

EDUCATION, ENVIRONMENTAL ATTITUDES AND THE DESIGN
PROFESSIONS: A MASTERS THESIS

A Thesis

Presented to the Faculty of the Graduate School
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Master of Science

by

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August 2005

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ABSTRACT

As the concept of sustainability continues to become more popular within society, a number of different professions are called on to help champion the movement. With the resource strain inflicted by the construction industry alone, dedicated architects and interior designers are important players in forward progress. Though many organizations and associations have been created to help the building industry embrace sustainability both practically and theoretically, the actual implementation of green building practices in construction has been minimal. The main focus of this study is to look at the influence of undergraduate education on designers' interest in sustainable design. Additional interest was in environmental attitudes and the impact of interpersonal relations on those attitudes.

Self-proclaimed practitioners in the green building industry were surveyed through a specified email list of the United States Green Building Council. The survey was web-based and addressed issues including environmental attitudes, undergraduate education and professional training. Dunlap and Catton's widely-used New Ecological Paradigm scale was included to measure proenvironmental orientation of the professionals.

Contrary to the main hypothesis of the study, undergraduate education was not seen by subjects to be a fundamental force in the decision to concentrate on sustainability. A number of educational elements typically seen in environmental education, including interpersonal interactions, were mentioned by subjects as substantially influential and are therefore explored.

B I O G R A P H I C A L S K E T C H

Traci Rose Rider was born and raised in Southwest Ohio. She worked across the country in a variety of different design firms while in pursuit of her Bachelors of Architecture, which she received from the University of Cincinnati in 2000. After graduation, she relocated to Houston, Texas, to work for HO+K Architects and to escape snow. While in Texas she became aware of her innate interest in green building and quickly became involved in the United States Green Building Council through the Emerging Green Builders Committee, of which she is now Chair. In June of 2003 she married a fellow Cincinnati Bearcat, M. Daniel Rider, and promptly returned north to Cornell University – despite the snow - to pursue her graduate degree and figure out *exactly* why it was so difficult to make the design profession “go green.”

A C K N O W L E D G E M E N T S

I must start by thanking Jack Elliott, my thesis advisor, for his good humor, thought-provoking questions and shared passion for the topic of environmental ethics and education as it pertains to the design field. He welcomed me in immediately and made my transition from the corporate world back to school a little less painful than it might have been. For his ability to both encourage something meaningful while keeping me from over-extending I will be forever grateful.

A resounding thank-you also to my minor advisor Dr. Charles Geisler for guiding this trained designer into and through the unknown realm of environmental sociology with wonderful patience and grace. I will always appreciate your dedication and willingness to take me on as a project.

Many other faculty and staff helped inspire me, though they may not know it. Thanks to Tess Cornwell for her unending smiles and good cheer; Sheila Danko for inspiring me to inspire others; Nancy Wells for great feedback and good humor; and to Alan Hedge for enabling me tell good research from bad. And a very special thank you to Rhonda Gilmore for taking an Ohio girl home again at least once a week. May Buckeyes always stick together!

I specifically need to thank Meghan Fay, at the U.S. Green Building Council, who was good enough to not only send out my survey to fellow green-builders across the country, but who has also become a wonderful friend and confidante. Members of my Emerging Green Builders Committee that permitted me to abuse my position at times and use them all endlessly as a sounding board for thesis ideas and trial surveys – Tripp Borstel, Eric Shamp,

Mike Pulaski, Joe Snider, and especially J. Matt Thomas who has talked me back from the edge more than once. Our common cause is what helps to inspire me on a daily basis.

Friends from around the country also deserve mention, because they didn't let me settle: Christine Michels for telling me I was brave when we were loading the Uhaul to uncharted territory; Maria Jones for helping me keep the dream alive; Jody Henry for giving me a great springboard in Texas; Sharon Murray for doing my worrying for me; Tim Hall, the best computer guru known to man; and Annie Renzino-Page for just keeping our relationship going in the wonderful way that it is. I thank you all so much.

My parents deserve unending praise for repeatedly telling me that I can literally accomplish whatever I want, thereby saving me from life in a 6'x6' cube. They are the most fabulous and supportive parents a gal could hope for. I am forever grateful. To my little brother, thank you, for helping to keep me from growing up too much with calls at 12:30am.

And lastly – but certainly not least – my husband Dan deserves the biggest thank you in the world for allowing me to drag him half way across the country, to a place we had never visited, where there is barely any design work to be found, for two long and cold years, just so I could work on figuring out my dream. I am forever yours and forever thankful.

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L I S T O F A B B R E V I A T I O N S

DWW	- Dominant Western Worldview
FIDER	- Foundation for Interior Design Education Research
HEP	- Human Exemptionalist Paradigm
HVAC	- Heating, Ventilating and Air Conditioning
LEED	- Leadership in Energy and Environmental Design
NAAB	- National Architectural Accrediting Board
NEP	- New Environmental (Ecological) Paradigm
SBS	- Sick Building Syndrome
SSSP	- Society for the Study of Social Problems
USGBC	- United States Green Building Council
WCED	- World Commission on Environment and Development

CHAPTER ONE: INTRODUCTION

"In the end we will conserve only what we love; we will love only what we understand; and we will understand only what we have been taught."

~ *Baba Dioum*¹

Sustainability has existed in the design world for centuries, though it was not referred to as such until recent decades. At times mislabeled vernacular, these buildings responded to regional and local elements throughout history without the convenience of central air conditioning and complex drainage systems. The Greek designed their cliff-side dwellings to take full advantage of the sun in the winter months and provide shelter from the beating rays in the summer; African huts were built primarily for shelter and minimum privacy, easily maintained and fit to human scale. As time and technology progressed, however, humanity became increasingly separated from nature and designs lost the necessity to reflect their surrounding environment. This is most apparently illustrated through the Industrial Revolution and the Modernist Era, as architecture claimed the capacity to be set in any landscape.

Design education has followed a similar path, slowly veering off regional and traditional knowledge to follow technological advancements, mobile professionals and lifestyles. The typical education process tends to focus either on the technological side of design, with the intention to teach the

¹ (2003). NatureNode. [Nature Quotes](http://www.naturenode.com/quotes/quotes.html). 2005. Available: <http://www.naturenode.com/quotes/quotes.html>. Retrieved April 27, 2005.

procedures and details of how a building goes together, or on the theoretical side, which emphasizes the importance and impact of the design itself through history on society. Regardless of which of these two concentrations a specific program has chosen, it is probable that the emphasis has shifted from a basis in regional and traditional knowledge – inherently sustainable elements – to one of wide-ranging and sweeping requirements such as history, structures and environmental technologies.

Some schools have kept sustainability in the curriculum through a fundamental dedication, such as Ball State University, California Polytechnic State University and the University of Minnesota, with a thread of ecological understanding running through many of their classes. Though these classes are not described as “sustainable” in either syllabi or course descriptions, each of these schools has a long-standing reputation as a “green school.” Professors within these programs are likely to be involved in green building organizations and will speak of green design simply as logical, not understanding the need to separate “green design” from any other type of design. With this integrated process, the students are exposed to a more comprehensive view and understanding of the impact of sustainability on both the final design and the process. These programs simply include sustainability on a regular basis because that they believe it is necessary and fundamental to the design process. Other programs seem to view sustainable design as a specialization that would require additional classes to be added to an already full curriculum.

Undergraduate education is a powerful factor in the forming of design ethics; it can be an equally powerful force in forming environmental ethics. Through the strategic integration of sustainability into whole curriculum paths,

students would begin to understand the interconnectedness between built forms and nature at an early stage in education, ingraining these ethics into their design process. With such an intense and longer-than-average curriculum, design programs have great potential to make an incredible difference in the direction of the ecological future of the design professions. No studies have been done, however, regarding the impact of design education on the “greenness” of practicing professionals.

This study will use an online survey tool to address two of the most important foundational elements of design – sociology and education – through three distinct threads. First, Dunlap and Van Liere’s NEP Scale will be used to evaluate the environmental attitudes of current green design professionals. Second, the impact of undergraduate education as an influence on sustainability will be examined. Third, additional influences on pro-environmental attitudes will be reviewed and analyzed in conjunction with formal education.² As important singular aspects of design, both sociology and education will be covered in individual chapters.

² While the topics of environmental attitudes and behaviors are linked closely in traditional research, this study will focus primarily on the attitudes of the subjects, not the resultant behaviors.

CHAPTER TWO: SOCIOLOGY

This study will create the argument that the environmental issues society faces are analogous to issues in the world of design and can be addressed through education and design training. Referencing Catton and Dunlap's New Ecological Paradigm (NEP)¹, which discusses foundational beliefs toward the environment, the importance of society's view of the environment in understanding the design profession will be illustrated through environmental sociology. Building on the parallel between the Human Exemptionalist Paradigm (HEP)² and the design field, similarities between the HEP and the foundation of education within the design profession will be explored, ultimately arguing that the design field is in dire need of a restructured paradigm, much like that outlined in the NEP.

To provide a conceptual background, an overview of environmentalism and sustainability will be reviewed first to create general historical and sociological reference points to later relate to the field of design. The topic of sustainability in design will then be reviewed, followed by environmental sociological theories. Varying methods of environmental education will be presented in the following chapter, as well as an overview of design education. This will establish a thorough understanding of sustainability, sociology and education, illustrating how the three elements are able to interact most productively.

¹ Catton, W. R. and R. E. Dunlap (1978). "Environmental sociology: a new paradigm." American Sociologist **13**: 41-49.

² Ibid.

2.1 About Environmentalism and Sustainability

It is important to provide a framework and context for the popular attitudes toward the green movement in today's society. While there is still a raging debate as to what "nature" actually is, as well as what constitutes conservation and what does not, there is substantial historical and contemporary information to be reviewed.

2.1.1 A History of Environmentalism

The American Conservation movement is recognized by many as beginning in the early 1900's with dedicated individuals such as John Muir, President Theodore Roosevelt, Gifford Pinchot and President Franklin D. Roosevelt. This is only the beginning of a long list, the whole of which is too extensive to be covered here. However, these few pioneers heightened environmental awareness and created such organizations as the Audubon Society, the Sierra Club, and the National Parks Service.

As it is known today, environmentalism is viewed as born in the 1960s by a combination of forces: Rachel Carson's work *Silent Spring* shed light on the effects of widely used pesticides while Paul Ehrlich's *The Population Bomb* highlighted concern about the exponentially rising population and the effects that this increase was having on the natural resources. In 1965 President Lyndon B. Johnson said: "Our conservation must be not just the classic conservation of protection and development, but a creative conservation of restoration and innovation. Its concern is not with nature alone, but with the

total relation between man and the world around him. Its object is not just man's welfare but the dignity of man's spirit."³

Earth Day was celebrated in 1970 for the first time by approximately twenty million people; Ansel Adams photographs help to instill a strong sense of reverence for nature in the general public. The incident at Love Canal became famous in 1978 bringing wide-spread awareness to the issue of toxic contamination, and 1979 brought the episode at the Three Mile Island nuclear reactor. Grassroots movements sprung up across the country in response to these episodes initializing change in a number of educational fields, though no major movements were noticed in the field of architecture and design.⁴ While the 1980s were fairly quiet, with elements of sustainable development coming to the forefront across the globe,⁵ the 1990s saw more than 1,200 land trusts protecting nearly five million acres. The United Nations Conference on Environment and Development, or the Earth Summit, was held in 1992 in Rio de Janeiro, resulting in heightened awareness of a number of global environmental issues.

While these happenings are important and definitely noteworthy in the realm of environmentalism, their impact on the average resident outside of the field is debatable. Because these topics did not permeate every household, design professionals – like the general public – were quick to overlook the both the depth and the relevance of the environmental issues that were coming to the forefront of society.

³ (2005). Conservation Timeline: 1901-2000. Conservation Timelines. Woodstock, VT, Conservation Study Institute. **2005**. Available: <http://www.nps.gov/mabi/csi/learning/1901.htm>. Retrieved March 24, 2005.

⁴ This can be seen in those schools referenced earlier, as well as a handful of others, including Cornell University's Department of Design and Environmental Analysis which houses Interior Design, Ergonomics and Facilities Management programs.

⁵ (1987). Our Common Future. Oxford, Oxford University Press: 28.

2.1.2 Sustainability

“We do not inherit the earth from our ancestors, we borrow it from our children.”

*~ Native American Proverb*⁶

Though environmentalism itself has been around for decades, as outlined in the previous section, it had been a movement typically championed by the minority of the population and by grassroots movements. The creation of the Brundtland Report by the World Commission on Environment and Development (WCED) in 1987 brought environmentalism to center stage by introducing the idea of sustainable development. Most well-known for the idea of meeting the needs of the present population without compromising the needs of future generations, the report by Norwegian Prime-Minister Gro Harlem Brundtland is repeatedly referenced in discussions on sustainability and environmentalism.

Brundtland's perspective began to realize the importance of interconnectedness of nature and human development. Sustainable business principles, however, came into focus primarily through the works of Paul Hawken and the duo of Amory and Hunter Lovins in the early 1990s. Hawken is the founder of a number of different companies focusing on environmental restoration and social justice.⁷ Amory and Hunter Lovins are cofounders of the Rocky Mountain Institute, a nonprofit organization concentrating on the efficient and restorative use of resources by inspiring businesses, societies,

⁶ (2003). NatureNode. [Nature Quotes](http://www.naturenode.com/quotes/quotes.html). 2005. Available: <http://www.naturenode.com/quotes/quotes.html>. Retrieved April 27, 2005.

⁷ For more information, see www.paulhawken.org.

and governments to implement integrative solutions.⁸ Hawken's *The Ecology of Commerce: A Declaration of Sustainability* was the first work addressing industry and business from an ecological perspective. A number of other works were quick to follow including *Natural Capitalism*, the collaboration between Hawken and the Lovins proposing a new business paradigm in which businesses create profitability through their own individual environmental responsibility.⁹ Hawken, Lovins and Lovins encourage a thorough understanding of nature through the Rocky Mountain Institute; this dedication is based on the opinion that collaboration with nature will create better systems and business for the earth as a whole.¹⁰

Perhaps the most notable shift resulting from these sustainable business works is that of Ray Anderson, CEO of Interface Inc. After reading Hawken's *The Ecology of Commerce* in 1994, Anderson shifted the focus of his billion-dollar per year company 180 degrees.¹¹ In 1997, Anderson was named co-chairman of President Clinton's Sustainable Development Council among other numerous honors.

Another notable document that followed was "The Hannover Principles" developed by William McDonough and Michael Braungart for the City of Hannover, Germany, for the World's Fair EXPO 2000.¹² These principles were intended to be guidelines directing city development in line with the definition of sustainability as previously put forth in the Brundtland Report

⁸ For more information on the Rocky Mountain Institute, see www.rmi.org.

⁹ Hawken, P., A. Lovins, et al. (1999). *Natural Capitalism: Creating the Next Industrial Revolution*. Boston, Little, Brown and Company: 2-5; Hawken, P. (1993). *The Ecology of Commerce: A Declaration of Sustainability*. New York, HarperCollins Publishers: 1-219.

¹⁰ For more information on the Rocky Mountain Institute, see www.rmi.org.

¹¹ Kinkead, G. (1999). In the Future, People Like Me Will Go to Jail. *Fortune*. **139**: 190-195.

¹² For an in-depth look at The Hannover Principles, download a copy of the report at <http://www.mcdonough.com/principles.pdf>

regarding the ability of the present population to meet their needs without compromising that ability of future generations to also meet their needs. These principles went on to provide the basis for McDonough's *Cradle to Cradle: Rethinking the Way We Make Things* in 2002.¹³

There are a number of works questioning some of the assumptions and messages of environmentalism, the most prominent being Bjorn Lomborg's *The Skeptical Environmentalist: Measuring the Real State of the World*. While Lomborg does not refute his status as an environmentalist, he proposes that the world may not be in as bad of shape as many environmentalists make it out to be. This perspective helps to balance other more extreme positions, gravitating toward the center of the environmentalism scale.

The topic of sustainability is closely tied with the topic of carrying capacity. Rees and Wackernagel feel that the idea of natural capital, as expounded on by Hawken, gives valuable insight to the true meaning of the term sustainability in terms of carrying capacity: no development path is sustainable if it depends on the continuous depletion of productive capital.¹⁴ One of the primary divisions of environmentalism is known as Deep Ecology, which is reliant on the perspective that humans are not able to exist beyond the earth's carrying capacity. The other side of the spectrum, known as Shallow Ecology, believes in the combination of natural resources and capital with the benefits of human capital. Both of these views reference an identifiable limit for the Earth to carry and are therefore connected to both

¹³ McDonough, W. (2002). *Cradle to Cradle: Remaking the Way We Make Things*. New York, North Point Press: 45-91.

¹⁴ Rees, W. and M. Wackernagel (1995). *Urban Ecological Footprints*. Gabriola Island, BC, New Society Publishers: 225.

moral and political issues.¹⁵ These questions address a number of environmental topics, including perspectives on the acceptance of the idea of limits and what approach should be taken to address these limits.¹⁶

Because the topic of the environment is so closely intertwined with endless other topics in endless directions, it is difficult to wrap all aspects into one conclusive argument or one position. However, with the background given, environment in design will be addressed next.

2.2 Green Design

The term “sustainability” itself is used frequently and is open to both interpretation and translation. At any given time the term could be used to refer to efficiency, environmental responsibility, personal or community health, future, systems productivity, environment and green design.¹⁷ There is great discrepancy as the idea currently spans a wide spectrum, from technical implementations to ethical considerations. Because of this range, innumerable works have tackled the subject and only a few will be reviewed here. An overview of the different facets such as solar electricity, landscaping, biomimicry, planning, eco-industry, resource management and ethics can be seen in *Sustainable Architecture White Papers*.¹⁸

¹⁵ Robinson, C. C., A. Dodson, et al. (2002). Adirondack Journal of Environmental Studies: 23-24.

¹⁶ Brown, M. A. (2003). Going for the Green: A Case Study Analysis Evaluating Energy Performance of a Conventional vs. a 'Green' Olympic Speed Skating Oval. Design and Environmental Analysis. Ithaca, NY, Cornell University: 7.

¹⁷ Brown, 2003: 6.

¹⁸ (2000). Sustainable Architecture White Papers. New York, Earth Pledge: 6-11, 19-23, 55-60, 68-76, 105-113, 196-200, 275-279.

The most commonly identified elements of sustainable and ecological design tend to address technical strategies and developments. There are a number of texts including *Energy Efficient Buildings: Architecture, Engineering, and Environment*¹⁹; *Eco-Tech: Sustainable Architecture and High Technology*²⁰; *Green Building Materials: A Guide to Product Selection and Specification*²¹; and *The HOK Guidebook to Sustainable Design*.²² A number of journals and periodicals have also surfaced in the recent years to provide a more fluid dissemination of this type of information into the field including *Environmental Design and Construction*, *Eco-Structure*, *GreenClips*, and *Environmental Building News*.

Most of the technologically focused texts circle around the topic of energy efficiency and is therefore closely tied to financial elements and incentives such as life-cycle cost analysis, building payback in years and lower energy bills. This is a common selling point for green design as designers try to convince their clients to take the sustainable design path. Because each individual building is different in an endless number of ways, it is difficult to compare the financial costs of a green construction effort with traditional construction. However, numerous financial breakdowns are available regarding energy efficiency and building costs, but are outside the scope of this study.²³ As discussed in the earlier section, this begins to relate clearly to

¹⁹ Hawkes, D. and W. Forster (2002). Energy Efficient Buildings: Architecture, Engineering, and Environment. New York, W. W. Norton & Company: 10-231.

²⁰ Slessor, C. and J. Linden (2001). Eco-Tech: Sustainable Architecture and High Technology. New York, W. W. Norton & Company: 1-192.

²¹ Spiegel, R. and D. Meadows (1999). Green Building Materials: A Guide to Product Selection and Specification. Indianapolis, IN, Wiley: 1-336.

²² Mender, S. and W. Odell (2000). The HOK Guidebook to Sustainable Design. Indianapolis, IN, Wiley: 1-412.

²³ More information can be found on endless websites, including but not limited to: KEMA (2003). *Managing the Cost of Green Buildings*. Oakland, CA, KEMA. **2005**; Matthiessen, L. F. and P. Morris (2004). *Costing Green: A Comprehensive Cost Database and Budgeting Methodology*, Davis Langdon Publications. **2005**; CIWMB (2005). *Executive Summary*.

sustainable business practices as described by Hawken, the Lovins' and Anderson. A number of seminars have been created to help designers through this point, such as the "Turning Green Into Gold" presentation from The Corporate Realty, Design & Management Institute out of Portland, Oregon.²⁴

2.3 Environmental Sociology

"Anthropocentrism is simply irrational. And yet this is the thrust of much of our traditional religious thought and teaching, particularly in the West."

~ Russell E. Train²⁵

Designers are, above all, both human and a part of society. Because of this underlying structure, both the history of environmentalism and influences on environmental attitudes must be looked at. Society's environmental attitudes have been addressed in the growing field of environmental sociology, which will be reviewed. There are understandably a number of shades of grey when discussing environmental sociology, but it is agreed upon that there is something worth investigating due to the recent expansion and popularity of the subject. This paper cannot do justice to the comprehensive works done on

Sacramento, CA, California Integrated Waste Management Board. **2005**. Turn up more sources by searching "green building cost analysis."

²⁴ See http://www.squarefootage.net/turning_green_into_gold_20.htm for additional information.

²⁵ Train, R. E. (1990). Speech. North American Conference on Religion and Ecology. Washington DC, QuoteGarden. **2005**. Available: <http://www.quote garden.com/environment.html>. Retrieved June 15, 2005.

the topic of environmental sociology, but will attempt an overview for the sake of relation to the design field.

2.3.1 Environmental Sociology and the NEP Scale

Unlike environmentalism and conservation, the field of sociology has been well-established for more than a few decades. This paper supports the opinion that throughout these years, practitioners became comfortable and well-versed in their field, creating a set of assumed standards. Though these standard beliefs and criterion are never actually outlined point by point, in the 1970's Catton and Dunlap came to feel that certain assumptions had become prerequisites for practicing sociology and were dictating how scientists approached their topics of interest. Because these two sociologists perceived the original root of the field of sociology to be primarily based on human centrality and a fundamental view that humans are exempt from ecological principles and limitations, Catton and Dunlap designated the traditional mindset as the Human Exemptionalism Paradigm (HEP).²⁶ More significantly, in response to these traditional anthropocentric sociological theories, Catton and Dunlap created a "New Environmental Paradigm" (NEP).²⁷

The New Environmental Paradigm was a combination of the early individual work done by both Catton and Dunlap. Catton began to feed the idea of the HEP/NEP debate while expounding on the well-known "Tragedy of

²⁶ Humphrey, C. R., T. L. Lewis, et al. (2002). Environment, Energy and Society: A New Synthesis. Belmont, CA, Wadsworth-Thomson Learning: 25.

²⁷ Dunlap, R. E., K. D. V. Liere, et al. (2000). "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." Journal of Social Issues **56**(3): 433.427.

the Commons” dilemma in his 1980 book *Overshoot*,²⁸ focusing on the fact that limited resources and unlimited resource usage will ultimately cause irreparable damage to the earth and its systems, wreak havoc on those living on it. Many chapters within *Overshoot* can be seen to outline some of the categories and questions used in the NEP survey, which will be discussed more specifically later. Chapter Nine speaks to the idea of human uniqueness and anthropocentrism permeating Western cultures, while Chapter Ten addresses the topic of the balance of nature. As implied by the title, the entire book tackles the topic of limits-to-growth in depth.

Dunlap’s early environmental survey work began during his graduate studies at the University of Oregon in 1970, initially concentrating on student ecoactivists in an Earth Day celebration.²⁹ This interest continued after joining the faculty at Washington State University in the Department of Rural Sociology and helped to urge the creation of the Environmental Problems Division within the Society for the Study of Social Problems (SSSP). This organization was intended to provide a base for like-minded sociologists interested in environmental issues. Those involved were undertaking studies such as environmental activism, environmental attitudes and environmental politics. Finding the opportunity to partner with Catton in the mid-1970’s, the pair became interested in the specific differentiations between environmental sociology and other sociological specialty fields.³⁰ In their perspective, the field of environmental sociology would scrutinize the relationships between

²⁸ Catton, W. R. (1980). *Overshoot: The Ecological Basis of Revolutionary Change*. Urbana, IL, University of Illinois Press: 17-57.

²⁹ Dunlap, R. E. (2002). "Environmental sociology: A personal perspective on its first quarter century." *Organization & Environment* 15(1): 10-29.

³⁰ Ibid.

environmental variables and social variables.³¹ The overarching intention was to identify a core of the environmental sociology realm that would not sway with the society's fickle interest in environmental issues, which has been thoroughly reviewed in communication theory literature, specifically relating to Downs' "issue-attention cycle."³²

The NEP was created just as the subset of environmental sociology was getting off the ground bringing the question of the relationship between environment and society into focus. Some social scientists felt that the standard notion of sociology was, to a large degree, ignoring environmental elements that had become so important to society as a whole during the 1970's. The creation of this field was seen by rural sociologists as a way to address environmental attitudes of societies at large.³³

Catton and Dunlap's NEP revolved around the idea that humans are actually entwined in the circle of life, linked with an infinite number of species and environments where – regardless of technology and culture – ecological laws cannot be overruled. The HEP theory, which Catton and Dunlap feel dominates modern day society, is based upon a Dominant Western Worldview (DWW).³⁴ The basic fundamentals of the DWW are: (1) People are fundamentally different from all other creatures on Earth, over which they have

³¹ Ibid.

³² Ibid; Downs, A. (1972). "Up and down with ecology - the "issue-attention cycle"." The Public Interest(28): 38-51.

³³ Humphrey, C. R., T. L. Lewis, et al., Eds. (2003). Environment, Energy, and Society: Exemplary Works. The Wadsworth Sociology Reader Series. Belmont, CA, Thomson Wadsworth: 4-8.

³⁴ Also referred to as the Dominant Social Paradigm (DSP). For more in-depth reading on the Dominant Western Worldview see Buttel, F. H. (1992). "Environmenralization: Origins, processes, and implications for rural social change." Rural Sociology **57**: 1-27; Buttel, F. H., P. Dickens, et al. (2002). Sociological Theory and the Environment: An Overview and Introduction. Sociological Theory and the Environment: Classical Foundations, Contemporary Insights. F. H. Buttel, P. Dickens, R. E. Dunlap and A. Gijswijt. Lanham, MD, Rowman, Littlefield Publishers, Inc.: 3-32.

dominion; (2) People are masters of their destiny; they can choose their goals and learn to do whatever is necessary to achieve them; (3) The world is vast and thus provides unlimited opportunities for humans; and (4) The history of humanity is one of progress; for every problem there is a solution, and thus progress need never cease.³⁵ It would then be the basic anthropocentric values of the DWW and in turn the HEP that are to blame, for the current state of the earth's biophysical environment.

The NEP environmental attitude scale itself, originally created in a 1976 study by Dunlap and Van Liere, addressed three proposed indicators of an environmental worldview when first created in the late seventies: anti-anthropocentrism, limits to growth, and the balance of nature.³⁶ This initial scale found that the twelve original questions strongly discriminated between environmentalists and the general population.³⁷ The name was quickly changed from the "New Environmental Paradigm" to the "New Ecological Paradigm" in order to better emphasize the ecological foundation of societies.³⁸ In 1990 the original 12-question scale was revisited and adapted, with the addition of two new areas of concern: the possibility of an ecocrisis and the rejection of human exemptionalism.³⁹ This new scale had fifteen questions and was found to be just as successful in the prediction of an ecological worldview while covering more topics, skillfully bringing together

³⁵ Dunlap, R. E. and W. R. Catton (1980). "A New Ecological Paradigm for a Post-Exuberant Sociology." American Behavioural Scientist **24**(1): 15-47.

³⁶ Dunlap, R. E. and K. D. VanLiere (1978). "The "new environmental paradigm": A proposed measuring instrument and preliminary results." Journal of Environmental Education(9): 10-19;

VanLiere, K. D. and R. E. Dunlap (1980). "The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence." Public Opinion Quarterly **44**: 181-199.

³⁷ Dunlap & Van Liere, 1978: 10-19.

³⁸ Dunlap, R. E. and W. R. Catton (1979). "Environmental Sociology." Annual Review of Sociology **5**: 243-273.

³⁹ Dunlap, R. E., K. D. V. Liere, et al. (2000). "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." Journal of Social Issues **56**(3): 433.

Dunlap's early environmental survey work and Catton's influential concerns for Earth's carrying capacity.

A number of studies on specific populations have helped to solidify Dunlap and Van Liere's original findings that the scale denotes proenvironmental attitudes and establishes known-group validity.⁴⁰ Additional studies have proven predictive validity as well by illustrating a significant relationship between the NEP scale and a variety of intended behaviors and actual behaviors, both observed and self-reported.⁴¹ The presence of both types of validity simultaneously indicates that the NEP scale possesses criterion validity, confirming the accuracy of the measure.⁴²

2.3.1-1 *HEP/NEP and the Design Practice*

The HEP/NEP debate is easily applied to the design professions. Paralleling the field of sociology, designers' actions and beliefs are historically based on underlying presumptions reflecting the HEP view as stated earlier.

⁴⁰ Pierce, J. C., M. E. Steger, et al. (1992). Citizens, political communication and interest groups: Environmental organizations in Canada and the United States. Westport, CT, Praeger; Widgren, O. (1998). "The new environmental paradigm and personal norms." Environment and Behavior **10**: 3-15.

⁴¹ Edgell, M. C. R. and D. E. Nowell (1989). "The new environmental paradigm scale: Wildlife and environmental beliefs in British Columbia." Society and Natural Resources(2): 285-296; Scott, D. and F. K. Willits (1994). "Environmental attitudes and behavior: A Pennsylvania survey." Environment and Behavior **26**: 239-260; Stern, P. C., T. Dietz, et al. (1995). "The new ecological paradigm in social-psychological context." Environment and Behavior **27**: 723-743; Schultz, P. W. and S. Oskamp (1996). "Effort as a moderator of the attitude-behavior relationship: General environmental concern and recycling." Social Psychology Quarterly **59**: 375-383; Blake, D. E., N. Guppy, et al. (1997). "Canadian public opinion and environmental action." Canadian Journal of Political Science(30): 451-472; Roberts, J. A. and D. R. Bacon (1997). "Exploring the subtle relationships between environmental concern and ecologically conscious consumer behavior." Journal of Business Research **40**: 79-89; Schultz, P. W. and L. C. Zelezny (1998). "Values and proenvironmental behavior: A five-country survey." Journal of Cross-Cultural Psychology **29**: 540-558.

⁴² Zeller, R. A. and E. G. Carmines (1980). Measurement in the social sciences. New York, Cambridge University Press; Kerlinger, F. N. and H. B. Lee (2000). Foundations of Behavioral Research. Fort Worth, TX, Harcourt College Publishers: 668-669.

Examples include but are not limited to: the unchecked harvesting of forests and extracting of minerals for construction materials; tearing down buildings no longer perceived to be attractive only to replace them with other equally-dated structures likely to be torn down later; the use of chlorofluorocarbons (CFCs)⁴³ in Heating, Ventilating and Air Conditioning units (HVAC), which are now no longer permitted in building use in accordance with the Montreal Protocol treaty; and the destruction of living ecosystems for new suburban sprawl.

Though there are no direct correlations to the design professions found in the NEP literature, the foundations of the NEP translate easily. Under the NEP proposal that long-term human existence is endangered by a variety of biophysical factors, the current civilization must adapt to probable future environmental conditions. This feeling is mirrored in a number of architectural writings such as McDonough and Braungart's *Hannover Principles*, as previously discussed.⁴⁴ However, the majority of practitioners within design and outside of academia no longer feel that societal concerns are central in their profession. While they have been overcome with budgets, schedules and construction constraints, some have not forgotten their potential to impact society dynamically. The NEP assumes that the health of modern societies depends largely on the health of the ecosystems with which they coexist.⁴⁵ Architects, designers and planners have an incredible impact on the health of both the physical and natural environment. For example, by specifying a material, such as an Italian stone, which must travel around the world to reach

⁴³ Chlorofluorocarbons are compounds that deplete ozone in the stratosphere.

⁴⁴ For an in-depth look at *The Hannover Principles*, download a copy of the report at <http://www.mcdonough.com/principles.pdf>: p.6.

⁴⁵ Dunlap, R. E. (2002). Paradigms, Theories, and Environmental Sociology. *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights*. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, Rowman & Littlefield Publishers, Inc.: 329-350.

the construction site, designers are not only mining arguably unnecessary minerals and resources simply for contrived aesthetics, but are also doing immense amounts of damage. Through the development of pollution and frivolous energy expenditure, in addition to other contributing forces, this type of material mining, transportation, and processing continues to compound the degradation of the environment on a variety of levels.

Site selection is also a key design decision that is easily taken for granted. While many clients and designers tend to seek out traditional beauty – landscapes, water features, natural settings – much less impact would be made on the environment during construction if a brownfield site⁴⁶ or previously used urban site was selected for construction. Minimizing the footprint and floorplate of the building minimizes site disturbance and gives ecosystems impacted by construction a better chance for survival. Orientations of a building on a site, or of spaces within an existing building, are also frequently overlooked. By giving priority to sun angles and wind direction instead of orientations decided only by views and lot lines, the HVAC needs for the building can be greatly altered, resulting in both less energy expenditure as well as a healthier workplace for the inhabitants. Though these are unintended consequences of daily decisions, the impact is not so small when multiplied thousands of times, going unchecked.

The majority of practitioners remain loyal to traditions and paradigms that have been reliable for endless decades. As it currently stands, sustainable designers are the exception to the rule. In sociological terms, non-

⁴⁶ The definition of a brownfield site as found on the Florida Senate website (<http://www.dep.state.fl.us/waste/categories/brownfields/pages/act.htm>) is as follows: real property, the expansion, redevelopment, or reuse of which may be complicated by actual or perceived environmental contamination.

green, conventional designers would be advocates of the HEP point-of-view. They are likely unmotivated to change and comfortable with consistency. These individuals would claim in defense of the conventional construction approach that clients are not willing to pay for green extras and inefficiencies, and thereby do not force the issue in the market. The market is the HEP-type designer's primary concern; demand is the ultimate design authority to which to answer. In this view there is no problem and therefore no necessity to implement sustainable design. In line with the Dominant Western World view and HEP perspective as covered earlier, resources may continue to become scarcer and the price will rise, but human ingenuity will prevail and alternatives will be found. It is the argument of this study that designers, as creators of the physical environments in which we live, work and play, should answer to a higher power than the market.

Through our creation of "better," more comfortable and convenient environments, the design profession has been credited with altering the natural environment to an unrecognizable degree. Many corporate campuses, multi-use buildings and neighborhoods of today have paved over natural areas and give society the message that, as humans, we are independent of and non-reliant on the biophysical environment. Closely tied to this is the technological innovation that perpetually changes the future of the professions. We are now able to engineer our buildings and environments to the point that users can be ultimately exposed to the natural elements for less than two minutes a day; a person can go from the home, to the car in the garage, to the garage at the office and back again without ever feeling a breeze of fresh air. Because of this removal from the natural environment, our dependence on it seems negligible. And while this scenario is a popular illustration of mankind's

removal from nature, it hits closer to home when referring to designers - because designers contributed to its creation.

The HEP/NEP paradigm shift has been applied to a number of specific populations in addition to the original Washington State population⁴⁷ including farmers⁴⁸, interest groups⁴⁹, ethnic minorities within the United States⁵⁰, and North Carolinians.⁵¹ Residents of specific countries have also been polled using the NEP scale including Sweden⁵², Turkey⁵³, Japan⁵⁴, and the Baltics.⁵⁵ Gender was also found to be a predictor of environmental attitudes using the NEP scale.⁵⁶ No studies have been found to use the NEP scale on the design and construction professions, though a number of the questions used in the scale can arguably relate directly to the field (Appendix B). For example, Statement Two in the NEP survey, "Humans have the right to modify the natural environment to suit their needs," directly addresses the very purpose of the design profession. While the definition of the term architect is "One who

⁴⁷ Dunlap et al., 2000: 428.

⁴⁸ Albrecht, D., G. Bultena, et al. (1982). "The new environmental paradigm scale." Journal of Environmental Education **13**: 39-43.

⁴⁹ Edgell, M. C. R. and D. E. Nowell (1989). "The new environmental paradigm scale: Wildlife and environmental beliefs in British Columbia." Society and Natural Resources(2): 285-296; Pierce, J. C., M. E. Steger, et al. (1992). Citizens, political communication and interest groups: Environmental organizations in Canada and the United States. Westport, CT, Praeger.

⁵⁰ Caron, J. A. (1989). "Environmental perspectives of Blacks: Acceptance of the "new environmental paradigm". " Journal of Environmental Education(20): 21-26; Noe, F. P. and R. Snow (1989). "Hispanic cultural influence on environmental concern." Journal of Environmental Education(21): 27-34.

⁵¹ Nooney, J. G., E. Woodrum, et al. (2003). "Environmental worldview and behavior: Consequences of dimensionality in a survey of North Carolinians." Environment and Behavior **35**(6): 763.

⁵² Widegren, O. (1998). "The new environmental paradigm and personal norms." *Ibid.* **10**: 3-15.

⁵³ Furman, A. *Ibid.* "A note on environmental concern in a developing country: Results from an Istanbul survey." **30**: 520-534.

⁵⁴ Pierce, J. C., N. P. Lovrich, et al. (1987). "Environmental belief systems among Japanese and American elites and publics." Political Behavior **9**: 139-159.

⁵⁵ Gooch, G. D. (1995). "Environmental beliefs and attitudes in Sweden and the Baltic states." Environment and Behavior **27**: 513-539.

⁵⁶ Rauwald, K. S. and C. F. Moore (2002). "Environmental attitudes as predictors of policy support across three countries." *Ibid.* **34**(6): 709-740.

designs and supervises the construction of buildings or other large structures,”⁵⁷ it is easily argued that in order to construct these buildings we are directly modifying the natural environment. Statement Four, “Human ingenuity will insure that we do NOT make the earth unlivable,” can be translated to speak directly to technological advancements in the building industry. In Statement Six, “The earth has plenty of natural resources if we just learn how to develop them,” references issues in design and construction including forestry management and energy conservation.

Though the connection between the NEP scale and the design profession may seem stretched, this study posits the idea that the state of ecologically-oriented design professions is actually tied closely to the basis of the NEP scale. It conversely sets out to determine the degree to which architectural training aligns itself with the Human-Exemptionalist Paradigm.

2.3.1-2 *Classical Sociological Influence*

The NEP theory does not claim to rebuke the classical sociological theories, but seeks to incorporate environmental attitudes more sufficiently into the traditional schemes. While each of the three classical sociological schools of thought – Weberian, Durkheimian, and Marxian – focus on the social causes of social phenomena, it has been recognized that they, too, have elements that can be viewed as environmentally friendly.⁵⁸ Each of the leading modern environmental sociologists has been powerfully influenced by

⁵⁷ Dictionary.com (2000). Architect. American Heritage Dictionary of the English Language, Houghton Mifflin Company. **2005**. Available: <http://dictionary.reference.com/search?q=architect> Retrieved: March 24, 2005.

⁵⁸ Buttel et al., 2002: 4-12, 51-115.

one of these classical institutions and cite examples as to how the classicists are vastly relevant to modern-day environmental sociology.⁵⁹ The traditional views of Weber and Marx have been repeatedly used in reference to environmental sociology in previous literature⁶⁰ and will not be presented in this study. However, because of the relevance of Durkheim's views to the issues facing the design profession, an overview Durkheim's views and connections to both the design profession and the environment will be given for reference.

Emile Durkheim, the third of the most recognized classical sociologists, believed that human ingenuity would facilitate growth and technology enough to overcome any environmental developments found to threaten humankind. In this perspective, humans are an exception from ecological limitations due to their constantly evolving culture and technology.⁶¹ This would happen, in Durkheim's view, through a social division of labor which would help denser societies adapt to their environments more easily through innovation.⁶² However, this division of labor "has increased human commitment to

⁵⁹ Albrow, M. (1987). The Application of the Weberian Concept of Raionalization to Contemporary Conditions. *Max Weber, Rationality and Modernity*. S. Whimster and S. Lash. London, Allen and Unwin: 164-182; Benton, T. (1996). Marxism and Natural Limits: An Ecological Critique and Reconstruction. *The Greening of Marxism*. T. Benton. New York, Guilford; Catton, W. R. (2002). Has the Durkheim Legacy Misled Sociology? *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights*. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, MD, Rowman and Littlefield Publishers, Inc.: 90-115; Dickens, P. (2002). A Green Marxism? Labor Processes, Alienation, and the Division of Labor. *Sociological Theory and the Environment: Classical Foundations. Contemporary Insights*. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, MD, Rowman, Littlefield Publishers, Inc.: 51-72; Murphy, R. (2002). Ecological Materialism and the Sociology of Max Weber. *Sociological Theory and the Environment: Classical Foundations, Contemporary Insights*. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, MD, Rowman & Littlefield Publishers, Inc.: 73-89.

⁶⁰ Buttel et al., 2002: 51-89; Humphrey, C. R., T. L. Lewis, et al. (2002). *Environment, Energy and Society: A New Synthesis*. Belmont, CA, Wadsworth-Thomson Learning: 45-68; Murphy, 2002: 73-89.

⁶¹ Humphrey et al., 2002: 42.

⁶² Buttel, F. H. (1986). "Sociology and the Environment: The Winding Road toward Human Ecology." *International Social Science Journal* **109**: 337-356.

managing (rather than just participating in) ecosystems.”⁶³ With designed structures separating humans from the natural environment, architects and designers have aided, if not entirely encouraged, a disassociation from ecosystems.

Durkheim felt that “value-adding” processes depended on the availability of natural resources, as well as on the “services” of others.⁶⁴ This can be seen in the design profession’s fundamental desire to make spaces and places better – to add value to the lives of the users, if only in some small way. The development of these better places have traditionally depended on the harvesting and razing of natural resources. As a sociologist noted early in the twentieth century, “quite in a day’s work, a people can so dissipate or use up its natural resources as to leave the land scarcely habitable.”⁶⁵

2.3.2 Environmental Concern and Behavior

The correlation between environmental concern and behavior has been studied to some extent with “environmentally significant behavior” being defined as “the extent to which it changes the availability of materials or energy from the environment or alters the structure and dynamics of ecosystems or the biosphere itself.”⁶⁶ While this may qualify as reduced water use, recycling or using public transportation for the general public, it goes farther for those in the design profession. In other words relating to design, behavioral change is an action that lessens the impact based on site selection,

⁶³ Catton, 2002: 99.

⁶⁴ Catton, 2002: 107.

⁶⁵ Ross, E. A. (1918). "Social Decadence." *American Journal of Sociology* **23**: 620-632.

⁶⁶ Stern, P. C. (2000). "Toward a Coherent Theory of Environmentally Significant Behavior." *Journal of Social Issues* **56**(3): 407-424.

water use, energy use, material selection, and other similar choices. Specifically, the process of clearing land for buildings and or clearing for material to build the buildings both directly and proximally causes environmental change.⁶⁷

By this definition, the entire practice of architecture would contest environmentally significant behavior. The environmental impact of design has increased throughout history because of desires for security, status, comfort, mobility, enjoyment and so on, relating back to Marx's sociological basis of capitalism. Because of this basic definition, the concession is commonly given that the design profession as a whole will continue to negatively influence the environment. Recent studies show that architects and the building industry are responsible for approximately half of America's energy consumption and half its greenhouse gas emissions, giving credence to this assumption.⁶⁸ Tighter buildings are designed with the intent to reduce energy consumption while increasing both user comfort and health; Seppanen found that air conditioning systems, in relation to natural ventilation systems, are consistently associated with a statistically significant increase of one or more symptoms of Sick Building Syndrome in office workers.⁶⁹ Buildings accounted for 39.4% of the total energy consumption of the United States in 2002.⁷⁰ Building occupants consume 12.2% of the total water in the United States daily.⁷¹ There was a 24% increase in land developed between the years 1992

⁶⁷ Stern, P. C., O. R. Young, et al., Eds. (1992). Global environmental change: Understanding the human dimensions. Washington, DC, National Academy Press: 36, 68-69.

⁶⁸ Hawthorne, C. (2003). Turning Down the Global Thermostat. Metropolis: 102-107, 149, 151-152.

⁶⁹ Seppanen, O. and W. J. Fisk (2002). "Association of ventilation system type with SBS symptoms in office workers." Indoor Air **12**(2): 98-112.

⁷⁰ DOE (2004). Buildings and the Environment: A Statistical Summary, Department of Energy. **2005**.: 2. Available: <http://www.epa.gov/greenbuilding/gbstats.pdf>. Retrieved May 31, 2005.

⁷¹ DOE, 2004: 3. Retrieved May 31, 2005.

and 2002, and approximately 136 million tons of waste per year is attributed to building-related construction and demolition.⁷²

However, this position of environmental degradation through construction could be argued against, with numerous examples of buildings that actually respond to the site and environment and are conscientious in building methods. Though it is virtually impossible to create a structure without having an impact on the immediate ecosystems, site selection and landscaping opportunities can be capitalized on to minimize the negative effect. Brownfields, contaminated or already used construction sites, can be used instead of virgin land; remaining site areas can be manipulated to create alternate living areas for organisms during the construction process. In the National Wildlife Federation Headquarters in Reston, Virginia, designed by the firm of Hellmuth, Obata + Kassabaum completed in 2002, the new design specifically and deliberately creates new habitats in the immediate periphery of the building, supporting a number of ecosystems throughout the construction site.⁷³

2.3.3 Environmental Attitude

Environmentalism has been described as the tendency to act with pro-environmental intentions.⁷⁴ There are a variety of theories addressing the different elements that may influence environmental attitudes and behavior

⁷² Ibid.

⁷³ Taken from the HOK Sustainability website <http://www.hoksustainabledesign.com>. Retrieved February 26, 2005.

⁷⁴ Stern, 2000: 411.

including affinity towards nature⁷⁵ and sympathy for others living beings.⁷⁶ Additionally, altruism has been viewed as a reason for environmental concern, based on the presumption that good environmental quality benefits the larger population.⁷⁷ While these are all significant possible determinants of environmentalist tendencies, the focus in this study will be on more general values, specifically those of design professionals that have “gone green.”⁷⁸

Schwartz promotes interdisciplinary activity as a way to bolster environmental attitude and behavior, claiming that those individuals focusing beyond their immediate social circle will be stronger and more likely to be among those involved in pro-environmental activities.⁷⁹ This theory may be specifically applicable to the design profession as architects and interior designers are continually focused on the immediate construction at hand, and have always been trained this way. Design training is traditionally narrow-focused, with few chances available for electives outside of the programs.⁸⁰ With the implementation of more interdisciplinary activities at the outset of training, there may be a possibility to turn more future professionals to the green track. It is educational implementations like these that will be reviewed.

⁷⁵ Kals, E., D. Schumacher, et al. (1999). "Emotional affinity toward nature as a motivational basis to protect nature." *Environment and Behavior* **31**: 178-202.

⁷⁶ Allen, J. B. and J. L. Ferrand Ibid. "Environmental locus of control, sympathy, and proenvironmental behavior: A test of Geller's actively caring hypothesis." 338-353.

⁷⁷ Schwartz, S. H. (1973). "Normative explanations of helping behavior: A critique, proposal, and empirical test." *Journal of Experimental Social Psychology* **9**: 349-364; Schwartz, S. H. (1977). Normative influences on altruism. *Advances in experimental social psychology*. L. Berkowitz. New York, Academic Press. **10**: 221-279.

⁷⁸ The terminology “go green” is used in the design profession to mean turning toward sustainable or ecological design from traditional processes and construction.

⁷⁹ Schwartz, S. H. (1994). "Are there universal aspects in the structure and contents of human values?" *Journal of Social Issues* **50**(4): 19-46.

⁸⁰ For example, the University of Cincinnati's Architecture program requires at least 24 credit hours - approximately eight classes - in electives outside the program in four years (http://www.daap.uc.edu/program_pdf/said/BS_Architecture.pdf). Cornell University's Architecture program requires a minimum of 28 credit hours – approximately nine classes – outside the department in five years (<http://www.architecture.cornell.edu/index.htm>).

CHAPTER THREE: EDUCATION

“Look deep into nature, and then you will understand everything better.”

~ Albert Einstein ¹

3.1 Environmental Education

Facilitating the desired shift toward pro-environmental values and behavior through ecological and environmental education has been a subject under intense scrutiny in recent decades. The movement has its foundation in rural and local studies in the 1960's.² Building on this momentum, the United Nations Conference on the Human Environment was held in Stockholm in 1972. The term “environmental education” became popular in the 1970's, and began to encompass the ethical, political and urban issues that had been previously left to other fields. The 1980's wrapped global issues into the field while the 1990's allowed “environmental education” to be grouped with other movements looking to education for change, such as social equality. In 1987, the World Commission on Environment and Development published The Brundtland Report, more commonly known as “Our Common Future,” which helped to fuel change in the education world by creating a unified world view and a unified global problem.³

¹ (2005). The Quote Garden. Nature. T. Guillements. Phoenix, Arizona, WBS Publishing. **2005**. Available: <http://www.quote garden.com/nature.html>. Retrieved April 27, 2005.

² Sterling, S. (2001). Sustainable Education: Re-visioning Learning and Change. Bristol, Schumacher Society: 30.

³ For additional information see <http://www.brundtlandnet.com/>

As a result of all these factors, a number of high-powered groups have continued to challenge the education profession to change the public's environmental perception.⁴ Many researchers and experts believe that traditional education is based on an outdated set of cultural beliefs and assumptions with an anthropocentric viewpoint and that a shift to environmental communication and education can change that.⁵ Taking this reasoning to heart, environmental education is championed by many to be the most effective means to an end.

Environmental education can be used in many forms. Direct and intensive forms of education employ primary communication tactics including nature camps, seminars, environmental essays, websites, community gardens, nature trails and lectures. Indirect education, using secondary communication means, include cartoons, toys and outdoor activities for children; adults may be more exposed to media outlets such as newspapers, television, and public service announcements. There are not many forms of education, marketing or public service announcements that are out of the scope of environmental education. Mark Terry went so far as to suggest in his 1971 book *Teaching for Survival* that all education is environmental, whether or not it is intended as such.

Much literature and research has been dedicated to this subject. The major purpose of this study is effective to determine if environmental education is in eliciting behavioral changes in university level students, as well as what are the most effective means.

⁴ Sterling, 2001: 12.

⁵ Bowers, C. A. (1995). Educating for an Ecologically Sustainable Culture: Rethinking Moral Education, Creativity, Intelligence, and Other Modern Orthodoxies. Albany, State University of New York Press: 6-8.

3.1.1 Educational Paradigms

Public schools and higher education have been identified by many experts as a critical leverage point for change in environmental thinking. Some argue that the fundamental flaw with this is that the majority of education is primarily based on outdated assumptions and values. Sterling claims that traditional education is behind the times in a number of ways: (1) it takes a “fundamentally mechanistic” view of the world; (2) it is primarily ignorant of issues concerning sustainability; and (3) it is uninformed of the growing ecological thinking that intends to more fully integrate humanity with the environment.⁶ Regarding the integration of ecological thought in education, Bowers identifies the irony in believing that these educational institutions are the “most enlightened and progressive aspects of modern culture.”⁷

In an effort to change the foundational emphasis and assumptions of education, much like Catton and Dunlap attempted with their New Ecological Paradigm in sociology⁸, new goals and values must be established. With his own “new educational paradigm” Sterling emphasizes the difference between a “first order” learning and a “second order” learning. While the “first order” learning takes place within the accepted boundaries of the familiar, the “second order” learning change involves critical reflection and awareness.⁹ As the field of sociology was perceived by Catton and Dunlap to hold to anthropocentric views as an outdated foundation, the educational field is considered to be functioning on outdated fundamentals as well. In line with

⁶ Sterling, 2001: 13.

⁷ Bowers, C.A., 1995: 3.

⁸ Catton, W. R. and R. E. Dunlap (1978). "Environmental sociology: a new paradigm." *American Sociologist* **13**: 41-49.

⁹ Sterling, 2001: 15-16.

Durkheimian sociological theories discussed previously, education is predicated on the assumption that human ingenuity will always prevail. However, as the scale of ecological disruption grows, that position becomes increasingly debatable.

Similar to the discussion on traditional education, much of the design curriculum has been established and accepted for decades at the very least, without much change in perspective. Design foundation classes revolve around perspectives, sight lines, materials and construction. Rarely, if ever, do you see a required class including ecological connections or even sustainability. This will be addressed in a later section dedicated to design education and curriculum.

An ecological approach to education would entail a more holistic view, more systematic than the traditional linear method. Ecological education demands the incorporation of science and practicality with largely ignored aspects such as politics, ethics and economics.¹⁰ As it stands, it is popular opinion in the environmental circle that many citizens do not make the connection between Western values emphasized in schools and universities and the state of the environment.¹¹

3.1.2 Elements of Environmental Education

Sustainability education is felt by some to not have the goal of creating throngs of environmentalists, but to implement lifelong learning as well as civic, social, emotional and academic competencies, creating a better world at all

¹⁰ Orr, D. W. (2002). The Nature of Design: Ecology, Culture, and the Human Intention. New York, Oxford University Press: 4.

¹¹ Bowers, 1995: 233.

levels in the future.¹² In concert with this lifelong learning, some elements addressed are critical thinking, transformative learning, participatory education, systematic education, ownership of learning, informal education and knowledge of place. While there is a wide range of literature on each of these individual subjects, not all can be addressed in the scope of this study. Therefore, the focus will lie mostly in the educational processes that seem to be most complementary to environmental education and communication.

3.1.2-1 *Critical thinking*

One of the most important, yet frequently overlooked elements of environmental education is critical thinking. While many only give the topic lip-service then addressing the subject, a number of experts agree on its importance. Sustainable education is defined by Sterling as “a change of educational culture which both develops and embodies the theory and practice of sustainability in a way which is critically aware.”¹³ This notion is reiterated by David Orr, a renowned environmental educator at Oberlin College in Ohio, who claims that today’s society is losing the capacity to think - ultimately losing the capacity to say what we mean and think what we mean.¹⁴ In essence, this is to say that we are simply regurgitating information and not thinking through things or understanding them fully. Krapfel recognizes this and points to the importance of complexity and speculation as a new and possibly better way to help integrate environmental education with the

¹² Santone, S. (2003). "Education for Sustainability." Educational Leadership(December 2003/January 2004): 61.

¹³ Sterling, 2001: 22.

¹⁴ Orr, 2002: 54.

traditional.¹⁵ For example, while children expect the teacher to have all the answers for any question that might come up while in the classroom, the students are quite ready for more complex experimentation out in the field, giving the instructor permission to not know all the answers and discover simultaneously. This allows teachers to also participate in the learning process, while still enlightening, engaging and energizing the students. Closely tied to participatory education, this process leads to sessions of watching, recording, understanding, and learning through first-hand experiences – not simply regurgitating facts from books.

Many authors tackling critical thinking claim it to be one of the most important elements of environmental education. According to the American Philosophical Association, critical thinking is the process of purposeful, self-regulatory judgment, which drives problem-solving and decision-making.¹⁶ While many young adults are noticeably aware of environmental problems, they are often less likely to actually understand the problem that they find themselves championing. Bator et al. outlines twelve steps closely tied to critical thinking that are necessary for communication to result in practical and executable behavior, following receiving an environmental message.¹⁷ These steps include paying attention to the message, liking it, understanding it, agreeing with it, and storing it for retrieval later, ultimately to make decisions based on the foundation of the message at a later time.¹⁸ Critical thinking,

¹⁵ Krapfel, P. (1999). Deepening Children's Participation through Local Ecological Investigations. Ecological Education in Action. G. A. Smith and D. R. Williams. Albany, NY, State University of New York: 47-64.

¹⁶ APA (1990). Critical thinking: a statement of expert consensus for purposes of educational assessment and instruction. ERIC Document No. ED 315 423, American Philosophical Association.

¹⁷ Bator, R. J. and R. B. Cialdini (2000). "The Application of Persuasion Theory to the Development Of Effective Proenvironmental Public Service Announcements." Journal of Social Issues **56**(3): 529.

¹⁸ Bator and Cialdini, 2000: 529.

embodied in these twelve outlined steps (Appendix A), is undoubtedly seen as an important ingredient in environmental communication and education and can be easily tied to the design process.

3.1.2-2 *Systems Thinking*

Closely tied to the topic of critical thinking is the idea of systems thinking, which hopes to broaden the scope of topics considered when attempting to understand the environment and environmental implications. Sterling proclaims the importance of critical thinking and “whole systems thinking.” In what he calls “second order” learning, critically reflective learning is employed and learning goes beyond the dominant forms of thinking such as analytic, linear and reductionist.¹⁹ The concept of “whole systems thinking” within education makes holistic thinking practical, feasible, accessible and understandable.²⁰

One of the best examples of whole systems thinking is interdisciplinary learning, where students are trained to identify contrasting perspectives and reexamine previously held views regarding certain topics.²¹ A complementary and important skill also emphasized by this type of training is the ability to respect a variety of disciplines as powerful sources of information and to recognize the limitations of single disciplinary approaches.²² In relation to environmental education, individuals experiencing this type of education would

¹⁹ Sterling, 2001: 52.

²⁰ Ibid.

²¹ Caviglia-Harris, J. L. and J. Hatley (2004). "Interdisciplinary teaching: analyzing consensus and conflict in environmental studies." International Journal of Sustainability in Higher Education 5(4): 396.

²² Ibid.

be more likely to search for multiple sources of information on controversial topics such as global warming and deforestation, where claims are often brief and pronounced.²³

One such course at Salisbury University in Salisbury, Maryland, was taught through three different departments: ecology, philosophy and economics. While the core beliefs of these three approaches held innate disagreements on the topic of the environment, each of the three perspectives were given equal time and billing, encouraging the students to develop a thorough knowledge of each. Ultimately, feedback from the course showed that while students came into the course with preconceived notions of the environment, throughout the semester they were both encouraged and willing to expand their views to take into consideration other valid viewpoints.²⁴ This type of course is becoming more popular at the university level, especially in fields such as engineering which have been accused of being isolationist in the past.²⁵

Charettes are another forum that holds significant potential in the design world. An intense collaborative design effort usually confined to a few days, a charette brings in a variety of different fields to collaborate on a singular project, pulling a wide range of perspectives to the table. Typically designers, engineers, users and landscape architects are involved, but other groups and organizations can be easily involved as well. Some charettes are intended as more of a community project, bringing not only those in the field

²³ Though the topic of environmental communication and its accuracy, sensationalism, and appropriateness is important and closely tied to the topic of environmental education, it is outside the scope of this study.

²⁴ Caviglia-Harris and Hatley, 2004: 401.

²⁵ Boyle, C. (2004). "Considerations on educating engineers in sustainability." International Journal of Sustainability in Higher Education 5(2): 148-149.

together but serving as an educational tool as well. On such charette to be held in Santa Fe, New Mexico, in September of 2005 is serving primarily as an educational experience focusing on both university and K-12 students in the area.²⁶ The event will not only bring in educators in the traditional fields of design, engineering and landscape, but also environmental educators, governmental groups, community groups, natural products, non-profits and organic foods, as well as socially responsive groups such as the Boys and Girls Clubs of America, with the hopes of creating a more well-rounded, comprehensive scope for designers to work within.

3.1.2-3 *Regionalism*

A number of experts interested in environmental education address the importance of knowledge of place.²⁷ This argument is based on the popular notion that sustainability begins at the local level. While this statement is difficult to dispute, the realistic application of this theory into formal education – especially at the university level – is (1) more difficult and detailed than possible to cover in four years and (2) could well be falling on deaf ears. With the highly mobile world of today, it is continually less likely that graduates will spend their entire lives in one location, let alone the location of their university experience. This makes an intimate knowledge of the land and history not only difficult, but also somewhat unnecessary.

²⁶ This charette is being hosted by the USGBC Emerging Green Builders Committee in partnership with the Santa Fe Boys and Girls Clubs to help facilitate ideas for a new local facility in the green design spectrum.

²⁷ McKibben, B. (1992). The Age of Missing Information. New York, Plume: 41-44, 52; Bowers, 1995: 33; Orr, 2000: 38-42.

McKibben repeatedly points out that the current population has lost fundamental knowledge on how to relate to our environment, but also argues that in today's society that knowledge is not necessary.²⁸ The task of retrofitting the modern day lifestyle to a time fifty years back is immensely overwhelming. The concentration of this paper will continue the assumption that educational efforts need to fit into the mainframe of today's transient culture and not dwell on our past levels of knowledge.

Orr refers to the same type of understanding referenced by McKibben, deeming it "slow knowledge."²⁹ This focuses on not only the "know-how," but also the "know-why" that is so frequently forgotten in current society. For example, we should not teach just to recycle, but also why to recycle. We ought to teach not just how to use public transportation, but why to use public transportation. Referring to the same concern voiced in McKibben's *The Age of Missing Information*, Orr believes that we are indeed in an age of information but feels that in terms of understanding, clarity, civility and wisdom we have come into a darker age than before. It is his point of view that it is the job of educators - through the combination of critical thinking, whole systems thinking and local knowledge - to bring us out of our depths and apparent despair in both communication and education.

One feasible application of this local-knowledge theory is what is called "Community Based Social Marketing," and is already being used emphatically and successfully in parts of Canada.³⁰ Composed of four steps – (1) uncovering barriers to behaviors and selecting what behavior to promote, (2)

²⁸ McKibben, 1992: 41-44.

²⁹ Orr, 2002: 35-42.

³⁰ McKenzie-Mohr, D. (2000). "Promoting Sustainable Behavior: An introduction to Community-Based Social Marketing." *Journal of Social Issues* 56(3): 549-551.

design a feasible and directed program, (3) pilot the designed program, and (4) evaluate the program once it has been implemented broadly³¹ – this type of implementation can be paralleled between a typical regional community and an educational community for the area. The success of this proposed parallel would depend deeply on vernacular knowledge and an investment of the students within the local environment, both socially and ecologically.

As McKenzie-Mohr emphasizes with neighborhood communities³², internal and external barriers and commonalities can also easily be found in educational settings. Identifying these common obstructions to environmental behaviors can allow for strategic means of communication and education targeted on the specific population – for this purpose, design in higher education.

3.1.2-4 *Participatory Education*

Participatory education is also hailed as an important educational component pertaining to environmental awareness. Educators have begun to find that intellectual and emotional attachment is an important dimension in the implementation of ecological education.³³ Krapfel found that attachment is directly correlated to individual participation in activities.³⁴ By becoming involved in some type of activity, the participant not only becomes connected to the problem, but begins to see the issue within a bigger picture; the world becomes interconnected and dynamic through the experience.³⁵ Supporting

³¹ Ibid.

³² Ibid.

³³ Krapfel, 1999: 49.

³⁴ Ibid: 55-57.

³⁵ Ibid: 50-55.

this, Orr claims that we are continually creating a world in which we no longer fit.³⁶ Designers are educated to create spaces on fictional projects with little budget and site constraints; it is nearly impossible to thoroughly comprehend the realistic expectations and opportunities found in the real world within this training arena. By taking individuals out into the field, into the woods, onto the construction site, or into the community, they can begin to understand more comprehensively the specific way in which they individually and professionally do fit into the greater scheme of things.

An additional facet of both critical learning and participatory education has to do with the ownership of the learning activity. As Sterling notes, "it has to be meaningful, engaging and participative, rather than functional, passive and prescriptive."³⁷ Research indicates that individuals assume an identity consistent to a behavior relating to feelings of commitment, which are more likely to result in long-lasting attitude and behavior change.³⁸ Findings also indicate that one's perceptions of self-efficacy regarding attempts to perform specific actions and meet specific goals are important and related to persistency, especially in children.³⁹ Through the participation in environmental education activities, the individuals grow in self-confidence, as well as in their understanding and perception of the impact they are able to have on larger problems such as deforestation, endangered species, and global warming. This leads us to believe that a strong participatory experience would likely increase the levels of self-efficacy and personal responsibility that participants typically feel in relation to environmental issues. The "poetry,"

³⁶ Orr, 2002: 25.

³⁷ Sterling, 2001: 27.

³⁸ Bator and Cialdini, 2000: 536.

³⁹ Devine-Wright, P., H. Devine-Wright, et al. (2004). "Situational influences upon children's beliefs about global warming and energy." Environmental Education Research **10**(4): 494.

beauty and connection to nature has been found to be as important in understanding and beliefs as the “science” of the environment.⁴⁰

3.1.2.5 *Informal influences*

The importance of informal influences, such as reading Rachel Carson’s *Silent Spring* or going camping with family on the weekends, should not be overlooked. Many environmentally-friendly people have noted childhood activities and role models as important when forming environmental ethics. In a study on nine-to-twelve year old members of the Woodcraft Folk educational organization in the UK, Devine-Wright et al. found that informal sources of environmental education led to more perceived responsibility, but created no difference in awareness of issues.⁴¹ While the Woodcraft Folk study could also easily fall into the Participatory Education category, it places more emphasis on informal interactions with parents and role models than with educational activities.

Similarly, public service announcements and other media events implementing secondary communication are repeated exposures that cannot be disregarded. In relation to public service announcements, the Persuasion Theory addresses two different routes to persuasion – the peripheral and the central – based on the how much mental processing the target audience would need.⁴² The peripheral route is used typically when the target may not be readily able to think about or digest the information. The central route is

⁴⁰ Williams, D. R. and S. Taylor (1999). From Margin to Center: Initiation and Development of an Environmental School from the Ground Up. *Ecological Education in Action*. G. A. Smith and D. R. Williams. Albany, NY, State University of New York: 86-98.

⁴¹ Devine-Wright et al., 2004: 500-502.

⁴² Bator and Cialdini, 2000: 530-531.

closely tied to critical thinking and usually occurs when the audience is motivated and interested, with the time and incentive to consider the content. While experts agree that the central routes are more desirable for probable results and behavior change, they also agree that peripheral routes are more appropriate for the general public because of their limited exposure to the announcements and information.⁴³ However, in the realm of education there is a captive audience where a central route to persuasion could be capitalized on, especially in higher education. It has also been shown that participants who considered and thoughtfully looked at information content showed more stable attitude change⁴⁴, which would be appropriate in the educational format.

Other medium selections such as movies, television, radio, and print media also have the potential to qualify as environmental education. Studies have been done on environmental messages in films, such as in *The Day After Tomorrow*⁴⁵, television programs⁴⁶, and print media.⁴⁷ While these are all elements of significant impact for environmental education, this study is specifically interested in the application of the environment in the formal education setting, whereas these would be targeted at the general public.

⁴³ Ibid.

⁴⁴ Cook, T. D. and B. R. Flay (1978). The persistence of experimentally induced attitude change. *Advances in experimental social psychology*. L. Berkowitz. San Diego, CA, Academic Press. **9**: 110-134.

⁴⁵ Leiserowitz, A. A. (2004). Before and after the Day After Tomorrow: A U.S. study of climate change risk perception. *Environment*: 23-37.

⁴⁶ Greenberg, M. R., D. B. Sachsman, et al. (1989). "Risk, Drama and Geography in Coverage of Environmental Risk by Network TV." *Journalism Quarterly*: 267-276; Shanahan, J. and K. McComas (1997). "Television's Portrayal of the Environment: 1991-1995." *Journalism and Mass Communication Quarterly* **71**(1): 147-159; McComas, K., J. Shanahan, et al. (2001). "Environmental Content in Prime-Time Network TV's Non-News Entertainment and Fictional Programs." *Society and Natural Resources* **14**: 533-542.

⁴⁷ Bowman, J. S. and T. Fuchs (1981). "Environmental Coverage in the Mass Media: A Longitudinal Study." *Journal of Environmental Studies* **18**: 11-22; Stocking, H. and J. P. Leonard (1990). "The Greening of the Press." *CJR* **November/December**: 37-38,40-44; McComas, K. and J. Shanahan (1999). "Telling Stories About Global Climate Change: Measuring the Impact of Narratives on the Issue Cycles." *Communication Research* **26**(1): 30-57.

3.2 Design Education

This paper supports the position that modern designers have historically envisioned themselves as separate from environmental problems, choosing to believe that the task at hand is, at a fundamental level, the simple need for shelter. The primary concerns for design professionals typically hinge on two facets of design: the creation of spaces to enhance productivity through adjacencies, circulation and square footage and the aesthetics of the proposed space. The focus is narrow, concentrating only on the immediate built form and the occupants' activities within.

It should be acknowledged that these statements seem overly jaded; design professionals often perceive themselves to have some type of a higher calling, which may be social responsibility, public design or improving the well-being of users. A vast number of professional firms pledge their mission statements to bettering the human condition through built form, which is easily within the scope of designer responsibility. However, each of these concerns – when pushed – would likely come in second to budget and marketability. To say that designers are strictly concerned with the creation of shelter devoid of human influence and activity is unreasonable. It is not too much of a stretch, however, to state that the typical designer is concerned primarily with the human relationship to the built-environment, not the built-environment's relationship to nature.

If a designer were to have heightened awareness of their contributions to environmental degradation, the impact would likely be brushed aside in the name of need, shelter, or design. This indirect defiance has been referred to as the “Ostrich Syndrome” in the business world, insinuating that professionals

bury their heads to continue with their work, without disruption⁴⁸; the thought being that if the professional is unaware of environmental problems to which they are contributing, there is no need to take steps to change ingrained habits. As it is said, old habits die hard. In line with this perspective, it is the position of this study that the majority of the design profession remains entrenched in conventional behaviors. With these established behaviors come the loss of both the desire and at times the ability to question daily, habitual choices. The following pages will further the argument that many of the very basic assumptions of the design professions as far back as education and training should be questioned.

The most notable document written on the topic of university education is the Boyer Report, published in 1996 by the Boyer Commission on Educating Undergraduates in the Research University. With the focus on research universities, the diverse members⁴⁹ of the Commission concentrate on the introduction and implementation of “inquiry-based” learning.⁵⁰ Understanding that the circumstances of higher education have changed dramatically in the past few decades, the Commission made recommendations based on the following foundational understandings: the American higher education system has become less elite than when it was established; students, as well as the families they come from, have created their own views of higher education and no longer unquestionably accept traditional roles; a wider range of

⁴⁸ Hasan, S. M. J. (1993). "Business schools: Ostrich syndrome." Journal of Organizational Change Management 6(1): 47-53.

⁴⁹ These members include individuals ranging from presidents of universities, to professors of engineering, design, law and education. For a full list, see the Boyer Report itself: Kenny, Shirley Strum, et al. (1996). *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*, The Boyer Commission on Educating Undergraduates in the Research University: v.

⁵⁰ Kenny, et al., 1996: 1.

professional undergraduate degrees are now available; and the first year at a university has often become repetitive to high school curriculum.⁵¹

The Commission also created an Academic Bill of Rights for students at both research and non-research universities, which can be seen in Appendix B.⁵² While it is understood that the Commission was concentrating solely on research universities, it could be argued that every student in a higher education setting would be entitled to such rights as that seen under the third point regarding research institutions: “Many options among fields of study and directions to move within those fields, including areas and choices not found in other kinds of institutions.”⁵³ The recommendations of this report include: making research based learning the standard in undergraduate education; removing barriers to interdisciplinary education; and linking communication skills with course work.

The Boyer Report also mentions research universities having a recognized role in visual and performing arts, remarking on the ability for these programs to engage in the actual practicing of their field – be it painting, photography, ballet or design – before graduating the program. The presence of these programs in the arts typically include, in addition to their academic initiatives at the university proper, additional public programs that allow the students and the community to relate to one another; these programs can become the foundations of cultural life within their neighborhoods and communities.⁵⁴

⁵¹ Ibid.

⁵² Kenny, et al., 1996: 12-13.

⁵³ Ibid.

⁵⁴ Kenny, et al., 1996: 3.

A section of the Boyer Report is dedicated to Internships within curriculum, specifically addressing professional programs in the arts and sciences. By giving students experience that cannot be gained within the classroom, these programs provide real-life, often interdisciplinary, problem solving opportunities. The Boyer Report identifies written and oral communication, diversity in fields, and inquiry-based courses, allowing the theoretical academic setting to be combined with practical experience.⁵⁵

Searches do not unveil much other literature involving educational traditions specific to the design professions with the exception of opinion pieces and magazine articles, which will be referenced. While there are a number of articles in peer-reviewed journals focusing on engineering curriculum, no such studies can be found regarding architecture and interior design. This absence may be due to the entire process becoming fabled to those both in and out of the field; stories of days on end spent in places called *studios*, leaving only to eat and occasionally to sleep.

Such programs remain basically unchanged because they may be seen as beyond reproach and too entrenched in tradition. The following section will briefly review the history and reputation of conventional American design schools. Then literature will be reviewed focusing on the implementation of ecological education, finishing with the possible relationships and integration between the two.

⁵⁵ Kenny, et al., 1996: 18.

3.2.1 History and Reputation

Originally created as a way to upgrade the societal status and intellectual distinction of American architects, the design experience of formal education has become fabled.⁵⁶ Frequently worn as a badge of honor, the long and controversial process that constitutes undergraduate design education is the foundation of what could be seen as something of a design brotherhood. Design curriculum revolves around studio classes, which is where students spend most of their time. “Studio” may have scheduled class time for twelve hours a week, but the actual time spent in the studio space working on design projects far exceeds the official scheduled time. Many students do all their work in studio, even for other classes, using it as a home base; many only leave the studio to sleep and shower, if then. Endless all-nighters and the lived-in state of the studio space are universal, creating a tight bond between anyone that experienced it. Those individuals that enter the work force through another path and without having had the studio experience will be missing some insight into the drive, mentality and inside references of those coworkers that did experience studio.

Typical design curriculum is fast paced and straight-forward, without much diversity or free time to schedule elective classes. Little time is given for electives, while semester schedules are frequently pre-arranged, focusing on design skills, history and theory. While each of these categories is certainly necessary, it will be argued that it is equally necessary to encompass ecological thought and sustainable notions within that curriculum. Though in short supply, elective credits are always included usually with the qualification

⁵⁶ Gutman, R. (1996). Redesigning architecture schools. *Architecture*. **85**: 87-89.

that they fall into one category or another and rarely include environmental studies; a certain amount of electives need to be within the department and a certain number need to be outside of the department. These stipulations are rationalized with the need to cover not only design skills, history and theory, but also technical classes such as structures, planning fundamentals, and heating and ventilation basics. Some have voiced the opinion that, because designers are “responsible for the corpus in which we live our lives,” that design education should be like medical school with different extensive levels of education, though that notion is not practical within the current system.⁵⁷

The building industry is closely tied with the economy of the region, country and world. Milton Glaser, a noted design instructor at the School of Visual Arts in New York City and member of the Boyer Commission, notes that the concentration of the students also follows that flux. Generations of students before the 1980s were mostly interested in aesthetics and beauty, which was followed by a shift in significance towards vocation and job preparation.⁵⁸ Now, possibly because there has been a struggling economy, the focus has been returning to beauty and excellence with the desire to find a larger purpose than just receiving a paycheck.⁵⁹ Similarly, Ernest Boyer stated in 1990 that focus had shifted from general to specialized education; it changed from loyalty to the campus to loyalty to the profession.⁶⁰

While many design schools are thoroughly entrenched in tradition, a few alternatives have been noted as important variations to the typical model.⁶¹ Cuff specifically speaks about studios based on computer

⁵⁷ Pedersen, M. C. (2003). Public Eye. *Metropolis*: 78.

⁵⁸ Pedersen, M. C. (2003). I Heart Milton Glaser. *Metropolis*: 44.

⁵⁹ Ibid.

⁶⁰ Kenny, et al., 1996: 7.

⁶¹ Cuff, D. (2000). Studio Crit. *Architecture*. **89**: 149.

technology, but the reasoning behind this welcome variation could easily be stretched to embrace ecological and sustainable design.⁶² On the basis that curriculum variations allow a break from the three days per week class time with a single professor, incorporating ecological thoughts into studio time and curriculum can help to break up the straight and narrow focus that is usually found in design schools.

Another appreciated change and untapped resource may be multi-disciplinary studios, contrasting the traditional perspective that creative design is best taught in a vacuum.⁶³ Originally, it was thought that providing designers with formal educations would help heighten status and compensation.⁶⁴ In the decades since the implementation of official training, it could be argued that the education process has reverted to a too focused and intense path. Programs at universities have become increasingly fragmented over the last fifty years, as each department tends to stick to itself.⁶⁵ What was once viewed as liberal and broad is seen as constricted and narrow in the ever-widening world of design. As changes continue to happen in the field of practice, 83% of the schools in a 2001 survey conducted by NAAB feel that curricula for architecture students must fluctuate to keep up with changes in practice.⁶⁶

The Boyer Report points out the importance of community relations and interaction between performing and visual arts and local neighborhoods,⁶⁷

⁶² Ibid.

⁶³ Briggs, D. C. (1996). Reform the Design Studio. *Architecture*. **85**: 75.

⁶⁴ Gutman, 1996: 87-89.

⁶⁵ Kenny, et al., 1996: 9.

⁶⁶ ArchitectureSchools.com (2005). Architecture Career Facts. *The Architecture School Directory*. Allison Park, PA, Education.org. **2005**. Available: <http://www.architectureschools.com/>. Retrieved: June 19, 2005.

⁶⁷ Kenny, et al., 1996: 3.

highlighting the importance of the symbiotic relationship between local culture and the arts. Through this type of interaction, design students would be able to see first-hand the importance of the human factor within the design process, as well as the resulting outcome of designs and implementations on the community. Easily falling into the category of participatory education, community outreach within undergraduate design programs could quickly become an invaluable opportunity for both students within the programs as well as for the communities themselves.

Many additional recommendations of The Boyer Report can be applied to design programs, whether or not the accredited design program is housed at a research university. It could be argued that while some design programs may not be at a research institution, design education is formatted with elements of research and discovery in mind including practical applications such as daylighting, structures and circulation flow. It is claimed that the non-researcher typically communicates knowledge bred by others, while the researcher-teacher functions through continuous inquiry.⁶⁸ In design, many instructors are also practitioners; design practitioners are constantly creating, discovering and applying in the real world, with the ability to both pass on their new knowledge, as well as present ideas to the design students for development and debate. While many undergraduate design programs are not found in research institutions, the practical application and continual discovery offered by instructors that also professionally practice design constructs an acceptable alternate.

Additionally, the report asserts that undergraduate students should be valued equally to graduate students and include them in a comprehensive

⁶⁸ Kenny, et al., 1996: 16.

image of the university.⁶⁹ This would include integrated and collaborative learning experiences complementing the implementation of green design, which holds great value in interdisciplinary processes. The main barrier to interdisciplinary learning is the present pattern of university organization, which creates vested interests in traditional fields.⁷⁰ Currently few interdisciplinary examples exist that truly combine design and environmental concerns. The Rhode Island School of Design has an interdisciplinary studio focused on taking large-scale infrastructure or environmental problems and viewing them from a designer's perspective. Created by Charlie Cannon in 1999, the Innovation Studio has tackled issues such as a master plan for an eco-industrial park in Phoenix, Arizona, and redesigned a proposed power plant for Ramaco, New York.⁷¹ In the process of combining necessary environmental issues with the theories of design, the students are given a broader perspective of design itself.

3.2.2 Combining Design Education with Ecology

While there has been no notable research addressing sustainability within design education, a few articles and examples have been published addressing the topic. A yearly survey done by *Metropolis Magazine* in 2003 states that while it is fundamentally true that grassroots environmentalism is having an effect on design and architecture, the integration of sustainability into formal education leaves much to be desired. It was the attempt of this survey to “take the pulse of design education in North America” and see how

⁶⁹ Kenny, et al., 1996: 7.

⁷⁰ Kenny, et al., 1996: 23.

⁷¹ Taylor, T. (2003). Thinking Big. *Metropolis*: 58.

sustainability was being integrated into curriculum. After 371 responses, it was reported that: two out of an average of eleven studios were dedicated to sustainable design; twenty-seven percent said that they had between one and three required courses dedicated to sustainability; forty-six percent were attempting to thread sustainability through the foundation of their program; and that funding was the biggest barrier to integrating sustainable design into the curriculum.⁷² This survey was sent out to deans, department chairs and professors in the United States and Canada. For a balanced look, a similar survey should be targeted to the students of those schools as well. Many of the findings seem inflated to enhance the sustainability perspective, which could be for a number of reasons including rivalry and perceived program norms.

Because a number of valuable articles have addressed the integration of sustainability into engineering education, applicable parallels will be drawn between the engineering and design fields. Previous research has tied critical thinking closely with environmental education, finding that those students that participated in environment-based programs were more capable of critical thinking than others in their cohort.⁷³ Qualities such as inquisitiveness, cognitive maturity, open-mindedness, analytical ability, systematic thinking, truth-seeking and critical self-confidence are often viewed as elements of critical thinking.⁷⁴ Many undergraduate programs are producing graduates

⁷² Szenasy, S. S. Ibid.School Survey: 2003: 104-107.

⁷³ Ernst, J. and M. Monroe (2004). "The effects of environment-based education on students' critical thinking skills and disposition toward critical thinking." Environmental Education Research **10**(4): 507-522.

⁷⁴ APA, 1990.

that are unable to think logically, write clearly or speak coherently.⁷⁵ In efforts to establish an environmentally literate society, critical thinking is imperative.

This element of critical thinking alone should be attractive to design programs, as problem solving and decision making are integral to design. The design process is simply different levels of problem solving; given the parameters of a program and site, it is up to the designer to find the right combination of practicality and artistic expression. Alternatives must be continually reviewed and analyzed; adjacencies, color palettes, structural alternatives, and orientation are all critical issues with endless alternatives to evaluate. Designers must critically balance a number of elements including both the measurable, such as heat loads and square footage, with immeasurable essentials such as aesthetics.

Just as design schools are often questioned about their methods of admission requirements and their applicability,⁷⁶ environmental education also questions the applicability of standardized scores.⁷⁷ Many educators and practitioners question the true applicability of standardized test scores in a concentration that is as abstract as the design fields; can identifying synonyms and antonyms or high scores in reading comprehension truly decide which students may be better combining the artistic and technical aspects of the design field? It is highly possible that better alternatives lie in the world of critical and creative thinking. Studies have shown that there are significant positive effects of environment-based programs on critical thinking skills of

⁷⁵ Kenny, et al., 1996: 6.

⁷⁶ It is frequently debated how typical admission requirements, such as standardized test scores and grade point averages, actually apply to what is often considered to be a field requiring a different skill set.

⁷⁷ Ernst and Monroe, 2004: 508-509.

ninth and twelfth graders.⁷⁸ It would then stand to reason that green-based design programs would also be able to offer enhanced critical thinking development.

While many argue that society is preoccupied with assessment in education,⁷⁹ others would argue that it is necessary in order to remain competitive in the industry, especially in a field such as design. Design is an aggressive field due to being a profession completely dependant on other professions; while education and healthcare will always be fairly level in terms of employment and demand, design is highly dependant on the economy and other businesses and organizations needing construction services. The construction field is closely tied to the local, regional and national economy, always just behind the economic trends. When the economy is on the upswing and companies have a little extra money to invest, real estate is a popular choice. Projects are likely to appear more quickly and in greater number after the upswing in the economy has been established. On the flip side, new construction projects tend to hold out the longest when a recession has hit, as they are some of the most promising investments made.

Because of this fluctuation and uncertainty, the field can be fairly dynamic, with only a certain number of jobs to go around at a given time. While many design positions are filled with professionals that did not attend an accredited design program, those that did often seek other means of employment. Approximately one-third of architectural interns do not anticipating being involved in a traditional role within five years, according to

⁷⁸ Ernst and Monroe, 2004: 517-520.

⁷⁹ Sterling, 2001: 42.

recent surveys.⁸⁰ The AIA estimates that only 30% of students entering an accredited program continue on to become licensed professionals.⁸¹ In 1999, the AIA reported that 23% of interns were pursuing non-traditional careers.⁸²

The topic of implementation pertaining to environment-based education in design programs is entirely too broad to tackle in this scope. However, some educational elements highlighted in the previous section, such as participatory education and informal influences, are appropriate to explore in relation to design training and environmental attitudes. By investigating the influences of established green building professionals, it should be possible to begin to identify some of the most effective means of sustainable education, as well as those elements that are consciously perceived to make design professionals to “go green.”

⁸⁰ ArchVoices (2005). Statistics Worth Considering. [ArchVoices.org](http://www.archvoices.org). ArchVoices. Albany, CA. **2005**. Available: <http://www.archvoices.org/pg.cfm?nid=home&IssueID=158>. Retrieved: June 19, 2005.

⁸¹ Ibid.

⁸² Ibid.

CHAPTER FOUR: METHODOLOGY

4.1 Objectives and Hypotheses

There are three main objectives that have been identified in this study. The first goal is to evaluate environmental attitudes of established green building professionals through the use of the NEP Scale. Second, determine the most effective factors in steering design professionals towards sustainability. The third goal is to look at the impact of design education on a professional's decision to go green.

Based on the review of existing literature and preliminary surveys, possible influences on professional interest in green design were selected as the focus points of this research. This study was intended to narrow the field of influences specifically related to sustainability with a special interest in the effects of design education. Each hypothesis was created to address different levels of influence on sustainability. The hypotheses of the current study are as follows:

HO1: Design professionals interested in green design will score high on the New Environmental Paradigm scale.

HO2: Design professionals interested in sustainable design will attribute their interest to the design education that they have experienced.

H03: Personal interactions, such as attending a speech or the enthusiasm of a coworker, will be the most powerful influence second to formal education.

4.2 Research Design

The design of this study is a simple case study design, concentrating on the influences of a single group of environmentally-friendly designers. In efforts to maintain a manageable study, no second control group was implemented. The interest is in looking at the influences that effect interest in sustainable design, as well as the possibility of an interaction of education. Each of the stated hypotheses will be addressed in a section of the final survey, as described in the following section.

Because of the need to reach a large number of people across the United States, an online survey was determined to be the best medium for this study. The development and implementation of the survey tool is described below.

4.2.1 Pilot Surveys

As the first step in developing the final survey tool, a short preliminary survey pertaining to undergraduate experiences and influences was developed and administered to just fewer than two hundred students and young professionals already interested in the green building movement. The preliminary survey was administered at Greenbuild, the United States Green Building Council's annual conference and expo held in Portland, Oregon,

November 9-12, 2004. Specifically, these surveys were left on chairs for the audience of the USGBC's Emerging Green Builders Forum on Wednesday, November 10, 2005, whose target group is students and young professionals interested in the green building movement. This pilot survey consisted of eight questions, with the primary intention to gain a better understanding of the number of backgrounds interested in green design, and what proportion of this self-selected group would have a background in design. Additionally, there was interest in finding how many of these interested subjects had an educational experience that helped turn them toward green design. Because of the general scope of the survey, questions were both simple and broad. Five of the questions were simply for categorization purposes, either in dichotomous or nominal form. The pilot survey can be seen in its entirety in Appendix C.

Because attendance at the forum was not specifically counted, the total number of preliminary surveys handed out is unknown.¹ Of the forty-nine respondents, one did not answer the first question about classes taken and was therefore removed from the sample; two others referred to graduate programs and were removed from the sample because of the specific interest in undergraduate programs. Of the remaining thirty-six responses, eighty-six percent said that they had an undergraduate experience dealing with green design. Of those, sixty-one percent claimed that that experience was integral in turning their interest towards a sustainable trajectory. Seventeen of the respondents were in either Architecture or Interior Design and of these respondents all claimed that they did have an undergraduate experience in

¹ It is not the policy of the committee to count attendees because of those who wander in or out during the presentation. Additionally, not all those that come to the Emerging Green Builders Forum are within our target audience, and therefore would not be counted.

be placed on an agreement continuum of the attitude in question.⁸ By allowing for intensity of attitude expression through possible selections of “agree” or “strongly agree,” a greater variance of results is received.

When the pool of questions was sufficiently compiled, the second version of the survey was sent to a small sample of professionals indicative of the larger target sample to be studied. Thirteen responses were received. A blank section for feedback was provided on the survey for additional insight. The survey was altered in light of the comments and was narrowed to forty-three questions. Questions 3, 7, 10, 22, 26, 51, 54, 58, and 59 were eliminated because they were felt to be presumed given the subject population that was already interested in green design. Questions perceived to be irrelevant to the basic purpose of the study were 11, 15, 17, 20, 25, 29, 49, and 52, and were eliminated. Questions 2, 12, 14, and 31 were viewed as unclear and therefore removed. Finally, questions 36, 43, and 45 were removed because it was suggested that they were actually duplicate questions. Question 39, which addressed influences of “going green,” was combined with question 35 as they were felt to address two parts of the same issue. However, this question was then broken out into a number of different questions to allow more specific answers to be recorded. For example, each respondent will now answer if the class was graduate or undergraduate in one question, required or elective in another question, etc.

Fifteen additional questions were then added to the final survey from previous environmental attitude studies. The most well-known study was performed in the late seventies by Dulap and Catton⁹, which was created in

⁸ Ibid.

⁹ Catton, W. R. and R. E. Dunlap (1978). "Environmental sociology: a new paradigm." *American Sociologist* **13**: 41-49.

an attempt to measure the popularity of an ecological worldview. This instrument consisted of twelve items focusing on three dimensions of environmental sociology: balance of nature, limits to growth and anti-anthropocentrism. While this group of questions was noted to have a high internal consistency, the scale was updated in 1990, adding the two additional dimensions regarding the possibility of an ecocrisis and the rejection of exemptionalist attitudes. The entire fifteen questions were added to the survey to judge overall environmental attitudes.

The final survey consisted of fifty-five questions allocated in the following way: fifteen questions addressed environmental attitudes per the NEP scale; eleven questions addressed general lifestyle choices and background; twenty-four questions addressed both education and professional experiences. The final question was a blank allowing for respondent email identification if they wished to be compensated through a drawing for an Amazon gift certificate.

4.2.2 Subjects

An email survey was presented to a representative sample of green building professionals. The survey was administered through a specific email from the Chapter Coordinator of the United States Green Building Council (USGBC), reaching approximately 200 professionals. The specific professionals reached were leaders of local chapters around the country. Because of the membership categories of the United States Green Building Council, the leadership and members of each of the chapters are quite diverse,

encompassing design firms as well as press, schools, financial firms, manufacturers and other interested parties.

The first request for surveys was sent out April 20, 2005. One follow-up was sent out the following week. A total of sixty-eight survey responses were recorded through Cornell University's WebSurveyor Desktop online program.

CHAPTER FIVE: RESULTS

The following section will objectively review the responses to the survey questions. The overall environmental position of this group of green professionals on the attitude spectrum as outlined by the NEP scale will be assessed. Common view-points, as well as peculiarly uncommon view-points, will be noted as well. Thirty-five of the sixty-eight respondents indicated that they were either architects or interior designers, for 51.5% of the total responses.¹ This narrowed population will be the overall focus of these results.²

5.1 NEP Scale

This group of proclaimed green design professionals scored highly on the NEP Scale. The percentage distributions for the entire population of responses to the first fifteen questions of the survey, which are the questions replicating the standardized NEP scale³, are pictured in Table 5.1. It is shown that each of the fifteen line items indicate that the majority of respondents endorse ecologically-friendly positions and beliefs. Table 5.2 illustrates the percentage distributions only for those respondents in Group A, either architecture or interior design. The highest percentages in each line item of

¹ Other responses included Biology, Environmental Science, Physics, general studies, Urban Planning, Solar studies, Sustainable Systems, History, Math, International Relations, Science, Geography, Liberal Arts, Landscape Architecture, and Political Science.

² As the primary focus of the study, the group of thirty-five architects and interior designers will be referred to as "Group A." The remaining thirty-two respondents in the green building profession will be called "Group B" when referenced. When the total number of respondents is referred to, it will be noted in the text as such.

³ Dunlap, R. E., K. D. V. Liere, et al. (2000). "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." *Journal of Social Issues* **56**(3): 433.

Table 5.1: Frequency Distribution for New Ecological Paradigm Scale for all Respondents

* SA = Strongly Agree, A = Agree, U = Unsure, D = Disagree, and SD = Strongly Disagree

	SA		A		U		D		SD	
	#	%	#	%	#	%	#	%	#	%
Q1	18	27.7%	22	33.8%	15	23.1%	9	13.8%	1	1.5%
Q2	3	4.6%	16	24.6%	9	13.8%	30	46.2%	7	10.8%
Q3	13	20.0%	40	61.5%	3	4.6%	8	12.3%	1	1.5%
Q4	5	7.7%	18	27.7%	16	24.6%	18	27.7%	8	12.3%
Q5	34	52.3%	25	38.5%	1	1.5%	4	6.2%	1	1.5%
Q6	7	10.8%	24	36.9%	9	13.8%	19	29.2%	6	9.2%
Q7	31	47.7%	29	44.6%	3	4.6%	2	3.1%	0	0.0%
Q8	1	1.5%	6	9.2%	10	15.4%	24	36.9%	24	36.9%
Q9	43	66.2%	22	33.8%	0	0.0%	0	0.0%	0	0.0%
Q10	0	0.0%	2	3.1%	6	9.2%	25	38.5%	32	49.2%
Q11	23	35.4%	32	49.2%	4	6.2%	6	9.2%	0	0.0%
Q12	1	1.5%	7	10.8%	4	6.2%	21	32.3%	32	49.2%
Q13	17	26.2%	28	43.1%	8	12.3%	9	13.8%	3	4.6%
Q14	1	1.5%	6	9.2%	6	9.2%	33	50.8%	19	29.2%
Q15	18	27.7%	37	56.9%	6	9.2%	4	6.2%	0	0.0%

Table 5.2: Frequency Distribution for New Ecological Paradigm Scale for Designer Respondents Only

* SA = Strongly Agree, A = Agree, U = Unsure, D = Disagree, and SD = Strongly Disagree

	SA		A		U		D		SD	
	#	%	#	%	#	%	#	%	#	%
Q1	11	33.3%	12	36.4%	6	18.2%	4	12.1%	0	0.0%
Q2	2	6.1%	8	24.2%	3	9.0%	15	45.5%	5	15.2%
Q3	9	27.3%	20	60.6%	1	3.0%	3	9.1%	0	0.0%
Q4	1	3.0%	11	33.3%	9	27.3%	9	27.3%	3	9.1%
Q5	20	60.6%	12	36.4%	0	0.0%	1	3.0%	0	0.0%
Q6	4	12.1%	11	33.3%	6	18.2%	9	27.3%	3	9.1%
Q7	16	48.5%	15	45.5%	1	3.0%	1	3.0%	0	0.0%
Q8	0	0.0%	4	12.1%	4	12.1%	10	30.3%	15	45.5%
Q9	20	60.6%	13	39.4%	0	0.0%	0	0.0%	0	0.0%
Q10	0	0.0%	0	0.0%	4	12.1%	12	36.4%	17	51.5%
Q11	13	39.4%	15	45.5%	2	6.1%	3	9.1%	0	0.0%
Q12	1	3.0%	5	15.2%	1	3.0%	9	27.3%	17	51.5%
Q13	12	36.4%	13	39.4%	4	12.1%	3	9.1%	1	3.0%
Q14	0	0.0%	3	9.1%	4	12.1%	16	48.5%	10	30.3%
Q15	11	33.3%	20	60.6%	2	6.1%	0	0.0%	0	0.0%

both tables are consistent, illustrating that architecture and interior design professionals are inline with other green building professionals within the industry.

The overwhelming majority of green building professionals responding to the survey scored high on the NEP Scale. Question content and designation is illustrated in Table 5.3. Responding in *agreement* to odd-numbered items indicated a pro-ecological view, while responding in *disagreement* to even-numbered questions would also point toward a pro-ecological view.⁴

Table 5-3: NEP Question Content

Q1	limits to growth
Q2	anti-anthropocentrism
Q3	fragility of nature's balance
Q4	rejection of exemptionalism
Q5	possibility of an eco-crisis
Q6	limits to growth
Q7	anti-anthropocentrism
Q8	fragility of nature's balance
Q9	rejection of exemptionalism
Q10	possibility of an eco-crisis
Q11	limits to growth
Q12	anti-anthropocentrism
Q13	fragility of nature's balance
Q14	rejection of exemptionalism
Q15	possibility of an eco-crisis

⁴ Ibid.

For questions one, six and eleven that concern Limits to Growth, the majority of subjects responded in line with a pro-ecological view. Questions one and eleven were a clear majority, but responses were less clear on question six, which refers specifically to the development of natural resources.

For questions two, seven and twelve, which address anti-anthropocentrism, the majority of subjects again responded in an environmentally friendly manner. While responses to questions seven and twelve were indicators of pro-environmental values, question two was less polarized, with just 30.3% either agreeing or agreeing strongly with the statement regarding humans' right to modify the environment.

Two of the questions (nine and fourteen) addressed the rejection of exemptionalism and showed that the vast majority of designers are in agreement with pro-environmental views. Question four, however, shows that subjects were generally spread evenly across the *Agree*, *Unsure*, and *Disagree* categories with approximately 30% in each. This question addresses human ingenuity.

The responses were most uniform for questions addressing the fragility of nature's balance and the possibility of an eco-crisis. For questions three, eight and thirteen pertaining to nature's fragility, at least 75.8% of the total subjects indicated pro-ecological attitudes in all three. For questions five, ten and fifteen addressing the possibility of an eco-crisis, the overwhelming majority indicated a pro-environmental stance with at least 87.9% in agreement. While a few indicated that they felt unsure⁵, only one individual answered against pro-environmental values in all three of the questions.

⁵ No subjects felt unsure in question five; 12.1% felt unsure in question ten; and 6.1% felt unsure in question fifteen.

5.2 Education

The specific population of subjects indicating that they are either architects or interior designers, Group A, was 51.5% of the total returned surveys as stated earlier. Others that completed the survey were in fields such as construction, business and engineering in line with the distribution shown in Figure 5.1. The following results will refer mainly to Group A, the architect and interior designer population responding to the survey, unless noted otherwise.

Of the thirty-five respondents in Group A, the vast majority finished their undergraduate work between 1980 and 2000, as shown in Figure 5.2. Seventeen of the thirty-five respondents indicated that education was not a factor in their interest in sustainable design, for a rate of nearly forty-one percent. Twelve (34.3%) cited some form of higher education as an influence. Of those, ten of the twelve (83.3%) felt that their undergraduate experiences were more formative than their graduate experiences. Sixty percent of respondents disagreed to some extent that sustainability was never addressed in their undergraduate education.

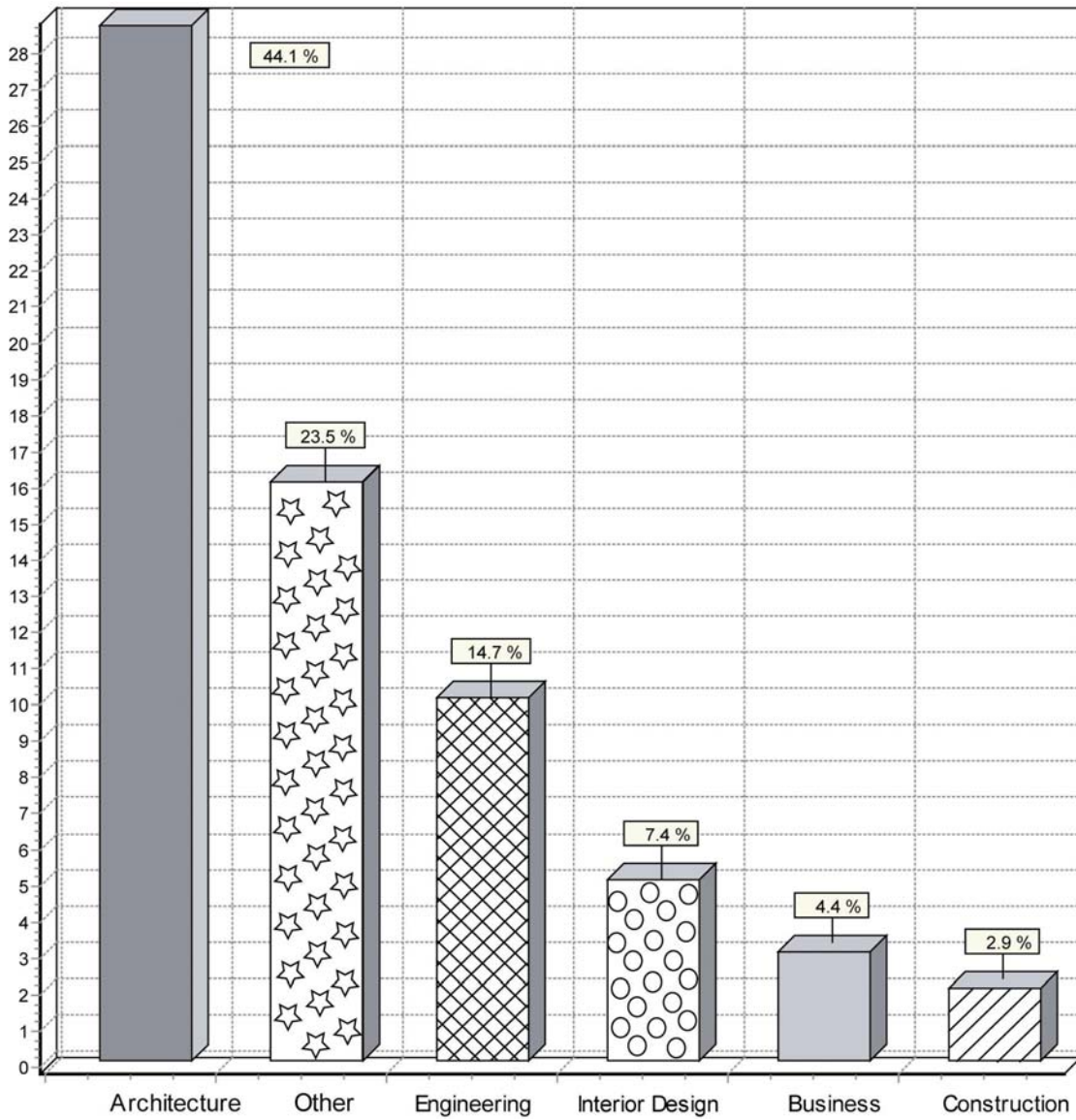


Figure 5.1: Undergraduate major

30	Architecture
16	Other
10	Engineering
5	Interior Design
3	Business
2	Construction
2	Environmental Studies

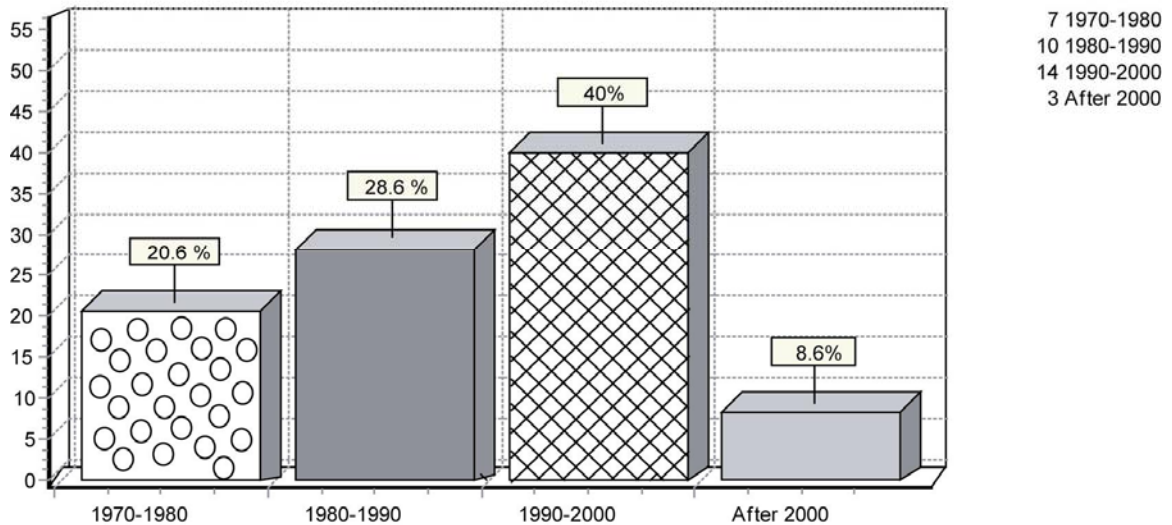


Figure 5.2: Undergraduate completion year for Group A

Of the remaining green building respondents comprising Group B, none finished their undergraduate degrees before 1970. Five of the thirty-two (15.6%) remaining respondents indicated that they graduated between 1970 and 1980; eleven of the thirty-two (34.3%) graduated between 1980 and 1990; fourteen (43.8%) finished between 1990 and 2000; and two (6.3%) graduated after the year 2000.

The responses were evenly distributed when the thirty-two green building professionals in Group B were asked about education being a factor determining interest in sustainable design. Seven subjects (21.9%) chose each of the categories Disagree and Strongly Agree; six subjects (18.8%)

chose each of the remaining three categories of Strongly Disagree, Neutral and Agree.

Only three of the thirty-two in Group B (9.4%) cited some form of higher education as a main influence in their interest in sustainable design. Eleven of the subjects not involved in architecture or interior design (34.4%) felt that their undergraduate experiences were more formative than their graduate experiences in relation to sustainability. Forty-seven percent of the thirty-two respondents felt that sustainability was never addressed in their undergraduate education.

Only one of the responding designers in Group A indicated choosing their place of undergraduate education based on environmental view and sustainability reputation.⁶ Twenty-four of these thirty-five respondents (68.6%) either disagreed or strongly disagreed that sustainable reputation had anything to do with their choice in what program to attend. As seen in Figure 5.3, the percentage of the total sample of sixty-eight that selected their formal education on the green reputation of the school is minimal at 5.9%.

⁶ It may be interesting to note that this respondent went to the University of Oregon, one of the schools most often heard repeated in the discussion of sustainability curriculum. One other respondent attended the University of Oregon and, contrary to the first subject's opinion, felt that no aspect of the education had an affect on their views pertaining to sustainability. Both of these subjects completed their studies between 1980 and 1990.

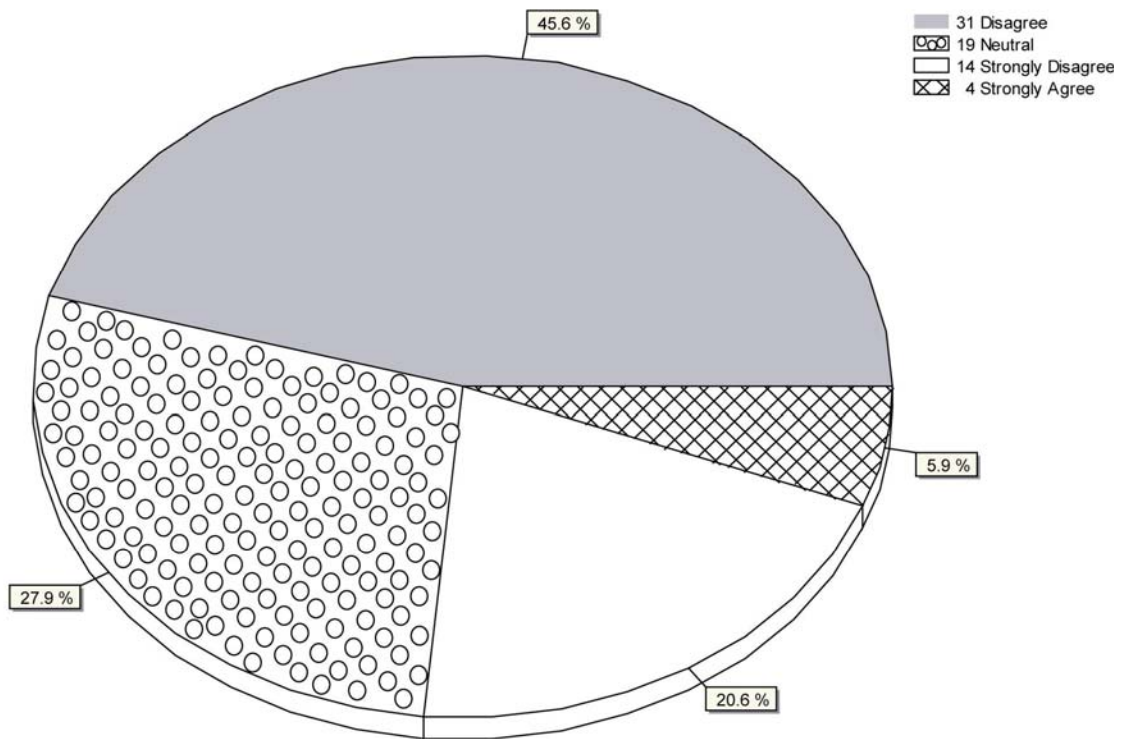


Figure 5.3: *Sustainable reputation as a factor when choosing program*

The overall distribution of total responses addressing the intention to concentrate on green building while in school can be seen in Figure 5.4. This comprehensive look is a good indicator of responses given by designers. The division of replies is mirrored across the agreement spectrum for Group A's designers: four (11.4%) responded that they strongly agree; eight (22.9%) responded that they agree; ten (28.6%) replied neutral; eight (22.9%) disagree; and four (11.4%) strongly disagree.

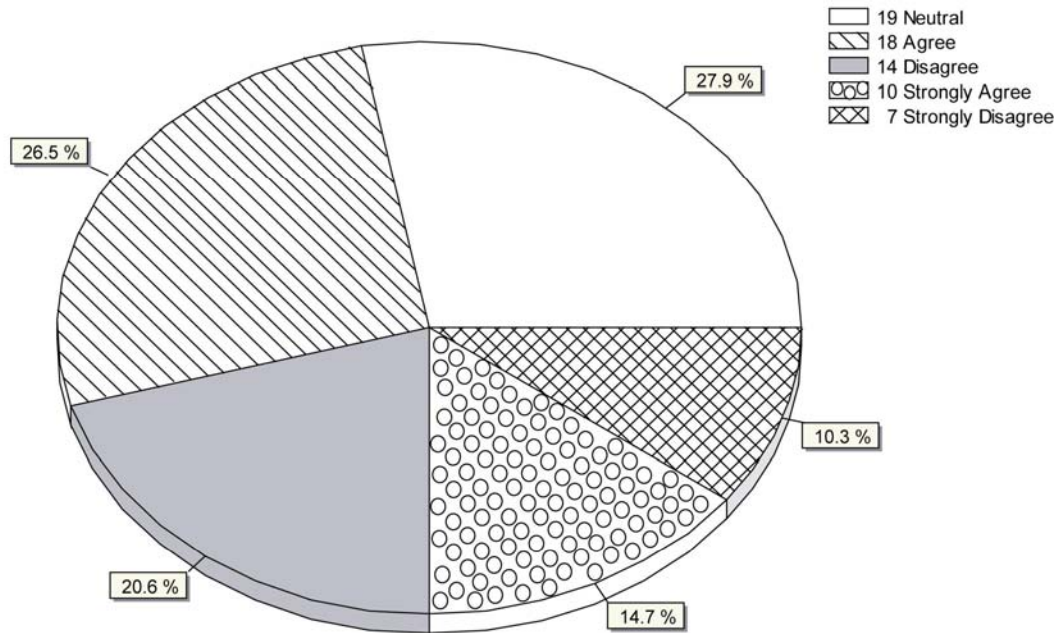


Figure 5.4: *Intention to concentrate on green building*

Only one respondent of the designers in Group A indicated agreement with the statement that their school addressed sustainable issues more in curriculum than other design programs would have. The remaining thirty-four (97.1%) felt that their programs were on par with the environmental pulse throughout the rest of the design schools at the time.

The majority of Group A respondents (65.7%) do not attribute their interest in sustainability to education at all. Of the remaining eleven (31.4%) that do credit their education as a factor in their environmental views, seven of

those eleven (63.6%) cite an elective class as the point of interest. Of the forty percent of respondents indicating that a class did influence them, eight of the eleven (61.5%) claimed that the class was design related, while the remaining five (38.5%) said it was an elective outside of the design school.

Ten of the designers in Group A (28.6%) could point out a specific professor that was an influence on their green building position. This is consistent with 30.4% of the total respondents who could also identify one instructor that they felt made a difference in their position. When asked about the inclusion of environmental authors such as Thoreau, Emerson, John Muir and Rachel Carson, thirty-two of the thirty-five in Group A (91.4%) agreed or strongly agreed that these authors should be included more in design curriculum. Three responded neutral for nearly nine percent.

5.3 Professional Interests

Two of the thirty-five designers from Group A (5.7%) did not view themselves as green designers, while the remaining thirty-three did. In the whole sample of sixty-eight subjects, twelve (17.4%) did not perceive themselves to be “green.” One individual gave a neutral answer to the question addressing sustainable issues as honestly too bothersome to address on a daily basis. The rest of the respondents disagree that sustainability was a bother at one level or another. The respondents, both overall and only designers, unanimously agreed that they have the ability to make a difference in the environment through their profession.

5.4 Additional Influences

None of the responding designers in Group A indicated that they were interested in sustainability due to marketability, professional reasons, internships, service learning, and recreation interests. As shown in Figure 5.5, the remaining proposed factors are fairly equal in response: two individuals (5.7%) indicated that they were influenced by a speaker; three (8.6%) were influenced by travel; five (14.3%) were influenced by formal education; five others (14.3%) were swayed by attending a conference; three more (8.6%) were influenced by a book or article; two (5.7%) credit a co-worker while one (2.3%) credits an acquaintance; five more (14.3%) tribute their upbringing; and eight (22.9%) attribute their interest in sustainability to other factors altogether.⁷

⁷ Other factors cited include having a child, participating in scouts, and other vague reasons such as “seemed necessary and right” and “personal experiences.”

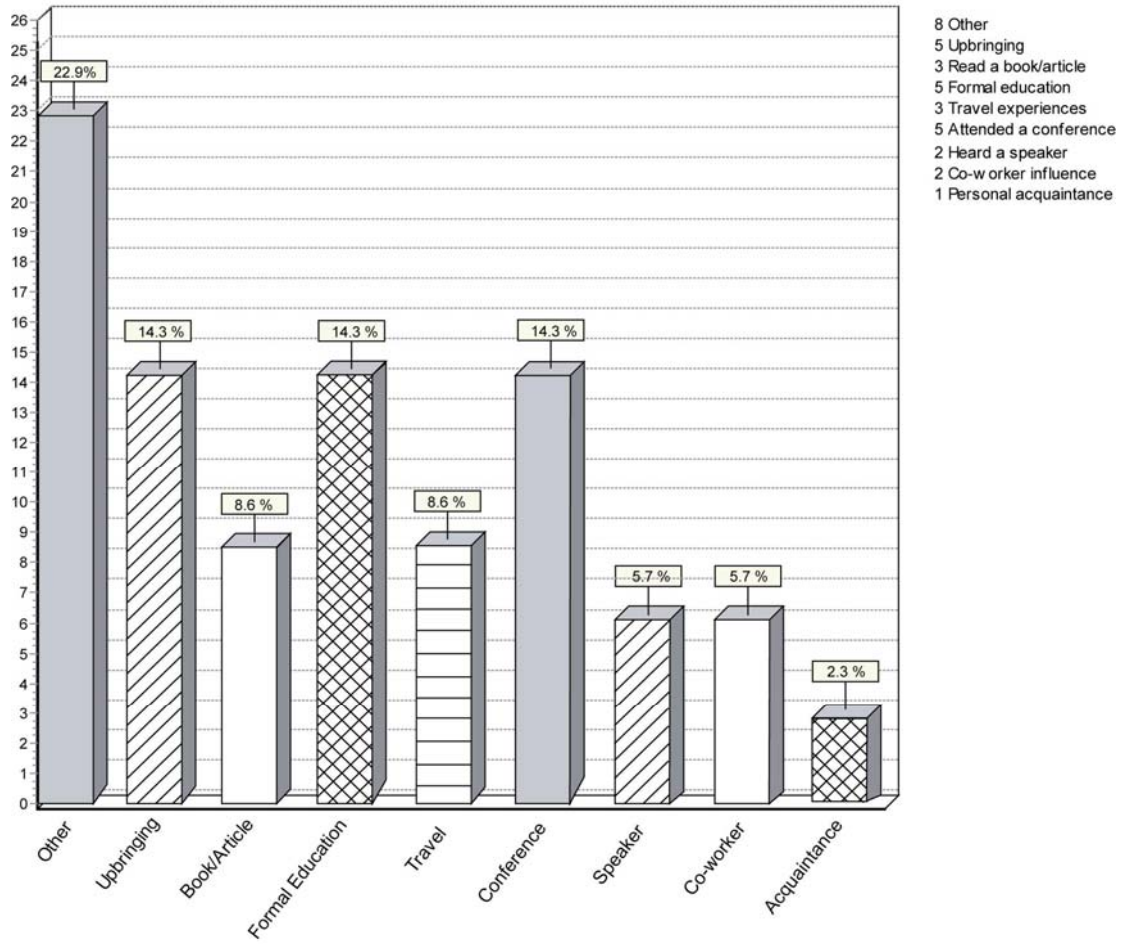


Figure 5.5: *Additional Influences*

CHAPTER SIX: DISCUSSION

6.1 Hypotheses

While the surge in green design is at an all-time high, there is still far to go in the movement. The results of the survey indicate that those design professionals involved in green design are fundamentally dedicated to sustainability. All responses suggested that the interest in sustainability was sincere and heart-felt, as opposed to the possible interest for a career boost.

6.1.1 Hypothesis One - NEP

In reference to the NEP scale portion of the survey, the results reinforce earlier findings that special interest groups and environmental organizations score high on the NEP Scale.¹ Proving Hypothesis One correct, the results illustrate pro-environmental tendencies within the group.

There are questions whose responses were not as significantly aligned with the pro-environmental indicators as the rest of the survey. Question six, which refers to the development of natural resources, was one of these questions. This may be the case due to the pre-determined nature of architecture and design as referenced earlier in the background section, which assumes that additional resources are ultimately needed to continue the

¹ Edgell, M. C. R. and D. E. Nowell (1989). "The new environmental paradigm scale: Wildlife and environmental beliefs in British Columbia." *Society and Natural Resources*(2): 285-296; Pierce, J. C., M. E. Steger, et al. (1992). *Citizens, political communication and interest groups: Environmental organizations in Canada and the United States*. Westport, CT, Praeger; Widegren, O. (1998). "The new environmental paradigm and personal norms." *Environment and Behavior* 10: 3-15.

growth of the built environment. Question two was also less clear, and may be attributed to the same reasoning. Referring to the right of humans to modify the natural environment to suit their needs, this question addresses the very premise of architecture as currently understood.

Question four, speaking to the rejection of exemptionalism and human ingenuity, returned the most uniformly spread responses from the group of designers. This may be the case because designers are trained to be creative and rely on ingenuity to problem solve on a daily basis. This ingrained perception within the designer population may be at odds with their fundamental environmental positions, resulting in the spread out responses for the question.

The responses were most uniform for questions addressing the fragility of nature's balance and the possibility of an eco-crisis. This may point to a lack of ecological knowledge in the design field, resulting from the narrow focus of design education. It could also indicate the perception that there is little interaction between the design fields and nature's balance and an eco-crisis, while the topics of anthropocentrism, limits to growth and exemptionalism may likely have a direct effect on the design professions.

6.1.2 Hypothesis Two - Education

Contrary to Hypothesis Two, the vast majority of green professionals did not attribute their desire to concentrate on sustainability to their formal education. There is some unclear data that should be looked at more carefully. While sixty percent of the respondents felt that sustainability was addressed in their undergraduate education, forty percent did not feel that their education

affected their environmental ethics in relation to green building.² This could be attributed to self-selection into the program for those already environmentally friendly or possibly credited to a delayed effect where the teachings were not fully realized until much later in their professional development. Similarly, it could be due to the differences in programs, teaching styles, curriculums or any number of other small differentiations in the schools. Regardless, education is not being identified by the majority of green designers as an influence on their interest in sustainability.

The large percentage of subjects that claim they did not choose their school based on sustainable reputation shows that many other elements of design education were playing a larger role in selection. This could be attributed to the possibility that not many programs had classes based in green design during the 1970s and 1980s when many were entering school, or were simply not called them by those terms. A number of schools have a well-known reputation for being green, but would be difficult to quantify for a researcher when looking at course titles, online descriptions and other easily accessible information.³ It may also be attributed to the fact that green building programs may not have existed at the time.

Of the thirty-five percent that did cite some form of higher education as an influence, the majority (83.3%) felt that their undergraduate experiences were more formative than their graduate experiences. This speaks to not only the importance and impact of undergraduate design curriculum, but also the possibilities for influence on the profession if there were to be a major swing in sustainability curriculum in formal design education. The National

² The degree to which green design was addressed in the curriculum was not questioned.

³ Schools in this category include California Polytechnic State University in San Luis Obispo, California, and Ball State University in Muncie, Indiana.

Architectural Accrediting Board (NAAB) is currently hosting talks about making sustainability classes mandatory for accredited programs; the Foundation for Interior Design Education Research (FIDER) will require sustainability classes effective January 1, 2006⁴, as well as retaining a LEED Accredited Professional on staff.⁵ This could be the push the environmental movement needs in undergraduate design education.

Results indicate that the majority of those affected by classes were influenced most by electives and not by design classes. This points toward a lack of green classes offered as a required part of the curriculum. This confirms previous surveys on sustainability in design schools where 27% claim having one to three classes required.⁶ Other subjects indicate the importance of design related classes, which emphasizes the significance of applicability and practicality. Classes such as service learning and participatory education that are informative and explicitly illustrate the implications of green building elements are found to be most productive and useful. Still other subjects indicated that the class most influential was outside the design school, lending support to the importance of systems thinking and interdisciplinary learning as covered previously.

Programs indicated to have addressed sustainability issues include the University of Oregon, University of Illinois, Ball State University, University of Illinois Urbana-Champaign, Texas Tech University, University of Kansas, Rice University, Temple University, Drexel University, New Jersey Institute of Technology, University of Cincinnati, Iowa State University, University of North

⁴ FIDER (2005). FIDER Professional Standards 2006. Professional Standards. Grand Rapids, MI, FIDER. **2005**: 8-10. Available: <http://fider.org/standards06.pdf> Retrieved: June 22, 2005.

⁵ FIDER, 2005: 16.

⁶ Szenasy, S. S. (2003). School Survey: 2003. Metropolis: 104-107.

Carolina at Charlotte, University of Wisconsin at Milwaukee, Universidad Simon Bolivar, Kansas State University, Kent State University, University of Arizona, University of Houston, and Gustavus Adolphus College. While this is not a complete list by any means, it could be used as a starting point for further investigations.

While the theme of the overall responses indicates that formal education did not affect the professional choice to think green, the overwhelming majority of respondents advocated more environmental readings during undergraduate education.⁷ While the remaining did not advocate it, neither did they disagree with it. This would indicate that these designers felt that environmental readings would have been more beneficial in retrospect, and would be suggested for future courses in all design programs.

6.1.3 Hypothesis Three – Personal Interactions

Data supports Hypothesis Three by showing that personal interactions are important in emphasizing environmental attitudes. By combining interactive means such as travel, conferences, speakers, co-workers, and personal acquaintances, results show that thirty-seven percent of professionals credit these methods of moving them toward sustainability, as opposed to the fourteen percent that actually did credit higher education. In reality, a number of subjects indicated “other” in their responses, which was seen to include items such as “girl scouts,” “travel combined with education,” and “observation.”⁸ If these specific elements were teased apart in more detail,

⁷ 83.8% of total respondents and 91.4% of designers advocated more environmental readings.

⁸ These examples of “other” come from the entire sample of sixty-eight subjects. Additional fill-in answers included: had a baby; book “Small is Possible”; interested since childhood; saw

it seems that they would likely fall into the categories of either education or personal interaction.

Though it was left out of this calculation, it may also be appropriate to include both “reading a book/article” and “upbringing” within the personal interaction category. The categorization was initially intended to be limited strictly to interpersonal interactions, but the influences of writings such as articles and books cannot be overlooked. Reading can be a very personal and influential event, even if it is typically a solitary event. Ray Anderson, CEO of Interface carpets, instigated one of the most notable environmental shifts to date as the result of reading Paul Hawken’s *The Ecology of Commerce*.⁹ A number of environmental writers throughout history, such as John Muir and Rachel Carson, have also been credited endlessly with influencing others to veer onto the environmental path. While the act of reading the piece would likely be a solitary action, the influence and effect of the piece on the individual could be just as effective as an interpersonal interaction. Often reading an insightful book encourages sharing with others.

6.2 Limitations of Current Study

While the scope and parameters of the current study were selected for their ability to provide a wide range of data, a number of factors in the present research design are limiting.

Seabrook nuclear power plant in 1969; Soul’s intention; critical part of job; no one element; my son; personal interest; personal experiences; Bush’s proposed energy plan; public middle/high school teachers; it seemed necessary and right; combo of many.

⁹ Kinkead, G. (1999). In the Future, People Like Me Will Go to Jail. *Fortune*. **139**: 190-195.

The limitation of personal bias must first be acknowledged. As a design professional deeply interested and dedicated to sustainable design, as well as deeply believing in the importance and impact of education, personal bias may have had an effect in either the creation of questions or in the translation of responses. While the researcher attempted to guard against this bias, it may nevertheless have slipped through to some extent.

By focusing on just one of the factors addressed in this study – environmental attitudes, formal education or environmental influences – research would be able to dig deeper into each of these facets, likely revealing more concrete findings. While combining the three components into one research design does allow for additional relationships to be reviewed, it also has the potential to confuse the subjects. Respondents may be perplexed as to what the NEP questions would have to do with green design, or what they have to do with anything in their professional realm at all. Additionally, the arrangement and order of the survey itself encourages the possibility of carry-over feelings and responses from the NEP Scale questions, which are positioned first, to the education and professional questions that follow.

Another limitation is the sample size returned from the online survey, as well as the manner in which it was administered. Though the overall number of returned surveys was decent at sixty-eight, only thirty-five of the respondents fell into the categories of architect or interior designer, the two fields that were being targeted in the study. A larger and better targeted sample size would increase both the validity and reliability of the research. Response rate could also be increased with additional follow-up requests to complete the survey, which were not available to send out in this study.

A more representative sample would also help to increase the number of subjects that completed their study in the year 2000 or later, which is when the “sustainability” buzz word would have become most integrated into curriculums. Because the majority of subjects graduated between 1980 and 1990, results will reflect specifically what was happening historically in the field at that time. A better distribution of subjects would help to filter out that influence.

By concentrating on only a handful of schools and programs, some of the finer elements pertaining to classes and influences could begin to be teased out of the data. For example, two subjects attended the same program within the same decade and had answers nearly polar opposite from each other. These discrepancies could be addressed through a closer look at individual programs, which was outside the scope of this study. This would also assist in the formulation of different levels of green schools to aid future students in their selection.

6.3 Future Research and Implications

To thoroughly investigate the scope of this research, a number of other studies should be conducted specific to each of the factors addressed. Research concentrating particularly on environmental attitudes as outlined through the NEP should be conducted¹⁰, as well as studies implicitly looking at the influences and involvement of green design.

A comparative analysis of environmental attitudes between populations of designers should be performed. For example, the population used in this

¹⁰ Dunlap and VanLiere, 1978: 10-19; Dunlap and VanLiere, 2000: 433.

study courtesy of the United States Green Building Council could be juxtaposed to a larger and more general population of designers through other professional organizations such as the American Institute of Architects and the International Interior Design Association. This would not only help to clarify the difference in environmental attitudes between the two groups, if there is indeed one, but also lay the foundation for more in-depth studies pertaining to the forming of those attitudes.

Educational influence can be researched further in a number of different ways. Detailed, objective program profiles should be created for a variety of curriculums addressing green design, incorporating the program's dedication to sustainability. In addition to providing data for a comparative analysis of different program types for use by organizations such as the NAAB and FIDER, it could provide a basis for other comparisons. This could include, but is not limited to, an alumni tracking and comparison study focusing on the professional tracks and positions of alumnus of different program types, while attempting to discern the actual difference in environmental attitudes of those alumni.

Closely related to that line of research, the NEP Scale could be administered in conjunction with different levels of programs and types of curriculums. This would be helpful in understanding the true effect of university level design curriculum on environmental attitudes and behaviors by contrasting responses from entry level cohorts of students with their responses to the same questions years later after graduation.

The NEP Scale could also be used on a larger sample of design professionals, using a group of proclaimed and established green design professionals as a control group. It would be interesting to gauge the

environmental beliefs of the profession as a whole through the use of such an established scale.

Through more intricate surveys focusing on educational experiences, a list of the most effective school programs could also potentially be developed. By surveying a larger portion of green building professionals, a more comprehensive and detailed list could be created for a database to service those incoming students interested in environmental design.

This vein of research could be easily extended into the realm of continuing education for both architects and interior designers. Because of the time lapse typical for achieving the position of decision maker or team leader in the design field, the learning curve for sustainable issues is steep. While current students are interested in studying and learning about sustainable practices while in school, the actual implementation of these practices under a Project Architect or Manager not interested in green design would be next to impossible. Though it has been seen repeatedly throughout organizations that excitement and interest can take you far, experience is what is most important in the design fields. Therefore, educating not only future professionals but current professionals as well is of the utmost importance. The best way to do this will likely encompass an entirely different scope of elements than would be implemented at the undergraduate and graduate levels.

6.4 Conclusion

Self-proclaimed green design professionals received high scores on the New Ecological Paradigm scale. This leads to the conclusion that designers have the ability to be concerned about the environment while still being

concerned with their profession; this illustrates that design and the environment need not be exclusive when dealing with practitioners. Other green building professionals, in addition to the primary sample of designers, also scored highly on the NEP scale emphasizing the possible opportunity for these two worlds to live in harmony within the construction industry.

Responses were most conflicting, but still within the pro-environmental spectrum, when referring to natural resources. This question may cause more internal debate within those in the design professions than others administered the NEP survey simply because of their professional relationship to mined and harvested resources. Many of the general population would think of wood, water, and coal as three of the primary natural resources referenced in the question; designers, however, would also include stones, minerals, and different species of woods in this scope having a greater exposure and interest in materials.

Also, as stated previously, there may be an inherent hesitation for designers to voice concern about the availability of these materials. The survival of the profession, as well as the livelihood of themselves and their families, is closely tied to the availability of construction materials. Without the materials available that are traditionally used in construction, a number of jobs could be in jeopardy. This type of perceived threat could possibly have affected some respondents.

Posing the question of human exemptionalism within the NEP scale to the sample group returned a spectrum of responses. Because of the inherent problem solving and critical thinking within the design professions, professionals are often trained to maximize and rely on ingenuity and creativity themselves during their daily activities. To respond to the human

exemptionalism question indicating that humans are not exempt from the laws of nature may compete internally with the foundations of what they are likely trying to do in their designs – create a comfortable world for the inhabitants separate and protected from the natural world outside. However, on the other hand, the creation of shelter is a natural occurrence for many organisms and it could be argued that, as humans have developed the brain power to expound and elaborate on structures, this is simply what designers are doing. The creation of built forms is therefore natural and not a cause for concern, no matter how high-tech and advanced they become. The many different shades of grey surrounding this topic may easily have been cause for the range of responses relating to human exemptionalism.

In light of these NEP survey results, the question then turns toward the *actions* and *behaviors* of these green design professionals within the workplace. Addressed briefly in this study, actual environmental behaviors within these green design professionals would be another topic to investigate. While the group as a whole does emphatically declare their allegiance to pro-environmental attitudes, this does not truthfully mean that they exhibit pro-environmental behaviors. Often, environmentalist intent is not one of the most important and reliable factors in determining pro-environmental behavior.¹¹ Because of the manner in which the survey was administered through a green building organization to board members of chapters, there is a higher possibility of the respondents truly participating actively in green building choices on a daily basis. There is realistically a possibility that, even while holding higher positions in the USGBC local chapters, the subjects actually do not emphatically push green design elements in daily practice. While this

¹¹ Stern, 2000: 415.

could be a problem with validity and may be researched at another time, the assumption will be made here that they are true advocates of green design. The subjects are more likely to take part in environmentally-friendly design than a random sample of designers not on a USGBC chapter board.

Because this study looks at the behavior in the design world specifically, and it is assumed that the subjects take part in green design behaviors at work, differentiations between pro-environmental behavior in private and professional lives should be taken into consideration. These green design professionals could be recycling and composting at home, while still specifying rare woods from the other side of the world for a project in the office. Likewise, they may be following LEED building standards to the minute detail, while not recycling and wasting water at home. There may well be a correlation between the two for design professionals, and should be reviewed in another study.

Contrary to the hypothesis, most green design professionals did not credit their undergraduate education with turning their professional interests toward sustainability. Though many programs and departments indicate that they do offer courses in sustainability and environmental design¹², graduates themselves are not feeling the effect. Whatever environmental messages are being communicated to students at the undergraduate level are not having the desired impact on their lives after graduation.

This may be due to a number of reasons. Possibly there was no chance for the practical application of sustainable principles during school, or possibly because the buzz-word has just become popularized in the design field within the last few decades. While sixty percent of respondents indicated that sustainability was addressed in their undergraduate studies, the degree to

¹² Szenasy, 2003.

which green design was addressed was not undertaken in this research. Self-selection into design programs may have played a larger role than shown in responses because of the amount of time elapsed. Additional studies concentrating on incoming freshmen and recent graduates would help to clarify some of these issues.

Though many did not credit their education with their interest in sustainability, a decent portion of subjects cited electives to be important in the forming of environmental ethics during school. One possibility is that there were not many required sustainable design classes available, making electives the only option, either within or outside the department. The numbers were split as to which type of electives were more important – those within the department or those outside the department. Both seem to have had a minor impact on the futures of the students.

Because of the responses pertaining to electives and education, I believe that education has the possibility of being more important in turning toward sustainability than an initial glance at the results from this study seem to indicate. The survey measure itself may be to blame, or it may have been the wording of the questions. Possibly the sample size was not large enough. Whatever the case, the subjects responded in great numbers to suggestions for design education reform, indicating a true interest and allegiance to design education. Suggestions, such as the reading of more environmental literature in the classroom, were met with overwhelmingly positive response. The combination of these responses lead to a sum greater than all the individual parts; while education itself is not ranked highly as a factor, each of the individual elements received high marks.

The results of this study indicate that the individual elements of environmental education, most likely found in electives, are what graduates remember in relation to environmental ethics in design education. These are not currently being implemented proficiently in design studies, regardless of what is being professed by the majority of educators and programs. While the findings indicate that formal education is not the most influential aspect turning design professionals towards sustainability, this study supports the fact that a number of individual elements could be incorporated into design education which would be highly beneficial to the movement.

This type of change will require an alternative view of design education than is currently in place, and will likely be unwelcome. Presently more common in environmental education, these include but are not limited to: travel, at home and abroad, to such locations as natural sites and state parks, as well as to exemplary and innovative examples of green building design; participatory activities such as community design charrettes, Habitat for Humanity and design/build studios concentrating on green construction and implementation; emphatic speakers focusing on environmental elements, not just pertaining to design, but also such topics as sustainable business, community planning and product design; and systems thinking, incorporating other fields such as engineering and economics undergraduate design education. The combination of these elements in design education give undergraduate programs the potential to deliver the necessary environmental knowledge, values and impact that future professionals in the design industry desperately need.

It is promising that current design professionals, however small the number, see themselves as having the ability to make a difference in the

environment through their profession. Some students may be able to identify the environment as the higher design purpose to which Glaser refers.¹³ Above all, it is encouraging to see the variety of reasons that design professionals are becoming interested in green design and that a wide net is indeed being cast. By increasing the exposure to these different alternatives, current and future professionals alike will be reminded that design is not simply about aesthetics and functionality. With it comes that higher calling, to create healthy buildings not just for the users but also for the natural environment, allowing future generations to meet their resource needs as we are currently able to meet ours.

¹³ Pedersen, M. C. (2003). I Heart Milton Glaser. Metropolis: 44.

A P P E N D I C E S

Appendix A: Critical Thinking Steps

Twelve Steps Necessary for Practical Communication

1. Have contact with the message
2. Having been exposed to the message, pay attention to the message
3. Like the message
4. Understand the message
5. Learn from the message
6. Agree with the message
7. Store the information
8. Retrieval the information later
9. Make decisions based on the message
10. Act from that decision
11. Get reinforced for such actions
12. Take on post-compliance activities enforcing the new attitude

Appendix B: An Academic Bill of Rights

By admitting a student, any college or university commits itself to provide maximal opportunities for intellectual and creative development. These should include:

1. Opportunities to learn through inquiry rather than simple transmission of knowledge.
2. Training in the skills necessary for oral and written communication at a level that will serve the student both within the university and in postgraduate professional and personal life.
3. Appreciation of arts, humanities, sciences, and social sciences, and the opportunity to experience them at any intensity and depth the student can accommodate.
4. Careful and comprehensive preparation for whatever may lie beyond graduation, whether it be graduate school, professional school, or first professional position.

The student in a research university, however, has these additional rights:

1. Expectation of and opportunity for work with talented senior researchers to help guide the student's efforts.
2. Access to first-class facilities in which to pursue research – laboratories, libraries, studios, computer systems, and concert halls.
3. Many options among fields of study and directions to move within those fields, including areas and choices not found in other kinds of institutions.

4. Opportunities to interact with people of backgrounds, cultures, and experiences different from the student's own and with pursuers of knowledge at every level of accomplishment, from freshmen students to senior research faculty.

Appendix C: NEP Scale

Subjects are given the option to choose Strongly Agree, Agree, Unsure, Disagree and Strongly Disagree.

1. We are approaching the limit of the number of people the earth can support.
2. Humans have the right to modify the natural environment to suit their needs.
3. When humans interfere with nature it often produces disastrous consequences.
4. Human ingenuity will insure that we do NOT make the earth unlivable.
5. Humans are severely abusing the environment.
6. The earth has plenty of natural resources if we just learn how to develop them.
7. Plants and animals have as much right as humans to exist.
8. The balance of nature is strong enough to cope with the impacts of modern industrial nations.
9. Despite our special abilities humans are still subject to the laws of nature.
10. The so-called "ecological crisis" facing humankind has been greatly exaggerated.
11. The earth is like a spaceship with very limited room and resources.
12. Humans were meant to rule over the rest of nature.
13. The balance of nature is very delicate and easily upset.
14. Humans will eventually learn enough about how nature works to be able to control it.

15. If things continue on their present course, we will soon experience a major ecological catastrophe.

Appendix D: Pilot Survey

Did you have an undergraduate learning experience dealing with Green design, ecology, environmental design, etc?

- yes
- No

If yes, was it:

- a required class in your department
- an elective class in your department
- an elective class outside your department

What type of class was it?

- studio
- lecture
- seminar
- service learning

Your concentration:

Architecture, Interior Design, Engineering, Construction, Business

School attended? (fill in the blank)

Was this experience integral in turning your focus to green?

- yes
- no

If no, how did you become interested in green design? (fill in the blank lines)

Please note any additional insights or opinions you might have on the implementation of sustainability in undergraduate education, or thoughts on other experiences that might influence others to “go green.” (fill in the blank lines)

Appendix E: Preliminary Survey

Possible responses were Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree unless otherwise noted.

Fill out this survey to be entered in a drawing for a \$50 Amazon giftcard! This survey should take approximately 5 minutes of your time. Your answers will be confidential and your contact information will not be recorded unless you wish to be entered in the drawing. Thank you for your participation!

- 1) Spending time outdoors was a substantial part of my childhood.
- 2) My vacations rarely include a natural aspect.
- 3) I consider myself environmentally friendly.
- 4) I have traveled to places of natural beauty such as Yosemite, the Grand Canyon, Niagara Falls, and Acadia.
- 5) I was not brought up to respect the environment.
- 6) I consider myself an environmentalist.
- 7) The state of the environment is going downhill.
- 8) I believe that I have the ability to make a difference in the future of the environment professionally.
- 9) I am going to be long gone before a true environmental crisis, so I don't worry about it.
- 10) When houses are built in a new area, they should be built around the trees - - not have the trees cut down.
- 11) Our cities sprawl too much.
- 12) We have gone beyond what is healthy in trying to control our immediate environment.
- 13) Our natural areas should not be developed as tourist resorts.
- 14) The life in a big city is far more interesting than nature ever could be.
- 15) Polluters are one of the worst forms of criminals.

- 16) Old houses should not be allowed to stand in the way of building more expressways.
- 17) I pay attention to the recycled content of paper I purchase for home use.
- 18) I just throw appliances away when they break.
- 19) I donate money to organizations such as the Audubon Society, the Sierra Club, the World Wildlife Federation, the SPCA, the Nature Conservancy, etc.
- 20) I don't see the harm in fertilizing your lawn every year.
- 21) I don't pay any attention to EPA statistics when looking to buy a new home.
- 22) I am interested in alternative energy.
- 23) I'm doing more for the environment than I was five years ago.
- 24) I have no desire to own a hybrid car.
- 25) I volunteer for an environmental, conservation or wildlife support group.
- 26) Recycling is not worth the time and energy.
- 27) I have no desire to ever take public transportation.
- 28) I am easily influenced by another person's excitement about the environment.
- 29) I immediately zone out when people start trying to convince me to "go green."
- 30) I have heard a speaker that has changed my view of the environment.
- 31) A personal interaction is the worst way to change my view of the environment.
- 32) I have taken part in a hands-on activity that has increased my interest in green building.

The following questions will address your undergraduate education, professional position and activities.

- 33) What was your undergraduate major? (*Architecture, Interior Design, Business, Environmental Studies, Engineering, Construction, Other*)
- 34) Please enter the name of the school you attended. (*Fill in the blank.*)
- 35) If you were to identify the elements that were most influential in making you “go green” what would they be? (*Education, Travel, Heard a speaker, Attended a conference, My boss made me, Read a book/article, Co-worker influence, Personal acquaintance, Marketability, Upbringing, Other*)
- 36) Which of those would you say was the MOST influential? (*Fill in the blank.*)
- 37) If an element of your education steered you green, which of the following describe the experience? (*Undergraduate level, Graduate level, Required class, Elective class, Within your major, Outside of major, Design related, Non-design related, It was not my education, Other*)
- 38) If it was a class, what type of class was it? (*Large lecture class, Small seminar class, Studio class, Was not a class, Other*)
- 39) If it was another specific experience that influenced you to “go green,” what type of experience was it? (*Service learning, Travel, Internship, Recreational, It was not another experience, Other*)
- 40) Sustainability was never addressed during my education.
- 41) Environmental authors like Thoreau, Emerson, John Muir and Rachel Carson should be more widely read in design education.
- 42) I had an undergraduate experience that encouraged me to focus on sustainable design.
- 43) I took at least one class during my formal education that emphasized sustainable design.
- 44) Choosing the program of my undergraduate education depended in part on its reputation with sustainable design.

- 45) The region of my undergraduate program was important to me because of regional environmental values.
- 46) I think that my undergraduate education addressed sustainable issues more than other programs.
- 47) I can identify one professor that was a strong influence on my environmental attitude.
- 48) Do you consider yourself a green designer (regardless of your affiliation with the USGBC)? (Yes, No)
- 49) What percentage of your daily practice involves sustainable elements? (0%-20%, 20%-40%, 40%-60%, 60%-80%, 80%-100%)
- 50) I don't think that known environmentally-friendly designers are any more enlightened than any other designer.
- 51) I would enjoy being assigned to a green project.
- 52) I rarely keep up with sustainable news around the industry.
- 53) I honestly feel that addressing sustainable issues on the job daily is too bothersome and takes too much time.
- 54) I have tried to "green" my office with things such as recycled paper stock and aluminum recycling efforts.
- 55) I am annoyed by people chattering about the environment all the time.
- 56) Supporting the environmental movement is more important to me on a personal level than on a professional level.
- 57) I had no intention of concentrating on sustainability while in school.
- 58) I don't know why clients would want to build green.
- 59) Sustainability is the future of the design profession.
- 60) Green design will eventually fade when people run out of enthusiasm.
- 61) I am interested in green design because professional organizations such as the AIA, ASID, and the USGBC tell me I am.

- 62) My office brings the possibility of green design to every client as a suggested building strategy.
- 63) Please provide any feedback you think might strengthen this survey. (ie: change in questions or wording, unclear statements, etc.)
- 64) Please enter your email address to be entered in a drawing for a \$50 Amazon gift card.

Appendix F: Final Survey

Possible responses were Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree unless otherwise noted.

The first section of questions has been adapted from a widely-used survey and addresses environmental attitudes.

- 1) We are approaching the limit of the number of people the earth can support.
- 2) Humans have the right to modify the natural environment to suit their needs.
- 3) When humans interfere with nature it often produces disastrous consequences.
- 4) Human ingenuity will insure that we do NOT make the earth unlivable.
- 5) Humans are severely abusing the environment.
- 6) The earth has plenty of natural resources if we just learn how to develop them.
- 7) Plants and animals have as much right as humans to exist.
- 8) The balance of nature is strong enough to cope with the impacts of modern industrial nations.
- 9) Despite our special abilities humans are still subject to the laws of nature.
- 10) The so-called "ecological crisis" facing humankind has been greatly exaggerated.
- 11) The earth is like a spaceship with very limited room and resources.
- 12) Humans were meant to rule over the rest of nature.
- 13) The balance of nature is very delicate and easily upset.
- 14) Humans will eventually learn enough about how nature works to be able to control it.

- 15) If things continue on their present course, we will soon experience a major ecological catastrophe.

The following questions address your general lifestyle and background.

- 16) Spending time outdoors was a substantial part of my childhood.
- 17) Our natural areas should all be developed as tourist resorts.
- 18) I frequently travel to places of natural beauty such as Yosemite, the Grand Canyon, Niagara Falls, and Acadia.
- 19) I am going to be long gone before a true environmental crisis, so I don't worry about it.
- 20) I consider myself an environmentalist.
- 21) I was not brought up to respect the environment.
- 22) I donate money to organizations such as the Audubon Society, the Sierra Club, the World Wildlife Federation, the SPCA, the Nature Conservancy, etc.
- 23) I don't pay any attention to EPA statistics when looking to buy a new home.
- 24) I'm doing more for the environment than I was 5 years ago.
- 25) I would not take public transportation if it stopped at my driveway.
- 26) I will buy a hybrid car for my next purchase.
- 27) I never talk to my family about the environment.
- 28) I have been influenced by another person's excitement about the environment.
- 29) I have heard a speaker that has changed my views on the environment for the better.
- 30) I have taken part in a hand-on activity that has increased my interest in the environment.

The following questions address your undergraduate education and professional opinions.

- 31) I had an undergraduate experience that encouraged me to focus on sustainable design.
- 32) What was your undergraduate major? (*Architecture, Interior Design, Business, Environmental Studies, Engineering, Construction, Other*)
- 33) Please enter the name of the school you attended.
- 34) In what time period did you finish your undergraduate work? (*Before 1950, 1950-1960, 1970-1980, 1980-1990, 1990-2000, After 2000*)
- 35) Sustainability was never addressed during my undergraduate education (even if it wasn't termed "sustainability.")
- 36) If you were to identify the elements that were most influential in making you "go green" what would they be? (*Travel experiences, Marketability, Heard a speaker, Formal education, Attended a conference, My boss made me, Read a book/article, Co-worker influence, Personal acquaintance, Upbringing, Internship, Service Learning, Recreational, Other*)
- 37) When was this experience? (*During my undergraduate education, During my graduate education, During my time in the workplace*)
- 38) If it was an element of your education that influenced you, at what level was it? (*Undergraduate level, Graduate level, It was not education*)
- 39) If it was a class that influenced you, what type of class was it? (*Large lecture class, Small seminar class, Studio class, Was not a class, Other*)
- 40) If it was a class that influenced you, was it a required class or an elective class, in your major or outside your major? (*Required within the major, Elective within the major, Elective outside the major, Required credit outside your major, It was not education*)
- 41) If it was a class that influenced you, was it design related or non-design related? (*Design related, Non-design related, It was not education*)
- 42) I am familiar with environmental authors like Thoreau, Emerson, John Muir and Rachel Carson should be more widely read in design education.

- 43) I believe that these environmental authors should be incorporated more into design education.
- 44) Choosing the program of my undergraduate education depended in part on its reputation with sustainable design.
- 45) My undergraduate education addressed sustainable issues more than other programs.
- 46) I can identify one professor that was a strong influence on my environmental attitude. *(Yes, No)*
- 47) I had no intention of concentrating on sustainability while in school.
- 48) What types of things do you think would have the greatest impact in making future professionals of our industry consider green design?
- 49) I have the ability to make a difference in the future of the environment through my profession.
- 50) I honestly feel that addressing sustainable issues on the job daily is too bothersome.
- 51) Do you consider yourself a green designer? *(Yes, No)*
- 52) I don't think that truly environmentally-friendly designers are any more enlightened than any other designer.
- 53) Supporting the environmental movement is more important to me on a personal level than on a professional level.
- 54) I wouldn't be interested in green design if people hadn't forced the issue.

W O R K S C I T E D

- (1987). Our Common Future. Oxford, Oxford University Press.
- (2000). Sustainable Architecture White Papers. New York, Earth Pledge.
- (2003). NatureNode. Nature Quotes. **2005**.
- (2005). Conservation Timeline: 1901-2000. Conservation Timelines. Woodstock, VT, Conservation Study Institute. **2005**.
- (2005). The Quote Garden. Nature. T. Guillements. Phoenix, Arizona, WBS Publishing. **2005**.
- Albrecht, D., G. Bultena, et al. (1982). "The new environmental paradigm scale." Journal of Environmental Education **13**: 39-43.
- Albrow, M. (1987). The Application of the Weberian Concept of Raionalization to Contemporary Conditions. Max Weber, Rationality and Modernity. S. Whimster and S. Lash. London, Allen and Unwin: 164-182.
- Allen, J. B. and J. L. Ferrand (1999). "Environmental locus of control, sympathy, and proenvironmental behavior: A test of Geller's actively caring hypothesis." Environment and Behavior **31**: 338-353.
- APA (1990). Critical thinking: a statement of expert consesus for purposes of educational assessment and instruction. ERIC Document No. ED 315 423, American Philosphical Association.
- ArchitectureSchools.com (2005). Architecture Career Facts. The Architecture School Directory. Allison Park, PA, Education.org. **2005**.
- ArchVoices (2005). Statistics Worth Considering. ArchVoices.org. ArchVoices. Albany, CA. **2005**.
- Bator, R. J. and R. B. Cialdini (2000). "The Application of Persuasion Theory to the Development Of Effective Proenvironmental Public Service Announcements." Journal of Social Issues **56**(3): 529.
- Benton, T. (1996). Marxism and Natural Limits: An Ecological Critique and Reconstruction. The Greening of Marxism. T. Benton. New York, Guilford.

- Blake, D. E., N. Guppy, et al. (1997). "Canadian public opinion and environmental action." Canadian Journal of Political Science(30): 451-472.
- Bowers, C. A. (1995). Educating for an Ecologically Sustainable Culture: Rethinking Moral Education, Creativity, Intelligence, and Other Modern Orthodoxies. Albany, State University of New York Press.
- Bowman, J. S. and T. Fuchs (1981). "Environmental Coverage in the Mass Media: A Longitudinal Study." Journal of Environmental Studies **18**: 11-22.
- Boyle, C. (2004). "Considerations on educating engineers in sustainability." International Journal of Sustainability in Higher Education **5**(2): 148-149.
- Briggs, D. C. (1996). Reform the Design Studio. Architecture. **85**: 75.
- Brown, M. A. (2003). Going for the Green: A Case Study Analysis Evaluating Energy Performance of a Conventional vs. a 'Green' Olympic Speed Skating Oval. Design and Environmental Analysis. Ithaca, NY, Cornell University: 7.
- Buttel, F. H. (1986). "Sociology and the Environment: The Winding Road toward Human Ecology." International Social Science Journal **109**: 337-356.
- Buttel, F. H. (1992). "Environmenralization: Origins, processes, and implications for rural social change." Rural Sociology **57**: 1-27.
- Buttel, F. H., P. Dickens, et al. (2002). Sociological Theory and the Environment: An Overview and Introduction. Sociological Theory and the Environment: Classical Foundations, Contemporary Insights. F. H. Buttel, P. Dickens, R. E. Dunlap and A. Gijswijt. Lanham, MD, Rowman, Littlefield Publishers, Inc.: 3-32.
- Caron, J. A. (1989). "Environmental perspectives of Blacks: Acceptance of the "new environmental paradigm"." Journal of Environmental Education(20): 21-26.
- Catton, W. R. (1980). Overshoot: The Ecological Basis of Revolutionary Change. Urbana, IL, University of Illinois Press.
- Catton, W. R. (2002). Has the Durkheim Legacy Mised Sociology? Sociological Theory and the Environment: Classical Foundations, Contemporary Insights. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, MD, Rowman and Littlefield Publishers, Inc.: 90-115.

- Catton, W. R. and R. E. Dunlap (1978). "Environmental sociology: a new paradigm." American Sociologist **13**: 41-49.
- Caviglia-Harris, J. L. and J. Hatley (2004). "Interdisciplinary teaching: analyzing consensus and conflict in environmental studies." International Journal of Sustainability in Higher Education **5**(4): 396.
- CIWMB (2005). Executive Summary. Sacramento, CA, California Integrated Waste Management Board. **2005**.
- Cook, T. D. and B. R. Flay (1978). The persistence of experimentally induced attitude change. Advances in experimental social psychology. L. Berkowitz. San Diego, CA, Academic Press. **9**: 110-134.
- Cuff, D. (2000). Studio Crit. Architecture. **89**: 149.
- Devine-Wright, P., H. Devine-Wright, et al. (2004). "Situational influences upon children's beliefs about global warming and energy." Environmental Education Research **10**(4): 494.
- Dickens, P. (2002). A Green Marxism? Labor Processes, Alienation, and the Division of Labor. Sociological Theory and the Environment: Classical Foundations. Contemporary Insights. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, MD, Rowman, Littlefield Publishers, Inc.: 51-72.
- Dictionary.com (2000). Architect. American Heritage Dictionary of the English Language, Houghton Mifflin Company. **2005**.
- DOE (2004). Buildings and the Environment: A Statistical Summary, Department of Energy. **2005**.
- Downs, A. (1972). "Up and down with ecology - the "issue-attention cycle"." The Public Interest(28): 38-51.
- Dunlap, R. E. (2002). "Environmental sociology: A personal perspective on its first quarter century." Organization & Environment **15**(1): 10-29.
- Dunlap, R. E. (2002). Paradigms, Theories, and Environmental Sociology. Sociological Theory and the Environment: Classical Foundations, Contemporary Insights. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanham, Rowman & Littlefield Publishers, Inc.: 329-350.

- Dunlap, R. E. and W. R. Catton (1979). "Environmental Sociology." Annual Review of Sociology **5**: 243-273.
- Dunlap, R. E. and W. R. Catton (1980). "A New Ecological Paradigm for a Post-Exuberant Sociology." American Behavioural Scientist **24**(1): 15-47.
- Dunlap, R. E., K. D. V. Liere, et al. (2000). "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." Journal of Social Issues **56**(3): 433.
- Dunlap, R. E. and K. D. VanLiere (1978). "The "new environmental paradigm": A proposed measuring instrument and preliminary results." Journal of Environmental Education(9): 10-19.
- Edgell, M. C. R. and D. E. Nowell (1989). "The new environmental paradigm scale: Wildlife and environmental beliefs in British Columbia." Society and Natural Resources(2): 285-296.
- Ernst, J. and M. Monroe (2004). "The effects of environment-based education on students' critical thinking skills and disposition toward critical thinking." Environmental Education Research **10**(4): 507-522.
- FIDER (2005). FIDER Professional Standards 2006. Professional Standards. Grand Rapids, MI, FIDER. **2005**.
- Furman, A. (1998). "A note on environmental concern in a developing country: Results from an Istanbul survey." Environment and Behavior **30**: 520-534.
- Gooch, G. D. (1995). "Environmental beliefs and attitudes in Sweden and the Baltic states." Environment and Behavior **27**: 513-539.
- Greenberg, M. R., D. B. Sachsman, et al. (1989). "Risk, Drama and Geography in Coverage of Environmental Risk by Network TV." Journalism Quarterly: 267-276.
- Gutman, R. (1996). Redesigning architecture schools. Architecture. **85**: 87-89.
- Hasan, S. M. J. (1993). "Business schools: Ostrich syndrome." Journal of Organizational Change Management **6**(1): 47-53.
- Hawken, P. (1993). The Ecology of Commerce: A Declaration of Sustainability. New York, HarperCollins Publishers.

- Hawken, P., A. Lovins, et al. (1999). Natural Capitalism: Creating the Next Industrial Revolution. Boston, Little, Brown and Company.
- Hawkes, D. and W. Forster (2002). Energy Efficient Buildings: Architecture, Engineering, and Environment. New York, W. W. Norton & Company.
- Hawthorne, C. (2003). Turning Down the Global Thermostat. Metropolis: 102-107, 149, 151-152.
- Humphrey, C. R., T. L. Lewis, et al. (2002). Environment, Energy and Society: A New Synthesis. Belmont, CA, Wadsworth-Thomson Learning.
- Humphrey, C. R., T. L. Lewis, et al., Eds. (2003). Environment, Energy, and Society: Exemplary Works. The Wadsworth Sociology Reader Series. Belmont, CA, Thomson Wadsworth.
- Kals, E., D. Schumacher, et al. (1999). "Emotional affinity toward nature as a motivational basis to protect nature." Environment and Behavior **31**: 178-202.
- KEMA (2003). Managing the Cost of Green Buildings. Oakland, CA, KEMA. **2005**.
- Kerlinger, F. N. and H. B. Lee (2000). Foundations of Behavioral Research. Fort Worth, TX, Harcourt College Publishers.
- Kinkead, G. (1999). In the Future, People Like Me Will Go to Jail. Fortune. **139**: 190-195.
- Krapfel, P. (1999). Deepening Children's Participation through Local Ecological Investigations. Ecological Education in Action. G. A. Smith and D. R. Williams. Albany, NY, State University of New York: 47-64.
- Leiserowitz, A. A. (2004). Before and after the Day After Tomorrow: A U.S. study of climate change risk perception. Environment: 23-37.
- Matthiessen, L. F. and P. Morris (2004). Costing Green: A Comprehensive Cost Database and Budgeting Methodology, Davis Langdon Publications. **2005**.
- McComas, K. and J. Shanahan (1999). "Telling Stories About Global Climate Change: Measuring the Impact of Narratives on the Issue Cycles." Communication Research **26**(1): 30-57.

- McComas, K., J. Shanahan, et al. (2001). "Environmental Content in Prime-Time Network TV's Non-News Entertainment and Fictional Programs." Society and Natural Resources **14**: 533-542.
- McDonough, W. (2002). Cradle to Cradle: Remaking the Way We Make Things. New York, North Point Press.
- McKenzie-Mohr, D. (2000). "Promoting Sustainable Behavior: An introduction to Community-Based Social Marketing." Journal of Social Issues **56**(3): 549-551.
- McKibben, B. (1992). The Age of Missing Information. New York, Plume.
- Mendler, S. and W. Odell (2000). The HOK Guidebook to Sustainable Design. Indianapolis, IN, Wiley.
- Murphy, R. (2002). Ecological Materialism and the Sociology of Max Weber. Sociological Theory and the Environment: Classical Foundations, Contemporary Insights. R. E. Dunlap, F. H. Buttel, P. Dickens and A. Gijswijt. Lanhan, MD, Rowman & Littlefield Publishers, Inc.: 73-89.
- Noe, F. P. and R. Snow (1989). "Hispanic cultural influence on environmental concern." Journal of Environmental Education(21): 27-34.
- Nooney, J. G., E. Woodrum, et al. (2003). "Environmental worldview and behavior: Consequences of dimensionality in a survey of North Carolinians." Environment and Behavior **35**(6): 763.
- Orr, D. W. (2002). The Nature of Design: Ecology, Culture, and the Human Intention. New York, Oxford University Press.
- Pedersen, M. C. (2003). I Heart Milton Glaser. Metropolis: 44.
- Pedersen, M. C. (2003). Public Eye. Metropolis: 78.
- Pierce, J. C., N. P. Lovrich, et al. (1987). "Environmental belief systems among Japanese and American elites and publics." Political Behavior **9**: 139-159.
- Pierce, J. C., M. E. Steger, et al. (1992). Citizens, political communication and interest groups: Environmental organizations in Canada and the United States. Westport, CT, Praeger.
- Rauwald, K. S. and C. F. Moore (2002). "Environmental attitudes as predictors of policy support across three countries." Environment and Behavior **34**(6): 709-740.

- Rees, W. and M. Wackernagel (1995). Urban Ecological Footprints. Gabriola Island, BC, New Society Publishers.
- Roberts, J. A. and D. R. Bacon (1997). "Exploring the subtle relationships between environmental concern and ecologically conscious consumer behavior." Journal of Business Research **40**: 79-89.
- Robinson, C. C., A. Dodson, et al. (2002). Adirondack Journal of Environmental Studies.
- Ross, E. A. (1918). "Social Decadence." American Journal of Sociology **23**: 620-632.
- Santone, S. (2003). "Education for Sustainability." Educational Leadership(December 2003/January 2004).
- Schultz, P. W. and S. Oskamp (1996). "Effort as a moderator of the attitude-behavior relationship: General environmental concern and recycling." Social Psychology Quarterly **59**: 375-383.
- Schultz, P. W. and L. C. Zelezny (1998). "Values and proenvironmental behavior: A five-country survey." Journal of Cross-Cultural Psychology **29**: 540-558.
- Schwartz, S. H. (1973). "Normative explanations of helping behavior: A critique, proposal, and empirical test." Journal of Experimental Social Psychology **9**: 349-364.
- Schwartz, S. H. (1977). Normative influences on altruism. Advances in experimental social psychology. L. Berkowitz. New York, Academic Press. **10**: 221-279.
- Schwartz, S. H. (1994). "Are there universal aspects in the structure and contents of human values?" Journal of Social Issues **50**(4): 19-46.
- Scott, D. and F. K. Willits (1994). "Environmental attitudes and behavior: A Pennsylvania survey." Environment and Behavior **26**: 239-260.
- Seppanen, O. and W. J. Fisk (2002). "Association of ventilation system type with SBS symptoms in office workers." Indoor Air **12**(2): 98-112.
- Shanahan, J. and K. McComas (1997). "Television's Portrayal of the Environment: 1991-1995." Journalism and Mass Communication Quarterly **71**(1): 147-159.

- Shirley Strum Kenny, B. A., Wayne Booth, Milton Glaser, Charles E. Glassick, Stanley O. Ikenberry, Kathleen H. Jamieson, Robert M. O'Neil,Carolynn Reid-Wallace, Chang-Lin Tien, Chen Ning Yang (1996). Reinventing Undergraduate Education: A Blueprint for America's Research Universities, The Boyer Commission on Educating Undergraduates in the Research University.
- Slessor, C. and J. Linden (2001). Eco-Tech: Sustainable Architecture and High Technology. New York, W. W. Norton & Company.
- Spiegel, R. and D. Meadows (1999). Green Building Materials: A Guide to Product Selection and Specification. Indianapolis, IN, Wiley.
- Sterling, S. (2001). Sustainable Education: Re-visioning Learning and Change. Bristol, Schumacher Society.
- Stern, P. C. (2000). "Toward a Coherent Theory of Environmentally Significant Behavior." Journal of Social Issues **56**(3): 407-424.
- Stern, P. C., T. Dietz, et al. (1995). "The new ecological paradigm in social-psychological context." Environment and Behavior **27**: 723-743.
- Stern, P. C., O. R. Young, et al., Eds. (1992). Global environmental change: Understanding the human dimensions. Washington, DC, National Academy Press.
- Stocking, H. and J. P. Leonard (1990). "The Greening of the Press." CJR **November/December**: 37-38,40-44.
- Szenasy, S. S. (2003). School Survey: 2003. Metropolis: 104-107.
- Taylor, T. (2003). Thinking Big. Metropolis: 58.
- Train, R. E. (1990). Speech. North American Conference on Religion and Ecology. Washington DC, QuoteGarden. **2005**.
- VanLiere, K. D. and R. E. Dunlap (1980). "The social bases of environmental concern: A review of hypotheses, explanations and empirical evidence." Public Opinion Quarterly **44**: 181-199.
- Widegren, O. (1998). "The new environmental paradigm and personal norms." Environment and Behavior **10**: 3-15.
- Williams, D. R. and S. Taylor (1999). From Margin to Center: Initiation and Development of an Environmental School from the Ground Up.

Ecological Education in Action. G. A. Smith and D. R. Williams. Albany, NY, State University of New York: 86-98.

Zeller, R. A. and E. G. Carmines (1980). Measurement in the social sciences. New York, Cambridge University Press.