2010).

Developing indicators of sustainability that the University of Iceland can monitor over time is an important step in creating a successful policy. Finally, any university policy working towards sustainability must be strong enough to face roadblocks. It is clear that sustainability efforts face many challenges, from funding to the nature of the academic institution, so successful programs must be strong and adaptable enough to break through difficult roadblocks.

3.2.5 Conclusion: The University of Iceland's time to shine

As a society, we are starting to recognize the importance of engaging higher education institutions to support the transition to a more sustainable society. In the summer of 2008, the United States Congress passed the Higher Education Sustainability Act that establishes a *University Sustainability Grants Program*. This program, administered by the US Department of Education, will administer \$50 million in grants to higher education institutions to develop and evaluate sustainability programs in the United States. As

Washington Senator Patty Murray said of the new program, "Colleges are a natural breeding ground for the kind of innovation we need to move to new, environmentally-friendly energy sources. Students know that developing sustainable energy programs will affect their lives, their economic well-being, and the planet they are inheriting. These grants will help make energy resources last longer and have less of an impact on our environment" (Murray, in Goudie, 2009, p. 2). This forward-thinking program is a wonderful example of commitment from the top that supports the transition to a sustainable future through higher education. Meanwhile, the European Union has developed a comprehensive sustainable development strategy which includes an educational component (Eurostat Monitoring Report, 2009).

3.3 Fostering Sustainable Behavior

3.3.1 Recycling as a Case Study of Sustainable Behavior

To gain a better understanding of how we can foster sustainable behavior, it is helpful to choose one specific behavior, and then analyze motivations and barriers to that particular activity. In the case of sustainable behaviors, recycling is often used as an example of how people perceive the costs and benefits of an everyday action that has potential to benefit the environment. As the weak recycling program at the University of Iceland discussed earlier has shown, environmental policy is not effective if people do not participate in desired environmentally conscious behaviors. The ability to competently take action that benefits the environment, and to understand how our actions affect the world around us, is the apex of ecological literacy. This is why when analyzing ecological literacy it is essential to collect information about existing sustainable behaviors within the University of Iceland community. In doing this, we should also be prepared to identify what possible motivations or cultural context can help to foster more sustainable behaviors within the University of Iceland community.

3.3.2 Recycling Behavior and the Campus Community; Motivations and Barriers

Bacot et al. (2002) identify commercial industry as an 'untapped' or 'undertapped' area for municipalities to reach their recycling goals. University campuses also fall into this category, particularly when considering that developing values and habits of recycling at the university level will impact behavior in the professional community when students graduate and begin careers. The particular case at the University of Iceland provides a unique opportunity to examine attitudes toward recycling, recycling behaviors, and methods to encourage recycling. If it is possible to increase recycling in this setting, it is likely to have a positive effect not only on the university community, but to help achieve the larger municipal and national goals as well when students enter the workforce with habits and values that include recycling.

A study published in the journal *Environment and Behavior* in 2008 conducted by Knussen and Yule investigated the relationship between habitual behavior and recycling. The aim of the study was to determine whether habit played a significant role in the behavior of recycling. Using the theory of planned behavior and other psychological research methodologies, the researchers determined that people who have recycled in the past are

more likely to recycle again, whereas people who have not recycled are less likely to recycle in the future. According to the study, “Lack of recycling habit, as a reason for having failed to recycle in the past, made a significant contribution to the variance of intention to recycle with and without the inclusion of past recycling behavior” (Knussen & Yule, 2008, p. 695). If people are not in the habit of recycling, they are less likely to start recycling in the future. Habit implies an automatic response, so if people habitually throw trash in the garbage bin, it may require significant re-education to replace the automatic habit of just throwing away with the habit of recycling.

Another possible barrier to recycling is simply a lack of information. It is important to note that a lack of environmentally conscious behavior does not imply a lack of concern for the environment (McGuire, 1985, p. 233). This means that people may be concerned about the environment, but not behave in a way that is good for the environment. This logically implies a lack of information about which actions are beneficial for the environment, since if people care about the environment, they would likely take action that was environmentally friendly. Studies show that even though recyclers had more information about recycling, “non-recyclers were no different in the strength of their belief that protecting the environment was an important reason to recycle” (Vining & Ebreo, 1990; Derksen & Gartell, 1993).

The inconvenience of recycling is often cited as a barrier for not participating in a recycling program (Ewing, 2001). In terms of household recycling, inconvenience is indeed a contributing factor, particularly when individuals need to collect, clean, store, and transport recyclables themselves. However, in the context of recycling programs on campus, inconvenience should have little influence in behavior if recycling bins are placed in the same places and with the same frequency as garbage bins. This would imply that people have exactly the same opportunity to either choose to throw trash in the garbage or recycle.

So, why don't people recycle when they are given the clear choice? Traditionally, this waste generation is viewed as an individual “behavioral problem of massive proportions” (Jacobs & Bailey, 1982, p. 141). However, more recent research suggests that it is more often social motivations for recycling that can have an incredibly significant impact on individual behavior. For instance, a study performed in a community in California (Oskamp et al., 1991) determined that living in a single-family home was the largest predicting factor for whether or not a person recycled and “The second strongest predictor was having friends who recycle. Thus, peer participation and modeling were important determinants of recycling behavior” (Derksen & Gartrell, 1993, p. 435). According to a separate study also published in 1991, the biggest contributing factor to the success of a community's recycling program was the appointment of community leaders who would encourage their neighbors to recycle. This had the most significant impact on recycling behaviors (Hopper & Nielsen, 1991). This same study showed that verbal and written reminders to recycle were less effective. While cash incentives are often used to encourage recycling within a community and may increase desired action, they do not create “long-term, enduring changes in behavior” (DeYoung, 1986, p. 438) like the changes needed to create a recycling habit.

3.3.3 Possible Approaches to Foster Sustainable Behavior on University Campuses

It has been suggested that encouraging people to recycle will require “A systematic, well-advertised program [that] could create a new community norm favoring recycling” (Derksen and Gartrell, 1993, p. 435). It will not be possible to implement a successful recycling program without establishing recycling waste as a social norm. This takes several steps, including proper infrastructure and opportunities to recycle, peer encouragement, education and social incentives. Some environmentally conscious behavior, such as selling a car and taking the bus to work, have large individual costs and low individual payoff. People are less likely to make large sacrifices for little environmental payoff, because the barriers are simply too high and not enough is gained in return (Ewing, 2001). However, in the case of recycling on campus, there is very little change required in individual behavior and thus a very low level of sacrifice is required to have significant payoff. It should be possible for people to change their behaviors with regard to recycling; and with very little individual inconvenience, it ought to be possible to establish a new social norm favoring recycling on campus.

3.4 Ecological Literacy

3.4.1 What is Ecological Literacy?

According to David Orr, environmental studies professor and author of *Ecological Literacy; Education and the Transition to a Postmodern*, “Literacy is the ability to read. Numeracy is the ability to count. Ecological literacy is the ability to ask, ‘what then?’” (Orr, 1992, p. 85). While this definition presents an intriguing perspective, it does not elaborate into directly operational terms. Balgopal and Wallace offer a more concrete definition, “Ecological literacy refers to a student’s [or person’s] understanding not only of ecological concepts, but also of his or her place in the ecosystem” (Balgopal & Wallace, 2009, p. 14). The concept of ecological literacy (also called ecoliteracy, environmental literacy, and sustainability literacy) has its roots in the study of education, and particularly in environmental education. As Orr’s definition suggests, ecological literacy is a complex term that implies several levels of understanding on the part of an individual. In the book *Handbook for Sustainability Literacy*, Stibbe (2009) writes,

The ability to take steps towards building a more sustainable self, community, society and world requires far more than knowledge *about* sustainability – it requires *sustainability literacy* [which is a term used] to indicate the skills, attitudes, competencies, dispositions and values that are necessary for surviving and thriving in the declining conditions of the world in ways which mitigate that decline as far as possible. Gaining practical skills requires a form of learning which goes beyond memorising and repeating facts. It requires *active learning*, a broad term used to refer to self-reflection, self-directed enquiry, learning by doing, engagement with real life problems and issues, and learning within communities (Stibbe, 2009, p. 2).

One helpful way to visualize ecological literacy is at the apex of a pyramid, since it is developed through a person’s environmental knowledge, values, and finally their action

competence when dealing with an environmental problem (see Figure 2 below). How well an individual performs at each level of the pyramid will influence their ability to succeed at the higher levels.

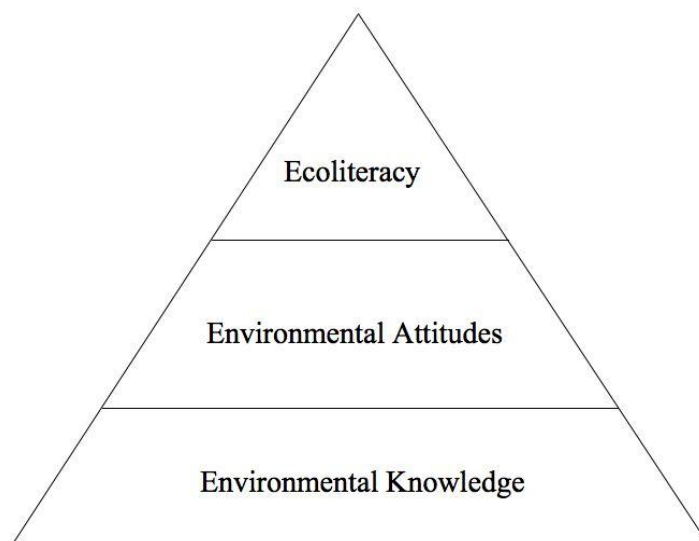


Figure 2. Ecological Literacy Pyramid, adapted from the NEETF Report on Environmental Literacy in America (Coyle, 2005).

At a very basic level of ecological literacy, people have a general understanding of a given environmental problem. Basic knowledge of environmental issues is the foundation upon which higher levels of ecological literacy can grow (Coyle, 2005, p. 15). This basic knowledge can be simple or extensive. For instance, a person may have ‘heard of’ climate change and may even have a general understanding of the causes of the issue or the scientific explanation for the phenomenon. According to Coyle, “awareness is best characterized by simple familiarity with an environmental subject with little real understanding of its deeper causes and implications” (Coyle, 2005, p. 15). On their own, awareness and knowledge of environmental issues have “limited lasting effect on environmental stewardship” (Coyle, 2005, p. 15). Still, an understanding of what environmental problems are and the causes and processes behind them is an important first step towards ecological literacy.

The next level of ecological literacy has to do with peoples’ values and attitudes towards the environment. After establishing some knowledge of an environmental issue, people begin to see the connections between their own personal conduct and large global issues such as climate change. This is when feelings of stewardship begin to play a role in the development of ecological literacy. Some alternative models of ecological literacy break this particular level into more distinct categories. For instance, the *Campaign for Environmental Literacy* (CEL), an organization that supports environmental education in the United States, explains environmental literacy in four levels instead of three. According to CEL’s view, the basic level of environmental literacy is general awareness of environmental issues. The next phase of environmental literacy is knowledge, followed by skills, and finally an ability to take collective action to combat environmental problems (Campaign for Environmental Literacy, Sep 14, 2009). While knowing about this

alternative model is helpful, this project will work from the pyramid model adapted from the National Environmental Education and Training Foundation.

Finally, the apex of the pyramid is a state of ecological literacy. An ecologically literate person has the ability to take existing knowledge of environmental issues, their own ecological values and feelings of stewardship, and translate those into effective action. Ecological literacy is built upon knowledge and values, and as Coyle states, “It [ecological literacy] starts out with framed information but also involves imparting the subject’s underlying principles, the skills needed to investigate the subject, and an understanding of how to apply the information” (Coyle, 2005, p. 15). Ecological literacy is a complicated process that requires several levels of in-depth understanding, personal inclination and values that lead a person to want to take action, and finally the ability to successfully identify how to competently take action. From an educational standpoint, building ecological literacy means addressing several levels of an individual’s intellect and personality.

While Figure 3 was first used to describe the process involved in fostering environmental behavior through environmental education, it is useful to see the many diverse factors that go into the decisions we make about how we act with respect to the environment. As Benedict explains, “In addition to having a knowledge of issues and being personally inclined to act, the person must also have knowledge of possible types of action (action strategies) and how these can be employed for a given issue (action skills)” (Benedict, 1989, p. 29). Huckle elaborates, “The important thing is not just to know about the issues and intend to act, but to act. Identifying various strategies for action and learning how to use them, as well as exploring the constraints and opportunities of one’s own situation, should now be considered basic elements in the environmental education process” (Huckle, 2006, p. 29).

External factors identified in the figure as ‘situational factors’ can also play a role in our ability to act responsibly when it comes to the environment. One example of this might be that we know pesticides can be harmful for plants, soil, and animals, and we may want to take action to stop farmers from using pesticides. We might also understand that to discourage the use of pesticides we should buy organic produce. For example, a situational factor might still prohibit us from doing this: if the organic produce is not available where we live, or if it is prohibitively expensive.

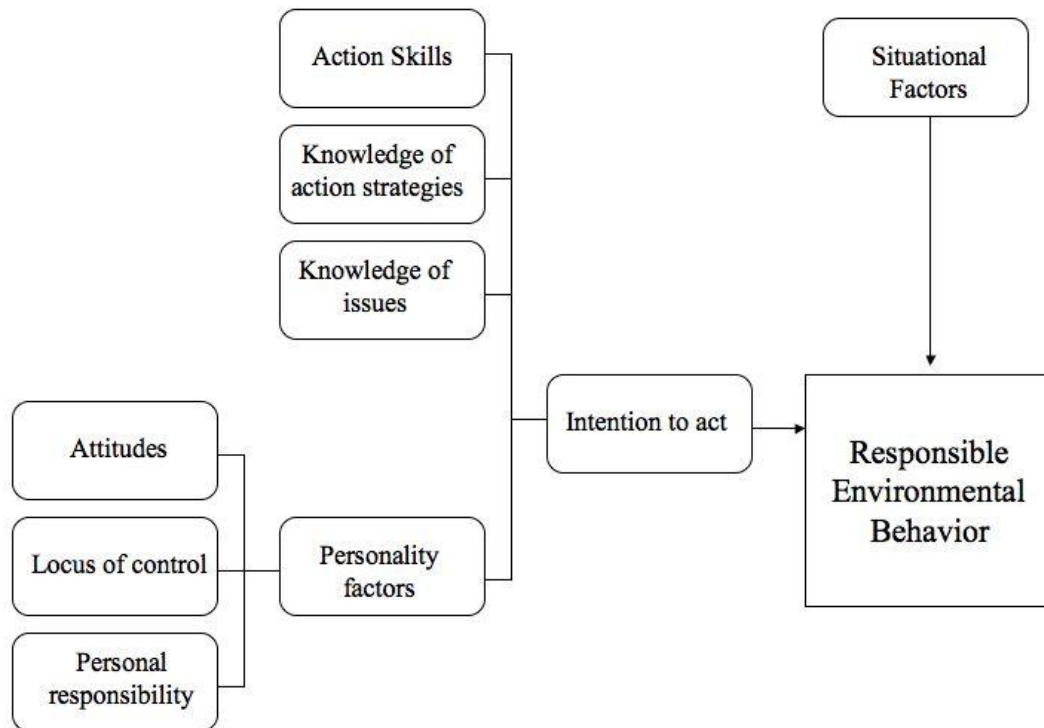


Figure 3. Hines model of behavior change through environmental education (adapted from Hines et al. 1986/7, in Benedict, 1989, p. 29)

3.4.2 Systems Thinking and Ecological Literacy

Another possible way to conceptualize what is meant by the term ecological literacy is to incorporate systems thinking into the definition. Systems thinking was born out of the field of systems dynamics in the 1950s because there was an increased need to describe complicated interactions within social systems in similar way as mechanical and biological systems were already described (Aronson, 1996, p. 1). Systems thinking is a methodology that attempts to analyse systems as whole entities instead of analyzing only their component parts. People who work in the field of sustainability use system dynamics and systems thinking to identify specific places in a system where taking action will have the most profound impact in creating the desired results. While it is not reasonable to expect everyone in society to think like a sustainability consultant, the concept of thinking on a systemic scale, or the ability to see the world as a complex system instead of focusing on small-scale interactions is a skill akin to ecological literacy.

An ecologically literate person would be able to think of their own actions in the context of a whole system, and thus would have a better understanding of how our individual behaviors influence something larger and more complicated than we are able to see on a daily basis. A person who is capable of systems thinking would have a better appreciation of the complexity and scale of the environmental problems facing the world today.

3.4.3 Ecological Literacy and Higher Education

Ecological literacy is important in the context of higher education. As a recent National Science Foundation funded report explains, “In the coming decades, the public will more frequently be called upon to understand complex environmental issues, assess risk, evaluate proposed environmental plans and understand how individual decisions affect the environment at local and global scales. Creating a scientifically informed citizenry requires a concerted, systemic approach” (Char & Rockman, 2008). As institutions tasked with educating responsible and informed citizens, higher education institutions should pay special attention to the changing needs of the world and the demands that places on educational goals. Orr explains further that, “[Sustainability] requires a rejuvenation of civic culture and the rise of an ecologically competent citizenry who understand global issues, but who also know how to live well in their places” (Orr, 1992, p. 1). This rejuvenation of civic culture applies to the campus community as well. Institutionalizing changes to make a university a more sustainable system is not possible outside the context of the culture on campus. This rejuvenation should take place at all levels of a community, and at all levels of the university. As Duailibi (2006) explains, “Ecological literacy is a pedagogy based on the local, and on the direct and intense participation of school community. Students, teachers, professors, principals, administrative staff, and country and community decide together which projects ... should be addressed each year” (Duailibi, 2006, p. 66).

Essential to the development of an ecologically literate community is the inclusion of members of that community. Engaging people at all levels of the university system gives people a sense of ownership in the sustainability projects a university will undertake, and the community can work together towards fostering ecological literacy. This can be a challenge, specifically in institutions that are traditionally fragmented and not used to working collaboratively, but rather specialized and work only within a particular area. As Orr explains, “Yes, we need experts, but not to the exclusion of a population that is both ecologically literate and competent. We need farmers, business persons, writers, bureaucrats, builders, foresters, and workmen who are ecologically literate and competent and who can build sustainable solutions from the bottom up” (Orr, 1992, p. 84). The same is true for the university community; students, professors, staff, faculty, administrators all need to be ecologically literate, and to understand the importance of encouraging ecological literacy at their levels of the higher education community.

3.4.4 Ecological Literacy Evaluation

Measuring levels of ecological literacy can give us very useful information about the cultural context in which a sustainability program will be implemented. That being said, evaluating ecological literacy presents several challenges. First, ecological literacy is not a destination, but rather a concept that can be used to compare individuals. There is no clear definition of ecological literacy, so it is impossible to state that an individual has reached or achieved ecological literacy. It is not possible to say that one person is ecologically literate and another person is not. Rather, it should be possible to describe relative levels of ecological literacy within sub-populations. For instance, people who have more general knowledge of environmental problems, more positive attitudes towards their environment, and act in ways that are more environmentally responsible can be said to have a higher level of ecological literacy than those who show less competence in all three areas. Secondly, we know that there are several factors that contribute to a person’s values and actions. A person

may have significant knowledge of problems, but does not have the action skills or appropriate values needed to change their behavior to reduce their individual impact.

The Campaign for Ecological Literacy was officially formed in the United States in 2005 to gain concerted support from the federal government for environmental education. According to the Campaign for Ecological Literacy, “The test of environmental literacy is the capacity of an individual to act successfully in daily life on a broad understanding of how people and societies relate to each other and to natural systems, and how they might do so sustainably. This requires sufficient awareness, knowledge, skills, and attitudes in order to incorporate appropriate environmental considerations into daily decisions about consumption, lifestyle, career, and civics, and to engage in individual and collective action” (Campaign for Environmental Literacy, Sep 9, 2009). It is through analysis of the knowledge, skills, and attitudes of a population that we can get a sense of levels of ecological literacy within the population.

One example of how to analyze cultural attitudes towards the environment is the Roper Classification System. This system describes sub-groups within a population and measures those groups’ interests in the environment. An example of the classification of levels of environmental interest and the chart describing the percentage of the United States population each group represents can be found in the Figure 4.

Roper’s representation of levels of interest in the environment in the US:

TRUE BLUE GREENS: about 10% of the public likely to be most interested and active on the environment...Some 43% of the True Blue Greens are likely to do pro-environment activities on a regular basis.

GREEN BACK GREENS: about 5% of the public who mostly fight environmental problems with consumerism. They are willing to pay the most for a cleaner environment but have less time to devote. About 25% of them are likely to engage in pro-environment activities on a regular basis.

SPROUTS: about 33% of the adult population who can best be defined as environmental "fence walkers." When they get behind an environmental cause, it has real clout. Some 26% say they are likely to perform pro-environment actions on a regular basis.

GROUSERS: about 18% of adults who are somewhat concerned about the environment and do some inexpensive non-intrusive activities. While 17% of them say they regularly take steps to conserve the environment, they are the most likely to make excuses for not taking such steps.

BASIC BROWNS – 31% of adults who consider the environment to not be a problem and are fairly resolved in that conclusion. Just 6% are likely to regularly engage in pro-environment behavior.

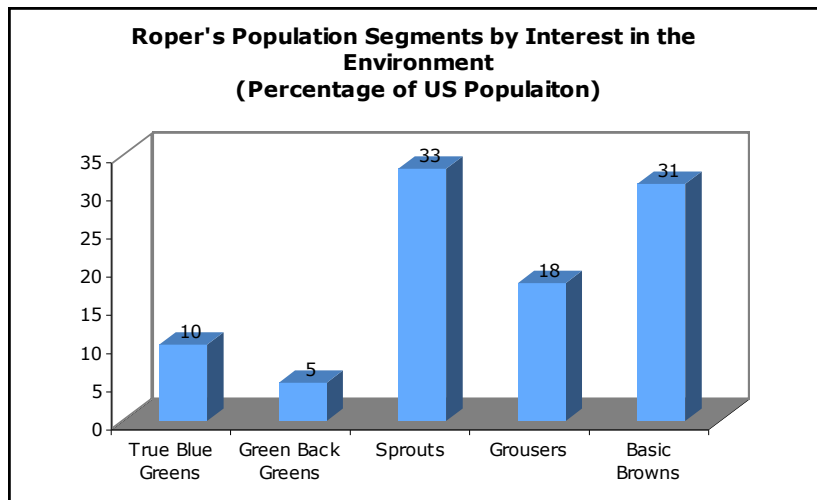


Figure 4. Roper Classification System of US population segments based on interest in the environment, Adapted from Green Gauge 2002: Americans' perspective on environmental issues: Yes ...but. (Roper, 2002)

The Roper Classification system is one example of how we might choose to analyze one portion of ecological literacy. Just like ecological literacy evaluation, the Roper system is a descriptive analysis of a culture represented by the sampled population. It groups individuals with similar levels of interest in environmental issues, and the same logic can be applied to analyzing knowledge and behaviors to paint a picture of the level of ecological literacy of the sample population. Such a description can be useful when implementing a policy, or introducing an innovation into a community. If we have an idea of what the culture of that community is like, then we can adjust our efforts in such a way that the message we are trying to get across is embraced as opposed to rejected.

3.5 Research Questions

Ecological literacy is indeed a challenge to measure and quantify. It is not possible to say that an individual has achieved ecological literacy, since it is a concept that exists on a spectrum rather than as a destination to be reached. Rather, attempting to understand the background knowledge, values, and behaviors of a community can help paint a picture of the culture of that community with respect to sustainability and the environment. Keeping in mind that a description of the cultural values and behaviors can be useful when introducing a new concept like sustainability, this research project aims to answer two primary questions:

- 1) What are the levels of ecological literacy of the University of Iceland faculty, staff, and students?
- 2) How can the environmental culture on campus inform a university sustainability policy?

4 Methods

4.1 Participants

This research aimed to build a robust understanding of the ecological literacy levels that exist among University of Iceland faculty, staff, and students. The possible participants, were those people on campus who have email addresses ending in @hi.is, and have agreed to receive emails from the Student Registration office or from the University Human Resources Department.

Statistics regarding the population and enrollment at the University of Iceland are collected two times a year, in January and October. Since the survey for this research was conducted during the fall term of 2009, the population statistics used in this research were collected during October 2009. However, the Student Registry did not release new statistics during this time period regarding the number of foreign students at the University of Iceland or the number of staff. So, all information related to the number of foreign students and the number of staff members is from the last time period that data was available, which was January 2009.

As of October 2009, there were 13,957 students at the University of Iceland. This included 9249 female and 4708 male students. There are 10,603 undergraduate students, 3006 graduate students, and 348 PhD students. The largest school at the University of Iceland is the Social Sciences school, which has 4598 students, followed by the Education school which has 2525 students, Humanities which has 2422, Health Sciences which has 2223, and finally Engineering and Natural Sciences which has 2189 students. As of January 2009, there were 1004 foreign students attending the University of Iceland, and 1231 employees working there.

It was not reasonable to assume that all the possible respondents chose to participate in this survey. The data collected were therefore a representation of the participants who responded, and does not necessarily represent the views, opinions, and knowledge of the larger University of Iceland community.

4.2 Instrumentation

Data was collected through a questionnaire that was developed based on the three levels comprising ecological literacy; background environmental knowledge, environmental values, and environmental behaviors. Additionally, one section was added that aimed to assess levels of interest in specific actions relating to the University of Iceland.

The questionnaire was answered online using the University of Iceland's survey software. Potential participants received e-mails asking them to participate in the study. The research questions required responses from as large and diverse a population as possible.

An electronic questionnaire was deemed the best technique to achieve this, since it could be sent to a large number of people in the University of Iceland in a short amount of time. Also, the questionnaire was offered in both Icelandic and English, which allowed participants to choose and respond in the language with which they were more comfortable.

The questionnaire developed for this project aimed to provide data for a descriptive analysis of the sample population. This questionnaire was divided into five distinct sections: demographic information, environmental attitudes, sustainable behaviors, environmental values and vision for the University of Iceland, and finally, environmental knowledge. Copies of the questionnaires, in English and Icelandic, are attached (Appendix A and B).

4.2.1 Demographics Section

The first section on demographics consisted of questions that provided information about the characteristics of the individuals who made up the sample. This included the respondent's age, gender, nationality, role at the university, department, and area of study or work. These characteristics were the basis of comparison when identifying trends in the respondents' answers to the rest of the questionnaire. That is to say, the demographic categories served as the independent variables.

4.2.2 Environmental Attitudes Section

The environmental attitudes section of the questionnaire aimed to detail respondents' environmental attitudes, particularly their feelings of personal stewardship, their views of humanity's role in modern environmental problems, and their feelings about lifestyle changes that foster sustainability. Some of these questions were taken directly from a study conducted by the OECD's Programme for International Student Assessment (PISA) in 2006 (OECD, 2007). The questions in this section were single statements, and respondents were asked to rank their level of agreement with the statement on a five-point scale ranging from strongly agree to strongly disagree. The five-point scale gave respondents an opportunity to choose the middle of the scale, indicating that they had no strong opinion about the statement either way.

4.2.3 Sustainable Behaviors Section

The sustainable behavior section aimed to establish existing environmentally conscious behaviors among respondents. Respondents were asked to answer how often they perform a specific action on a five-point scale from 1, 'never' to 5, 'always.'

4.2.4 Priorities and Vision for the University Section

The section on priorities and vision for the university included questions about respondent's views regarding the role of the university in promoting sustainability, and which actions should be taken to make the campus more sustainable. Respondents were asked to rank whether or not they agree with a statement on a five-point scale, 1, 'strongly disagree' to 5, 'strongly agree.'

4.2.5 Environmental Knowledge Section

This section on environmental knowledge was based on the environmental literacy quiz used by the National Environmental Education and Training Foundation in their 2005 report entitled *Environmental Literacy in America* (Coyle, 2005, p. 3). Some of these questions are taken directly from the NEETF quiz, while others were modeled after the style. Respondents chose from four potential answers, one of which is correct. The responses also include a fifth possible selection of ‘don’t know.’

This section included a few specific areas of environmental knowledge. The questions were designed so that responses would highlight areas that people generally understand more. These areas included: general ecological knowledge, awareness of regulatory systems for environmental problems, size of crisis, extent of common myths, and useful basic environmental knowledge.

The knowledge questions ranged in levels of difficulty, although it was intended that respondents with a good comprehension of environmental problems should have been able to answer all of them. This section was added last because of the potential for respondents to feel discouraged when answering questions with only one correct answer. Respondents who chose to drop out of the survey without completing the questionnaire will be included in the data set up until the point where they chose to leave the survey.

4.2.6 Piloting and Potential Methodological Obstacles

The questionnaire was piloted over a three-week period, from October 12 to October 30, 2009. The aims of the piloting period were to refine the structure of the questionnaire, content, questioning style, scales, language consistencies, and other possible areas for improvement. As part of the piloting procedure, the questionnaire was given to an education for sustainability working group at the University of Iceland School of Education. Members of the group contributed their comments and ideas.

There were drawbacks to this method. Response to the questionnaire was voluntary, so it is possible that the response rate was lower than it would have been with other methods. The period of time in which people could respond to the questionnaire was left open for three weeks, and reminder emails were sent twice to encourage people to respond. Another drawback to using this method was the length of the questionnaire, which took about fifteen minutes to complete. Since response was voluntary, it is possible that a subset of the population that has more negative attitudes about the environment might have self-selected out of the sample because they did not wish to participate. It is not possible to compensate for such a bias if one exists within the data collected. A final drawback was the language translation. The questionnaire was originally developed in English, and was translated by four bilingual peers. However, there is a chance that respondents read the translated questions in a way not intended in the original English. Still, the benefits of choosing to answer the questions in Icelandic or English outweigh potential risks.

4.3 Procedure

The questionnaire and a brief introduction to the project were emailed to potential respondents on November 6, 2009. Recipients of this email were instructed to click a link in the email that would take them to the questionnaire in their language of preference; either Icelandic or English. The data was collected for a three-week period. A reminder email was sent on November 17, 2009 and the survey was closed on November 23, 2009. The email was sent in both Icelandic and English. The English version of the email is here:

Dear participants,

Please answer the following questionnaire which is a vital part of the creation of the University of Iceland's sustainability policy. The questionnaire is sent to all staff and students at the University of Iceland.

It takes about fifteen minutes to complete. Your answers are important and very appreciated.

Link: <https://ugla.hi.is/K2/eydublad.php?sid=135&fid=3455>

Thank you,

Mary Frances Davidson mfd1@hi.is master's student in natural resources

Krístín Vala Ragnarsdóttir vala@hi.is and Allyson Macdonald allyson@hi.is are supervisors

4.4 Data Analysis

Data was analyzed using Excel. The primary aim of the data analysis was to describe general opinions and attitudes of people on campus with respect to sustainability and actions the University of Iceland should take as it works towards sustainability. A secondary aim of the data analysis was to identify any trends in responses from specific sub-groups on campus. The respondents were grouped by gender, age, nationality, level of schooling, and which school within the University of Iceland they attend. Comparisons between these groups were done to identify which community members of the University of Iceland population tend to have more positive environmental attitudes, behaviors, background knowledge, and a more favorable outlook regarding sustainable actions the University should undertake. Combined with the general survey responses, this analysis will be sufficient to answer the two research questions posed in this thesis.

Several statistical tools were used to analyze the data collected in the survey. To find the general results of the survey, the number of like responses to each question was counted. That is, the number of survey respondents that marked the box 'strongly agree' or 'agree' or the other options were grouped together for each question. Responses were then further grouped into three categories; 'agree' for those who indicated that they either strongly agree or agree with the statement, 'no opinion' for those who marked the box entitled 'neither agree nor disagree,' and 'disagree' for those who chose either 'disagree' or

‘strongly disagree.’ A similar method was used for the environmental behaviors section of the survey that groups respondents based on the frequency with which they indicated participating in the given behavior. This means that for each question of the survey we can see how many people and what percentage of respondents agreed, disagreed, or had no opinion. These were then ranked so we can see where there are the strongest levels of agreement.

To determine trends within groups of respondents, the first statistical method used was simple averages. For each question, the average response from each group was calculated. With the exception of the demographics section and environmental background knowledge quiz, the survey questions were scaled and had five possible responses, and in most cases, the lower the response the lower the agreement with the statement. Respondents were grouped and their average responses were compared to other groups to show which subset of the population tended to have more positive environmental outlooks. For example, the average female response to each question was compared to the male average response to the same question. This gives us a general impression of which group answered in a more positive way.

Several other statistical tools were used to determine whether or not the averages of two groups were different in a statistically significant way, and how much of an effect the independent variable had on the outcome. For each group, the standard deviation (or variance, as it is called in Excel), degrees of freedom, *t* statistic, *P* value, and Cohen’s *d* value were calculated for each question of the survey. For the purposes of this data analysis, when the comparison of two means resulted in a $P < 0.05$, the means are considered significantly different.

To determine size of the effect the independent variable had on the survey responses, the Cohen’s *d* value was then calculated for all questions where difference in means was statistically significant. For the questions that showed significant difference, the Cohen’s *d* value can help us see the effect size that the independent variable had on determining the mean result. The Cohen’s *d* value is calculated by dividing the difference in the two means by the average standard deviation of the two groups. By taking into account the standard deviations, the Cohen’s *d* value is a way to determine how much of the data in the distribution of results overlaps. If there is significant overlap, then it is harder to say that the resulting means are very different from one another. However, if there is less overlap, then we can say that the average response was more significantly affected by the independent variable. The Cohen’s *d* value can range from 0.0 to about 2.0, and it is helpful when comparing responses to different questions to see which were more strongly affected by the independent variable. For the purposes of this analysis, a Cohen’s *d* value between 0.01 and 0.30 are considered a small effect, 0.31 to 0.50 are medium effect, and all values over and including 0.51 are a large effect.

5 Results

A detailed analysis of the data can be found in the appendix.

5.1 Participants

By the end of the survey period, 934 individuals had responded to the survey. The population of the University of Iceland is 13,650 students and 1,231 employees, which makes the total population of the University community is 14,881 people. This means that of the entire population of the University of Iceland, approximately 6% responded to the survey.

Of the 934 responses, 639 (68%) were female and 295 (32%) were male. The University of Iceland student body is approximately 67% female and 33% male. The largest age group represented in the survey responses is between the ages of 20 and 25 with 291 respondents identifying themselves as part of that category. For the purposes of analysis, respondents were grouped into two age groups, 30 and younger with 477 (51%) respondents, and 31 and older with 454 (49%) respondents. Three of the 934 respondents did not include their ages on the survey, so their responses are not included in any of the analysis relating to age. 834 (89%) of the respondents identified themselves as Icelandic, and 100 (11%) of the responses were from non-Icelanders. The majority of the responses were from undergraduate students, who with 473 responses made up just over 50% of the respondents (see Figure 5). For the purposes of analysis, respondents were grouped into two categories with relation to their role at the University of Iceland: undergraduate (473 respondents) and other (461 respondents).

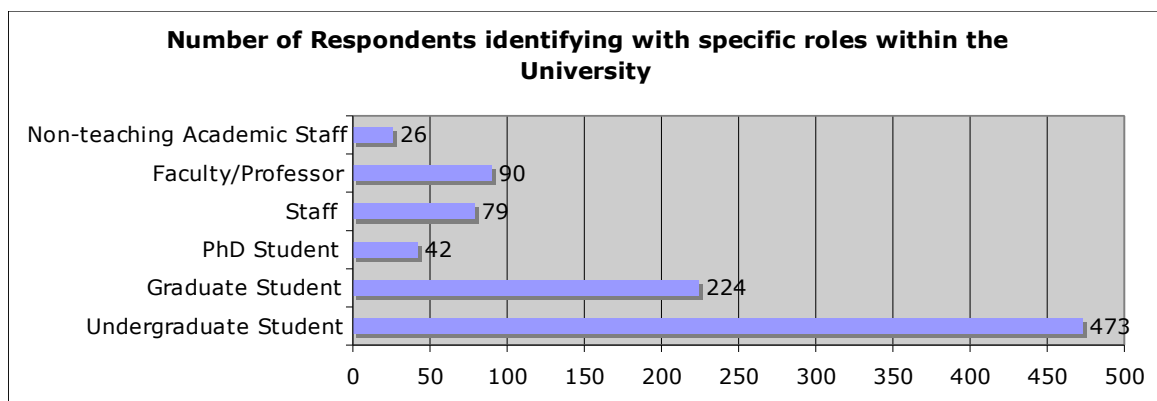


Figure 5. Survey respondents' roles within the University of Iceland

As Figure 6 shows below, the Social Sciences school, which is the largest school at the University of Iceland made up 26% (n=248) of the responses. The students in the Social

Sciences school make up about 33% of the University of Iceland's student body. While the Engineering and Natural Sciences school makes up only about 16% of the student body, this school makes up 26% (n=242) of the survey responses. The Humanities school makes up about 17% of the student body, and about 18% (n=165) of the data collected from the survey. The Education school is about 18% of the student body and makes up 15% (n=141) of the sample. 11% (n=101) of the data collected came from the Health Sciences school, which makes up about 16% of the University of Iceland student body. The final 4% (n=37) of the sample identified themselves as central administration, which is not associated with any particular school on campus.

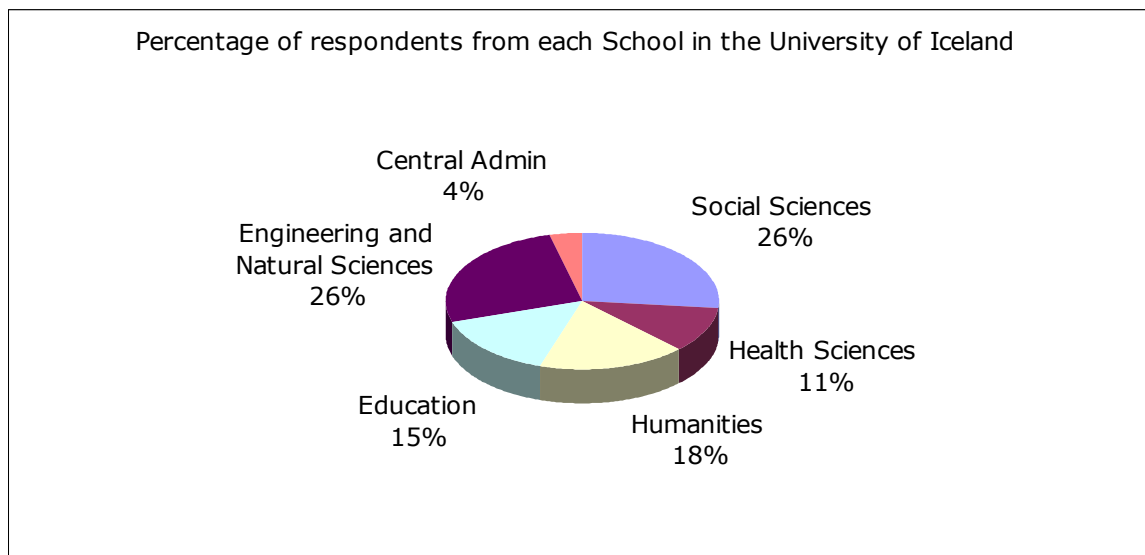


Figure 6. Relative percentages of survey responses from each school at the University of Iceland

5.2 Introduction to General Results

This section of the results chapter presents the general responses from the University of Iceland community. This section presents results to each part of the survey, including the attitudes and values section, behaviors, university action, and environmental knowledge.

5.3 General Responses to Attitudes and Values Section

The first section of the survey consisted of questions that aimed to describe the general attitudes and values of respondents. The highest levels of agreement were to the statement, "Industries should be required to prove that they safely dispose of dangerous waste materials," 96.8% (n=904) of respondents stated that they either agreed or strongly agreed. 85.8% (n=801) either agreed or strongly agreed with the statement "To reduce waste, the use of plastic packaging should be kept to a minimum." When asked to mark their levels of agreement with the statement, "I am concerned about the environment, but I think that one person's actions cannot make a big enough difference," 70.4% (n=658) of respondents

marked either ‘disagree’ or ‘strongly disagree,’ while approximately 17.5% (n=163) marked either ‘agree’ or ‘strongly agree’ and 12.1% (n=113) had no opinion. When asked to mark agreement with the statement, “People in Iceland act in a more environmentally responsible way than people in most other countries,” 60.9% (n=569) of respondents either disagreed or strongly disagreed, while 10.9% (n=102) agreed or strongly agreed, and 28.2% (n=263) had no opinion.

Table 3. Survey respondents’ levels of agreement to statements about environmental attitudes and values.

Attitudes and Values	% Agree	% Disagree	% No Opinion
Industries should be required to prove that they safely dispose of dangerous waste materials.	96.8	1.7	1.5
To reduce waste, the use of plastic packaging should be kept to a minimum.	85.8	3.7	10.5
I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	78.9	5.5	15.6
I feel responsible to reduce the impact I make on the environment	78.1	8.6	13.4
I am in favor of charging people a fine if they throw litter on the street.	76.6	11.1	12.3
It is possible to improve environmental, social, and economic problems in the world all at once.	64.3	13.4	22.3
Electricity should be produced from renewable sources as much as possible, even if it increases the cost.	60.6	12.0	27.4
It disturbs me when people leave the tap water running unnecessarily.	52.9	19.1	28.1
It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	52.2	23.3	24.4
I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.	17.5	70.4	12.1
People in Iceland act in a more environmentally responsible way than people in most other countries.	10.9	52.4	28.2

5.3.1 Attitudes and Values and the PISA Study

Four statements for this section of the survey were taken from the PISA study of 15 year-old students’ feelings of responsibility in relation to sustainable development. This study contrasted student responses from Iceland with those from students in other OECD countries (Table 4).

There are some areas in which the University of Iceland survey results are consistent with the PISA study and some areas where results differ. The largest difference in responses was to the statement “Industries should be required to prove that they safely dispose of dangerous waste materials” with roughly 97% of the University of Iceland respondents agreeing with the statement, compared to 92% of respondents from the OECD students and 89% of Icelandic students in the PISA survey. Also, respondents from the University of

Iceland indicated stronger agreement with the statement “I am in favor of having laws that regulate factory emissions even if it would increase the price of products” than the other two groups. University of Iceland respondents indicated less agreement with the statement “Electricity should be produced from renewable sources as much as possible, even if it increases the cost” with only 60% of respondents agreeing with that statement compared to 79% of students respondents from OECD countries and 77% of Icelandic students in the 2007 study. In the original study, the largest disparity between Icelandic students and students from other OECD countries was regarding the statement “It disturbs me when energy is wasted through the unnecessary use of electrical appliances” and as the results from this survey show, Icelandic respondents still indicated less agreement with that statement than respondents from other OECD countries.

Table 4. Percentage of respondents who agree or strongly agree with a statement indicating a willingness to take responsibility for sustainable development (adapted from OECD, 2007, p. 160)

Statement concerning responsibility for sustainability	% of respondents agreeing or strongly agreeing		
	% OECD students in 2006	% 15 year-old Icelandic students in 2006	% University of Iceland in 2009*
Electricity should be produced from renewable sources as much as possible, even if it increases the cost.	79	77	60
Industries should be required to prove that they safely dispose of dangerous waste materials.	92	89	97
I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	69	65	79
It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	69	45	52

*This study - University of Iceland responses compared to results from previous PISA study.

5.4 General Responses to Environmental Behaviors Section

This section of the questionnaire aimed to establish which environmentally responsible behaviors respondents engaged in, and how often they performed those behaviors. Responses to these questions were grouped into those who indicated that they ‘always’ or ‘often’ participated in the stated behavior, or those who ‘never’ or ‘rarely’ did.

Table 5. Survey respondents’ frequency of action with respect to their environmental behaviors

Behaviors	% Always and Often	% Never and Rarely	% Sometimes
At home, I separate recyclable beverage cans and bottles from other household garbage.	88.4	7.0	4.6

When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.	75.1	13.7	11.2
At home, I separate recyclable paper from other household garbage.	66.5	25.1	8.5
When I have time off from work, I like to spend some time outside.	58.1	8.1	33.7
I walk, bus, bike, or carpool to campus.	52.9	32.0	15.1
When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.	45.0	34.5	20.6
I try to reduce the amount of plastic I use in everyday life.	42.1	28.7	29.2
When I go to the grocery store, I bring reusable bags with me.	31.3	54.0	14.8
When I go to the grocery store, I try to buy organic products, even if they cost more money.	20.4	46.3	33.3
When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.	15.0	55.1	29.9
At home, I separate food waste from other household garbage.	13.2	79.9	7.0

The most frequent environmentally positive behavior is seen in responses to the statement, “At home, I separate recyclable beverage cans and bottles from other household garbage” to which 88.4% (n=826) responded that they always or often performed that task. The second most frequent behavior was in response to the statement, “When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it” with 75.1% (n=701) always or often performing the task. The lowest ranked recycling behavior was the statement regarding recycling paper on campus, to which only 45% (n=420) of respondents indicated that they always or often do this. A detailed list of respondent’s environmental behaviors can be found in Table 5.

5.5 General Responses to the University Action Section

The next section of the questionnaire had to do with how respondents view the role of the University of Iceland when it comes to environmental action and sustainability.

Table 6. Survey respondents’ levels of agreement with respect to action the University of Iceland should take to work toward sustainability

University Action	% Agree	% Disagree	% No Opinion
The University of Iceland should offer double-sided printing for all printers.	91.6	2.0	6.3
The University of Iceland should make more of an effort to encourage people to recycle on campus.	82.5	3.3	14.1
The University of Iceland should make an effort to reduce the amount of energy used on campus	72.3	4.1	23.7
The University of Iceland should work to spread awareness about sustainability on campus.	71.8	3.3	24.8

University of Iceland should reduce the amount of packaging that is used in the dining facilities.	69.1	4.5	26.4
The University of Iceland should offer classes about sustainability for faculty and staff.	57.1	4.4	38.5
The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.	57.0	17.8	25.3
The University of Iceland should offer organic products in their dining facilities.	49.5	8.1	42.4
The University of Iceland should offer more classes about sustainability for students.	47.0	5.0	48.0
The University of Iceland has a special responsibility to teach people about sustainability.	46.5	14.8	38.8
The University of Iceland should charge people to park their cars on campus.	26.9	50.7	22.4

The statements that had the highest levels of agreement were related to the University of Iceland offering double-sided printing, with 91.6% (n=856) of respondents agreeing, and the University of Iceland promoting recycling on campus, with 82.5% (n=771) of respondents agreeing. More respondents agreed that the University of Iceland should offer classes about sustainability for faculty and staff, with 51.7% (n=533) agreeing, than for students, with 47% (n=439) agreeing. The lowest level of agreement was to the statement, “The University of Iceland should charge people to park their cars on campus” with which 26.9% (n=251) agreed, 50.7% (n=474) disagreed, and 22.4% (n=209) had no opinion.

In other question in this section respondents were asked to identify their level of environmentalism (Figure 7). Three respondents chose the statement “I am not an environmentalist at all,” 74 chose the statement, “I am not really an environmentalist,” and 273 chose the statement, “I don’t have strong feelings about being an environmentalist.” 491 respondents chose the statement, “I am an environmentalist,” and 93 chose the statement, “I am a serious environmentalist.”

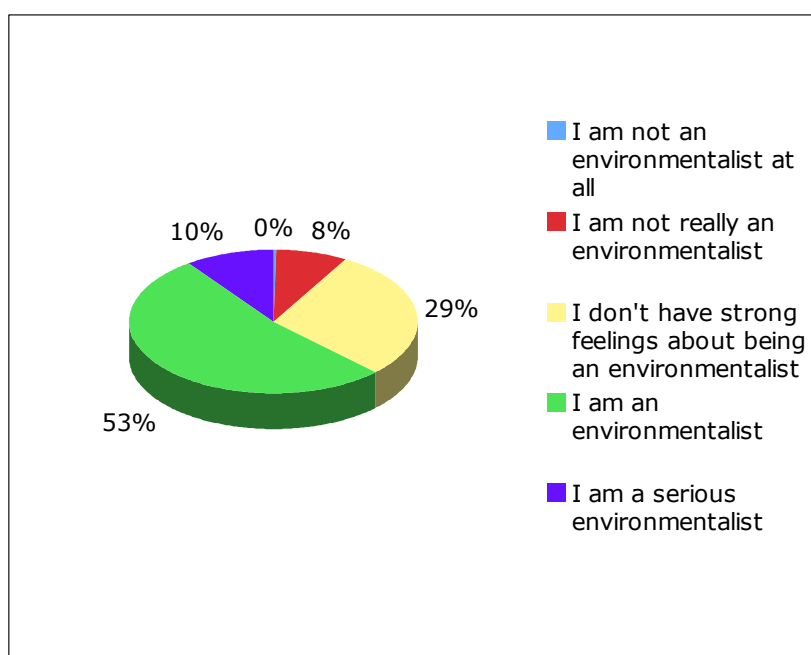


Figure 7. Responses to question asking participants to rank their level of environmentalism

5.6 Knowledge

The final section of the questionnaire was the environmental knowledge quiz, designed to demonstrate general knowledge and awareness of environmental issues among respondents. If a respondent marked the 'Don't Know' box, their response is not included in the number of respondents that answered correctly. The average number of correct responses was 5.75 out of 12, with a standard deviation of 1.95. There was one respondent that answered all 12 questions correctly, and there were five respondents that did not answer any of the questions correctly. Figure 8 shows the distribution of respondents who answered a certain number of the questions correctly. The most frequent number of correct answers was 6 out of the possible 12.

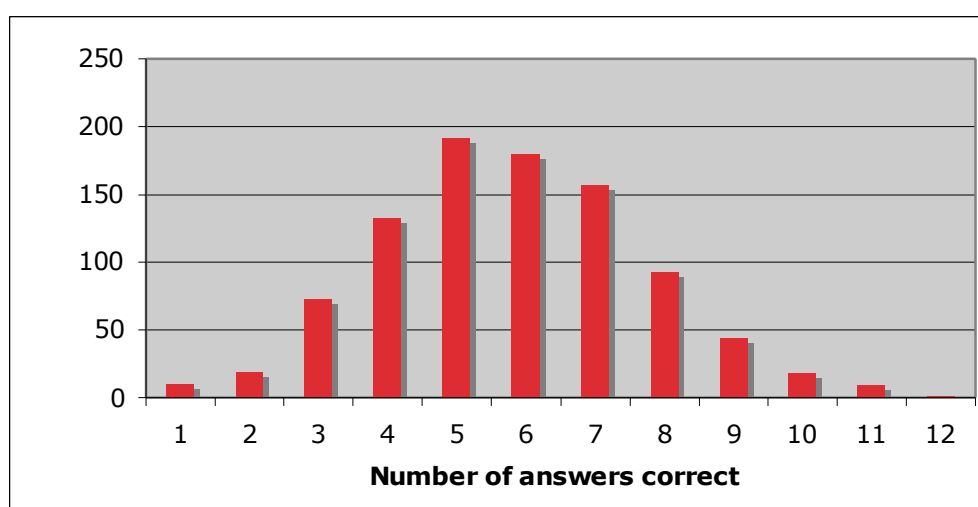


Figure 8. The distribution of respondents who scored each number of correct responses on the environmental knowledge quiz.

Some questions were more frequently answered correctly than others (Figure 9). the questions that respondents most often knew the answer to were related to hazardous household waste, the Kyoto Protocol, the function of the ozone layer, and the name of Iceland's environmental agency. The questions that fewest people were able to answer correctly were related to the dangers of phosphorous, population growth, the amount of recyclable materials in Icelandic landfills, the benefits of wetlands, and plant matter as a sink for carbon dioxide. A detailed description of how many respondents were able to correctly answer each question can be found in Table 7 below.

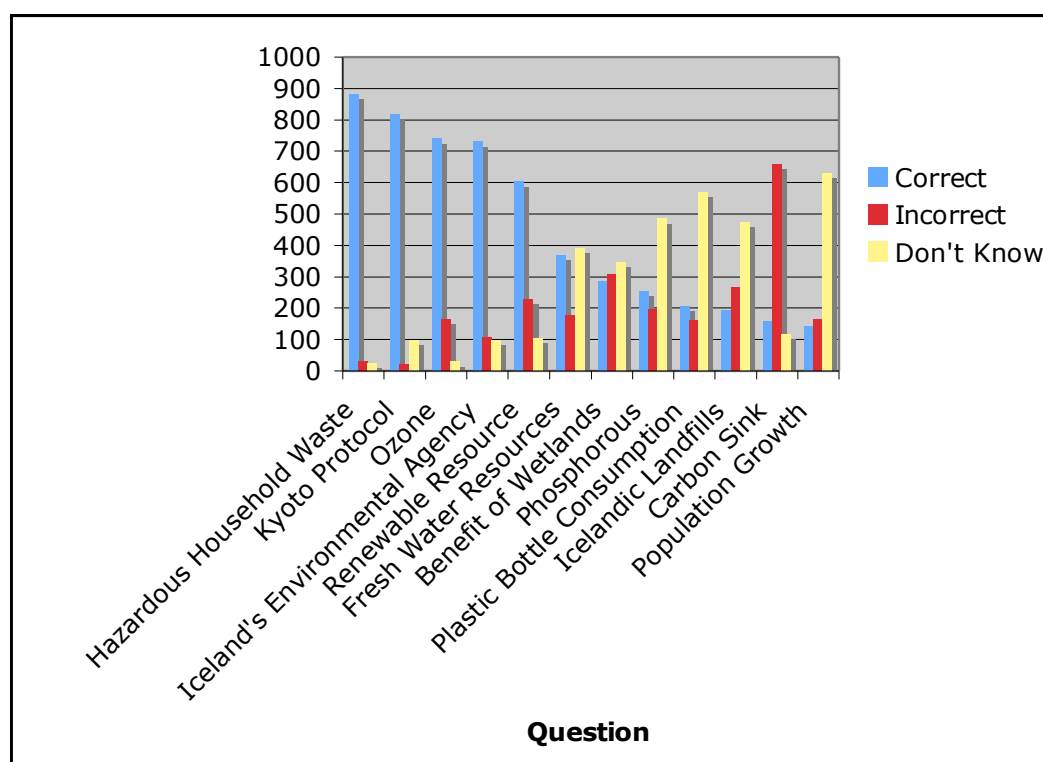


Figure 9. Representation of which questions most respondents answered correctly

Table 7. Percentage of respondents who answered each environmental knowledge question correctly, incorrectly, and marked 'Don't Know.'

Background Environmental Knowledge Questions	% Who answered correctly	% Who answered incorrectly	% Who answered 'Don't Know'
Hazardous Household waste	94.3	3.2	2.5
Kyoto Protocol	87.4	2.1	10.5
Ozone Layer	79.2	17.7	3.1
Iceland's Environmental Agency	78.2	11.6	10.3
Renewable Resources	64.5	24.3	11.2
Fresh Water Resources	39.5	18.8	41.6
Benefit of Wetlands	30.3	31.8	37.9
Phosphorous	27.2	20.9	51.9

Global Plastic Bottle Consumption	21.8	17.2	60.9
Icelandic Landfills	20.8	28.6	50.6
Carbon Sinks	16.9	70.6	12.5
Global Population Growth	15.0	17.7	67.3

5.7 Introduction to Results by Group

This section will present all significantly different mean responses between groups. The groups compared will be women and men, older and younger, Icelandic and non-Icelandic, undergraduate and non-undergraduate. When the mean responses between two groups was statistically significant, that is to say when the differences in the means resulted in a P value < 0.05 , the results were included in this section. For a complete presentation of results, please see the appendix. The Cohen's d values are included to indicate the size of the effect that the group had on the responses to each question. For each question, the group that responded in a way that indicated stronger environmental attitudes, behaviors, and support for actions to make the university more sustainable are highlighted in gray.

5.8 Results by Gender

5.8.1 Responses by gender to the attitudes and values section

Of the eleven questions in the values section of the survey, eight resulted in a statistically significant difference in average responses of men and women. The responses in this section with the largest Cohen's d values were to the statement, "It disturbs me when people leave the tap water running unnecessarily" which resulted in a female average of 3.63 and a male average of 3.15 with a Cohen's d value of 0.33 and to the statement, "To reduce waste, the use of plastic packaging should be kept to a minimum" which resulted in an average female response of 4.31 and an average male response of 4.08 with a Cohen's d value of 0.30. The lowest Cohen's d was for the statement, "Electricity should be produced from renewable sources as much as possible, even if it increases the cost" with a female average response of 3.59, an average male response of 3.74, and a Cohen's d of 0.16.

Table 8. Statistically significant responses by gender to the attitudes and values section

	Attitudes and Values	Female	Male	Cohen's d
Medium Effect	It disturbs me when people leave the tap water running unnecessarily.	3.63	3.15	0.33
	To reduce waste, the use of plastic packaging should be kept to a minimum.	4.31	4.08	0.30
Small Effect	It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	3.56	3.29	0.21
	I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	4.09	3.93	0.19
	I feel responsible to reduce the impact I make on the environment	4.04	3.84	0.18

	People in Iceland act in a more environmentally responsible way that people in most other countries	2.36	2.19	0.18
	I am concerned about the environment, but I think that one person's actions cannot make a big enough difference	2.19	2.40	0.17
	Electricity should be produced from renewable sources as much as possible, even if it increases the cost.	3.59	3.74	0.16

5.8.2 Responses by gender to the environmental behaviors section

Of the eleven questions in the environmental behaviors section, seven resulted in statistically significant differences in the average responses between female and male respondents. Behaviors that resulted in the highest Cohen's d values were related to buying organic and fair-trade products. The average response to this statement was 2.72 for women and 2.24 for men, and the Cohen's d value was 0.42. In response to the fair-trade question, female responses averaged at 2.50 and the male average was 2.06, with a Cohen's d value of 0.39.

Table 9. Statistically significant responses by gender to the environmental behaviors section

	Behaviors	Female	Male	Cohen's d
Medium Effect	When I go to the grocery store, I try to buy organic products, even if they cost more money.	2.72	2.24	0.42
	When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.	2.50	2.06	0.39
	I try to reduce the amount of plastic I use in everyday life.	3.30	2.89	0.30
Small Effect	When I have time off work, I like to spend some time outside	3.64	3.52	0.18
	At home, I separate recyclable beverage cans and bottles from other household garbage.	4.58	4.41	0.15
	I walk, bus, bike, or carpool to campus.	3.33	3.58	0.12
	At home, I separate recyclable paper from other household garbage.	3.80	3.57	0.09

5.8.3 Responses by gender to the university action section

Of the twelve questions in the university action section, seven had a statistically significant difference between female and male average responses. Gender had the largest effect on determining the responses to the statement, "The University of Iceland should offer classes about sustainability for faculty and staff" with an average female response of 3.78, an average male response of 3.48, and a Cohen's d of 0.40.

Table 10. Statistically significant responses by gender to the university action section

	University Action	Female	Male	Cohen's d
Medium Effect	The University of Iceland should offer classes about sustainability for faculty and staff.	3.78	3.48	0.40
	The University of Iceland should offer organic products in their dining facilities.	3.63	3.30	0.38
	The University of Iceland should offer double-sided printing for all printers.	4.57	4.35	0.37
	The University of Iceland should make more of an effort to encourage people to recycle on campus.	4.26	3.99	0.36
	University of Iceland should reduce the amount of packaging that is used in the dining facilities.	4.01	3.75	0.35
Small Effect	The University of Iceland should offer more classes about sustainability for students.	3.62	3.40	0.30
	The University of Iceland should work to spread awareness about sustainability on campus.	3.94	3.75	0.29
	The University of Iceland should charge people to park their cars on campus.	2.50	2.81	0.16

5.8.4 Responses by gender to the environmental knowledge section

The difference in the average female and male scores was statistically significant in the background environmental knowledge section. The average female score was 5.57 correct answers out of a possible 12, whereas the average male score was a higher 6.17 correct answers out of 12.

5.9 Results by Age

5.9.1 Responses by age to the attitudes and values section

Of the eleven questions relating to environmental attitudes and values, there was a statistically significant difference average response by age group for six questions. The question that resulted in the highest Cohen's *d* value was "I am in favor of having laws that regulate factory emissions even if it would increase the price of products," that resulted in a Cohen's *d* of 0.42.

Table 11. Statistically significant responses by age to the attitudes and values section

	Attitudes and Values	31 and Older	30 and Younger	Cohen's d
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Medium Effect	I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	4.20	3.88	0.42
Small Effect	It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	3.65	3.31	0.28
	I am concerned about the environment, but I think that one person's actions cannot make a big enough difference	2.10	2.41	0.25
	It disturbs me when people leave the tap water running unnecessarily.	3.65	3.31	0.24
	To reduce waste, the use of plastic packaging should be kept to a minimum.	4.29	4.18	0.16
	It is possible to improve environmental, social, and economic problems in the world all at once.	3.72	3.58	0.14

5.9.2 Responses by age to the environmental behaviors section

Eleven questions in the behavior section of the survey. All yielded statistically significant differences in the average scores of the two age groups. The largest Cohen's *d* value in this section was 0.51, which resulted from the statement, "When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin." See table 12 for details.

Table 12. Statistically significant responses by age to the environmental behaviors section

	Behaviors	31 and Older	30 and Younger	Cohen's <i>d</i>
Large Effect	When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.	3.61	2.75	0.51
Medium Effect	I try to reduce the amount to plastic I use in everyday life.	3.41	2.93	0.38
	When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.	4.32	3.82	0.37
	When I have time off from work, I like to spend some time outside.	3.72	3.48	0.37
	At home, I separate recyclable paper from other household garbage.	4.10	3.36	0.34
	I walk, bus, bike, or carpool to campus.	3.06	3.75	0.34
	At home, I separate recyclable beverage cans and bottles from other household garbage.	4.69	4.37	0.31
Small Effect	When I go to the grocery store, I try to buy organic products, even if they cost more money.	2.74	2.41	0.29

	When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.	2.51	2.23	0.24
	When I go to the grocery store, I bring reusable bags with me.	2.69	2.30	0.20
	At home, I separate food waste from other household garbage.	1.85	1.59	0.16

5.9.3 Responses by age to the university action section

There was a statistically significant difference in the average responses between age groups on ten of the twelve questions in this section. The highest Cohen's d value was 0.39, resulting from the statement, "The University of Iceland should work to spread awareness about sustainability on campus."

Table 13. Statistically significant responses by age to the university action section

	University Action	31 and Older	30 and Younger	Cohen's d
Medium Effect	The University of Iceland should work to spread awareness about sustainability on campus.	4.00	3.76	0.39
	The University of Iceland should make an effort to reduce the amount of energy used on campus	4.04	3.78	0.38
	How would you rate your level of environmentalism?	3.75	3.53	0.38
	University of Iceland should reduce the amount of packaging that is used in the dining facilities.	4.07	3.79	0.37
	The University of Iceland should offer classes about sustainability for faculty and staff.	3.80	3.57	0.34
	The University of Iceland has a special responsibility to teach people about sustainability.	3.58	3.26	0.33
	The University of Iceland should offer more classes about sustainability for students.	3.66	3.44	0.32
Small Effect	The University of Iceland should make more of an effort to encourage people to recycle on campus.	4.28	4.08	0.28
	The University of Iceland should charge people to park their cars on campus.	2.84	2.37	0.25
	The University of Iceland should offer organic products in their dining facilities.	3.60	3.46	0.16

5.9.4 Responses by age to the environmental knowledge section

The average score for the group of respondents who were 31 and older was 6.01 correct answers out of a possible 12, and the average score for the younger group was 5.52 correct answers. This difference was statistically significant.

5.10 Results by Nationality

5.10.1 Responses by nationality to the attitudes and values section

Of the eleven questions in this section, there was a statistically significant difference between the average response of Icelanders and foreigners in nine instances. Five of these had large Cohen's d values, indicating that nationality had a strong effect on responses in these five cases. The highest Cohen's d values resulted from the differences in responses to the statements, "It disturbs me when people leave the tap water running unnecessarily," and "It disturbs me when energy is wasted through the unnecessary use of electrical appliances," both of which had a Cohen's d of 0.76.

Table 14. Statistically significant responses by nationality to the attitudes and values section

	Attitudes and Values	Icelandic	Foreigner	Cohen's d
Large Effect	It disturbs me when people leave the tap water running unnecessarily.	3.38	4.24	0.76
	It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	3.39	4.24	0.76
	Electricity should be produced from renewable sources as much as possible, even if it increases the cost.	3.58	4.13	0.73
	I feel responsible to reduce the impact I make on the environment	3.93	4.38	0.54
	To reduce waste, the use of plastic packaging should be kept to a minimum.	4.20	4.53	0.53
Medium Effect	I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	4.01	4.24	0.35
	Industries should be required to prove that they safely dispose of dangerous waste materials.	4.65	4.77	0.34
	It is possible to improve environmental, social, and economic problems in the world all at once.	3.69	3.30	0.33

5.10.2 Responses by nationality to the environmental behaviors section

Of the eleven questions in this section, eight resulted in statistically significant difference in averages between Icelanders and foreigners. The largest difference in mean responses occurred between these two groups in this section of the survey, with Icelanders indicating an average of 2.35 when asked how often they bring reusable bags to the grocery store, and foreigners indicating 3.71 for the same question. This resulted in a difference of 1.36 between the two groups and a Cohen's d of 0.79, the highest observed in the whole study.

Table 15. Statistically significant Responses by nationality to the environmental behaviors section

	Behaviors	Icelander	Other	Cohen's <i>d</i>
Large Effect	When I go to the grocery store, I bring reusable bags with me.	2.35	3.71	0.79
	I walk, bus, bike, or carpool to campus.	3.28	4.44	0.71
Medium Effect	When I have time off from work, I like to spend some time outside.	3.57	3.88	0.50
	At home, I separate food waste from other household garbage.	1.64	2.39	0.37
	When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.	3.11	3.73	0.36
	I try to reduce the amount of plastic I use in everyday life.	3.12	3.57	0.34
	When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.	2.33	2.66	0.29
Small Effect	At home, I separate recyclable beverage cans and bottles from other household garbage.	4.56	4.25	0.24

5.10.3 Responses by nationality to the university action section

Of the twelve questions in this section, the average difference in responses of Icelanders and foreigners was statistically significant in five instances. The statements that resulted in the largest Cohen's *d* values were, "The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus" with a Cohen's *d* of 0.61, and, "The University of Iceland has a special responsibility to teach people about sustainability," with 0.54.

Table 16. Statistically significant responses by nationality to the university action section

	University Action	Icelander	Other	Cohen's <i>d</i>
Large Effect	The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.	3.53	4.22	0.61
	The University of Iceland has a special responsibility to teach people about sustainability.	3.37	3.83	0.54
Medium Effect	The University of Iceland should make an effort to reduce the amount of energy used on campus	3.87	4.18	0.44
	The University of Iceland should charge people to park their cars on campus.	2.53	3.19	0.38
Small Effect	The University of Iceland should offer more classes about sustainability for students.	3.53	3.72	0.27

5.10.4 Responses by nationality to the environmental knowledge section

There was no statistically difference between the Icelandic and foreign groups when answering the question about how they would rate their level of environmentalism, and there was no statistically significant difference between the groups in the average scores on the environmental knowledge section.

5.11 Results by Role at the University of Iceland

5.11.1 Responses by role to the attitudes and values section

In the values section of the questionnaire, there was a statistically significant difference in the average responses of undergraduates and non-undergraduates for eight of the questions. In fact, the strongest effect resulted from the question about laws to regulate factory emissions, which had a Cohen's d value of 0.36, indicating a that role had a moderate effect on the responses.

Table 17. Statistically significant responses by role to the attitudes and values section

	Attitudes and Values	Undergraduate	Non-Undergraduate	Cohen's d
Medium Effect	I am in favor of having laws that regulate factory emissions even if it would increase the price of products.	3.90	4.17	0.36
	It disturbs me when energy is wasted through the unnecessary use of electrical appliances.	3.28	3.68	0.33
Small Effect	It disturbs me when people leave the tap water running unnecessarily.	3.30	3.66	0.26
	Electricity should be produced from renewable sources as much as possible, even if it increases the cost.	3.53	3.75	0.24
	I am concerned about the environment, but I think that one person's actions cannot make a big enough difference	2.39	2.12	0.22
	To reduce waste, the use of plastic packaging should be kept to a minimum.	4.17	4.31	0.20
	I feel responsible to reduce the impact I make on the environment	3.90	4.07	0.15
	It is possible to improve environmental, social, and economic problems in the world all at once.	3.58	3.72	0.14

5.11.2 Responses by role to the environmental behaviors section

In the behaviors section, all differences in means between the undergraduate and non-undergraduate groups were statistically significant. The largest Cohen's d was 0.48, which

was in response to the statement, “When I have time off from work, I like to spend some time outside,” which had an average undergraduate response of 3.45, and an average non-undergraduate response of 3.75.

Table 18. Statistically significant responses by role to the environmental behaviors section

	Behaviors	Undergraduate	Non-Undergraduate	Cohen's <i>d</i>
Medium Effect	When I have time off from work, I like to spend some time outside.	3.45	3.75	0.48
	When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.	2.78	3.57	0.46
	I try to reduce the amount of plastic I use in everyday life.	2.92	3.43	0.40
	At home, I separate recyclable beverage cans and bottles from other household garbage.	4.35	4.71	0.36
	At home, I separate recyclable paper from other household garbage.	3.36	4.10	0.34
Small Effect	When I go to the grocery store, I bring reusable bags with me.	2.25	2.74	0.25
	At home, I separate food waste from other household garbage.	1.58	1.86	0.18
	When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.	3.94	4.19	0.18
	When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.	2.27	2.46	0.16
	When I go to the grocery store, I try to buy organic products, even if they cost more money.	2.49	2.64	0.13
	I walk, bus, bike, or carpool to campus.	3.51	3.31	0.09

5.11.3 Responses by role to the university action section

In this section of the questionnaire, ten of the twelve questions resulted in statistically significant differences in the means of the undergraduate and non-undergraduate groups. Two of these statements resulted in Cohen's *d* values that indicated a large effect size. These were the statements, “The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus,” and “The University of Iceland has a special responsibility to teach people about sustainability.” These resulted in Cohen's *d* values of 0.61 and 0.54 respectively.

Table 19. Statistically significant responses by role to the university action section

	University Action	Icelander	Other	Cohen's <i>d</i>
Large Effect	The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.	3.53	4.22	0.61

	The University of Iceland has a special responsibility to teach people about sustainability.	3.37	3.83	0.54
Medium Effect	The University of Iceland should make an effort to reduce the amount of energy used on campus	3.87	4.18	0.44
	The University of Iceland should charge people to park their cars on campus.	2.53	3.19	0.38
Small Effect	The University of Iceland should offer more classes about sustainability for students.	3.53	3.72	0.27

5.11.4 Responses by role to the environmental knowledge section

The average score for non-undergraduates was 6.23 correct answers correct out of a possible 12, and the average undergraduate score was 5.30 correct answers out to 12. The difference was statistically significant.

6 Discussion

6.1 General Survey Results

I will now discuss levels of agreement and support for environmental action within the University of Iceland's population, and where support is lacking. This analysis is the first step towards answering the primary research question of this thesis and painting a picture of the culture on the University of Iceland campus when it comes to the environment and sustainability. The goal is to establish relative levels of ecological literacy on campus, which is to say the general levels of knowledge, values, and actions that support sustainability.

6.1.1 Attitudes and Values

In general, the data showed relatively positive attitudes when it comes to the environment and sustainability. The area of strongest agreement was with the statement about industries being required to show that they safely dispose of dangerous waste, to which 96.8% of respondents agreed. The next highest levels of agreement were with statements about the use of plastic packaging being kept to a minimum and laws that regulate factory emissions.

There was strong agreement with questions that related to governmental intervention and top-down regulation in this section of the survey, while there was slightly less willingness to sacrifice personally for sustainability. For instance, people were less enthusiastic about paying more for renewable energy, with only 60.6% of people agreeing with the statement "Electricity should be produced from renewable sources as much as possible, even if it increases the cost." Still, 78.1% of respondents feel that they have a responsibility to reduce their impact on the environment, which hints at a willingness on the part of the culture to accept new ideas that could help people reduce negative environmental effects.

6.1.2 Environmental Behaviors

The most frequent behaviors respondents indicated were related to recycling. The top two behaviors were recycling cans and bottles at home (88.4% always or often) and on campus (75.1% always or often). The fact that recycling bottles and cans is so high while recycling paper on campus is lower, only 45.0% always or often, might have something to do with the incentive programs in place in Iceland for recycling beverage containers. People can get paid for recycling beverage containers, but not paper. Less common environmentally responsible behaviors were those related to shopping and trips to the grocery store. For instance, 31.3% of respondents always or often bring reusable bags to the grocery store. 20.4% of respondents try to buy organic products despite additional costs, and 15% of respondents indicated that they try to buy fair trade products despite additional costs. The

least common environmentally friendly behavior was composting at home, to which only 13.2% of respondents stated that they did always or often.

As for the behavior section, respondents indicated some strong environmental behaviors, such as recycling bottles both on campus and at home. Overall, the level of environmental behavior seems to be lower than levels of environmental attitudes, since there were fewer people who indicated that they either always or often perform a given environmentally friendly behavior than agree with a given statement of environmental values.

6.1.3 University Action

The results from this section will tell us which specific actions have a large deal of support from the University of Iceland community, and which actions have less support. In general, the actions that most people agreed to were changes at the institutional level such as more recycling, or reducing energy consumption, and were not the type of action that would require large changes in action at the individual level, such as taking a class about sustainability or driving to campus less often. Respondents tended to agree strongly when it was suggested that the University take action that would not require extra effort on the part of the respondent. People tended to be apathetic or disagree when asked if the University should take action that would require some sacrifice or change of behavior, such as paying to park on campus, pay more for products, or take a class about sustainability.

In many cases with lower agreement, the data shows that people don't necessarily disagree with the statement, but rather have no strong opinion. For example, in response to the statement, "The University of Iceland should offer organic products in their dining facilities" 49.5 % of respondents agree, but about 42.4% of respondents do not have an opinion. This means that the respondents don't disagree with the idea that there should be more organic food on campus, but rather that they don't care either way. In other cases of lower agreement, the number of respondents that disagree drastically increases. This indicates that people are not apathetic about the statement, but that they disagree with the action. An example of this can be seen in the responses to the statement, "The University of Iceland should charge people to park their cars on campus" to which 26.9% of respondents agreed, 22.4% had no opinion, and 50.7% disagreed. This is important for the University of Iceland to consider as it tries to build policies and programs that require individuals to change their behavior.

6.1.4 Background Environmental Knowledge

While some of the questions were easier to answer than others, the quiz was designed in such a way that a person with a good understanding of environmental issues should have been able to answer all the questions. According to this survey results, environmental knowledge within the University of Iceland community is an area for improvement. As the base of the pyramid of ecological literacy, environmental knowledge and awareness of the complexity and scale of environmental issues is a cornerstone of ecological literacy. The average score on the environmental knowledge section of the survey at the University of Iceland of 5.75 answers correct out of a possible 12 is worrying, to say the least.

6.1.5 Summary of general results

In summary, the results from the survey indicate that people at the University of Iceland have generally positive environmental attitudes and values, and that their behavior is good but has room for improvement beyond simply recycling. Also, respondents seemed to favor institutional rather than individual-level change, while levels of general environmental knowledge are lower than desirable.

6.2 Trends in Groups of Respondents

The second way in which the survey data was analyzed was to identify trends within groups of people on campus. By analyzing the differences in average responses of two groups to questions in each section, we can see which group tended to respond in a more environmentally friendly way.

6.2.1 Trends in gender groups

Female respondents tended agree more often in areas of environmental values, behaviors, and action they felt the University of Iceland should take, but male respondents tended to do better on the environmental knowledge quiz.

For most of the questions in the attitudes and values section, the data indicates that female respondents have more environmentally positive values than male respondents. The one exception to this trend was in response to the question “Electricity should be produced from renewable sources as much as possible, even if it increases the cost” to which the female average response was 3.59 and the male response was 3.74. While this response showed a more positive male response, there was a Cohen’s *d* value of only 0.16, which indicates that while the average is likely to be related to gender, it is a small effect.

The behaviors section of the survey also yielded some interesting results when related to gender. Once again, female responses to questions that were statistically significant tended to be more environmentally positive than male responses, the only exception being to the question “I walk, bus, bike, or carpool to campus,” to which the average female response was 3.33 and the average male response was 3.58. However, once again the Cohen’s *d* value for this relationship was on the lower end at just 0.12, which indicates that gender did not have a very strong effect on determining the responses.

When asked to rate agreement about actions the University of Iceland should take to work towards sustainability, the general pattern of females responding more positively than males on statistically significant questions continues. Of the statistically significant differences in responses to these questions, male respondents were more environmentally positive only on the statement “The University of Iceland should charge people to park their cars on campus,” to which the average male response was 2.81 and the average female response was 2.50.

Gender had a larger effect on the statement about offering classes in sustainability to faculty and staff, with a Cohen’s *d* of 0.40, and on the statement about offering organic food in the dining facilities, with a Cohen’s *d* of 0.38, and the statement about double-sided

printing, with a Cohen's d of 0.37. In all of these instances, the female response was more environmentally positive than the male response.

Of all the areas tested, environmental background knowledge is the only instance in which male respondents scored higher than females. A similar trend was seen in the 2005 report by NEETF/Roper study of environmental literacy in the United States. The researchers suggest that this gender gap in environmental knowledge might occur because of the lower levels of women's involvement in science and technology than men (Coyle, 2005).

6.2.2 Trends in age groups

In general, the older group tended to indicate more positive environmental attitudes, behaviours, support for the university to take on sustainability, and environmental knowledge than the younger group did.

In all statistically significant instances related to attitudes and values, the group that had more positive environmental values was respondents that were 31 and older. In most cases, the Cohen's d values for these responses was fairly low, the highest effect was on the statement about having laws to regulate factory emissions, to which older respondents had an average level of agreement of 4.20 and the younger group averaged 3.88 with a Cohen's d of 0.42. From this data, it does not seem that a person's age has a strongly significant influence on their environmental values, but when age is a factor, then older people seemed to have more positive attitudes than younger generations in the sample population.

Age does seem to have a significant influence on behavior, however. In all but one case, the older group indicated more environmentally responsible behavior than the younger group. The one statement that resulted in more positive response from the younger group was "I walk, bus, bike, or carpool to campus," to which the older group average response was 3.06 and the younger group average response was 3.75 with a Cohen's d value of 0.34. This means that out of all the environmentally responsible behaviors asked about in this survey, older respondents engaged in them more often than younger respondents with the exception of taking alternative transportation to campus. Age does seem to have an influence on the behavior of the respondents in this survey.

Respondents' ages also seemed to have an influence on which actions they think the University of Iceland should make to work towards sustainability. Those that did not seem to be influenced by age were the statements about the University providing double-sided printing and offering incentives for people to take alternative transportation. It seems that regardless of age, people generally agree about those two issues. In all statistically significant cases, the older group once again showed more positive environmental attitudes than the younger generation. The older group also indicated a stronger feeling of environmentalism, with an average score of 3.75 while the younger group had an average score of 3.53 with a Cohen's d of 0.38. The average responses in this section that were statistically significant with respect to age generally resulted in moderate Cohen's d values, indicating that age does seem to have an effect on the actions people feel the University of Iceland should take to work towards sustainability, and the older group of respondents are more in favor of positive action.

The older group also performed slightly better than the younger group on the background environmental knowledge section of the survey. The average score of the older group was 6.01 out of 12, whereas the younger group averaged 5.52 correct answers.

6.2.3 Trends in nationality groups

In general, foreigners indicated slightly more positive environmental values than Icelanders. Where the differences were statistically significant, one statement indicated that the Icelandic group had a more positive environmental attitude than the foreign group. The statement that resulted in a higher environmental values score for Icelanders was “It is possible to improve environmental, social, and economic systems at the same time,” to which Icelanders indicated 3.69 average agreement, and foreigners indicated 3.30 average agreement with a Cohen’s *d* value of 0.33. In all other cases where the difference in average responses between Icelanders and foreigners was statistically significant, foreigners responded in a more environmentally positive way than Icelanders. Nationality had the strongest effect on the responses to the questions about the excessive use of electrical appliances and water, both of which resulted in a Cohen’s *d* of 0.76 in favor of foreigners.

For the behavior section of the survey, foreigners scored better in general than the Icelandic group on the questions where the difference in averages of the two groups was statistically significant. Still, Icelanders scored higher on the question related to recycling bottles in the home, with the average response of 4.56 for Icelanders and 4.25 for foreigners with a Cohen’s *d* value of 0.24. In all other cases in this section where the means were statistically significant, the foreign group had more positive environmental behaviors than the Icelandic group.

Despite the relatively strong trend indicating more environmentally positive attitudes and behaviors of foreigners than Icelanders, nationality does not seem to have as much of an effect on how respondents answered questions about actions the University of Iceland should take to be more sustainable. Of the five instances where the difference in means was statistically significant, however, the foreign group responded in favor of environmental action more strongly in each case than the Icelandic group. Nationality has the strongest effect on how respondents answered the question “The University of Iceland should provide incentives for people to walk, bike, bus, or carpool to campus” to which the average Icelandic response was 3.53 and the average foreign response was 4.22 with a Cohen’s *d* value of 0.61.

There was not a statistically significant difference in knowledge scores between the Icelandic and foreign groups.

6.2.4 Trends in role at the University of Iceland groups

In general, the non-undergraduate group indicated more positive environmental attitudes and values, behaviors, support for university action, and environmental background knowledge than the undergraduate group. In fact, the only statistically significant difference in means that resulted in a more positive response from undergraduates was to the statement “I walk, bus, bike, or carpool to campus,” to which the average response from undergraduates was 3.51, and the average non-undergraduate response was 3.31, with

a very low Cohen's d of 0.09. The average non-undergraduate environmental knowledge score was 6.23, while the average undergraduate knowledge score was 5.30, with a Cohen's d of 0.25. Non-undergraduates had more positive scores in all areas than undergraduates in the survey population.

6.2.5 Summary of trends within groups at the University of Iceland

Respondents that were 31 years of age and older did better in all areas than respondents who were 30 years old and younger (Table 20). Similarly, respondents in the non-undergraduate group responded more positively in all areas of the survey than those in the undergraduate group. Foreigners tended to do better than Icelanders, with the exception of the background environmental knowledge section, for which nationality did not appear to have a significant effect on respondents' performances.

Table 20. Summary of trends between groups participating in the survey for each section

Section of the Survey	Female	Male	Younger	Older	Icelandic	Foreign	Under-graduate	Non-under-graduate
Environmental attitudes and values	+	-	-	+	-	+	-	+
Environmental behaviors	+	-	-	+	-	+	-	+
University Action towards sustainability	+	-	-	+	-	+	-	+
Background environmental knowledge	-	+	-	+	n/a	n/a	-	+

6.3 Applying survey results to the University of Iceland

Now that I have a better understanding of what the ecological literacy levels are on campus, and a general picture of the cultural makeup of the University of Iceland community with respect to sustainability, I can begin to address the second primary research question of this thesis and explore how this information can help develop and implement a new sustainability policy. As discussed in the literature review, the Campus Environmental Report Card of 2008 identifies several keys to creating a successful sustainability policy in a higher education institutions. One of these is that the policy aligns with campus culture and values. After analyzing the results of the survey, we have a much better understanding of the cultural willingness to work towards sustainability at the University of Iceland. There are several ways in which knowing about the culture of the

campus can help policymakers address the challenge of creating a policy that will make real changes for the University of Iceland as we work towards a dynamic state of sustainability.

6.4 Identifying low hanging, bland, and toxic fruit

The first way in which policymakers can use the data collected in this research project is fairly straightforward; with a better understanding of the culture on campus, policymakers will be able to identify specific actions that can be incorporated into the policy as ‘low hanging fruit.’ This phrase is often used as a way to describe actions that are not very expensive, but lead to significant progress towards a given goal. The ‘low hanging fruit’ are picked first, since they require minimal effort and lead to substantial results. In the case of the University of Iceland, policymakers can use the data collected in the survey to identify which actions would be wise to take first when working towards sustainability, because they are inexpensive and have the support of the culture on campus.

We know from the results of the data analysis that attitudes and values for the environment are high at the University of Iceland, so there is a general cultural willingness to take actions that will reduce our impact on the environment. In fact, when asked to rate their level of environmentalism, the most frequently marked option by survey respondents was ‘I am an environmentalist.’ In total, 63% of respondents identified themselves as either ‘environmentalist’ or a ‘serious environmentalist.’ So given this cultural context, which specific actions would classify as ‘low hanging fruit’?

First of all, there seems to be a lot of support amongst survey respondents in favor of offering double-sided printing on campus. 91.6% of respondents either agreed or strongly agreed that this is an action the University of Iceland should take. This would be a fairly simple, cost effective step the University could take to reduce the amount of paper that is wasted on campus, and it has overwhelming cultural support.

Another example of ‘low hanging fruit’ according to the data analysis would be to improve the existing recycling program. 82.5 % of respondents thought that the University should make more of an effort to encourage recycling on campus, and as we learned from the behaviors section of the survey, many people already recycle at home and on campus. As discussed in the literature review, when people are in the habit of recycling, they are more likely to continue to recycle. So, the fact that 88.4% of respondents always or often recycle plastic bottles at home and 75.1 % of respondents always or often recycle bottles on campus means that the cultural habit of recycling bottles is already fairly well established. Still, many more respondents indicated recycling bottles in the home than recycling paper in the home, so we might assume that their behavior is financially motivated, since there are economic incentives in place to recycle bottles in Iceland.

We know from the literature review that a social norm in favor of recycling is a critical factor that influences people to start recycling. Clearly the groundwork exists for the University of Iceland to make more of an effort to encourage recycling on campus, and that this extra effort would be accepted by the community. Recycling is another example of ‘low hanging fruit’ since taking extra action to encourage recycling on campus would be

cost effective and have a significant impact on reducing the amount of waste on campus. It is also a highly visible step for the administration to take, which would send a message to the larger community that the University of Iceland is serious about taking actions to become more a sustainable institution.

The results from the survey can tell us about more than which actions qualify as ‘low hanging fruit,’ they also identify ‘bland fruit.’ To shamelessly extend the metaphor, ‘bland fruit’ is a way to describe actions the University of Iceland could take that would have an impact, but due to cultural ambivalence would require more effort, either financially or strategically, to implement than ‘low hanging fruit’. An example of this would be a campaign to offer more organic or fair-trade food in the University of Iceland dining facilities. According to the survey results, 49.5% of respondents agreed that the university should offer more organic food on campus. Despite the fact that almost half the respondents indicated that they thought this was a good idea, it would take significantly more effort on the part of the University to actually implement as a tool for sustainability, since about 40% of respondents were ambivalent on the issue, and did not indicate a strong opinion either in favor or against organic food on campus. Another instance where data shows some apathy with respect to action the University of Iceland could take is when respondents were asked about classes on the topic of sustainability. About 57% of respondents agreed that there should be classes for faculty and staff about sustainability, and 39% of respondents had no opinion, whereas 47% agreed that there should be classes about sustainability for students, and 48% had no opinion. In these instances, there is not necessarily disagreement with the statement, but many people have no opinion as to whether or not the statement is a good idea. This means that if the University of Iceland policymakers choose to pursue one of these ‘bland fruit’ actions as a means to work towards sustainability on campus, they can expect that there will need to be an awareness campaign simultaneously to inspire people to care about the issue.

Finally, the descriptive analysis of the data collected in this research can help policymakers identify ‘poison fruit.’ While ‘poison fruit’ actions might be easy to implement, and have significant payoff in progress towards sustainability goals, the culture of the campus would likely not support the actions. If policymakers chose to pursue one of these options, the community would not be satisfied with the decision and might even fight against it.

According to the data, the most notable case of ‘poison fruit’ at the University of Iceland would be charging people to park on campus. While this action could potentially decrease unnecessary use of private cars and increase the use of public transportation while opening up more land on campus that is currently used for parking lots, people are generally against the idea. According to the survey, 26.9% of respondents agree that the University of Iceland should charge people to park on campus, whereas 50.6% disagree or strongly disagree with the action. In this case, not many people are apathetic towards the issue, with only about 22.3% of respondents marking the ‘neither agree nor disagree’ option. This means that while the university could greatly benefit from charging people to park on campus, they can expect some extreme resistance on the part of the community. If policymakers choose to pursue this option, it should be accompanied by an aggressive awareness campaign, and strong cooperation with local public transportation agencies so that people on campus feel their needs are being met.

Still, poison fruit presents an opportunity for the University of Iceland to open a meaningful dialogue about important issues, and in that sense, they are very valuable

options. For example, if people on campus are against the university charging to park on campus, there is a special opportunity to find out why people feel that way, and to have a debate in which we try and address some of the underlying problems that charging to park could fix. Such a debate might force people opposed to the parking fee to consider how the action of driving to campus affects a larger system, and work together to solve the conflict creatively.

6.5 School Nuances

In addition to giving policymakers a general picture of the cultural willingness to accept sustainability interventions within the campus community, the data illustrates subtleties in the makeup of the University of Iceland population that can help policymakers tailor actions to specific schools.

It is likely that the University of Iceland will develop a broad policy that will apply across the whole university community, and leave the ultimate responsibility to implement the policy to each individual school. Provided that all the schools are supportive of the larger sustainability goals of the institution, this is a good way to approach spreading a common effort across a large, diverse campus community. If the ultimate responsibility to make strategic changes to education and research practices and everyday life on campus falls to each school, then it can be very helpful for that school to have a solid understanding of the cultural trends identified in this research. That way, each school can develop strategies that are tailored to the cultural backgrounds and needs of the population of their particular section of the larger university population. For example, the Engineering and Natural Sciences school has a higher ratio of younger, male students than the rest of the university. The policy that the Engineering and Natural Sciences school would implement might then look very different than the policy implemented in the Education school, where the majority of students are female and older. As seen in the research, men and younger people tend to have less-strong environmental values and behaviors than women and older people, but men have higher background environmental knowledge. Perhaps the implementation of the policy in the Engineering and Natural Sciences school, then, may choose to focus on improving people's feelings of responsibility and empowerment with respect to sustainability issues in their community, while the Education school could focus on increasing knowledge and awareness of environmental issues. In any case, having an understanding of the nuances within each school can help policymakers address a wide-range of needs within the community as we work towards our sustainability goals.

It is important to note here that while the analysis of this research focused specifically on describing differences in groups of people on campus, it would also be useful to analyze where these groups were the most similar. An area for future investigation could be to compile a list of all questions that did not result in statistically significant differences in mean responses between groups. This way, we could see where the groups tended to agree, or at least where being a part of a given group did not influence a participant's response to the statement.

6.6 Monitoring Progress Towards Sustainability

One very important sustainability goal for the University of Iceland will be to increase awareness of sustainability and foster ecological literacy on campus. Another way in which the established levels of ecological literacy can be useful in implementing a sustainability policy at the University of Iceland is by serving as a baseline to measure progress towards sustainability goals such as this. The second key feature of successful sustainability policies on higher education institutions, according to the Campus Environmental Report Card of 2008, is that they set and review environmental and sustainability goals. This survey, or one like it, can be used as a tool to monitor changes in the levels of ecological literacy of the University of Iceland community over time. Hopefully, if the forthcoming sustainability policy includes a commitment to promote ecological literacy, as encouraged in the Talloires Declaration, the data collected in this survey can serve as a baseline to monitor how the policy is affecting ecological literacy on campus. In the future, another version of this study can be sent out to the University of Iceland faculty, students, and staff, and those results can be compared to previous results as a way to track progress towards sustainability goals.

When it comes to measuring an institution's progress towards sustainability, it is not a static state that is usually considered. Rather, measurement is done in the change of specific indicators over time. The levels of ecological literacy could serve as such an indicator for the University of Iceland; given what has been established through this research as the baseline levels of ecological literacy on campus, any future studies could measure the change in responses as contrasted to this baseline. For example, if the same survey was administered next year, we would be able to see whether environmental values, behaviors, and knowledge had generally increased or decreased in specific groups of the campus. This would be a particularly useful exercise to measure the effectiveness of the new sustainability policy. For instance, if the new policy states that it is a goal of the University of Iceland to improve attitudes, behaviors, and knowledge of the campus community, it is possible to administer the same survey after implementing the policy and investigate whether there has been any progress in achieving these goals or not.

6.7 Using Foreigners as Resources

One of the most interesting results from the data collected for this research is the difference in responses of Icelanders and foreigners. Despite the fact that for some of the questions on the survey Icelanders indicated higher environmental attitudes and behaviors than foreigners did, nationality had a very strong effect on some of the other questions. In all other comparisons between groups, there was a small or medium size effect of the independent variable as measured by the Cohen's d value. For nationality, however, the differences between the two groups resulted in some very high Cohen's d values. It seems that where these two groups are different, such as opinions about the use of reusable bags when shopping, feeling disturbed by the excessive use of electricity and water, and the use of alternative transportation, they are very different. This likely also has to do with the cultural context of resource abundance in Iceland, particularly when it comes to water and relatively inexpensive energy.

If the differences between Icelanders and foreigners at the University of Iceland are drastic and significant, how can this help us as we work towards creating a new sustainability policy? First of all, we need to learn to see foreign students as a potential resource for campus sustainability. In foreign students, we have a wealth of information about how other universities all over the world approach the challenges of sustainability. It would be very useful to ask foreign students about sustainability programs at their own universities, and how they think the University of Iceland could adapt new programs that would help it address environmental issues. It would also be useful to ask foreign students about their impressions of how the University of Iceland is coping with environmental challenges. One area for further research could be to try and determine why this difference between Icelandic and foreign respondents exists.

6.8 Identifying Areas for Improvement

One of the most surprising outcomes from this research is the relatively low scores on the background environmental knowledge section of the survey. There are several possible reasons for why respondents did not do very well on this section, including the structure and nature of the questions themselves. For instance, while the section was designed like a quiz so that people could choose the option that made the most sense to them, there was always an option to mark the ‘Don’t Know’ box. It may be that if respondents did not have the option to opt out of answering a given question, and would have been forced to make an educated guess, their guess would have been right. People may have relied too much on the ‘Don’t Know’ option when they were unsure of a question instead of guessing, which would lower their overall score on the quiz. Another possible reason for the low knowledge score is the phrasing of the questions. In many cases, the questions to which the most people did not know the answers were the ones that asked about specific numbers. While the quiz was designed in such a way that people with a good understanding of the complexity and scale of environmental issues should have been able to answer the questions correctly, it may be that asking about specific numbers and percentages made people more inclined to mark the ‘Don’t Know’ option. For example, if the question “How many plastic bottles are consumed globally every year?” was open-ended instead of multiple choice, it would have been much more difficult to answer correctly. Respondents with a good comprehension of the enormity of the global population and high rate of consumption of plastic bottles would have likely been able to infer that the correct answer was 200 billion. Instead, this was one of the most frequently missed questions, with only 204 respondents marking the correct answer, and 569 marking the ‘Don’t Know’ option. Finally, many of the questions for the quiz were borrowed from outside sources from foreign countries. It might be that these questions are a good indication of knowledge in other countries, but Icelanders might be better prepared to answer different questions about the environment. For example, one frequently missed question was about the primary benefit of wetlands. This question was taken directly from the NEETF/Roper study of environmental literacy in America, and the correct answer was the service wetlands provide natural filters that clean out toxins in water before it is released into a larger body of water. In the survey, 283 respondents answered this question correctly, 354 marked ‘Don’t Know,’ and 297 respondents answered incorrectly. The relatively low number of correct answers could be due to the fact that this feature of wetlands is not widely considered to be their primary benefit in Iceland, since there is so much attention here given to the function of wetlands as systems to sequester carbon.

Carbon sequestration was not given as an option for respondents to choose for this question, so this may have lead to people guessing incorrectly, or choosing not to answer the question. All in all, we might say that the low scores in the background environmental knowledge section resulted in part from the way the questions were asked.

Despite any potential influence questioning style might have had on the outcome, the background environmental knowledge scores collected in this survey are still discouraging. The questions respondents were not able to answer, or answered incorrectly, primarily dealt with the complexity and scale of environmental problems. That is to say, a person with a good comprehension of the complicated nature and massive scale of environmental problems facing the world today should have been able to accurately answer these questions. As mentioned in the introduction to the academic framework section, the global nature of the problems faced at this moment in history such as climate change, energy security, overpopulation, and poverty require a new kind of thinking that incorporates the complexities of these issues. Perhaps one reason why so many people were not able to answer some of the questions in the environmental knowledge section of the survey was that they were too complex and required respondents to picture environmental problems on a global scale. For instance, the question that was the most missed in this section was related to the speed of global population growth. In this case, only 140 people answered the question correctly, 165 were incorrect, and 629 people did not know the answer. It is likely difficult for people living in small country like Iceland with the polulation of 300,000 to imagine the world's population growing by 230,000 per day. Nonetheless, if ecological literacy requires an individual to understand his or her place in the larger ecosystem, then surely having an understanding of the speed of global population growth is an important realization that could inspire significant action to reduce the impact we make on the world. Another frequently missed question on the environmental knowledge quiz was about the amount of waste in Icelandic landfills that is either compostable or recyclable. In this case, 194 people answered with the correct response of 60%, and 473 people indicated that they did not know the answer to the question. This is yet another instance in which if respondents knew the correct answer, they would be better able to place their own actions in a larger context that might inspire them to act in a different way. If people could comprehend that more than half of the waste in landfills in Iceland does not need to be there because it can be recycled or composted and used for other purposes, they might reflect on their own actions to find ways they might reduce their impact. The complex nature of the problems addressed in the background environmental knowledge quiz might be one reason that respondents were not confident enough to answer them and ended up scoring lower than expected on this section of the survey.

There were not any significant differences on the environmental knowledge section between the different schools sampled in this survey. People in the Engineering and Natural Sciences school did slightly better than those in the other schools, but the difference was not very significant. This slightly higher score by engineers and scientists is likely due to the fact that they have more experience learning about earth's systems. Still, the relative consistency in responses between schools does tell us that it seems whatever people know about background environmental knowledge was not likely learned in school, or particularly, at the University of Iceland. If this were the case, we would expect to see more significant differences between responses by school than were observed in the data. In the context of answering the research question about how policymakers can use the information collected in this survey to implement the new sustainability policy

successfully, it is safe to say that an effort to improve background knowledge of environmental issues will need to be made throughout the whole University of Iceland.

As demonstrated in the ‘Fostering Sustainable Behaviors’ section of the literature review, strong environmental attitudes and values do not necessarily lead to more environmentally friendly behavior. Our decisions are guided, rather, by a multitude of independent factors that lead us to action, as outlined in Hines’s model of behavioral change (see Figure 3). In this model, action skills, knowledge of action strategies, and knowledge of issues all play a strong role in influencing a person’s behavior, in addition to attitudes, situation, and personality factors. This diagram is important when interpreting the results from the survey because knowledge areas are one specific factor affecting behavior where actions by the University of Iceland can make a difference for people on campus. By addressing the low levels of environmental knowledge, and incorporating information about action skills and strategies, the University of Iceland is well-positioned to improve not only the levels of knowledge within the community, but empower people to act in a more ecologically literate way.

7 Conclusions

7.1 Incorporation of ESD into University of Iceland's Educational Framework

This thesis has aimed to serve as a tool for policymakers at the University of Iceland as they work towards drafting and implementing a campus-wide sustainability policy. Through a framework of education for sustainable development, and with help from literature about sustainability in higher education, environmental behavior, and ecological literacy, this research project is an attempt to paint a picture of the community at the University of Iceland that will be affected by the new policy. By developing a better understanding of the cultural context within the university with respect to sustainability issues, policymakers should now be more prepared to create a policy and management plan that will make real changes where they are needed at the University of Iceland.

As the University of Iceland works toward drafting a new sustainability policy, it can use the information provided in this thesis as a guide not only for tailoring the policy towards a unique campus culture, but also as a general introduction of methods to improve ecological literacy on campus through implementing education for sustainability teaching strategies.

7.2 Whole person, whole school approach

While the data collected in the survey suggests that people at the University of Iceland have generally positive attitudes and values when it comes to the environment, this is simply not enough to have a significant impact on improving ecological literacy on campus. It is good to know that people are concerned about the environment, and even taking some steps to reduce the impact of their actions, but ecological literacy requires a much more comprehensive understanding of our place within the larger system. This comprehensive approach can be achieved by using the tools of education for sustainability. As the ActionESD project in Iceland explains, the pedagogy of education for sustainable development builds upon an individual's knowledge of issues, and works to develop respect and a sense of responsibility in students. In this way, ESD aims to improve the whole person at once; it is not enough to have our values in the right place, we need to empower people to feel their actions make a difference and supplement missing background knowledge. One area for potential future research is to investigate what is already being done at the University of Iceland that supports education for sustainability.

After reading and analyzing data for this thesis, I am convinced that one of the best ways the University of Iceland can implement education for sustainable development and work towards implementing the whole-person, whole-school approach is by creating an interdisciplinary service learning program for students. In this model, students would be

able to work on projects within the larger community that relate to the academic work they do in class. The students would benefit because they would have a chance to see how the themes they are learning about in school apply to society, the community would benefit from having extra help in the form of engaged university students, and the University of Iceland would certainly benefit from having a stronger connection to the local community. In this respect, a service learning program might be one strategy that the University of Iceland could use to execute education for sustainability and hence work to improve ecological literacy on campus.

7.3 Use of existing successful programs

One step the University of Iceland could take as it works towards becoming a model sustainable community is the use of existing programs that are designed to help institutions as they transition to sustainability. There is a plethora of quality time-tested programs that the University of Iceland should actively investigate and pursue that will help the university make the best use of its resources in the process of policy implementation. The University of Iceland is not the first higher education institution to begin a sustainability initiative, and there are several well-established models that policymakers can borrow from as they develop a unique program to fit the specific needs of the institution. To begin with, the University of Iceland could sign the Talloires Declaration to signal institution-wide commitment to sustainability. This declaration is specifically designed for use in higher education institutions, and with more than 400 signatories, there is a wealth of knowledge and stories about how to implement its mandates successfully. Secondly, the University of Iceland could begin the process of pursuing an Eco-Schools certification. This model is well established in Iceland, and it is likely that many new incoming students to the university are already familiar with the process from their previous studies. Also, the Eco-Schools process guarantees that even after achieving *Green Flag* certification, a school is still expected to continue to make improvements and monitor its progress. This could help combat the problem many universities face of letting sustainability projects fall by the wayside.

7.4 Looking ahead

Based on this research, I recommend that the University of Iceland take the following steps to implement sustainability on campus.

- 1) Sign the Talloires Declaration.
- 2) Start working towards the *Green Flag* certification.
- 3) Create a ‘Sustainability Task Force.’
- 4) Open an ‘Office of Sustainability’ on campus.
- 5) Hire a ‘Campus Sustainability Director.’
- 6) Develop a comprehensive sustainability management plan.

No matter how the University of Iceland chooses to proceed with the development and implementation of its forthcoming sustainability policy, there are a few things to keep in mind as we take on this new project. First of all, if plans include the incorporation of education for sustainable development into teaching practices, as suggested in this thesis, then it would be helpful to have an evaluation of existing methods and programs already being used at the University of Iceland that would fit under the umbrella of ESD. This is one area that this particular research project did not investigate, but it would be interesting to see how much the university already does that supports sustainability. This way, programs could be created around existing practices so they could simply augment what is already being done and build more programs as needed. Another area for possible research could be a pilot study of a service-learning model suggested previously. Such a program could be adapted to fit the needs of the teaching staff at the University of Iceland while building a bridge between the University of Iceland and the surrounding community.

Regardless of what further research is done in this area, one thing is clear; that the University of Iceland needs to adopt a strategic management structure for the sustainability policy to ensure its success and to keep momentum for sustainability projects going. There are many projects all over the university that support sustainability, from student groups working on environmental issues, to staff-led recycling programs, to research about sustainability. There needs to be a place where all these little projects are documented and collected, and new projects are started so that we can keep track of the progress we make as an institution. There is a wealth of information about successes and failures from other universities around the world with similar programs, and a good way for the University of Iceland to proceed would be to adapt an existing management model from another campus that has had success in its sustainability program. This could be the work of a governing committee, or an office of sustainability, but someone needs to be responsible for seeing that this policy is implemented successfully.

In light of the recent trying economic times, Iceland has a special opportunity in the coming years to re-imagine itself as a nation. As the nation reflects on the series of unfortunate decisions that eventually led to its economic crisis, it is clear that the attitude of the entire country is shifting. It is at this special moment of self-reflection in Iceland's history that new concepts like sustainability can take hold and flourish. Now is the time to refocus the educational system on what really matters to a successful, happy society, and education for sustainability is one leverage point that can help this transition take place. As the largest educational institution in the country, the University of Iceland has a special responsibility to lead the way in educating its students so that they can become ecologically literate global citizens.

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Appendix A: English Questionnaire, Sustainability and Our University

Dear participants,

The following questionnaire is designed to better understand environmental literacy of all staff and students at the University of Iceland. The questionnaire takes about fifteen minutes to complete, and is a part of a graduate research project. The data collected will help inform the creation of the University of Iceland's sustainability policy. Your answers are important and very much appreciated.

Thank you,

Mary Frances

I. Demographic Information

Please check the box corresponding to the answer that best describes you

1.1 Gender

1) Female

2) Male

1.2 What year were you born?

1.3 Which best describes your role at the University of Iceland?

1) Undergraduate Student

2) Graduate Student

3) PhD Student

4) Staff

5) Faculty/Professor

6) Non-teaching Academic Staff

1.4 What is your nationality?

1) Icelandic

2) Other

1.5 In which school do you study (and/or) work at the University of Iceland?

1) Social Sciences

2) Health Sciences

3) Humanities

4) Education

5) Engineering and Natural Sciences

6) Central Administration/Other

II. Values, Attitudes, and Personal Views

Please read the following statements carefully and mark the box that corresponds to your personal opinion of the statement. The possible answers range from 'Strongly Disagree' to 'Strongly Agree'

1) Strongly Disagree

2) Disagree

3) Neither agree nor disagree

4) Agree

5) Strongly Agree

2.1 I feel responsible to reduce the impact I make on the environment.

2.2 I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.

2.3 I am in favor of charging people a fine if they throw litter on the street.

2.4 It is possible to improve environmental, social, and economic problems in the world all at once.

2.5 People in Iceland act in a more environmentally responsible way than people in most other countries.

2.6 Electricity should be produced from renewable sources as much as possible, even if it increases the cost.

2.7 Industries should be required to prove that they safely dispose of dangerous waste materials.

2.8 I am in favor of having laws that regulate factory emissions even if it would increase the price of products.

2.9 To reduce waste, the use of plastic packaging should be kept to a minimum.

2.10 It disturbs me when energy is wasted through the unnecessary use of electrical appliances.

2.11 It disturbs me when people leave the tap water running unnecessarily

III. Behaviors and Actions

Please read the following statements about actions and behaviors carefully, and mark the box that best describes you. The choices range from 'Never' on the left to 'Always' on the right.

1) Never

2) Seldom

3) Sometimes

4) Often

5) Always

3.1 When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.

- 3.2 When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.
- 3.3 At home, I separate recyclable beverage cans and bottles from other household garbage.
- 3.4 At home, I separate recyclable paper from other household garbage.
- 3.5 At home, I separate food waste from other household garbage.
- 3.6 When I go to the grocery store, I bring reusable bags with me.
- 3.7 When I go to the grocery store, I try to buy organic products, even if they cost more money.
- 3.8 When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.
- 3.9 I try to reduce the amount of plastic I use in everyday life.
- 3.10 When I have time off from work, I like to spend some time outside.
- 3.11 I walk, bus, bike, or carpool to campus.

IV. Opinions Regarding Campus Sustainability

- 1) Strongly Disagree
- 2) Disagree
- 3) Neither agree nor disagree
- 4) Agree
- 5) Strongly Agree

- 4.1 The University of Iceland should make more of an effort to encourage people to recycle on campus.
- 4.2 The University of Iceland should offer double-sided printing for all printers.
- 4.3 The University of Iceland should offer organic products in their dining facilities.

4.4 University of Iceland should reduce the amount of packaging that is used in the dining facilities.

4.5 The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.

4.6 The University of Iceland should charge people to park their cars on campus.

4.7 The University of Iceland should make an effort to reduce the amount of energy used on campus.

4.8 The University of Iceland should offer classes about sustainability for faculty and staff.

4.9 The University of Iceland should offer more classes about sustainability for students.

4.10 The University of Iceland has a special responsibility to teach people about sustainability.

4.11 The University of Iceland should work to spread awareness about sustainability on campus.

4.12 Please mark the statement that best describes you:

How would you rate your level of environmentalism?

1) I am not an environmentalist at all

2) I am not really an environmentalist

3) I don't have strong feelings either way about being an environmentalist

4) I am an environmentalist

5) I am a serious environmentalist

V. Environmental Knowledge

Please answer the following questions as best as you can. If you don't know the answer to the question, please mark 'don't know.'

*NOTE: Correct answers are **bold**

1) The ozone is a protective layer in the earth's upper atmosphere. What does the ozone layer protect us from? Is it:

a. Acid rain

- b. Global warming
- c. Harmful, cancer-causing sunlight**
- d. Sudden changes in temperature
- e. Don't know

2) Which of the following is a renewable resource?

- a. Coal
- b. Gasoline
- c. Iron Ore
- d. Timber**
- e. Don't know

3) A seed weighs next to nothing, but trees weigh a lot. From where does the tree get the majority of the stuff that makes up a wooden desk?

- a. The air**
- b. The ground
- c. The Sun
- d. Water
- e. Don't know

4) Food waste, paper, and plastics are all recyclable, compostable, or reusable materials, that still end up in landfills. Combined, these materials make up what percentage of the trash in landfills in Iceland?

- a. 20%
- b. 40%
- c. 60%**

- d. 80%
- e. Don't know

5) Approximately how many plastic bottles of water are consumed globally every year?

- a. 50 million
- b. 90 million
- c. 50 billion
- d. 200 billion**
- e. Don't know

6) Many household cleaning products contain phosphorous which makes them hazardous for the environment. Why is phosphorous considered dangerous?

- a. Phosphorous is toxic for plants and animals, and it poisons them when it gets into the water supply
- b. When it gets into the water supply, too much phosphorous causes excessive growth of algae, which takes oxygen from other organisms that need it.**
- c. When it reacts with other chemicals in the water supply, phosphorous causes acid rain
- d. Phosphorous is very sticky, so it can block natural waterways
- e. Don't know

7) What is the international agreement that attempts to regulate the amount of greenhouse gasses which nations produce called?

- a. The Kyoto Protocol**
- b. The Montreal Protocol
- c. The Basel Convention
- d. The UN Global Climate Convention
- e. Don't know

8) Taking into account births and deaths, approximately how many new people are added to the world's population everyday?

- a. 23,000
- b. 70,000
- c. 230,000**
- d. 700,000
- e. Don't know

9) What is the name of the primary governmental agency in Iceland that works to protect the environment?

- a. The Environment Agency**
- b. The Icelandic Nature Conservation Association
- c. Natural Iceland
- d. Saving Iceland
- e. Don't know

10) What is the primary benefit of wetlands? Do they:

- a. Promote flooding
- b. Help filter water before it enters lakes, rivers, streams, or oceans**
- c. Help keep the number of undesirable plants and animals low
- d. Act as breeding ground for endangered species
- e. Don't know

11) Which of the following household wastes is considered hazardous waste? Is it:

- a. Plastic packaging

b. Aluminum

c. Batteries

d. Spoiled food

e. Don't know

12) Approximately what percentage of the earth's water is available as fresh drinking water?

a. more than 90%

b. around 45%

c. around 20%

d. less than 3%

e. Don't know

Do you have any additional comments?

Thank you for your responses.

Appendix B: Icelandic Questionnaire, Sjálfbærni og háskólasvæðið okkar

Kæri þátttakandi,

Eftirfarandi spurningalisti á að kanna umhverfisvitund í háskólasamfélaginu, þ.e. hjá kennurum, nemendum og starfsfólki. Mikil hjálp væri í því ef þið gætu varið 15-20 mínútum til að svara spurningunum. Niðurstöður þessarar könnunar verða hafðar til hliðsjónar og til upplýsingar fyrir Háskóla Íslands, sem er með sjálfbærnistefnu í smíðum.

Heiðarlegar skoðanir ykkar væru vel þegnar.

Takk fyrir,

Mary Frances

I. Almennar upplýsingar

Vinsamlegast fylltu í reitina og veljið það svar sem lýsir þér best.

1.1 Kyn

1) Kona

2) Karl

1.2 Hvaða ár ertu fædd(ur)?

1.3 Hvert eftirfarandi á best við um stöðu þína við Háskóla Íslands?

- 1) Nemandi í grunnnámi
- 2) Meistaraniemi
- 3) Doktorsnemi
- 4) Starfsmaður
- 5) Kennari/Prófessor
- 6) Fræðimaður án kennslu

1.4 Hvert er þjóðerni þitt?

- 1) Íslendingur
- 2) Annað

1.5 Við hvaða svið Háskóla Íslands starfar þú/leggur þú stund á nám?

- 1) Félagsvísindasvið
- 2) Heilbrigðisvísindasvið
- 3) Hugvísindasvið
- 4) Menntavísindasvið
- 5) Verkfræði-og náttúruvísindasvið
- 6) Miðlæga stjórnsýslu og þjónustu

II. Gildi, viðhorf og skoðanir

Vinsamlegast lestu eftirfarandi staðhæfingar vandlega og merkið við reitina eftir því hversu sammála eða ósammála þú ert hverju sinni, allt frá „algjörlega ósammála“ yfir í „algjörlega sammála“.

- 1) Algjörlega ósammála
- 2) Ósammála
- 3) Hvorki sammála né ósammála

4) Sammála

5) Algjörlega sammála

2.1 Mér finnst það skylda mín að minnka áhrif mín á umhverfið.

2.2 Mér er umhugað um umhverfið en tel að hegðun einnar manneskju geti ekki skipt svo miklu máli.

2.3 Mér finnst sjálfsagt að sekta fólk fyrir að henda rusli úti á götu.

2.4 Það er mögulegt að leysa umhverfis-, félagsleg og efnahagsleg vandamál samtímis.

2.5 Fólk á Íslandi ber meiri ábyrgð gagnvart umhverfinu en fólk í flestum öðrum löndum.

2.6 Rafmagn ætti að framleiða á endurnýjanlegan hátt eins og kostur er, jafnvel þótt það skili sér í verðhækkunum.

2.7 Iðnaðarfyrirtækjum ætti að vera skylt að sýna fram á að þau losi hættuleg úrgangsefni með öruggum hætti.

2.8 Ég styð lög sem takmarka útblástur úr verksmiðjum jafnvel þótt það hækki verð framleiðsluvörunnar.

2.9 Til að draga úr úrgangi ætti að halda umbúðum úr plasti í lágmarki.

2.10 Óþarfa notkun á rafmagnstækjum fer í taugarnar á mér.

2.11 Það pirrar mig þegar fólk lætur vatn renna úr krana að óþörfu.

III. Hegðun og aðgerðir

Vinsamlegast lestu eftirfarandi staðhæfingar vandlega og merkið við þann reit sem lýsir þér best.

1) Aldrei

2) Sjaldan

3) Stundum

4) Oft

5) Alltaf

3.1 Þegar ég er á háskólasvæðinu og þarf að henda plastflösku, þá geymi ég hana þangað til ég finn endurvinnslutunnu fyrir plastflöskur.

3.2 Þegar ég er á háskólasvæðinu og þarf að henda pappír, þá geymi ég hann þangað til ég finn endurvinnslukassa fyrir pappír.

3.3 Heima hjá mér flokka ég drykkjarumbúðir og -flöskur frá öðrum heimilisúrgangi.

3.4 Heima hjá mér flokka ég endurvinnanlegan pappír frá öðrum heimilisúrgangi.

3.5 Heima hjá mér aðskil ég lífrænan úrgang (matarleifar) frá öðru heimilissorpi.

3.6 Þegar ég kaupi í matinn tek ég margnota poka með mér.

3.7 Þegar ég kaupi í matinn reyni ég að kaupa lífrænt ræktaðar vörur jafnvel þótt þær séu dýrari.

3.8 Þegar ég kaupi í matinn reyni ég að kaupa „fair trade“ vörur, jafnvel þótt þær séu dýrari.

3.9 Ég reyni að lágmarka notkun plasts í daglegu lífi mínu.

3.10 Þegar ég er í fríi frá vinnu reyni ég að verja tíma utandyra.

3.11 Ég geng, tek strætó, hjóla eða samnýti bíl til að komast í skólann.

IV. Skoðanir á sjálfbærni á háskólasvæðinu

Vinsamlegast lestu eftirfarandi fullyrðingar vandlega og merkið við reitinn eftir því hversu sammála eða ósammála þú ert hverju sinni, allt frá „algjörlega ósammála“ yfir í „algjörlega sammála“.

1) Algjörlega ósammála

2) Ósammála

3) Hvorki sammála né ósammála

4) Sammála

5) Algjörlega sammála

4.1 Háskóli Íslands ætti að leggja meiri áherslu á að hvetja fólk til þess að flokka rusl til endurvinnslu á háskólasvæðinu.

4.2 Háskóli Íslands ætti að bjóða upp á að prenta báðum megin á blöðin í öllum prenturum.

4.3 Háskóli Íslands ætti að bjóða upp á lífrænt ræktaðar vörur í matstofum sínum.

4.4 Háskóli Íslands ætti að draga úr umbúðum sem notaðar eru í matstofum skólans.

4.5 Háskóli Íslands ætti að umbuna fólki sem gengur, hjólar eða deilir bílum á leið sinni í skólann.

4.6 Háskóli Íslands ætti að gera bílastæði á háskólasvæðinu gjaldskyld.

4.7 Háskóli Íslands ætti að leggja áherslu á að draga úr orkunotkun á háskólasvæðinu.

4.8 Háskóli Íslands ætti að bjóða upp á námskeið um sjálfbærni fyrir nemendur, kennara og starfsfólk.

4.9 Háskóli Íslands ætti að bjóða upp á fleiri námskeið um sjálfbærni fyrir nemendur.

4.10 Háskóli Íslands ber sérstaka ábyrgð á að fræða fólk um sjálfbærni.

4.11 Háskóli Íslands á að vinna að því að auka meðvitund um sjálfbærni á háskólasvæðinu.

V. Umhverfisþekking

Vinsamlegast svarið eftirfarandi spurningum eftir bestu getu. Ef þú veist ekki svarið við spurningunni, svaraðu „Veit ekki”.

1) Ósónlagið er varnarlag í efri hluta lofthjúps jarðarinnar. Hvað ver ósónlagið okkur gegn?

a. Súru regni

b. Hlýnun jarðar

c. Hættulegum krabbameinsvaldandi sólargeislum

d. Skyndilegum hitastigsbreytingum

e. Veit ekki

2) Hvert eftirfarandi er endurnýjanleg auðlind?

a. Kol

b. Bensín

c. Járn

d. Timbur

e. Veit ekki

3) Fræ eru smá en tré eru stór. Hvaðan fá tré bróðurpartinn af því sem til þarf til að verða t.d. að efni í skrifborð?

a. Úr loftinu

b. Úr jörðu

c. Frá sólinni

d. Úr vatni

e. Veit ekki

4) Matarleifar, pappír og plast eru allt endurvinnanleg, niðurbjótanleg og endurnotanleg efni en stór hluti þeirra endar engu að síður á sorphaugum. Hvað eru þessi efni samtals hátt hlutfall af sorphaugum á Íslandi?

a. 20%

b. 40%

c. 60%

d. 80%

e. Veit ekki

5) Um það bil hversu margar plastflöskur með drykkjarvatni eru notaðar í heiminum á ári?

a. 50 milljón

b. 90 milljón

c. 50 milljarðar

d. 200 milljarðar

e. Veit ekki

6) Margar gerðir hreinsiefna innihalda fosfór sem gerir vöruna hættulega umhverfinu. Hvers vegna er fosfór álitinn hættulegur?

a. Fosfór virkar sem eiturefni fyrir plöntur og dýr ef það kemst í vatnsból.

b. Óhóflegt magn fosfórs í vatnsbóli veldur ofvexti þörunga, sem taka súrefni frá öðrum lífverum sem þurfa á því að halda.

c. Ef fosfór gengur í efnasamband við önnur efni í vatnsbóli verður súrt regn.

d. Fosfór er mjög límkenndur og getur stíflað náttúrulegt vatnsflæði.

e. Veit ekki

7) Alþjóðlegi samningurinn um takmörkun á losun þjóða á gróðurhúsalofttegundum kallast

a. Kyoto bókunin

b. Montreal bókunin

c. Basel ráðstefnan

d. Veðurfarsbókun Sameinuðu þjóðanna

e. Veit ekki

8) Ef tekið er tillit til fæðinga og dauðsfalla, hversu mikil er fólksfjölgun í heiminum á degi hverjum?

- a. 23,000
- b. 70,000
- c. 230,000**
- d. 700,000
- e. Veit ekki

9) Hvað nefnist íslenska ríkisstofnunin sem vinnur að verndun umhverfisins?

a. Umhverfisstofnun

- b. Náttúruverndarsamtök Íslands
- c. Náttúra Íslands
- d. Saving Iceland
- e. Veit ekki

10) Hver er meginávinningur af mýrum fyrir umhverfi?

- a. Auka líkur á flóðum
- b. Að sía vatn áður en það berst í vötn og ár og fellur til sjávar**
- c. Að lágmarka fjölda óæskilegra plantna og lífvera
- d. Mýrar eru mikilvæg tímgunarsvæði fyrir lífverur í útrýmingarhættu
- e. Veit ekki

11) Hver af eftirfarandi heimilisúrgangi er talinn spilliefni?

- a. Plastumbúðir
- b. Ál

c. Rafhlöður

d. Rotinn matur

e. Veit ekki

12) Hvaða hlutfall alls vatns á jörðinni er drykkjarhæft?

a. Meira en 90%

b. Um 45%

c. Um 20 %

d. Minna en 3%

e. Veit ekki

Vinsamlegast dragðu hring um þá fullyrðingu sem lýsir þér best:

a) Ég er alls ekki umhverfisverndarsinni

b) Ég er eiginlega ekki umhverfisverndarsinni

c) Ég hef ekki sterkar skoðanir er varða umhverfið

d) Ég er umhverfisverndarsinni

e) Ég er mikill umhverfisverndarsinni

Aðrar athugasemdir eða ábendingar?

Takk kærlega fyrir þátttökuna.

Appendix C: Complete Results

VALUES BY GENDER

Question 1, I feel responsible to reduce the impact I make on the environment.

	<i>Female</i>	<i>Male</i>
Mean	4.04	3.84
Variance	1.10	1.17
Observations	639.00	295.00
df	557.00	
t Stat	2.65	
P(T<=t) two-tail	0.01	
Cohen's d	0.18	

Question 2, I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.

	<i>Female</i>	<i>Male</i>
Mean	2.19	2.40
Variance	1.16	1.32
Observations	639.00	295.00
df	541.00	
t Stat	-2.64	
P(T<=t) two-tail	0.01	
Cohen's d	0.17	

Question 3, I am in favor of charging people a fine if they throw litter on the street.

	<i>Female</i>	<i>Male</i>
Mean	4.00	3.89
Variance	0.97	1.25
Observations	639.00	295.00
df	512.00	
t Stat	1.37	
P(T<=t) two-tail	0.17	
Cohen's d	0.09	

Question 4, It is possible to improve environmental, social, and economic problems in the world all at once.

	<i>Female</i>	<i>Male</i>
Mean	3.67	3.60
Variance	0.87	1.17
Observations	639.00	295.00
df	502.00	
t Stat	1.00	
P(T<=t) two-tail	0.32	

Cohen's d	0.07
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Question 5, People in Iceland act in a more environmentally responsible way than people in most other countries.

	<i>Female</i>	<i>Male</i>
Mean	2.36	2.19
Variance	0.95	0.89
Observations	639.00	295.00
df	590.00	
t Stat	2.48	
P(T<=t) two-tail	0.01	
Cohen's d	0.18	

Question 6, Electricity should be produced from renewable sources as much as possible, even if it increases the cost.

	<i>Female</i>	<i>Male</i>
Mean	3.59	3.74
Variance	0.87	1.00
Observations	639.00	295.00
df	537.00	
t Stat	-2.23	
P(T<=t) two-tail	0.03	
Cohen's d	0.16	

Question 7, Industries should be required to prove that they safely dispose of dangerous waste materials.

	<i>Female</i>	<i>Male</i>
Mean	4.69	4.61
Variance	0.43	0.46
Observations	639.00	295.00
df	556.00	
t Stat	1.76	
P(T<=t) two-tail	0.08	
Cohen's d	0.19	

Question 8, I am in favor of having laws that regulate factory emissions even if it would increase the price of products.

	<i>Female</i>	<i>Male</i>
Mean	4.09	3.93
Variance	0.67	0.96
Observations	639.00	295.00
df	492.00	
t Stat	2.42	
P(T<=t) two-tail	0.02	
Cohen's d	0.19	

Question 9, To reduce waste, the use of plastic packaging should be kept to a minimum.

	<i>Female</i>	<i>Male</i>
Mean	4.31	4.08
Variance	0.61	0.88
Observations	639.00	295.00
df	490.00	
t Stat	3.62	
P(T<=t) two-tail	0.00	
Cohen's d	0.30	

Question 10, It disturbs me when energy is wasted through the unnecessary use of electrical appliances.

	<i>Female</i>	<i>Male</i>
Mean	3.56	3.29
Variance	1.12	1.46
Observations	639.00	295.00
df	510.00	
t Stat	3.30	
P(T<=t) two-tail	0.00	
Cohen's d	0.21	

Question 11, It disturbs me when people leave the tap water running unnecessarily.

	<i>Female</i>	<i>Male</i>
Mean	3.63	3.15
Variance	1.28	1.61
Observations	639.00	295.00
df	517.00	
t Stat	5.52	
P(T<=t) two-tail	0.00	
Cohen's d	0.33	

VALUES BY AGE

Question 1, I feel responsible to reduce the impact I make on the environment.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.98	3.97
Variance	1.29	0.98
Observations	454.00	477.00
df	899.00	
t Stat	0.17	
P(T<=t) two-tail	0.87	
Cohen's d	0.01	

Question 2, I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.10	2.41

Variance	1.22	1.17
Observations	454.00	477.00
df	925.00	
t Stat	-4.22	
P(T<=t) two-tail	0.00	
Cohen's d	0.25	

Question 3, I am in favor of charging people a fine if they throw litter on the street.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.02	3.90
Variance	0.89	1.22
Observations	454.00	477.00
df	918.00	
t Stat	1.80	
P(T<=t) two-tail	0.07	
Cohen's d	0.11	

Question 4, It is possible to improve environmental, social, and economic problems in the world all at once.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.72	3.58
Variance	0.90	1.02
Observations	454.00	477.00
df	929.00	
t Stat	2.11	
P(T<=t) two-tail	0.04	
Cohen's d	0.14	

Question 5, People in Iceland act in a more environmentally responsible way than people in most other countries.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.32	2.29
Variance	0.90	0.99
Observations	454.00	477.00
df	929.00	
t Stat	0.41	
P(T<=t) two-tail	0.68	
Cohen's d	0.03	

Question 6, Electricity should be produced from renewable sources as much as possible, even if it increases the cost.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.68	3.59
Variance	0.88	0.95
Observations	454.00	477.00

df	929.00
t Stat	1.46
P(T<=t) two-tail	0.14
Cohen's d	0.10

Question 7, Industries should be required to prove that they safely dispose of dangerous waste materials.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.66	4.67
Variance	0.48	0.41
Observations	454.00	477.00
df	913.00	
t Stat	-0.33	
P(T<=t) two-tail	0.74	
Cohen's d	0.03	

Question 8, I am in favor of having laws that regulate factory emissions even if it would increase the price of products.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.20	3.88
Variance	0.65	0.83
Observations	454.00	477.00
df	924.00	
t Stat	5.56	
P(T<=t) two-tail	0.00	
Cohen's d	0.42	

Question 9, To reduce waste, the use of plastic packaging should be kept to a minimum.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.29	4.18
Variance	0.66	0.75
Observations	454.00	477.00
df	929.00	
t Stat	2.05	
P(T<=t) two-tail	0.04	
Cohen's d	0.16	

Question 10, It disturbs me when energy is wasted through the unnecessary use of electrical appliances.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.65	3.31
Variance	1.01	1.42
Observations	454.00	477.00
df	916.00	
t Stat	4.77	
P(T<=t) two-tail	0.00	

Cohen's d	0.28
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Question 11, It disturbs me when people leave the tap water running unnecessarily.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.65	3.31
Variance	1.18	1.62
Observations	454.00	477.00
df	919.00	
t Stat	4.41	
P(T<=t) two-tail	0.00	
Cohen's d	0.24	

VALUES BY NATIONALITY

Question 1, I feel responsible to reduce the impact I make on the environment.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.93	4.38
Variance	1.19	0.46
Observations	834.00	100.00
df	168.00	
t Stat	-5.76	
P(T<=t) two-tail	0.00	
Cohen's d	0.54	

Question 2, I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.25	2.34
Variance	1.21	1.26
Observations	834.00	100.00
df	123.00	
t Stat	-0.79	
P(T<=t) two-tail	0.43	
Cohen's d	0.08	

Question 3, I am in favor of charging people a fine if they throw litter on the street.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.96	3.97
Variance	1.09	0.78
Observations	834.00	100.00
df	135.00	
t Stat	-0.09	
P(T<=t) two-tail	0.93	
Cohen's d	0.01	

Question 4, It is possible to improve environmental, social, and economic problems in the world all at once.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.69	3.30
Variance	0.89	1.46
Observations	834.00	100.00
df	114.00	
t Stat	3.13	
P(T<=t) two-tail	0.00	
Cohen's d	0.33	

Question 5, People in Iceland act in a more environmentally responsible way than people in most other countries.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.31	2.25
Variance	0.94	0.92
Observations	834.00	100.00
df	125.00	
t Stat	0.63	
P(T<=t) two-tail	0.53	
Cohen's d	0.07	

Question 6, Electricity should be produced from renewable sources as much as possible, even if it increases the cost.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.58	4.13
Variance	0.92	0.58
Observations	834.00	100.00
df	140.00	
t Stat	-6.65	
P(T<=t) two-tail	0.00	
Cohen's d	0.73	

Question 7, Industries should be required to prove that they safely dispose of dangerous waste materials.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	4.65	4.77
Variance	0.46	0.22
Observations	834.00	100.00
df	154.00	
t Stat	-2.20	
P(T<=t) two-tail	0.03	
Cohen's d	0.34	

Question 8, I am in favor of having laws that regulate factory emissions even if it would increase the price of products.

	<i>Icelander</i>	<i>Foreigner</i>
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Mean	4.01	4.24
Variance	0.80	0.49
Observations	834.00	100.00
df	141.00	
t Stat	-2.97	
P(T<=t) two-tail	0.00	
Cohen's d	0.35	

Question 9, To reduce waste, the use of plastic packaging should be kept to a minimum.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	4.20	4.53
Variance	0.72	0.51
Observations	834.00	100.00
df	134.00	
t Stat	-4.24	
P(T<=t) two-tail	0.00	
Cohen's d	0.53	

Question 10, It disturbs me when energy is wasted through the unnecessary use of electrical appliances.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.39	4.18
Variance	1.22	0.86
Observations	834.00	100.00
df	135.00	
t Stat	-7.87	
P(T<=t) two-tail	0.00	
Cohen's d	0.76	

Question 11, It disturbs me when people leave the tap water running unnecessarily.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.38	4.24
Variance	1.43	0.83
Observations	834.00	100.00
df	143.00	
t Stat	-8.56	
P(T<=t) two-tail	0.00	
Cohen's d	0.76	

VALUES BY ROLE

Question 1, I feel responsible to reduce the impact I make on the environment.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.90	4.07
Variance	1.02	1.23
Observations	473.00	461.00
df	920.00	
t Stat	-2.40	

P(T<=t) two-tail	0.02
Cohen's d	0.15

Question 2, I am concerned about the environment, but I think that one person's actions cannot make a big enough difference.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	2.39	2.12
Variance	1.28	1.12
Observations	473.00	461.00
df	930.00	
t Stat	3.73	
P(T<=t) two-tail	0.00	
Cohen's d	0.22	

Question 3, I am in favor of charging people a fine if they throw litter on the street.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.96	3.97
Variance	1.11	1.01
Observations	473.00	461.00
df	932.00	
t Stat	-0.21	
P(T<=t) two-tail	0.83	
Cohen's d	0.01	

Question 4, It is possible to improve environmental, social, and economic problems in the world all at once.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.58	3.72
Variance	0.98	0.94
Observations	473.00	461.00
df	932.00	
t Stat	-2.17	
P(T<=t) two-tail	0.03	
Cohen's d	0.14	

Question 5, People in Iceland act in a more environmentally responsible way than people in most other countries.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	2.35	2.26
Variance	1.02	0.86
Observations	473.00	461.00
df	929.00	
t Stat	1.40	
P(T<=t) two-tail	0.16	

Cohen's d	0.09
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Question 6, Electricity should be produced from renewable sources as much as possible, even if it increases the cost.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.53	3.75
Variance	0.91	0.89
Observations	473.00	461.00
df	932.00	
t Stat	-3.53	
P(T<=t) two-tail	0.00	
Cohen's d	0.24	

Question 7, Industries should be required to prove that they safely dispose of dangerous waste materials.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	4.65	4.68
Variance	0.46	0.42
Observations	473.00	461.00
df	932.00	
t Stat	-0.64	
P(T<=t) two-tail	0.52	
Cohen's d	0.06	

Question 8, I am in favor of having laws that regulate factory emissions even if it would increase the price of products.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.90	4.17
Variance	0.79	0.71
Observations	473.00	461.00
df	932.00	
t Stat	-4.74	
P(T<=t) two-tail	0.00	
Cohen's d	0.36	

Question 9, To reduce waste, the use of plastic packaging should be kept to a minimum.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	4.17	4.31
Variance	0.71	0.70
Observations	473.00	461.00
df	932.00	
t Stat	-2.57	
P(T<=t) two-tail	0.01	

Cohen's d	0.20
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Question 10, It disturbs me when energy is wasted through the unnecessary use of electrical appliances.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.28	3.68
Variance	1.31	1.09
Observations	473.00	461.00
df	928.00	
t Stat	-5.58	
P(T<=t) two-tail	0.00	
Cohen's d	0.33	

Question 11, It disturbs me when people leave the tap water running unnecessarily.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.30	3.66
Variance	1.59	1.20
Observations	473.00	461.00
df	920.00	
t Stat	-4.70	
P(T<=t) two-tail	0.00	
Cohen's d	0.26	

BEHAVIORS BY GENDER

Question 1, When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.

	<i>Female</i>	<i>Male</i>
Mean	4.11	3.96
Variance	1.32	1.59
Observations	639.00	295.00
df	528.00	
t Stat	1.68	
P(T<=t) two-tail	0.09	
Cohen's d	0.10	

Question 2, When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.

	<i>Female</i>	<i>Male</i>
Mean	3.18	3.15
Variance	1.82	1.99
Observations	639.00	295.00
df	549.00	
t Stat	0.36	
P(T<=t) two-tail	0.72	
Cohen's d	0.02	

Question 3, At home, I separate recyclable beverage cans and bottles from other household garbage.

	<i>Female</i>	<i>Male</i>
Mean	4.58	4.41
Variance	0.90	1.32
Observations	639.00	295.00
df	485.00	
t Stat	2.22	
P(T<=t) two-tail	0.03	
Cohen's d	0.15	

Question 4, At home, I separate recyclable paper from other household garbage.

	<i>Female</i>	<i>Male</i>
Mean	3.80	3.57
Variance	2.16	2.65
Observations	639.00	295.00
df	522.00	
t Stat	2.01	
P(T<=t) two-tail	0.04	
Cohen's d	0.09	

Question 5, At home, I separate food waste from other household garbage.

	<i>Female</i>	<i>Male</i>
Mean	1.71	1.72
Variance	1.57	1.64
Observations	639.00	295.00
df	562.00	
t Stat	-0.09	
P(T<=t) two-tail	0.93	
Cohen's d	0.01	

Question 6, When I go to the grocery store, I bring reusable bags with me.

	<i>Female</i>	<i>Male</i>
Mean	2.51	2.46
Variance	2.01	2.09
Observations	639.00	295.00
df	562.00	
t Stat	0.50	
P(T<=t) two-tail	0.61	
Cohen's d	0.02	

Question 7, When I go to the grocery store, I try to buy organic products, even if they cost more money.

	<i>Female</i>	<i>Male</i>
Mean	2.72	2.24
Variance	1.04	1.22
Observations	639.00	295.00
df	534.00	

t Stat	6.25
P(T<=t) two-tail	0.00
Cohen's d	0.42

Question 8, When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.

	<i>Female</i>	<i>Male</i>
Mean	2.50	2.06
Variance	1.12	1.13
Observations	639.00	295.00
df	569.00	
t Stat	5.89	
P(T<=t) two-tail	0.00	
Cohen's d	0.39	

Question 9, I try to reduce the amount to plastic I use in everyday life.

	<i>Female</i>	<i>Male</i>
Mean	3.30	2.89
Variance	1.18	1.52
Observations	639.00	295.00
df	511.00	
t Stat	4.91	
P(T<=t) two-tail	0.00	
Cohen's d	0.30	

Question 10, When I have time off from work, I like to spend some time outside.

	<i>Female</i>	<i>Male</i>
Mean	3.64	3.52
Variance	0.60	0.71
Observations	639.00	295.00
df	532.00	
t Stat	2.04	
P(T<=t) two-tail	0.04	
Cohen's d	0.18	

Question 11, I walk, bus, bike, or carpool to campus.

	<i>Female</i>	<i>Male</i>
Mean	3.33	3.58
Variance	2.26	1.97
Observations	639.00	295.00
df	610.00	
t Stat	-2.48	
P(T<=t) two-tail	0.01	
Cohen's d	0.12	

BEHAVIORS BY AGE

Question 1, When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.32	3.82
Variance	1.12	1.57
Observations	454.00	477.00
df	917.00	
t Stat	6.61	
P(T<=t) two-tail	0.00	
Cohen's d	0.37	

Question 2, When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.61	2.75
Variance	1.62	1.74
Observations	454.00	477.00
df	929.00	
t Stat	10.19	
P(T<=t) two-tail	0.00	
Cohen's d	0.51	

Question 3, At home, I separate recyclable beverage cans and bottles from other household garbage.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.69	4.37
Variance	0.70	1.32
Observations	454.00	477.00
df	870.00	
t Stat	4.82	
P(T<=t) two-tail	0.00	
Cohen's d	0.31	

Question 4, At home, I separate recyclable paper from other household garbage.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.10	3.36
Variance	1.68	2.68
Observations	454.00	477.00
df	899.00	
t Stat	7.68	
P(T<=t) two-tail	0.00	
Cohen's d	0.34	

Question 5, At home, I separate food waste from other household garbage.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	1.85	1.59
Variance	1.74	1.41

Observations	454.00	477.00
df	908.00	
t Stat	3.14	
P(T<=t) two-tail	0.00	
Cohen's d	0.16	

Question 6, When I go to the grocery store, I bring reusable bags with me.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.69	2.30
Variance	1.92	2.06
Observations	454.00	477.00
df	929.00	
t Stat	4.29	
P(T<=t) two-tail	0.00	
Cohen's d	0.20	

Question 7, When I go to the grocery store, I try to buy organic products, even if they cost more money.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.74	2.41
Variance	1.11	1.12
Observations	454.00	477.00
df	927.00	
t Stat	4.74	
P(T<=t) two-tail	0.00	
Cohen's d	0.29	

Question 8, When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.51	2.23
Variance	1.12	1.17
Observations	454.00	477.00
df	928.00	
t Stat	3.94	
P(T<=t) two-tail	0.00	
Cohen's d	0.24	

Question 9, I try to reduce the amount to plastic I use in everyday life.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.41	2.93
Variance	1.12	1.40
Observations	454.00	477.00
df	925.00	
t Stat	6.58	
P(T<=t) two-tail	0.00	
Cohen's d	0.38	

Question 10, When I have time off from work, I like to spend some time outside.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.72	3.48
Variance	0.52	0.73
Observations	454.00	477.00
df	916.00	
t Stat	4.51	
P(T<=t) two-tail	0.00	
Cohen's d	0.37	

Question 11, I walk, bus, bike, or carpool to campus.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.06	3.75
Variance	2.03	2.09
Observations	454.00	477.00
df	928.00	
t Stat	-7.37	
P(T<=t) two-tail	0.00	
Cohen's d	0.34	

BEHAVIORS BY NATIONALITY

Question 1, When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	4.04	4.23
Variance	1.43	1.21
Observations	834.00	100.00
df	129.00	
t Stat	-1.60	
P(T<=t) two-tail	0.11	
Cohen's d	0.14	

Question 2, When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.11	3.73
Variance	1.86	1.63
Observations	834.00	100.00
df	128.00	
t Stat	-4.57	
P(T<=t) two-tail	0.00	
Cohen's d	0.36	

Question 3, At home, I separate recyclable beverage cans and bottles from other household garbage.

	<i>Icelander</i>	<i>Foreigner</i>
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Mean	4.56	4.25
Variance	0.96	1.58
Observations	834.00	100.00
df	114.00	
t Stat	2.38	
P(T<=t) two-tail	0.02	
Cohen's d	0.24	

Question 4, At home, I separate recyclable paper from other household garbage.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.73	3.67
Variance	2.30	2.51
Observations	834.00	100.00
df	122.00	
t Stat	0.38	
P(T<=t) two-tail	0.71	
Cohen's d	0.03	

Question 5, At home, I separate food waste from other household garbage.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	1.64	2.39
Variance	1.41	2.64
Observations	834.00	100.00
df	112.00	
t Stat	-4.50	
P(T<=t) two-tail	0.00	
Cohen's d	0.37	

Question 6, When I go to the grocery store, I bring reusable bags with me.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.35	3.71
Variance	1.89	1.54
Observations	834.00	100.00
df	130.00	
t Stat	-10.25	
P(T<=t) two-tail	0.00	
Cohen's d	0.79	

Question 7, When I go to the grocery store, I try to buy organic products, even if they cost more money.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.55	2.66
Variance	1.14	1.20
Observations	834.00	100.00
df	123.00	
t Stat	-0.92	
P(T<=t) two-tail	0.36	

Cohen's d	0.09
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Question 8, When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.33	2.66
Variance	1.15	1.16
Observations	834.00	100.00
df	124.00	
t Stat	-2.90	
P(T<=t) two-tail	0.00	
Cohen's d	0.29	

Question 9, I try to reduce the amount to plastic I use in everyday life.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.12	3.57
Variance	1.29	1.38
Observations	834.00	100.00
df	122.00	
t Stat	-3.62	
P(T<=t) two-tail	0.00	
Cohen's d	0.34	

Question 10, When I have time off from work, I like to spend some time outside.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.57	3.88
Variance	0.63	0.63
Observations	834.00	100.00
df	124.00	
t Stat	-3.73	
P(T<=t) two-tail	0.00	
Cohen's d	0.50	

Question 11, I walk, bus, bike, or carpool to campus.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.28	4.44
Variance	2.17	1.10
Observations	834.00	100.00
df	151.00	
t Stat	-9.92	
P(T<=t) two-tail	0.00	
Cohen's d	0.71	

BEHAVIORS BY ROLE

Question 1, When I am on campus and need to throw away a plastic bottle, I carry it with me until I find a place to recycle it.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.94	4.19
Variance	1.48	1.31
Observations	473.00	461.00
df	931.00	
t Stat	-3.18	
P(T<=t) two-tail	0.00	
Cohen's d	0.18	

Question 2, When I am on campus and need to throw away paper, I recycle it, even if I have to carry it with me until I find a bin.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	2.78	3.57
Variance	1.81	1.61
Observations	473.00	461.00
df	931.00	
t Stat	-9.25	
P(T<=t) two-tail	0.00	
Cohen's d	0.46	

Question 3, At home, I separate recyclable beverage cans and bottles from other household garbage.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	4.35	4.71
Variance	1.37	0.63
Observations	473.00	461.00
df	832.00	
t Stat	-5.45	
P(T<=t) two-tail	0.00	
Cohen's d	0.36	

Question 4, At home, I separate recyclable paper from other household garbage.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.36	4.10
Variance	2.56	1.81
Observations	473.00	461.00
df	912.00	
t Stat	-7.64	
P(T<=t) two-tail	0.00	
Cohen's d	0.34	

Question 5, At home, I separate food waste from other household garbage.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	1.58	1.86

Variance	1.37	1.78
Observations	473.00	461.00
df	910.00	
t Stat	-3.48	
P(T<=t) two-tail	0.00	
Cohen's d	0.18	

Question 6, When I go to the grocery store, I bring reusable bags with me.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	2.25	2.74
Variance	1.87	2.07
Observations	473.00	461.00
df	927.00	
t Stat	-5.40	
P(T<=t) two-tail	0.00	
Cohen's d	0.25	

Question 7, When I go to the grocery store, I try to buy organic products, even if they cost more money.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	2.49	2.64
Variance	1.20	1.08
Observations	473.00	461.00
df	931.00	
t Stat	-2.05	
P(T<=t) two-tail	0.04	
Cohen's d	0.13	

Question 8, When I go to the grocery store, I try to buy fair-trade products, even if they cost more money.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	2.27	2.46
Variance	1.23	1.07
Observations	473.00	461.00
df	930.00	
t Stat	-2.60	
P(T<=t) two-tail	0.01	
Cohen's d	0.16	

Question 9, I try to reduce the amount of plastic I use in everyday life.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	2.92	3.43
Variance	1.37	1.14
Observations	473.00	461.00

df	928.00
t Stat	-6.90
P(T<=t) two-tail	0.00
Cohen's d	0.40

Question 10, When I have time off from work, I like to spend some time outside.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.45	3.75
Variance	0.70	0.54
Observations	473.00	461.00
df	922.00	
t Stat	-5.80	
P(T<=t) two-tail	0.00	
Cohen's d	0.48	

Question 11, I walk, bus, bike, or carpool to campus.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.51	3.31
Variance	2.25	2.10
Observations	473.00	461.00
df	932.00	
t Stat	2.04	
P(T<=t) two-tail	0.04	
Cohen's d	0.09	

UNIVERSITY ACTION BY GENDER

Question 1, The University of Iceland should make more of an effort to encourage people to recycle on campus.

	<i>Female</i>	<i>Male</i>
Mean	4.26	3.99
Variance	0.60	0.87
Observations	639.00	295.00
df	489.00	
t Stat	4.25	
P(T<=t) two-tail	0.00	
Cohen's d	0.36	

Question 2, The University of Iceland should offer double-sided printing for all printers.

	<i>Female</i>	<i>Male</i>
Mean	4.57	4.35
Variance	0.47	0.69
Observations	639.00	295.00
df	486.00	
t Stat	3.88	
P(T<=t) two-tail	0.00	
Cohen's d	0.37	

Question 3, The University of Iceland should offer organic products in their dining facilities.

	<i>Female</i>	<i>Male</i>
Mean	3.63	3.30
Variance	0.79	0.95
Observations	639.00	295.00
df	528.00	
t Stat	4.94	
P(T<=t) two-tail	0.00	
Cohen's d	0.38	

Question 4, University of Iceland should reduce the amount of packaging that is used in the dining facilities.

	<i>Female</i>	<i>Male</i>
Mean	4.01	3.75
Variance	0.73	0.79
Observations	639.00	295.00
df	554.00	
t Stat	4.29	
P(T<=t) two-tail	0.00	
Cohen's d	0.35	

Question 5, The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.

	<i>Female</i>	<i>Male</i>
Mean	3.63	3.53
Variance	1.34	1.58
Observations	639.00	295.00
df	531.00	
t Stat	1.25	
P(T<=t) two-tail	0.21	
Cohen's d	0.07	

Question 6, The University of Iceland should charge people to park their cars on campus.

	<i>Female</i>	<i>Male</i>
Mean	2.50	2.81
Variance	1.80	2.05
Observations	639.00	295.00
df	539.00	
t Stat	-3.13	
P(T<=t) two-tail	0.00	
Cohen's d	0.16	

Question 7, The University of Iceland should offer classes about sustainability for faculty and staff.

	<i>Female</i>	<i>Male</i>
Mean	3.78	3.48
Variance	0.65	0.79

Observations	639.00	295.00
df	525.00	
t Stat	4.78	
P(T<=t) two-tail	0.00	
Cohen's d	0.40	

Question 8, The University of Iceland should offer more classes about sustainability for students.

	<i>Female</i>	<i>Male</i>
Mean	3.62	3.40
Variance	0.65	0.83
Observations	639.00	295.00
df	514.00	
t Stat	3.61	
P(T<=t) two-tail	0.00	
Cohen's d	0.30	

Question 9, The University of Iceland has a special responsibility to teach people about sustainability.

	<i>Female</i>	<i>Male</i>
Mean	3.44	3.38
Variance	0.88	1.18
Observations	639.00	295.00
df	504.00	
t Stat	0.76	
P(T<=t) two-tail	0.45	
Cohen's d	0.05	

Question 10, The University of Iceland should work to spread awareness about sustainability on campus.

	<i>Female</i>	<i>Male</i>
Mean	3.94	3.75
Variance	0.55	0.80
Observations	639.00	295.00
df	488.00	
t Stat	3.28	
P(T<=t) two-tail	0.00	
Cohen's d	0.29	

Question 11, The University of Iceland should make an effort to reduce the amount of energy used on campus

	<i>Female</i>	<i>Male</i>
Mean	3.92	3.87
Variance	0.58	0.89
Observations	639.00	295.00
df	478.00	
t Stat	0.75	
P(T<=t) two-tail	0.45	
Cohen's d	0.06	

Question 12, How would you rate your level of environmentalism?

	<i>Female</i>	<i>Male</i>
Mean	3.65	3.62
Variance	0.58	0.68
Observations	639.00	295.00
df	532.00	
t Stat	0.49	
P(T<=t) two-tail	0.63	
Cohen's d	0.04	

UNIVERSITY ACTION BY AGE

Question 1, The University of Iceland should make more of an effort to encourage people to recycle on campus.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.28	4.08
Variance	0.71	0.67
Observations	454.00	477.00
df	924.00	
t Stat	3.58	
P(T<=t) two-tail	0.00	
Cohen's d	0.28	

Question 2, The University of Iceland should offer double-sided printing for all printers.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.48	4.52
Variance	0.53	0.57
Observations	454.00	477.00
df	929.00	
t Stat	-0.86	
P(T<=t) two-tail	0.39	
Cohen's d	0.08	

Question 3, The University of Iceland should offer organic products in their dining facilities.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.60	3.46
Variance	0.76	0.97
Observations	454.00	477.00
df	924.00	
t Stat	2.27	
P(T<=t) two-tail	0.02	
Cohen's d	0.16	

Question 4, University of Iceland should reduce the amount of packaging that is used in the dining facilities.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.07	3.79
Variance	0.70	0.80
Observations	454.00	477.00
df	929.00	
t Stat	4.91	
P(T<=t) two-tail	0.00	
Cohen's d	0.37	

Question 5, The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.57	3.63
Variance	1.31	1.53
Observations	454.00	477.00
df	928.00	
t Stat	-0.86	
P(T<=t) two-tail	0.39	
Cohen's d	0.05	

Question 6, The University of Iceland should charge people to park their cars on campus.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	2.84	2.37
Variance	1.84	1.84
Observations	454.00	477.00
df	927.00	
t Stat	5.22	
P(T<=t) two-tail	0.00	
Cohen's d	0.25	

Question 7, The University of Iceland should offer classes about sustainability for faculty and staff.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.80	3.57
Variance	0.70	0.71
Observations	454.00	477.00
df	927.00	
t Stat	4.29	
P(T<=t) two-tail	0.00	
Cohen's d	0.34	

Question 8, The University of Iceland should offer more classes about sustainability for students.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.66	3.44
Variance	0.71	0.69
Observations	454.00	477.00
df	925.00	
t Stat	4.14	

P(T<=t) two-tail	0.00
Cohen's d	0.32

Question 9, The University of Iceland has a special responsibility to teach people about sustainability.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.58	3.26
Variance	0.87	1.02
Observations	454.00	477.00
df	928.00	
t Stat	4.94	
P(T<=t) two-tail	0.00	
Cohen's d	0.33	

Question 10, The University of Iceland should work to spread awareness about sustainability on campus.

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.00	3.76
Variance	0.54	0.70
Observations	454.00	477.00
df	923.00	
t Stat	4.75	
P(T<=t) two-tail	0.00	
Cohen's d	0.39	

Question 11, The University of Iceland should make an effort to reduce the amount of energy used on campus

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	4.04	3.78
Variance	0.59	0.72
Observations	454.00	477.00
df	926.00	
t Stat	4.73	
P(T<=t) two-tail	0.00	
Cohen's d	0.38	

Question 12, How would you rate your level of environmentalism?

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	3.75	3.53
Variance	0.56	0.63
Observations	454.00	477.00
df	929.00	
t Stat	4.45	
P(T<=t) two-tail	0.00	
Cohen's d	0.38	

UNIVERSITY ACTION BY NATIONALITY

Question 1, The University of Iceland should make more of an effort to encourage people to recycle on campus.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	4.16	4.27
Variance	0.72	0.52
Observations	834.00	100.00
df	134.00	
t Stat	-1.37	
P(T<=t) two-tail	0.17	
Cohen's d	0.17	

Question 2, The University of Iceland should offer double-sided printing for all printers.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	4.51	4.45
Variance	0.55	0.55
Observations	834.00	100.00
df	124.00	
t Stat	0.71	
P(T<=t) two-tail	0.48	
Cohen's d	0.10	

Question 3, The University of Iceland should offer organic products in their dining facilities.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.52	3.62
Variance	0.88	0.76
Observations	834.00	100.00
df	128.00	
t Stat	-1.11	
P(T<=t) two-tail	0.27	
Cohen's d	0.13	

Question 4, University of Iceland should reduce the amount of packaging that is used in the dining facilities.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.91	4.07
Variance	0.78	0.67
Observations	834.00	100.00
df	128.00	
t Stat	-1.83	
P(T<=t) two-tail	0.07	
Cohen's d	0.22	

Question 5, The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.53	4.22
Variance	1.43	0.86
Observations	834.00	100.00
df	142.00	
t Stat	-6.84	
P(T<=t) two-tail	0.00	
Cohen's d	0.61	

Question 6, The University of Iceland should charge people to park their cars on campus.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	2.53	3.19
Variance	1.89	1.59
Observations	834.00	100.00
df	129.00	
t Stat	-4.89	
P(T<=t) two-tail	0.00	
Cohen's d	0.38	

Question 7, The University of Iceland should offer classes about sustainability for faculty and staff.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.68	3.75
Variance	0.72	0.65
Observations	834.00	100.00
df	127.00	
t Stat	-0.86	
P(T<=t) two-tail	0.39	
Cohen's d	0.11	

Question 8, The University of Iceland should offer more classes about sustainability for students.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.53	3.72
Variance	0.71	0.73
Observations	834.00	100.00
df	123.00	
t Stat	-2.12	
P(T<=t) two-tail	0.04	
Cohen's d	0.27	

Question 9, The University of Iceland has a special responsibility to teach people about sustainability.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.37	3.83
Variance	0.98	0.75
Observations	834.00	100.00
df	132.00	
t Stat	-4.96	
P(T<=t) two-tail	0.00	
Cohen's d	0.54	

Question 10, The University of Iceland should work to spread awareness about sustainability on campus.

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.87	3.98
Variance	0.64	0.63
Observations	834.00	100.00
df	125.00	
t Stat	-1.33	
P(T<=t) two-tail	0.18	
Cohen's d	0.18	

Question 11, The University of Iceland should make an effort to reduce the amount of energy used on campus

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.87	4.18
Variance	0.66	0.73
Observations	834.00	100.00
df	121.00	
t Stat	-3.39	
P(T<=t) two-tail	0.00	
Cohen's d	0.44	

Question 12, How would you rate your level of environmentalism?

	<i>Icelander</i>	<i>Foreigner</i>
Mean	3.64	3.67
Variance	0.63	0.45
Observations	834.00	100.00
df	135.00	
t Stat	-0.48	
P(T<=t) two-tail	0.63	
Cohen's d	0.06	

UNIVERSITY ACTION BY ROLE

Question 1, The University of Iceland should make more of an effort to encourage people to recycle on campus.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	4.07	4.29
Variance	0.71	0.67
Observations	473.00	461.00
df	932.00	
t Stat	-4.06	
P(T<=t) two-tail	0.00	
Cohen's d	0.32	

Question 2, The University of Iceland should offer double-sided printing for all printers.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	4.45	4.55
Variance	0.61	0.48
Observations	473.00	461.00
df	924.00	
t Stat	-1.99	
P(T<=t) two-tail	0.05	
Cohen's d	0.18	

Question 3, The University of Iceland should offer organic products in their dining facilities.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.51	3.54
Variance	0.91	0.83
Observations	473.00	461.00
df	932.00	
t Stat	-0.54	
P(T<=t) two-tail	0.59	
Cohen's d	0.04	

Question 4, University of Iceland should reduce the amount of packaging that is used in the dining facilities.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.74	4.12
Variance	0.77	0.69
Observations	473.00	461.00
df	931.00	
t Stat	-6.86	
P(T<=t) two-tail	0.00	
Cohen's d	0.53	

Question 5, The University of Iceland should provide incentives for people to walk, bus, bike, or carpool to campus.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.54	3.66
Variance	1.49	1.34
Observations	473.00	461.00
df	931.00	
t Stat	-1.52	
P(T<=t) two-tail	0.13	
Cohen's d	0.08	

Question 6, The University of Iceland should charge people to park their cars on campus.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	2.14	3.07
Variance	1.56	1.80
Observations	473.00	461.00
df	923.00	
t Stat	-10.98	
P(T<=t) two-tail	0.00	
Cohen's d	0.55	

Question 7, The University of Iceland should offer classes about sustainability for faculty and staff.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.60	3.77
Variance	0.73	0.69
Observations	473.00	461.00
df	932.00	
t Stat	-2.92	
P(T<=t) two-tail	0.00	
Cohen's d	0.23	

Question 8, The University of Iceland should offer more classes about sustainability for students.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.47	3.64
Variance	0.69	0.72
Observations	473.00	461.00
df	930.00	
t Stat	-3.10	
P(T<=t) two-tail	0.00	
Cohen's d	0.24	

Question 9, The University of Iceland has a special responsibility to teach people about sustainability.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.23	3.61
Variance	0.93	0.94
Observations	473.00	461.00
df	931.00	
t Stat	-5.84	
P(T<=t) two-tail	0.00	
Cohen's d	0.39	

Question 10, The University of Iceland should work to spread awareness about sustainability on campus.

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
	<i>e</i>	
Mean	3.76	4.00
Variance	0.65	0.60
Observations	473.00	461.00

df	932.00
t Stat	-4.74
P(T<=t) two-tail	0.00
Cohen's d	0.39

Question 11, The University of Iceland should make an effort to reduce the amount of energy used on campus

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.71	4.11
Variance	0.71	0.56
Observations	473.00	461.00
df	924.00	
t Stat	-7.56	
P(T<=t) two-tail	0.00	
Cohen's d	0.62	

Question 12, How would you rate your level of environmentalism?

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	3.52	3.77
Variance	0.59	0.59
Observations	473.00	461.00
df	931.00	
t Stat	-4.96	
P(T<=t) two-tail	0.00	
Cohen's d	0.42	

Knowledge Quiz score by Gender

	<i>Female</i>	<i>Male</i>
Mean	5.57	6.17
Variance	4.01	3.42
Observations	639.00	295.00
df	616.00	
t Stat	-4.53	
P(T<=t) two-tail	0.00	
Cohen's d	0.16	

Knowledge by Age

	<i>31 and Older</i>	<i>30 and Younger</i>
Mean	6.01	5.52
Variance	3.74	3.94
Observations	454.00	477.00
df	929.00	
t Stat	3.85	
P(T<=t) two-tail	0.00	
Cohen's d	0.13	

Knowledge by Nationality

	<i>Icelander</i>	<i>Foreigner</i>
Mean	5.75	5.86
Variance	3.72	5.43
Observations	834.00	100.00
df	116.00	
t Stat	-0.47	
P(T<=t) two-tail	0.64	
Cohen's d	0.02	

Knowledge by Role

	<i>Undergraduate</i>	<i>Non-Undergraduate</i>
Mean	5.30	6.23
Variance	3.77	3.60
Observations	473.00	461.00
df	932.00	
t Stat	-7.37	
P(T<=t) two-tail	0.00	
Cohen's d	0.25	

