5-2011

Interior Designer's Attitudes Toward Sustainable Interior Design Practices and Barriers Encountered when Using Sustainable Interior Design Practices

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INTERIOR DESIGNER'S ATTITUDES TOWARD SUSTAINABLE INTERIOR DESIGN PRACTICES AND BARRIERS ENCOUNTERED WHEN USING SUSTAINABLE INTERIOR DESIGN PRACTICES

by

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A THESIS

Presented to the Faculty of

The Graduate College at the University of Nebraska

In Partial Fulfillment of Requirements

For the Degree of Master of Science

Major: Architecture

Under the Supervision of Professor Betsy Gabb

Lincoln, Nebraska

May 2011

INTERIOR DESIGNER'S ATTITUDES TOWARD SUSTAINABLE INTERIOR DESIGN PRACTICES AND BARRIERS ENCOUNTERD WHEN USING SUSTAINABLE INTERIOR DESIGN PRACTICES

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University of Nebraska, 2011

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The objectives of this study evaluated whether interior designer's had a positive or negative attitude toward sustainable interior design practices. Next, it evaluated the three areas of perceived barriers interior designers encounter when using sustainable interior design practices (project capabilities, transition to sustainability, and knowledge and skills associated with sustainable design). The final objectives determined if attitudes and barriers affected the use of sustainable interior design practices, and determined whether the attitudes of interior designers and the barriers encountered by interior designers were related. Overall, attitudes toward sustainable interior design practices were positive. Barrier scores indicated that factors affecting project capabilities were the biggest obstacle to practicing sustainable interior design. Attitudes toward sustainable interior design practices were highest among respondents who used sustainable interior design practices the most. Barrier scores were lowest among interior designers who used sustainable interior design practices the most. There was a correlation between attitudes and perceived barriers, suggesting a positive attitude partially contributed to overcoming barriers associated with sustainable interior design

practices, and the ability to overcome barriers contributed to a more positive attitude toward sustainable interior design practices.

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Chapter I. Introduction

In recent years, a concern for the environment has made its way into the food industry, clothing industry, design industry, and every aspect of life. Its on the news, its plastered on billboards, cereal boxes, soap, and toothpaste. Sustainability is more than a marketing scheme. To those who truly seek to improve where and how they live sustainability includes avoiding the depletion of natural resources.

For the purpose of this paper, sustainable interior design practices will be defined as the balance among interior design practices and the use of Earth's resources that benefit humans and the earth now and in the future (Kang & Guerin, 2009; Loftness, 2007; USGBC). Examples of sustainable design practices include: specifying locally manufactured materials, rapidly renewable materials, and/ or durable, long lasting materials. Winchip (2007) explored sustainable strategies of commercial and residential interiors. Solutions for commercial interiors included designing spaces that can easily adapt to the changes in a spaces activities, employees, and technology while conserving resources, giving occupants access to thermal comfort controls and outdoor views, daylighting, designing for minimal heat gain or loss, including centralized energy management units and energy-efficient light systems, efficiently using space to conserve energy and materials, and specifying low-flow fixtures to conserve water. The numerous approaches to sustainable interior design are evident, and will be unique to each project's criteria. A successful project will blend sustainability into each phase of the design process, its execution and post-occupancy (Winchip, 2007). An Interior designer juggles client concerns, cost factors, time restraints, and technology among other things. Sustainability adds yet another factor to the design mix. For this reason it is assumed that

barriers will be encountered as interior designers utilize sustainable interior design practices. Abuthnott (2009) explained there is less of a chance of making a sustainable choice when an action, in this case a sustainable interior design practice, is perceived as beyond ones control.

Among the possible barriers to using sustainable interior design practices is attitude. Does attitude play an important role in choosing sustainable interior design practices, and is ones attitude toward these practices enough to make a difference and overcome other barriers encountered (i.e., project capabilities, transition to sustainability, knowledge and skills)?

Gaining insight about the perceived barriers regarding sustainability and interior design has the potential to aid sustainable interior design practices and the interior design profession in general. The purpose of this study is to examine the relationship of interior designer's attitude toward sustainable interior design practices and the perceived barriers associated with using sustainable interior design practices among professional members of two national interior design organizations, the International Interior Design Association (IIDA) and the American Society of Interior Designers (ASID). **This thesis relates the interior designer's attitude toward sustainable interior design practices to the perceived barriers interior designers encounter when using sustainable interior design practices.**

Chapter II. Literature Review

Environmentally Sustainable Interior Design

Environmental sustainability is becoming a major concern within the interior design field due to the extensive resources needed for interior use (Ruff & Olson, 2009). Sustainable interior design practices are actions that lessen environmental impact due to site selection, water use, energy use, and material selection (Rider, 2005). With these considerations, interior designers are able to provide a physiologically and psychologically healthy indoor environment (Kang & Guerin, 2009). Overall, environmentally sustainable interior design minimizes negative effects and maximizes positive effects on environmental systems over the life cycle of a building (Kang & Guerin, 2008), by blending solutions of the past with new technology of today (Loftness, 2007). Pilatowicz (1995) defined sustainable interiors as interiors designed in such a manner that they sensibly address the impact of all their functions, parts and elements on the global environment. Pilatowicz (1995) also defined environmentally conscious interior design as professional practice that attempts to create indoor spaces that are environmentally sustainable and healthy for the occupants. In this review of literature the following sustainable interior design topics will be examined: indoor air quality, materials, daylighting, and connectedness to the environment. Additionally potential barriers to sustainable interior design practices concerning project capabilities, transition to sustainability, and knowledge and skills will be addressed.

Indoor Air Quality (IAQ).

The Environmental Protection Agency (EPA) and National Institute of Occupational Safety and Health (NIOSH) defined good Indoor Air Quality (IAQ) as the introduction and distribution of adequate ventilation air, control of airborne contaminants, and maintenance of acceptable temperature and relative humidity (Spiegel & Meadows, 2006). Indoor air pollution is introduced into a space through materials, finishes, furnishings, and equipment, chemicals used inside a building, and through human activities and biological processes (Pilatowicz, 1995). Interior Designers help control Indoor Air Quality (IAQ) by taking precautions with construction or renovation procedures (Kang & Guerin, 2009). For example Pilatowicz (1995) gave the following examples: raise the base of partitions one to two inches from the floor to allow airflow around acoustic partitions in an office space, place exhaust fans in enclosed spaces or where pollutants are contained (e.g. a kitchen, smoking lounge, or bathroom), and consider using plants in interior spaces when fitting. Additionally, delaying occupancy so new materials can release harmful chemicals prior to occupancy prevents occupants from any unnecessary volatile organic compound (VOC) exposure (Pilatowicz, 1995). Designers are responsible for addressing a client's needs, including the exposure to dangerous chemicals found in the air. Human health, safety, well-being, and productivity can be affected by the choices designers make (Pilatowicz, 1995). Improved ventilation helps reduce illness and increase productivity. International case studies showed a 9-20% drop in respiratory illness and up to an 11% increase in productivity (Loftness, 2007). The EPA (1998) rated Indoor Air Quality (IAQ) as the fifth greatest heath threat to public health. This unhealthy air is present in thirty percent of new and renovated buildings, and has led to lawsuits resulting in damages and repair costs exceeding $20,000,000 and

settlements of over $500,000 (Johnson, 2000). Common symptoms of poor indoor air quality include headaches, shortness of breath, coughing, sneezing, fatigue, sinus congestion, skin irritation, nausea, eye, nose, and throat irritation, and dizziness. Sick Building Syndrome (SBS) is a term sometimes used when no cause or illness explains such symptoms; rather, these symptoms become effects of the time an occupant spends in the building. Building Related Illness (BRI) is a diagnosable illness, such as asthma, where symptoms are attributed to environmental agents and exposure to building air. Multiple Chemical Sensitivity (MCS) is a condition affecting a small percentage of individuals sensitive to indoor air chemicals occurring at low concentrations (EPA, 1998). Wasco and Lindsey (2003) featured proactive approaches for mold free interior environments in their article. Approaches included source control, separation and filtration, and ventilation. Source control included minimizing cracks and crevices in millwork and specifying nonporous materials to prevent the growth of mold. Additionally, source control would ensure the proper installation and maintenance of plumbing, and air conditioning systems to prevent condensation and standing water. Separation and filtration used barriers in the form of air pressure differences, transitional spaces in the form of vestibules, air-lock entrances, mudroom, or breezeway, or filters that have the ability to remove a variety of pollutants. Ventilation ensured a proper ratio of natural and mechanical air. Designing with building orientation in mind can facilitate cross-ventilation and negative air pressure. Controlled ventilation manipulates air pressure with mechanical systems that ventilate with controlled pressures (Wasco & Lindsey, 2003).

Materials.

The EPA reported office furniture, flooring, paints and coatings, adhesives and sealants, wall coverings, office equipment, wood products, textiles, insulation, and cleaning products as sources of indoor air pollution (Spiegel & Meadows, 2006). Indoor air pollution is chemical, physical, or biological contaminants in indoor air as defined by the EPA (Spiegel & Meadows, 2006). Indoor materials have the ability to support healthy environments, reduce transportation energies that carry secondary health concerns, influence thermal performance, air quality and out-gassing, toxicity, and mold. Additionally, the selection of proper materials can positively affect respiratory and digestive systems, eyes and skin (as cited by Loftiness, 2007). Designer's choices regarding interior materials, airflow, furnishing placement, and fenestration are important to the prevention of indoor pollution (Wasco & Lindsey, 2003). In regard to materials, Winchip (2007) recommends durable, adaptable finishes with a long life, and less square footage to reduce the need for unnecessary materials. Sustainable residential interiors should encourage sustainable lifestyles (e.g. access to bike paths and well designed recycling areas) and reuse or refurbish furniture when possible. Sustainable residential interior designers should recommend products that minimize environmental impact during all stages of its life (e.g., extraction, manufacturing, transport, use and post-use) (Winchip, 2007) and consider embodied energy. Recyclability and reusability of a project is determined by the choice of materials used (Osmani et al., 2007). According to LEED requirements sustainable materials are materials made from rapidly renewable resources, are highly durable, recyclable, and low emitting (LEED, 2010). Renewable resources and products are grown or naturally replenished at a rate that is greater than humans deplete the resource (Speigel & Meadows, 2006). Selecting materials by

considering their entire life from extraction to disposal or reuse and recycling help when deciding about whether or not to specify a certain product or material (Pilatowicz, 1995).

Abeysundara, Babel, and Piantanukulchai (2008) created a matrix to aid in selecting materials for floors. The matrix combined environmental (embodied energy), economic (price, affordability), and social (thermal comfort, good interior ability to construct fast, strength, durability) aspects of sustainability. Environmental impacts such as global warming, acidification and nutrient enrichment were analyzed with the Life Cycle Assessment (LCA). LCA looks at embodied energy, the energy a product holds due to material extraction, manufacturing, transportation of raw materials and finished product. The inherent energy of the product is separate from embodied energy, and not considered in an embodied energy measurement. They looked at porcelain and ceramic floor tile versus vinyl floor tile in 50 government single story school buildings in Sri Lanka. The selected materials had their pros and cons in each area, for example, vinyl tile costs less, ceramic or porcelain was better when considering thermal comfort, and interior aesthetics, strength and durability, but vinyl allows for quicker construction. When selecting materials and products these factors must be weighed, and having tools to aid in that process is beneficial. Abeysundara's study formulated the many aspects of sustainability into a matrix to aid in making sustainable material choices (Abeysundara et al., 2009). Among its obvious importance to the indoor environment, material selection was found to be a less frequently applied sustainable interior design measure in research by Kang & Guerin (2009).

Daylight and a connection to the environment.

Factors relating to sustainable interior design are the use of daylight and a connection to the natural environment. The Heshong Mahone Group has performed several studies on daylighting. In 1999 the Heshong Mahone Group related daylight to improved test scores among elementary students, and improved sales among office and computer workers (Heshong Mahone Group, 1999). In 2003 the Heshong Mahone Group followed these studies with similar studies to further their findings. Their first study looked at the effect of windows and daylight on worker performance. Within this study two office environments were analyzed. The first was a call center of 100 workers whose performance and the time it took for each call was tracked by a computer system. The second group of 200 office workers performance was calculated by cognitive assessment tests. The workers environments were fairly uniform to prevent other potential influences on performance. Findings revealed that call center workers with the best possible views processed calls 6% to 12% faster than workers without views. Office workers performed 10% to 25% better on mental function and memory recall tests when given the best possible view over those who did not have a view. The best possible view was measured by the size of the window and the amount of vegetation. Further, better views and better health conditions of office workers were positively related (Heshong Mahone Group, 2003). A follow up study on the effects of daylighting on retail sales done in 2003 found daylighting to be as great a predictor of sales as other measures of sales such as parking area, number of local competitors, and neighborhood demographics. Results found up to a 40% increase in sales, a 1-2% increase in the number of monthly transactions, and more satisfied employees in daylit stores (Heshong Mahone Group, 2003).

The Heshong Mahone Group also conducted a series of three studies in which daylighting was related to improved student performance. The first examined school districts in Seattle, Washington and Fort Collins, Colorado. Students in the most daylit classrooms had 7% to 18% higher scores than those with the least daylighting in their classrooms. A comparison was done between fall and spring test scores in San Juan Capistrano, California. Students performed 20% faster on math tests and 26% faster on reading tests over a one-year period in classrooms with the most daylighting in their classrooms versus classrooms with the least daylighting. The second study concerning daylighting in schools identified an average of 21% improved learning rate for students in classrooms with the most daylighting compared to those with the least amount of daylight. The third study in Fresno California did not support the findings of the Capistrano study. Daylighting did not significantly predict student performance. This finding suggested other problems such as poor acoustics, poor outdoor air quality and more operable widows may have led to lower student performance that did not exist in prior studies. However, the Fresno California study did support the importance of physical environment for student learning (Heshong Mahone Group, 2003).

Along the lines of productivity, the Center for Building Performance and Diagnostics/ Advanced Building Systems Integration Consortium reported increases up to 18% in individual productivity and a reduction in absenteeism, sick building syndrome and recovery time due to access to the natural environment. Temperature control has also been shown to have the same effects (Loftness, 2007).

Attitude towards Sustainable Interior Design Practices

The New Environmental Paradigm (NEP) is a tool made up of a series of questions determining environmental concern. It has been widely used over the years with proven reliability and validity (Ruff & Olson, 2009, Ewert & Baker, 2001). Ruff and Olson (2009) use a revised version of the NEP to measure the environmental views of ninety-five interior design students at the university level. Students commonly believed that Earth's resources would not run out because they renew themselves. Students viewed man as superior to nature, and thought technology would correct mistakes (Ruff & Olson, 2009). Rider (2005) used the NEP scale with interior designers and architects who consider themselves green professionals and found a majority had a pro-environmental view.

The following studies addressed the difficulty of overcoming obstacles associated with implementing sustainable practices. Outside of the NEP scale, Fujii (2006) looked at attitudes toward pro-environmental behaviors and other impacts on environmental concern. Environmental concern is equally an awareness of the environment and an awareness of consequences behaviors have on the environment. Further, he looked at the attitude toward frugality, which considered the resources required to perform behaviors, and perceived ease of behavior, the perceived ease of implementing a pro-environmental behavior. If perceived ease was greater, in other words a behavior was easy to perform; there was a positive effect on pro-environmental behavior. Findings revealed the perceived ease of implementation positively influenced behavioral intention. Similarly, Abuthnott (2009) looked at perceived control. If a behavior was considered to be beyond control, there was no attempt to change this behavior despite a person's attitude. If a behavior appeared to make no difference, there was a smaller chance of a behavior

change (Abuthnott, 2009). The nature of intentions, contextual barriers and supports, and individual characteristics determine if attitudes are transformed into actions (Abuthnott, 2009).

Paul C. Stern (2000) did an in depth investigation of environmentally significant behavior. He suggested theories on environmentally significant behavior be combined for a more complete theory of the factors determining environmentally significant behavior. He offered definitions of intent-oriented and impact-oriented environmental behavior. The definition of intent-oriented behavior is intent independently causes behavior, but environmental impact may not result. Impact-oriented behavior changes the availability of materials or energy from the environment or alters the structure and dynamic of the biosphere or ecosystems. Stern (2000) created and tested the value belief-norm (VBN) theory. It combined the ideas of the new environmental paradigm (NEP), value theory, and norm-activation theory. From these theories came five variables that may lead to behavior: personal values, environmental attitudes, adverse consequences for valued objects, the perceived ability to reduce threat, and personal norms. The VBN began with personality and belief structure and moved toward more specific beliefs about relationships between humans and the environment, consequences and individual responsibility (Stern, 2000).

Stern (2000) went on to say that different environmental behaviors had different causes, and each individual required a unique combination of causes to create environmental impact. This is seen in the ABC theory, which suggested personal behavior not supported by context relied less on attitude. A combination of attitudinal factors, contextual factors, personal capabilities, and habit will determine specific

behaviors. As far as changing behaviors, he wrote, interventions will be unsuccessful unless important barriers to change are removed. Different combinations of interventions are unique to each individual and certain interventions do not provide returns after they have fulfilled their function (Stern, 2000).

Evans and Abrahamse (2009) examined what initiated the desire for a sustainable lifestyle, and found sustainability was not just about a concern for the environment, but may have begun as something else. Frugality and being a vegetarian are two examples of initial concerns that led participants to sustainable lifestyles and eventually a connection with the environment (Evans & Abrahamse, 2009). Abuthnott (2009) reviewed psychological research about the correlation between attitude and behavior. He found that attitudinal factors, contextual factors, and personal resources and characteristics are mediators that fell between intention and behavior. Attitudinal factors included intention specificity: the more specific intentions are, the more likely they influenced behavior. Contextual and personal factors influenced expressed attitudes and behavior. Contextual factors made sustainable behavior more or less likely. Inconvenience or cost can discourage sustainable behavior despite intention. In addition, acting in ways opposite normal routines required more effort. This idea is known as self-regulation depletion. Self-control takes effort and is exhausted when one has to act against intentions. In other words, making pro-environmental choices in a world not set up for these choices requires more self control, and when depleted, poor choices are made. Tensions and inconsistencies exist when trying to live sustainability (Arbuthnott, 2008). Participants in Evan and Abrahamses study (2009) felt there was always more they could or should be doing. They felt trapped by current infrastructures and systems of provision. Making

sustainable behaviors easy has the potential to increase adoption of sustainable practices (Arbuthnott, 2008).

Environmentally significant behavior is defined as a behavior that is undertaken with the intention to change (normally, to benefit) the environment (Stern, 2000). This definition focuses on the relationship between intent and behavior with the chance that environmental intent may not result in environmental impact. Environmental intent is not necessarily the most important factor affecting behavior. Behaviors are a consequence of habit, routine, income restraints, and infrastructure. Intended behavior is less likely when these aspects are considered (Abuthnott, 2009). Additionally, environmental factors can be minor or major influences of behavior. Without proper knowledge a seemingly pro-environmental choice can be worse for the environment (Stern, 2000). In a telephone survey of 512 randomly selected households in Ontario it was found that individual characteristics are important in describing attitudes toward the environment; however, contextual factors and collective resources were more important (Wakefield, Elliot & Cole, 2005).

Barriers towards Sustainable Interior Design Practices

Project capabilities, transition to sustainability, and knowledge and skills associated with sustainable interior design practices present barriers to using sustainable interior design practices. The examination of these three barrier categories is a pressing topic of this paper; however personal characteristics and contextual factors should not be overlooked.

Characteristics and contextual factors.

In their study, Kang and Guerin (2009) sought to determine the characteristics of interior designers who are applying environmentally sustainable interior design in their work. They used a purposeful sample of members of the American Society of Interior Designers (ASID). Personal characteristics studied were geographic region of employment. Professional characteristics studied were education, experience, examination, and regulation. The respondent group was made up of 63.6% who had received a degree from a CIDA accredited interior-design program, 55.1% who have taken a continuing education course, and 57.4% who work in residential design. Results showed a relationship between interior designer characteristics and the frequent use of environmentally sustainable interior design. Project size was the only predictor of how often environmentally sustainable interior design was used. Larger interior design projects used environmentally sustainable interior design more frequently. An interior designer's specialty was related to the importance designers placed on environmentally sustainable interior design practices. Those who specialized in child care and educational facilities were most concerned with sustainable interior design followed by hospitality/ entertainment, financial institutions, health care, government/ institutional, corporate/ office, and residential (Kang and Guerin, 2009). The characteristics of interior designers who applied environmentally sustainable design practices were studied by Kang and Guerin (2009), and will not be looked at extensively. Instead, a closer look will be taken at attitudes and factors that might present barriers to the use of environmentally sustainable design practices.

Marchand and Walker (2007) studied consumer characteristics. They examined the motivation for pro-environmental behavior and responsible consumption and found

four common profiles describing participant's reasons for sustainable lifestyles: eco-efficient simplifiers, better world simplifiers, quality of life simplifiers, and involuntary simplifiers. Eco-efficient simplifiers did not consume less; instead they substituted their regular products with eco-efficient products. Better world simplifiers adopted sustainable lifestyles to better the world, and for personal benefit. Quality of life simplifiers lived a sustainable lifestyle to improve their quality of life. Involuntary simplifiers simplified because of financial constraints. Environmental and social issues did not motivate involuntary simplifiers. All groups intend to consume less, but lacked a true understanding of how their actions influence the world (Marchand & Walker, 2007).

Personal characteristics.

A study by Spetic, Kozak, and Cohen (2008) investigated the knowledge and attitudes toward healthier homes of Canadian homeowners and renters. Attitudinal and demographic variables were used to identify clusters of consumers. A mail questionnaire was sent to a randomly selected sample of 400 individuals. Questionnaires addressed specific aspects of Indoor Environmental Quality (IEQ). Respondents indicated their level of agreement with statements related to different aspects of indoor environmental quality. Respondents were found to most likely agree with statements about energy efficiency and an interest in learning about materials causing allergies. Respondents were least likely to agree with statements concerning the existence of mold and statements about the preference of artificial lighting. The Clusters of consumers that developed are of interest. Cluster 1 had more positive attitudes towards healthier homes, and included respondents in the 40 and under age group and those ages 41-60. Cluster 1 was mostly women. Cluster 2 respondents had a more negative attitude toward healthier

homes and were made up mostly of those in age groups 40-60 and 61 and over. Cluster 3 was neutral in their attitudes toward healthier homes and made up of mostly those in the age group 41-60 and 61 and over. Those ages 41 to 60 dominated all clusters, but had the highest response rate in Cluster 1. Male respondents were most dominant in Cluster 3. Further exploration of the Clusters revealed that Cluster 1 was notably less satisfied than Clusters 2 and 3 in their responses toward lighting and energy efficiency. Cluster 1 was least satisfied with indoor air quality, lighting, and energy efficiency in their homes, and gave a high importance to indoor air quality (Spetic, et al., 2008).

Barriers and motivators concerning construction waste were identified by Osmani, Glass, and Price (2007) in their research on waste minimization. Questionnaires were sent to architectural practices and achieved a 40% response rate. The major barrier to waste reduction was a lack of interest from clients, followed by the view that waste was inevitable, poorly defined individual responsibilities, and a lack of training; only 14% had attended a waste minimization course. This lack of training created a barrier to minimizing waste in the design process. On the other hand, respondents agreed that financial rewards and legislation were incentives that encouraged waste minimization. Overall, factors hindering waste reduction were impacts on the generation of construction waste, a lack of client concern, poor understanding of waste origins and improper training (Osmani et al., 2007). Rider (2005) found architecture and interior design respondents were interested in sustainability for the following reasons: marketability, professional reasons, internships, service learning, and recreation interests. Other reasons for an interest were a speaker's influence, travel, formal education, conference attendance, books or articles, co-workers, acquaintances, upbringing, or other miscellaneous factors.

Many design professionals were involved with green design because of a fundamental dedication to sustainability (Rider, 2005).

Project capabilities

Project capabilities form another area of possible resistance to the implementation of sustainability. The cost of implementing green measures might negatively affect behavior (Fujii, 2006). Further, there is, on average, an additional 6% in construction costs to building green (Fleming, 2009).

Client.

Osmani et al. (2007) ranked a lack of client interest and changes to meet client's requirements and preferences as a leading cause of design waste. Many studies suggested educating clients and the public as an important step in achieving sustainability (Fujii 2006;Arbuthnott, 2008; Osmani et al., 2007). Properly educating end users about the importance of sustainable design decisions can encourage sustainable choices. The occupants of a building have a large impact on indoor air quality, the selection of products, furnishings and appliances, and maintaining healthy indoor environments (Loftness, 2007). When considering consumer education, Arbuthnott (2008) found public education was more effective when focused on specific pro-environmental behaviors rather than larger environmental issues (Arbuthnott, 2008). Additionally, educational interventions promoting equal opportunity and active engagement that contrast education models characterized by competition or individualistic goals and a passive environment were related to higher levels of efficacy and personal responsibility toward global warming among children (Devine-Wright et al., 2004).

Time constraints and deadlines.

Applying sustainable design practices within the time constraints and deadlines of a project can be a challenge. Osmani et al. (2007) looked at the impact architectural design practices have on construction waste in the U.K. They found last minute design changes by clients, other design changes, and detailing errors were the highest cause of design waste. Not designing to minimize waste, not designing for standardization, and not implementing a consultation process were other contributing factors of design waste (Osmani et al., 2007).

Contextual factors and infrastructure.

Contextual factors and infrastructure also play a role in the implementation of sustainable practices. Pro-environmental lifestyles are stifled by current infrastructure and product choices (Marchand & Walker, 2007). It has been suggested sustainable behaviors be made more convenient (Fujii, 2006), and money be spent to reduce the cost of sustainable behaviors rather than given to industries that degrade the environment. Further, legislation has the ability to encourage pro-environmental behavior, and should be taken into consideration by leaders and lawmakers (Arbuthnott, 2008; Fujii, 2006). In Kagawa and Fumiyo's (2007) exploration of student's understandings and perceptions of sustainable development, they found that students felt responsible for the environment as consumers. They suggest university infrastructures facilitate pro-environmental actions, and provide opportunities for students to influence the greening of campus regulations (Kagawa & Fumiyo, 2007). Osmani et al. (2007) found legislation and financial rewards were incentives for waste reduction during the design process. Their findings suggested rewards instead of fines as a more effective approach to waste minimization rather than

voluntary waste minimization (Osmani et al., 2007). Stern pointed out that the behaviors of many could be changed simultaneously with the use of public policies (Stern, 2000).

Codes, tools and labels.

Several codes, tools and labels pertaining to sustainability are emissions guidelines such as ASTM D5116-97 (ASTM 2007a) and D6670-01 (ASTM 2007b), Greenguard, the Carpet and Rug Institutes Green Label (Loftness et al., 2007), and LEED requirements. Participants might use tools because of demands from national, international or public body legislation, to gain a perspective on a present situation, to find alternatives to business operations, and for better management of the decision making process. The desire for a green image might motivate people to use a sustainable measurement tool. There are benefits associated sustainable practices. For example, a green label might come public finance opportunities, greater chance of building quotas, and backing from local authorities. Reasons for not using tools are a lack of motivation and openness; the tools create more difficulty when there is no perceivable gain or obligation for using a tool. A lack of motivation and openness were reasons planners, designers, consultants did not use urban sustainability tools in the research by Jensen & Elle (2007). Little knowledge of a tool and the extra time it takes to find the correct tool also prevented a tools use (Jensen& Elle, 2007). More knowledge of tools may be necessary to promote sustainable practices. Ruff and Olson (2009) concluded respondents did not have an adequate interpretation of environmental sustainability, but it could be strengthened through a change in interior designer education whereas green professionals in another study did not consider their education a factor in their interest in sustainability (Rider, 2005).

Knowledge and Skills

Education.

The following study by Ruff and Olson (2009) addressed the education of interior designers. It is an investigation of the attitudes of interior design students toward environmental sustainability. Ninety-five students enrolled in all levels of interior design courses in the same program participated. The survey consisted of four parts: demographics, ecology, sustainability, and comments. They found respondents had a pro-environmental and pro-sustainable attitude, yet they did not have a complete understanding of environmental sustainability. Most respondents thought the Earth's resources would renew themselves, and many students believed man was superior to nature, and relied on technology to correct mans mistakes. Students felt they could use sustainable products in commercial and residential projects; however, they were unsure about directing clients to examples of sustainable homes (Ruff & Olson, 2009).

Transition to Sustainability

Technology.

Arbuthnott (2008) suggested technology as a way to allow individuals to live as they always have while lessening environmental impact. From a slightly different point of view, McDonough states the importance of designers to creating a sustainable world in the midst of technology that has potential to negatively affect the world (McDonough, 2002).

Resistance to change.

Resistance to change might be caused by industry culture (Teo &Loosemore, 2001). As noted earlier current infrastructure does not always allow for sustainability, and environmentally sustainable behavior will require more effort as society adjusts (Arbuttnott, 2008). Knowledge and skills concerning sustainability include new practices and products. New green sustainable building materials are unfamiliar, keeping professionals from using them (Osmani et al., 2007).

Chapter III. Method

Research concerning sustainable attitudes of building professionals, specifically interior designers, is scarce. Exploring the attitudes interior designers have toward sustainable interior design practices is a step towards understanding the use of these practices. In their study, Ruff and Olson (2009) looked at the environmental view of interior design students. Similarly, an evaluation of professional interior designers would be useful. It is likely other factors beyond a designer's environmental attitude play a role in choosing whether or not to use sustainable interior design practices. Stern (2000) explains the importance of examining multiple variables such as attitude, capabilities and context when exploring environmentally significant behavior. He worked to develop a theory about the cause of environmental significant theory, the value-belief-norm (VBN) theory. The VBN theory combines many variables toward a more cohesive predictor of environmental attitudes. He also stated the importance of interdisciplinary research because each individual has a separate set of variables and different interactions among variables (Stern, 2000).

This study assessed the attitudes of interior designers toward interior design practices as well as potential barriers to using these practices. There is potential for such insight to aid in creating an infrastructure or changing existing infrastructures for the promotion of sustainable design decisions among the interior design field, related professions and their clients. Arbuthnott (2008) states, changing the physical and social environment to make sustainable behaviors less difficult and more socially valued will enable those with weaker attitude changes to behave more sustainability. Interior designers have an opportunity to reinforce this.

Objectives and Hypotheses

Three main objectives were identified in this study. First, interior designer's positive or negative attitudes towards sustainable interior design practices were evaluated. Whether or not this attitude affected the use of sustainable interior design practices was also evaluated. The second objective was to evaluate the defined categories of perceived barriers, which include project capabilities, transition to sustainability, and the knowledge and skills associated with sustainable interior design practices. Whether or not these perceived barriers affected the use of sustainable interior design practices was also evaluated. The third was to determine if attitudes towards sustainable interior design practices and perceived barriers associated with sustainable interior design practices were related.

After reviewing the literature, it became apparent that several barriers might exist to practicing sustainability and/ or living a sustainable lifestyle. This study looked at sustainability in regards to the interior design profession; how interior designers are using sustainable interior design practices and the barriers they encounter, overcome, or yield to. Based on previous research the following hypotheses were tested:

HO1: Interior designers who have a positive attitude toward sustainable interior design practices will use sustainable interior design practices more than those with a negative attitude toward sustainable interior design practices.

HO2: Some barriers will be stronger indicators of the use of sustainable interior design practices than others.

HO3: Some barriers will be overcome by a positive environmental attitude, while others will be too great to implement despite a positive attitude toward the environment and desire to perform sustainable interior design practices.

Research Design

To better understand the attitudes of interior designers towards sustainable interior design, and the potential barriers interior designers face when implementing sustainable interior deign practices, an online survey addressing these items was created. The survey was sent to members of the American Society of Interior Designers (ASID) via their bi-monthly electronic newsletter, NewsFlash, and the International Interior Design Organization (IIDA) through an e-mail blast sent by IIDA.

An electronic survey was chosen in order to reach a large number of participants on a national level. The survey was compiled based on previous research done on sustainable design, attitude and behavior, environmental attitude, sustainable lifestyles and barriers to green building. The survey was divided into the following sections: sustainable interior design practice use, attitudes toward sustainable interior design practices, three categories of barriers to practicing sustainable interior design: project capabilities, transition to sustainability, knowledge and skills, and general demographic information about experience, examination, and certifications.

The section on sustainable interior design practices measured how often interior designers use sustainable interior design practices. The attitude section measured where attitudes were on a scale of between being in favor of sustainable interior design practices to being against sustainable interior design practices. These questions are based on the NEP (New Environmental Paradigm) scale, a measurement of environmental attitude

used in previous studies, in combination with items relevant to the interior design profession. Participants responded to statements on a five point Likert scale ranging from strongly agree to strongly disagree. Answers to these questions determined whether participants have a positive attitude toward the environment or a negative attitude toward the environment concerning sustainable interior design practices.

The next three sections of the survey considered possible barriers interior designers face when putting sustainable measures into practice. Barriers were categorized as project capabilities, transition to sustainability, and knowledge and skills. Participants answered questions in these three sections on a scale of one to five, one being not a barrier and 5 being very much a barrier. A higher score indicated a stronger barrier. Project capabilities related to items necessary to completing a project such as costs, schedules, time crunches, and laws. Transition to sustainability considered that many sustainable interior design practices are evolving. It takes time to adjust to a new way of designing especially when one has been practicing a certain way for many years. The knowledge and skills section is about experience with and knowledge of sustainable interior design practices. Knowledge and skills considered the type of education one receives or their current specialization within interior design.

Survey questions were created to address points in a precise way, while still providing enough information for participant comprehension. The language of the interior design profession is utilized to further communicate each questions purpose. The Institutional Review Board (IRB) at the University of Nebraska, Lincoln, has approved this research (IRB# 20100911077 EX). Complete research questionnaires can be found in Appendix A and B.

Chapter VI. Results and Analysis

The following is a review of the responses to survey questions. Responses of ASID (American Society of Interior Designers) and IIDA (International Interior Design Association) will be reviewed separately. When of interest, responses will be compared across interior design organizations. The survey sent to members of IIDA had small differences due to requirements requested by IIDA. Because of slight differences in survey questions, the results of each subgroup of perceived barriers (i.e. project capabilities, transition to sustainability, knowledge and skills) will not be compiled as one score. Comparisons across interior design organizations should consider these minor differences.

Overall, sixty-two total respondents completed the survey distributed to members of ASID for a response rate of 2.70%. Response rates varied slightly from question to question and will also be stated separately in the discussion of each section. Overall, one hundred forty-three total respondents completed the survey distributed to members of IIDA for a response rate of 2.45%. Again, response rates varied slightly from question to question and will also be stated separately in the discussion of each section.

Sustainable Interior Design Practice Use

ASID sustainable interior design practice use received a 2.6% response rate. ASID members used sustainable interior design practices at least 40% of the time. Twenty-one point seven percent used sustainable interior design practices 80-100%, 23.3% used sustainable interior design practices 60-79%, 21.7% used sustainable interior

Table 1

ASID Sustainable Practice Use

	Frequency (N=60)	(%)
0-19%	11	18.3
20-39%	9	15.0
40-59%	13	21.7
60-79%	14	23.3
80-100%	13	21.7

Table 2

IIDA Sustainable Practice Use

	Frequency (N=142)	(%)
0-19%	20	14.1
20-39%	18	12.7
40-59%	32	22.5
60-79%	40	28.2
80-100%	32	22.5

design practices 40-59%, 15% used sustainable interior design practices 20-39%, and 18.3% used sustainable interior design practices 0-19%. Results for sustainable practice use are illustrated in Figure 5 and Table 1.

IIDA sustainable interior design practice use received a 2.44% response rate. One hundred forty-two valid responses were used to calculate sustainable practice use among members of IIDA. Twenty-two and one-half percent of IIDA respondents used sustainable interior design practices 80-100%, 28.2% used sustainable interior design practices 60-79%, 22.5% used sustainable interior design practices 40-59%, 12.7% used sustainable interior design practices 20-39%, and 14.1% used sustainable interior design practices 0-19%. Results for sustainable practice use are illustrated in Figure 5 and Table 2.

Attitude toward Sustainable Interior Design Practices

Attitude questions were based on the following categories, and scored on a five-point Likert scale. Question categories appear in Table 3.

Table 3

Attitude toward Sustainable Interior Design Practices Question Categories	
ASID	**IIDA**
Q1: Preserving earth's resources	Q1: Preserving earth's resources
Q2: Encouraging the use of sustainable interior design practices	Q2: Encouraging the use of sustainable interior design practices
Q3: Trend	Q3: Benefits the health of building occupants
Q4: Open to use	Q4: Trend
	Q5: Open to use

Within each interior design organization (ASID, IIDA) attitude towards sustainable interior design was positive. Respondents did not answer every question in this section; therefore, response rates vary for each question. Differences in scores appear in Table 4 and Table 5. The mean attitude score for ASID respondents was 4.32 (SD=.997). The mean attitude scores of IIDA respondents was 4.46 (SD=.64). Figure 1 illustrates attitude scores for both ASID and IIDA.

ASID attitude toward sustainable interior design practices.

Among ASID respondents, there was a 2.61% response rate to resources and encourage use, and a 2.65% response rate to trend and open to use. Respondents viewed sustainable interior design practices as important to preserving Earth's resources (M=4.38, SD=1.08). ASID respondents often encouraged co-workers and clients to use sustainable interior design practices on projects (M=4.18, SD=1.07). ASID respondents did NOT believe sustainable interior design practices were a passing trend (M=4.20, SD=1.18). ASID respondents were usually open to the use of sustainable interior design practices (M=4.52, SD=.96)

Table 4.

ASID Attitude Toward Sustainable Interior Design Practices

	Resources	Encourage Use	Trend	Open to Use
Valid Responses	60	60	61	61
Mean	4.3833	4.1833	4.1967	4.5246
Std. Deviation	1.07501	1.06551	1.18067	.95928

Table 5

IIDA Attitude towards sustainable interior design practices.

	Resources	Encourage Use	Benefits Health	Trend	Open to Use Use
Valid Responses	143	143	142	142	143
Mean	4.5664	4.2028	4.5000	4.2465	4.7622
Std. Deviation	.80105	.87661	.83156	1.05982	.59289

Among IIDA respondents, there was a 2.45% response rate to resources, encourage use, and open to use, and a 2.44% response rate to benefits and trend. IIDA respondents viewed sustainable interior design practices as important to preserving Earth's resources (M=4.57, SD=.80). IIDA respondents encouraged co-workers and clients to use sustainable interior design practices on projects (M=4.20, SD=.88). IIDA respondents viewed sustainable interior design practices as beneficial to physical and mental health of building occupants (M=4.50, SD=.83). Most IIDA respondents thought sustainable interior design practices were NOT a passing trend (M=4.25, SD=1.06).

Members of IIDA were open to the use of sustainable interior design practices (M=4.76, SD=.59).

Perceived Barriers Associated with Sustainable Interior Design Practices

Perceived Barrier Questions were scored on a five-point Likert scale (1=not a barrier to 5=very much a barrier). Differences between ASID and IIDA survey questions are displayed in Table 6 and Table 7. Some questions were added, and some questions were elaborated on for clearer understanding, upon the request of IIDA, before survey distribution.

Table 6

ASID Barriers Associated with Sustainable Interior Design Practices		
Project Capabilities	**Transition to Sustainability**	**Knowledge and Skills**
Q1: Cost	Q1: Personal resistance	Q1: Level of experience
Q2: Project schedule	Q2: Resistance within my firm	Q2: Level of success
Q3: Flexibility	Q3: Lack of motivation	Q3: Familiarity with measuring sustainability
Q4: Laws and policies		Q4: Current knowledge
		Q5: Availability of resources

Note. The perceived barrier section concerning transition to sustainability differs from the survey sent to members of IIDA.

Table 7

IIDA Barriers Associated with Sustainable Interior Design Practices		
Project Capabilities	**Transition to Sustainability**	**Knowledge and Skills**
Q1: Cost	Q1: Personal resistance	Q1: Level of experience
Q2: Project schedule	Q2: Extra time commitment	Q2: Level of success
Q3: Flexibility	Q3: Resistance within my firm	Q3: Familiarity with measuring sustainability
Q4: Laws and policies	Q4: Resistance from client	Q4: Current knowledge
	Q5: Habit	Q5: Availability of resources
	Q6: Lack of motivation	

Note. The perceived barriers section of the survey sent to members of IIDA differs from the survey sent to members of ASID. Differences appear in red.

ASID perceived barriers associated with sustainable interior design.

Three categories were made up of questions that addressed the perceived barriers to practicing sustainable interior design. These groups included: project capabilities, transition to sustainability, and knowledge and skills associated with sustainable interior design. ASID respondents scored below a three in all barrier categories: project capabilities (M=2.89, SD=.77), transition to sustainability (M=2.16, SD=1.002), and knowledge and skills (M=2.41, SD=.93).

Project capabilities.

The survey sent to members of ASID contained a project capabilities section that was composed of four questions. A five-point Likert scale was used to measure responses. Cost, project schedule, need for flexibility, and laws and policies had response rates of 2.65%. The cost of sustainable materials and design features had the largest mean score in this category (M=3.41, SD=.96). Project schedule had a mean score of 2.62 (SD=.97). The need for flexibility had a mean score of 2.95 (SD=1.13).

Laws and policies requiring sustainable practices had a mean score of 2.57 (SD=1.22). Results for project capabilities questions are illustrated in Figure 2.

Transition to sustainability.

The next group of perceived barrier questions concerned transition to sustainability. The survey sent to members of ASID contained three questions in this category. Of these questions, resistance within firm had a 2.61% response rate. Lack of motivation on respondent's part and personal resistance had a 2.65% response rate. A five-point Likert scale was used to measure responses. Resistance within the respondent's firm had the largest mean score within this category (M=2.25, SD=1.28), followed by a lack of motivation on the respondent's part to incorporate sustainable interior design practices (M=2.20, SD=1.34), and personal resistance from the respondent (M=2.07, SD=1.28). Results for transition to sustainability questions are illustrated in Figure 3.

Knowledge and skills.

The third group of perceived barrier questions concerned knowledge and skills. The survey sent to members of ASID was composed of five questions. Of these questions, familiarity with ways to measure sustainability, level of experience, current knowledge, availability of resources, and success with sustainable practices received a 2.65% response rate. A five-point Likert scale was used to measure responses. Familiarity with ways to measure sustainability had the largest mean score within this group (M=2.66, SD=1.32). The next three questions were rated closely: level of experience (M=2.36, SD=1.28), current knowledge of sustainable interior design practices (M=2.38, SD=1.31), availability of resources about sustainable interior design

practices (M=2.38. SD=1.14). The respondent's success with sustainable practices had the lowest mean score (M=2.28, SD=1.08). Results for knowledge and skills questions are illustrated in Figure 4.

IIDA perceived barriers associated with sustainable interior design.

The survey sent to members of IIDA was made up of three groups of questions. Each addressed the perceived barriers to practicing sustainable interior design. A five-point Likert scale was used to measure responses. If a respondent did not answer all questions in this category their answers were not used; therefore, each group has its own response rate. Perceived barriers groups included: project capabilities, transition to sustainability, and knowledge and skills associated with sustainable interior design. The survey sent to members of IIDA scored below a three in all three perceived barrier categories: project capabilities (M=2.99, SD=.678), transition to sustainability (M=2.45, SD=.738), and knowledge and skills (M=2.65, SD=.861).

Project Capabilities.

The survey sent to members of IIDA contained a project capabilities section that was composed of four questions. Responses were scored on a five-point Likert scale. Cost has a response rate of 2.42%, project schedule and need for flexibility had a response rate of 2.38%, and laws and policies had a response rate of 2.42%. The cost of sustainable materials and design features had the largest mean score (M=3.62, SD=.92). Next, was the need for flexibility with last minute changes (M=3.03, SD=1.06), followed by project schedule (M=2.73, SD=1.004), and laws and policies requiring sustainable practices (M=2.59, SD=1.16). Results for project capabilities questions are illustrated in Figure 2.

Transition to sustainability.

The next group of perceived barrier questions concerned transition to sustainability. The survey sent to members of IIDA contained six questions in this category. Of these questions, resistance from client had a 2.38% response rate, and habit had a 2.44% response rate. Lack of motivation on respondent's part, personal resistance, and extra time commitment required for sustainable practices had a 2.45% response rate. Resistance within firm had a 2.37% response rate. A five-point Likert scale was used to measure responses. Resistance from client had the largest mean score of (M=2.98,SD=1.09), followed by habit (M=2.91, SD=1.32), lack of motivation on the respondent's part to incorporate sustainable interior design practices (M=1.83, SD=1.02), personal resistance (M=1.64, SD=1.07), extra time commitment required to perform sustainable interior design practices (M=2.58, SD=1.21), and resistance within respondent's firm (M=2.19, SD=1.16). Results for transition to sustainability questions are illustrated in Figure 3.

Knowledge and skills.

The third group of perceived barrier questions concerned knowledge and skills. The survey sent to members of IIDA was composed of five questions. Of these questions, level of experience, availability of resources and current knowledge of sustainable practices had a 2.45% response rate. Familiarity had a 2.44% response rate, and level of success had a 2.40% response rate. A five-point Likert scale was used to measure responses. The level of experience with sustainable interior design practices had the largest mean score (M=2.82, SD=1.17), followed by the familiarity with ways to measure sustainability (e.g. LEED, Green Star, CRIs Green Label, Energy Star) (M=2.75,

SD=1.21), the availability of resources about sustainable interior design practices (M=2.62, SD=1.16), the respondent's level of success with sustainable interior design practices (e.g. making choices with reduced environmental impact while meeting other design criteria (cost, aesthetics, code, client needs)) (M=2.57, SD=1.03), and the respondent's current knowledge of sustainable interior design practices (M=2.55, SD=1.14). Results for knowledge and skills questions are illustrated in Figure 4.

Demographics

The remaining survey questions focused on demographics. The ASID survey contained a question about geographic location that differed from the survey sent to IIDA. The survey sent to members of ASID asked for region of employment by time zone. The survey sent to IIDA asked for the location of projects by time zone. The survey sent to members of IIDA allowed for more than one answer to be selected while the survey sent to members of ASID did not. Because of this difference the geographic location question will not be compared across interior design organizations. For surveys sent to ASID and IIDA, the specialization question under experience asked for all design specialties of the respondents firm. Respondents were allowed to select more than one answer. A selection of multiple specialization categories will affect the percentage; therefore, this question was omitted from responses received from IIDA and will not be discussed. Survey question subjects appear in Table 8.

Table 8

Demographic Questions			
General	**Education**	**Experience**	**Certification**
Q1: Geographic location	Q1: CIDA accredited program	Q1: Years of experience	Q2: NCIDQ certification
Q2: Gender	Q2: Year of Graduation		Q4: LEED AP certification
Q3: Age			

ASID demographics.

Region of employment.

The survey sent to members of ASID contained general demographic questions. The first asked for region of employment by time zone. This question had a 2.65% response rate. The locations by time zone are listed respectively: Eastern (50.8%), Pacific (19.7%), Central (19.7%), Mountain (8.2%), and Alaska (1.6%).

Gender.

Gender received a 2.61% response rate. Responses from members of ASID were 95% female and 5% male.

Age.

Age received a received a 2.65% response rate. The age of ASID respondent was distributed across groups. The majority were 25-34 (29.5%), followed by the under 25 group (21.3%), 45-54 (19.7%), 55-65 (19.7%), and 35-44 (9.8%). There were no respondents over the age of 65.

Education.

Of the education questions on the survey sent to members of ASID, CIDA accreditation received a 2.65% response rate, and year of graduation received a 2.43% response rate. The members of ASID that graduated from a CIDA (formerly known as FIDER) accredited program were 75.4%, while 24.6% did not. Year of graduation was highest among respondents graduating from 2005-2010 (51.8%). The remaining percentages were: before 1980 (10.7%), 1980-1984 (8.9%), 1985-1989 (7.1%), 1990-1994 (8.9%), 1995-1999 (3.6%), and 2000-2004 (8.9%).

Experience.

The years of experience question on the survey sent to members of ASID received a 2.65% response rate. The years of experience for members of ASID were highest among those with 0-4 years of experience (47.5%), followed by over 20 years (24.6%), 5-9 years (9.8%), 15-20 years (9.8%), and 10-14 years (8.2%).

Certification.

The next group of demographic questions requested information on certification. Of the certification questions on the survey sent to members of ASID, the NCIDQ certification question received a 2.65% response rate, and the LEED AP certification question received a 2.65% response rate. Of ASID respondents, 37.7% were NCIDQ certified and 62.3% were not NCIDQ certified. Of ASID respondents, 26.2% were LEED AP certified and 73.8% were not LEED AP certified.

IIDA demographics.

Location of projects.

The survey sent to members of IIDA contained a question about the location of projects by time zone. More than one response was allowed; therefore, these percentages are not comparable to ASID responses. A selection of multiple specialization categories will affect the outcome; therefore, this question was omitted from IIDA results.

Gender.

Of the remaining general demographic questions on the survey sent to members of IIDA, gender received a 2.44% response rate. Responses from members of IIDA were 93% female and 7% male.

Age.

Age received a received a 2.42% response rate. The IIDA respondents were a younger group. The under 25 group (38.3%) and 25-34 group (36.9%) contained the largest percentage of respondents, followed by 35-44 (9.9%), 45-54 (9.9%), and 55-65 (5%). There were no respondents over the age of 65.

Education.

Of the education questions on the survey sent to members of IIDA, graduation from a CIDA accredited program received a 2.37% response rate, and year of graduation received a 1.94% response rate. The members of IIDA that graduated from a CIDA (formerly known as FIDER) accredited program were 68.1%, while 31.9 % did not. Year of graduation was greatest among those graduating from 2005-2010 (84.1%). The

remaining percentages were: 1980-1984 (2.7%), 1985-1989 (1.8%), 1995-1999 (4.4%), and 2000-2004 (7.1%). There were no responses for before 1980 or 1990-1994.

Experience.

The years experience question on the survey sent to members of IIDA received a 2.40% response rate among members of IIDA. The years of experience for members of IIDA were highest among those with 0-4 years of experience (82.1%), followed by 5-9 years (10.7%), 10-14 years (5%), and over 20 years (2.1%). Due to the low response rate for 15-20 years experience, the percentage was not valid.

Certification.

The next group of demographic questions was certification. Of the certification questions on the survey sent to members of IIDA, the NCIDQ question received a 2.38% response rate, and the LEED AP certification question received a 2.37% response rate. Of IIDA respondents 10.1% were NCIDQ certified and 89.9% were not NCIDQ certified. Of IIDA respondents 23.9 % were LEED AP certified and 76.1% were not LEED AP certified.

ASID Group Statistics

Independent-samples t-tests, one-way statistical test between subjects ANOVAs, Turkey HSD's, and regression analysis were used to determine if barriers or attitude scores differed significantly among demographic information and to test hypotheses. Demographic information was divided into general, education, experience and certification.

General.

Geographic location.

A one-way statistical test between subjects ANOVA was conducted to compare the effect of geographic location of ASID respondents to the respondents score for perceived barriers associated with sustainable interior design scores. There was not a significant effect of geographic location on perceived barrier scores [$F(4,54)=1.106, p=.363, n^2=08$]. A one-way statistical test between subjects ANOVA was conducted to compare ASID respondents attitude toward sustainable interior design scores for each of the different geographic locations by times zone. There was not a significant effect of geographic location on attitude scores for the five conditions [$F(4,55)=.549, p=.701, n^2=04$].

Gender.

For members of ASID, there were 3 male respondents and 57 female. The sample size for male respondents was too small to generate accurate results; therefore, a test was not run for this category.

Age.

A one-way statistical test between subjects ANOVA was conducted to compare the effect of ASID respondent's age on their attitude toward sustainable interior design practices score. There was not a significant effect of age on attitude for these conditions [$F(4,54)=2.187, p=.083, n^2= .14$]. A one-way statistical test between subjects ANOVA was conducted to compare the effect of ASID respondent's age on their score for perceived barriers associated with sustainable interior design. There was not a significant effect of age on perceived barrier scores [$F(4,55)=.201, p=.937, n^2=.01$].

Education.

Q1: CIDA (formerly known as FIDER) accredited program.

An independent-samples t-test was conducted to compare the attitude toward sustainable interior design scores of ASID respondents who graduated from CIDA accredited program to respondents who did not graduate from a CIDA accredited program. There was not a significant difference in attitude scores for respondents who graduated from a CIDA accredited program (M=4.28, SD=1.11) and respondents who did not graduate from a CIDA accredited program (M=4.43, SD=.56) conditions [t(57)=.517, p=.607]. An independent-samples t-test was conducted to compare perceived barriers associated with practicing sustainable interior design scores of ASID respondents who graduated from CIDA accredited program and respondents who did not graduate from a CIDA accredited program. There was not a significant difference in barrier scores for respondents who graduated from a CIDA accredited program (M=2.45, SD=.72) and respondents who did not graduate from a CIDA accredited program (M=2.62, SD=.49); [t(58)=.839, p=.405].

Q2: Year of Graduation.

A one-way statistical test between subjects ANOVA was conducted to compare the effect of year of graduation to ASID respondent's attitude toward sustainable interior design scores. There was not a significant effect of year of graduation on attitude scores [F(6,47)=.984, p=.447, n^2= .11]. A one-way statistical test between subjects ANOVA was conducted to compare the effect of year of graduation to ASID respondent's perceived barriers associated with sustainable interior design scores. There was not a

significant effect of year of graduation on perceived barriers for these conditions [$F(6,48)=1.421$, $p=.226$, $n^2=.15$].

Experience.

Q1: Years of experience.

A one-way statistical test between subjects ANOVA was conducted to compare the effect of years of experience on ASID respondent's attitude toward sustainable interior design scores. There was not a significant effect of years of experience on attitude scores for these conditions [$F(4,54)=.846$, $p=.502$, $n^2= .06$]. A one-way statistical test between-subjects ANOVA was conducted to compare the effect of years of experience on ASID respondent's perceived barriers associated with sustainable interior design scores. There was not a significant effect of years of experience perceived barriers scores for these conditions [$F(4,55)=.436$, $p=.782$, $n^2= .03$].

Certification.

Q2: NCIDQ certification.

An independent samples t-test was conducted to compare ASID respondent's attitude toward sustainable interior design scores for ASID respondents who are NCIDQ certified and those who are not NCIDQ certified. There was not a significant difference in the attitude scores for ASID respondents who were NCIDQ certified ($M=4.19$, $SD=1.11$) and ASID respondents who were not NCIDQ certified ($M=4.39$, $SD=.93$); [$t(57)=.738$, $p=.464$]. An independent samples t-test was conducted to compare ASID respondent's perceived barriers associated with practicing sustainable interior design scores for ASID respondents who are NCIDQ certified and those who are not NCIDQ

certified. There was not a significant difference in perceived barriers scores for ASID respondents who were NCIDQ certified (M=2.38, SD=.63) and those who were not NCIDQ certified (M=2.57, SD=.70); [t(58)=.1.016, p=.314].

Q4: LEED AP certification.

An independent samples t-test was conducted to compare attitude toward sustainable interior design practices scores for ASID respondents who were LEED AP certified and those who were not LEED AP certified. There was not a significant difference in attitude scores for ASID respondents who were LEED AP certified (M=4.47, SD=.90) and ASID respondents who were not LEED AP certified (M=4.26, SD=1.03); [t(57)=-.707, p=.483]. An independent samples t-test was conducted to compare perceived barriers associated with sustainable interior design scores for ASID respondents who were LEED AP certified and those who were not LEED AP certified. There was a significant difference in barriers scores for ASID respondents who were LEED AP certified (M=2.10, SD=.60) and ASID respondents who were not LEED AP certified (M=2.64, SD=.64); [t(58)=2.931, p=.005].

Hypotheses.

Hypothesis one.

Hypothesis one was tested by comparing mean scores for the attitude toward sustainable interior design practices to the varying percentages ASID respondents indicated they use sustainable interior design practices. A one-way statistical test between subjects ANOVA found there is not a significant difference in attitude scores for

the varying percentages of indicated sustainable interior design practice use [$F(4,53)=2.229, p=.078, n^2= .14.$]. Figure 7 illustrates this finding.

Hypothesis two.

Hypothesis two was tested by comparing the perceived barriers one associates with sustainable interior design practices scores to the varying percentages ASID respondents indicated they use sustainable interior design practices. A one-way statistical test between subjects ANOVA found a significant difference in perceived barriers scores among the varying percentages ASID respondents indicated they used sustainable interior design practice use [$F(4,54)=3.351, p=.016, n^2= .20$].

Post hoc comparisons using the Turkey HSD test indicated that mean scores for 0-19% (M=2.97, SD=.68) use was significantly different than 60-79% (M=,2.23 SD=.57) use (p=.038), and 80-100% (M=2.19, SD=.75) use (p=.028). Twenty to 39% (M=2.75, SD=.56) use and 40-59% (M=2.55, SD=.55) use did not significantly differ from 0-19% use. Figure 6 represents this finding.

Hypothesis three.

Hypothesis three stated: some barriers will be overcome by a positive environmental attitude, while others will be too great to implement despite a positive attitude toward the environment and desire to perform sustainable interior design practices.

Regression analysis was used to determine if a linear combination of the three perceived barrier category scores (project capabilities, transition to sustainability, and knowledge and skills) would predict attitude scores among ASID respondents.

A regression analysis predicting ASID attitude scores from a linear combination of the three perceived barrier scores of ASID respondents, was statistically significant ($F(3,54)=4.583$, $p=.006$). An R^2=value of .203 indicates that 20.3% of variance in attitude is accounted for by a linear combination of the three perceived barrier scores.

Individual correlations between each of the three perceived barrier scores and attitude were significant. Attitude and project capabilities were strongly related $r(56)=.029$, $p<.05$. Attitude and transition to sustainability were strongly related $r(56)=.001$, $p<.05$. Attitude and knowledge and skills were strongly related, $r(56)=.004$, $p<.05$. Because these correlations were significant, attitude would also be a significant predictor of perceived barrier scores in a regression context. Individual regressions were not run because only relationships between attitude and behavior were of interest for this study.

IIDA Group Statistics

Independent samples t-tests, one-way statistical tests between subjects ANOVAs, Turkey HSD's, and regression analysis were used to determine if barriers or attitude scores differed significantly among demographic information and to test hypotheses. Demographic information was divided into general, education, experience and certification.

General.

Q2: Gender.

An independent-samples t-test was conducted to compare the attitude scores of IIDA respondents who are male and attitude scores of IIDA respondents who are female.

There was not significant difference in attitude scores for male (M=4.34, SD=.43) and female (M=4.47, SD=.65); [t(138)=.608, p=.544]. An independent-samples t-test was conducted to compare perceived barrier scores of IIDA respondents who are male to perceived barrier scores of IIDA respondents who are female. There was not a significant difference in perceived barriers scores for male (M=2.42, SD=.37) and female (M=2.63, SD=.58) respondents; [t(131)=1.102, p=.273].

Q3:Age.

A one-way statistical test between subjects ANOVA was used to compare the effect of the IIDA respondent's age to IIDA respondent's attitude toward sustainable interior design practices scores. There was not a significant effect of age on attitude scores [F(4,134)=.311, p=.870, n^2=.001]. A one-way statistical test between subjects ANOVA was used to compare the effect of IIDA respondent's age to IIDA respondent's perceived barriers scores. There was not a significant effect of age on perceived barriers [F(4,129)=.245, p=.912, n^2=.01].

Education.

Q1: CIDA (formerly known as FIDER) accredited program.

An independent-samples t-test was conducted to compare attitude scores for IIDA respondents who graduated from a CIDA accredited program and those who did not. There was not a significant difference in attitude scores for respondents who graduated from a CIDA accredited program (M=4.43, SD=.70) and those who did not graduate from a CIDA accredited program (M=4.55, SD=.45); [t(134)=.1.054, p=.294]. An independent-samples t-test was conducted to compare perceived barriers scores for IIDA

respondents who graduated from a CIDA accredited program and those who did not. There was not a significant difference in barrier scores for IIDA respondents who graduated from a CIDA accredited program (M=2.59, SD=.57) and IIDA respondents who did not graduate from a CIDA accredited program (M=2.68, SD=.56);[t(130)=.787, p=.432] in terms of CIDA accreditation.

Q2: Year of Graduation.

A one-way statistical test between subjects ANOVA was used to compare the effect of IIDA respondent's year of graduation to IIDA respondent's attitude toward sustainable interior design practices. There was not a significant effect of year of graduation on attitude scores [F(4,106)=.309, p=.871, ?2? .01]. A one-way statistical test between subjects ANOVA was used to compare the effect IIDA respondent's year of graduation to IIDA respondent's perceived barriers associated with practicing sustainable interior design. There was not a significant effect of year of graduation on perceived barriers [F(4,104)=.810, p=.521, n^2= .03].

Experience.

Q1: Years of experience.

A one-way statistical test between subjects ANOVA was used to compare the effect of IIDA respondent's years of experience to IIDA respondent's attitude toward sustainable interior design. There was not a significant effect of years of experience on attitude [F(3,134)=.095, p=.962, n^2=.002]. A one-way statistical test between subjects ANOVA was used to compare the effect of IIDA respondent's year of graduation to IIDA respondent's perceived barriers associated with sustainable interior design. There was a

significant effect of years of experience on perceived barriers for these conditions [F(3,128)=.5.723, p=.001, n^2=.12].

Post hoc comparisons using the Turkey HSD test indicated that the mean score for 10-14 years experience (M=1.78, SD=.38) was significantly different than 0-4 years experience (M=2.65, SD=.50). The Turkey HSD test also indicated that the mean score for 10-14 years experience (M=1.78, SD=.38) was significantly different than 5-9 years experience (M=2.64, SD=.82).

Certification.

Q2: NCIDQ certification.

An independent-samples t-test was conducted to compare the attitude toward sustainable interior design practices scores for IIDA respondents who are NCIDQ certified to respondents who are not NCIDQ certified. There was a significant difference in attitude scores for respondents that were NCIDQ certified (M=4.02, SD=1.03) and respondents who were not NCIDQ certified (M=4.52, SD=.55); [t(135)=2.826, p=.005]. An independent-samples t-test was conducted to compare the perceived barrier scores IIDA respondents who were NCIDQ certified to respondents who were not NCIDQ certified. There was not a significant difference in perceived barrier scores for respondent that were NCIDQ certified (M=2.66, SD=.71) and respondents who were not NCIDQ certified (M=2.59, SD=.54); t(130)=-.453, p=.651).

Q4: LEED AP certification.

An independent-samples t-test was conducted to compare the attitude toward sustainable interior design practices scores of IIDA respondents who have LEED AP

certification to IIDA respondents who do not have LEED AP certification. There was not a significant difference in attitude scores for IIDA respondents that were LEED AP certified (M=4.43, SD=.75) and IIDA respondents who were not LEED AP certified (M=4.48, SD=.59); [t(134)=.452, p=.652]. An independent-samples t-test was conducted to compare the perceived barriers associated with sustainable interior design practices scores of IIDA respondents who are LEED AP certified to IIDA respondents who are not LEED AP certified. There was not a significant difference in attitude scores for respondents that were LEED AP certified (M=2.44, SD=.65) and respondents who were not LEED AP certified (M=2.65, SD=.52); [t(130)=1.923, p=.057].

Hypotheses.

Hypothesis one.

Hypothesis one stated: interior designers who have a positive attitude toward sustainable interior design practices will use sustainable interior design practices more than those with a negative attitude toward sustainable interior design practices. Hypothesis one was tested by comparing the attitude toward sustainable interior design practices scores to the varying percentages IIDA respondents indicated they used sustainable interior design practices. A one-way statistical test between subjects ANOVA found a significant difference in attitude scores for the varying percentages of indicated sustainable interior design practice use [$F(4,135)=4.611, p=.002, n^2=.12$].

Post hoc comparisons using the Turkey HSD test indicated mean attitude towards sustainable interior design practices scores for 80-100% use were significantly different than 0-19% use (p=.019), 20-39% use (p=.038), and 40-59% use (p=.036). Figure 9 illustrates this finding.

Hypothesis two.

Hypothesis two stated: some barriers will be stronger indicators of the use of sustainable interior design practices than others. It was tested by comparing the perceived barriers one associated with sustainable interior design practices scores to the varying percentages IIDA respondents indicated they use sustainable interior design practices. A one-way statistical test between subjects ANOVA found a significant difference in perceived barriers scores among the varying percentages of indicated sustainable interior design practice use [$F(4,129)=6.807$, $p=.001$, $n^2=.17$].

Post hoc comparisons using the Turkey HSD test indicated that mean perceived barrier scores for 80-100% use was significantly different than 0-19% use ($p=.001$), 20-39% use ($p=.001$), and 40-59% use ($p=.014$). Figure 8 illustrates this finding.

Hypothesis three.

Hypothesis three stated: some barriers will be overcome by a positive environmental attitude, while others will be too great to implement despite a positive attitude toward the environment and desire to perform sustainable interior design practices.

Regression analysis was used to determine if a linear combination of scores for the 3 perceived barrier categories (project capabilities, transition to sustainability, and knowledge and skills) would predict perceived attitude scores among IIDA respondents. A regression analysis predicting IIDA attitude scores from a linear combination of the three perceived barrier scores of IIDA respondents, was statistically significant ($F(3,128)=4.346$, $p=.006$). An R^2=value of .092 indicates that 9.2% of variance in attitude is accounted for by a linear combination of the 3 perceived barrier scores.

Attitude and project capabilities were not strongly related, $r(130)=.180$, $p<.05$. Attitude and transition to sustainability were not strongly related, $r(130)=.095$, $p<.05$. Attitude and knowledge and skills were strongly related, $r(130)=.001$, $p<.05$. Because the attitude and knowledge and skills correlation was significant, attitude would also be a significant predictor of knowledge and skills scores in a regression context. Individual regressions were not run because only relationships between attitude and behavior were of interest for this study.

Chapter V. Conclusion

The results of this study found a positive attitude towards sustainable interior design practices. Positive attitudes related to how often interior designers used sustainable interior design. While positive attitudes are hopeful, there are many barriers preventing interior designers to practicing sustainable interior design. It is worth repeating what Stern's (2000) suggestion: "interventions will be unsuccessful unless important barriers to change are removed."

Percentage of Use

Most respondents from ASID and IIDA pools reported using sustainable interior design practices at least some of the time. Few respondents from each group indicated 0-19% use. The majority of respondents indicated using sustainable interior design practices at least 40 % of the time.

Attitude and Barrier Scores

Attitude towards sustainable interior design practices.

The mean scores for all attitude related questions were very strong, suggesting interior designers have a favorable attitude toward sustainable interior design practices, similar to findings by Rider (2005) in which the majority of interior designers and architects who considered themselves green professionals had a pro-environmental view. ASID and IIDA respondents scored highest on open to the use of sustainable interior design practices question and lowest on encourage clients and co-workers to use sustainable interior design practices question. A high score for the attitude question

concerning the open to use of sustainable practices indicates that respondents are willing to use or try sustainable methods. Openness to sustainability is an important factor to implementing sustainable practices and encouraging sustainable change in the interior design field. A low score on the encourage use question might indicate less of an emphasis on pushing others to act sustainably, and more of a personal dedication to sustainable design rather than a corporate dedication. It is possible that respondents did not feel as confident in communicating their desires to practice sustainable interior design as students in Ruff and Olson's study (2009) in which interior design students had pro-environmental attitude, but were unsure of how to direct clients to examples of sustainable homes.

Although the attitude question concerning the respondent's encouraged use of sustainable interior design practices among co-workers and clients had the lowest score of the attitude questions for ASID and IIDA respondents, it scored high on the overall scale of attitude toward sustainable interior design practices with a mean score of 2.32 for ASID respondents and mean score of 4.46 for IIDA respondents.

The attitude question concerning the physical and mental health benefits of building occupants was only part of the survey distributed to members of IIDA. It was the second highest scoring question among the attitude questions further demonstrating an understanding of the benefits of sustainable interior design practices. Respondents may understand the importance; however, it is hard to determine the depth of this understanding or the ways in which respondents demonstrate this understanding in their professional work. This suggests a commitment to occupant's physical and mental health is important to the work of interior designers.

NCIDQ certification was only significant in IIDA respondent's attitude scores. IIDA respondents with NCIDQ certification had significantly higher attitude scores than those who did not have NCIDQ certification. Interior designers with more years of experience are more likely to be NCIDQ certified than those with fewer years of experience; however, years of experience did not impact attitude scores among IIDA respondents. NCIDQ certification recognizes a certain level of achievement in interior design. This finding suggests that more of a commitment to sustainable interior design practices is also achieved with NCIDQ certification.

Barriers associated with sustainable interior design practices.

LEED AP certification was only significant in ASID respondents perceived barriers associated with sustainable interior design practices scores. ASID respondents with LEED AP certification had significantly lower barrier scores than respondents who did not have LEED AP certification. This could be due to a stronger commitment to sustainability among certified respondents. It would be expected that along with LEED certification comes a stronger knowledge of sustainable interior design practices.

Transition to sustainability.

ASID and IIDA respondents indicated the transition to sustainable practices, from what have become common interior design practices, as the lowest barrier to using sustainable interior design practices. Within this group, personal resistance to sustainability was the lowest scoring question. This aligns with the high attitude towards sustainable interior design practices scores among ASID and IIDA respondents. The greatest scoring barrier among ASID respondents within the project capabilities section was resistance from firm. ASID respondents did not have the option to select resistance

from client; however firm resistance was greater than personal resistance suggesting as a project or design begins, obstacles arise within ones firm. IIDA respondents rated resistance from client as the highest scoring barrier within transition to sustainability and may be related to project capabilities such as cost. A resistance from clients might be lessened with proper education and explanation to clients about sustainable interior design practices. Properly presenting ideas and communicating the importance of sustainable features is a way of overcoming client objections. Arbuthnott (2008) makes several suggestions for educating about environmental issues, such as providing specific behavioral examples and promoting equal opportunity and active engagement. A low score here matches the lowest score of the attitude questions which examined how often respondents encourage clients and co-workers to use sustainable interior practices. Recognizing barriers interior designers encounter is important for moving past a state of transitioning to sustainable practices and to place where sustainable design is common and expected. It is not that all sustainable ideas are 100 percent new; rather, ideas need to be re-explored and revamped for current living and designing.

Project capabilities.

Cost was the highest rated barrier under project capabilities for both ASID and IIDA. This aligns with findings by Evans and Abrahamse (2009). Although it is categorized under project capabilities, cost is partially higher due to the transition from common methods of design to more sustainable practices. Cost might also relate to pressure from clients and firm to stay within a certain budget. Educating fellow employees and the public about the importance of sustainable practices becomes important to overcoming the cost barrier. Educating co-workers and clients was rated the

lowest among the attitude section of questions; therefore, an improvement in this score might suggest an improvement in client and co-worker attitudes and better understanding of costs associated with sustainable interior design features. Understanding the client and the different motivations for sustainability, as several studies aim to do (Marchand & Walker, 2007; Spetic et al., 2008), is one possible solution to overcoming the cost barrier. Changing another's attitude requires speaking their language whether it is money, productivity, heath, or another passion driving their decisions.

It is encouraging to see laws and policies requiring sustainable practices as the lowest rated barrier under project capabilities. Many codes, labels and tools are not yet required; therefore respondents did not view them as restrictive. It could be that laws and policies may guide respondents toward more sustainable choices. Additionally, the benefits of green codes, labels and tools might outweigh the restrictions against the use of sustainable design practices. For example, LEED certification might reflect a company's dedication toward building or designing sustainably, and a commitment to something more than a profit. The implementation of more concrete laws and policies requiring sustainable practices will tell how interior designers and those in related fields truly feel about this issue.

Hypothesis One -Attitude and Percentage of Use

Hypothesis one stated: interior designers who have a positive attitude toward sustainable interior design practices will use sustainable interior design practices more than those with a negative attitude toward sustainable interior design practices. There was a relationship between respondent's attitude toward sustainable interior design practices and the percentage of the time respondents use sustainable interior design

practices. This finding would benefit further exploration. Perhaps, exploring attitudes more deeply and in what ways specific attitudes toward design practices or the environment impact the use of sustainable design measures. It is hard to say whether respondents were required to use sustainable practices and therefore generated a positive attitude toward them or respondents had a positive attitude toward sustainable practices and were more willing to use sustainable interior design practices. Nonetheless, there was a positive relationship between attitude and percentage of use. There was significant statistical evidence of this relationship among ASID and IIDA respondents. More knowledge about how attitudes towards sustainable interior design practices would help in forming a positive attitude toward sustainable design. Such research is important to shaping ideas about interior design and creating a dedication to sustainable interior design practices, especially among new designers.

Attitude scores were high among all respondents; however ASID respondents answers varied significantly on attitude scores for low use and high use. IIDA respondents mean attitude scores varied significantly from low and average use compared to high use of sustainable interior design practices. For ASID and IIDA respondents, it appears a higher use of sustainable interior design practices coincides with a more positive attitude toward sustainable interior design practices. With more use of sustainable interior design practices comes a more thorough knowledge and understanding of them. Findings suggest more use of sustainable interior design practices leads to overcoming barriers and be less of a threat to project capabilities. Respondents who use sustainable interior design practices may be more confident in communicating their process and its importance to their clients, their firm, and other

decision makers. Respondents who use sustainable interior design practices may see the benefits first hand, further contributing to their positive attitude toward sustainable interior design practices.

Abuthnott (2009) stated that attitude context, personal resources and characteristics are things that fall between attitude and behavior; therefore, the relationship between attitude scores and the percentage of sustainable interior design use is not a direct link. Project size, characteristics of a designer, and design specialty are factors explored by Kang and Guerin (2009) that may relate to the use of sustainable interior design practices on projects. The barriers explored in this study are variables that lie between attitude and the use of sustainable interior design practices; however, it is encouraging to see a relationship between attitude and the use of sustainable interior design practices. Further exploration of the factors beyond attitude, such as Kang and Guerin (2009) have done with personal characteristics, that encourage and discourage sustainable practices is complex but necessary for a deeper understanding.

Hypothesis Two -Barriers and Percentage of Use

There was a relationship between perceived barriers associated with sustainable interior design practices scores and the percentage of time interior designers used sustainable interior design practices. As barrier scores decreased, the percentage of use increased. The results of ASID respondents were more gradual with the largest differences among those who practiced sustainable interior design the least (0-19%) and those who practice sustainable interior design an average to a majority of the time (60-100%). IIDA respondents differed the most between respondents who use sustainable interior design practices the most (80-100%) and all other respondents. This finding is

also encouraging to the development of sustainable interior design practices. It appears as respondents became more aware and familiar with sustainable interior design practices, barriers decreased. The reason behind this might be a higher comfort level with sustainable interior design practices, or more confidence in accomplishing project goals and meeting deadlines while using sustainable interior design practices. More experience with sustainable design practices was another variable that lessened mean barrier scores among members of IIDA. There was a significant difference between IIDA respondents who have none to moderate experience and respondents with 10 to 14 years of experience. This finding might relate to more knowledge, skills, success and familiarity with sustainable interior design practices. Also, with more years of experience interior designers become more comfortable with the design process and professional practice; therefore, respondents might be accustomed to overcoming barriers and have a process for overcoming them. There was a significant difference between respondents who have none to moderate experience and respondents with 10 to 14 years of experience. This finding recognizes the importance of mentoring. Less experienced interior designers have much to learn from more experienced interior designers. Passing on knowledge about overcoming barriers will be necessary as designers young and old push forward with sustainable practices.

Hypothesis Three -Attitude and Perceived Barriers

The third hypothesis predicted some barriers would be overcome by a positive environmental attitude, while others would be too great to implement despite a positive attitude toward the sustainable interior design practices. There was a significant relationship between attitude and barriers among ASID and IIDA respondents. Barrier

scores are a good predictor of attitude scores. The opposite is also true; attitude scores are a predictor of barrier scores. There was a stronger relationship between attitude and barrier scores among ASID respondents. This finding might be due to the smaller number of respondents and the demographic information of the respondents. Among IIDA respondents, the only significant correlation was between attitude and knowledge and skills, revealing the importance of education and developing sustainable skills has towards a positive attitude toward sustainable interior design practices and overcoming the barriers associated with sustainable interior design. This strong correlation between attitude and perceived barriers associated with knowledge and skills is interesting due to the fact that IIDA respondents were made up of many new designers. Ideally, this relationship suggests with a more positive attitude, one can overcome barriers associated with sustainable interior design practices.

The barriers associated with sustainable interior design practices represent some of the variables preventing the translation of a positive attitude toward sustainable interior design practices into a sustainable practice. ASID respondents attributed 22.3% of their attitude to barriers, and IIDA respondents attributed 9.2% of their attitude scores to perceived barriers. Had a correlation been run predicting barriers based on attitudes, the findings would be similar. Based on these findings, as attitudes increase and barrier scores decrease, sustainable interior design practice use will likely increase.

Previous studies mentioned the numerous variables attributed to whether or not one will carry out a sustainable action, and reasons for being involved in green design. The importance of understanding how a positive attitude towards sustainable interior design practices are formed, and when it is beneficial to overcoming barriers helps when

working sustainability into the interior design profession. Recognizing barriers associated with sustainable interior design and finding solutions to counteract them is also beneficial. Each designer and project is different; therefore, each will be unique in how it incorporates sustainability. It is the author's hope that time, significant case studies, and collaboration will build positive attitudes and remove barriers within the interior design profession.

Limitations

This study was done electronically. A small response rate is expected for this type of study, and there is no way to know why some respondents chose to participate and some did not. An interest in sustainability may have prompted respondents to participate, affecting the high attitude scores. It has been mentioned that different surveys were sent to ASID and IIDA. This limited the comparisons between groups. Additionally, respondent's interpretation of questions were beyond the author's control; however, care was taken to accurately communicate each question.

Future Study

The focus of this study was the attitudes and barriers associated with sustainable interior design practices. From this, additional questions have been raised. Future investigation into the effects of education on attitudes and barriers associated with sustainable interior design would be beneficial. This includes the education of interior designers as well as the education of clients. More study of

how interior designer's form positive attitudes toward sustainable interior design practices would also be of use to the interior design profession.

Figure 1. Mean values of attitude towards sustainable interior design practices scores for members of ASID and IIDA. Scores were high among both interior design organizations; therefore, respondents had a positive attitude toward sustainable interior design practices.

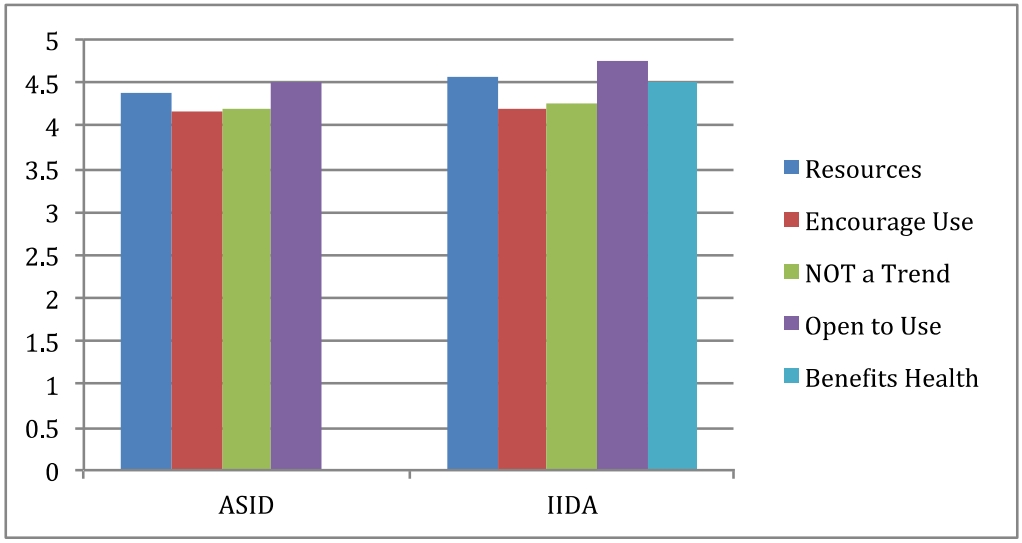


Figure 2. Mean scores of perceived barrier questions concerning project capabilities for members of ASID and IIDA. Highest and lowest means were similar among interior design organizations with slightly larger means among IIDA respondents, possibly due to a larger respondent pool.

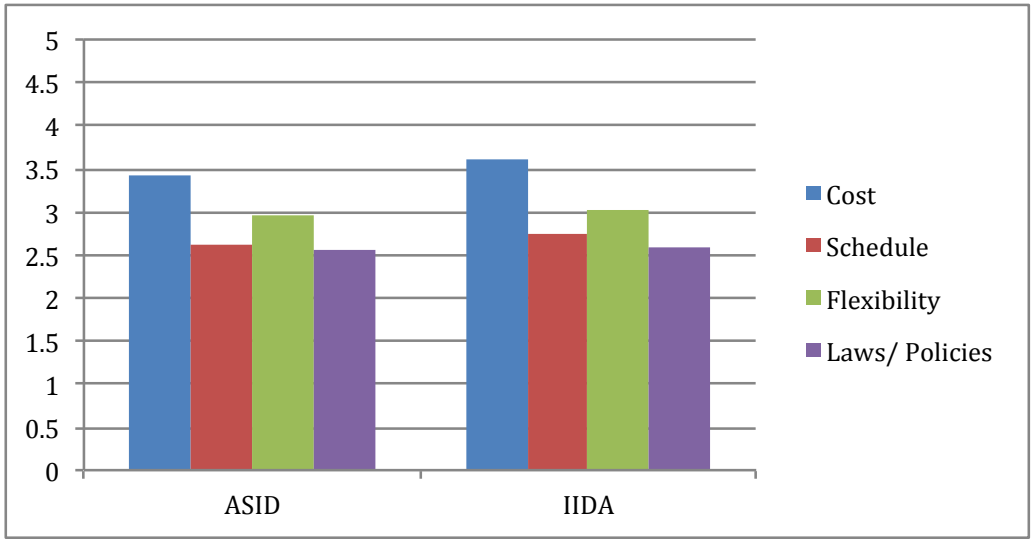


Figure 3. Mean scores of perceived barrier questions concerning transition to sustainability for members of ASID and IIDA. All barrier scores fell below a three; therefore, transition to sustainability was not a highly rated barrier. The IIDA survey had additional questions due to revisions requested by IIDA.

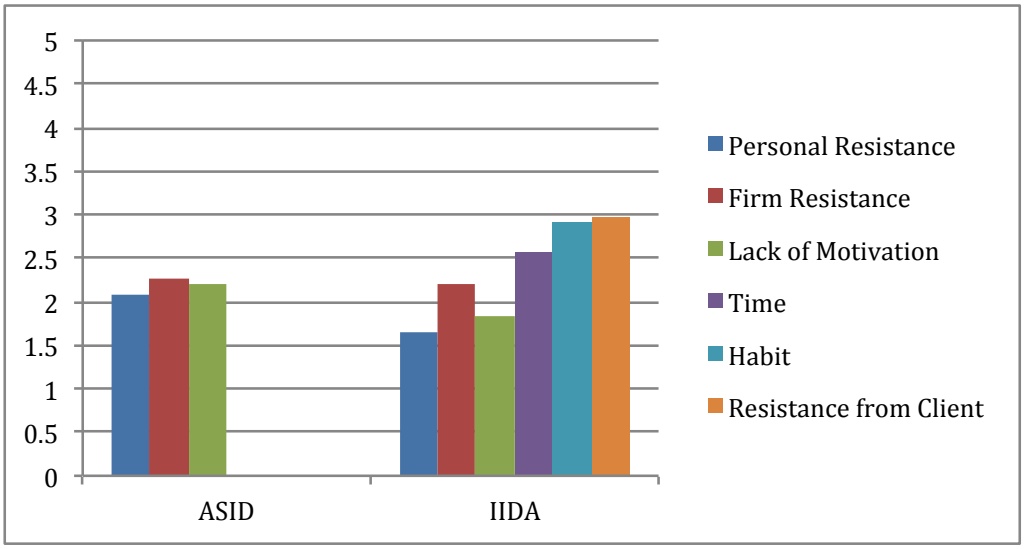


Figure 4. Mean scores of perceived barrier questions concerning knowledge and skills for members of ASID and IIDA. All knowledge and skills barrier scores fell below a three; therefore, knowledge and skills were not highly rated barriers.

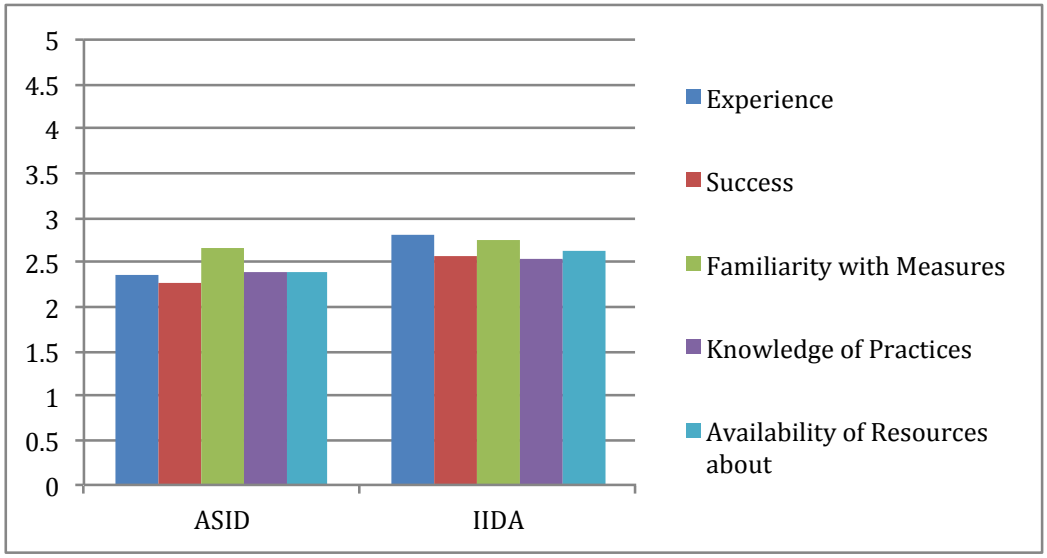


Figure 5. The Percentage of time ASID and IIDA respondents use sustainable interior design practices. Most respondents used sustainable interior design practices 60-79% of the time, and a majority of respondents reported using sustainable interior design practices between 40% and 100% of the time.

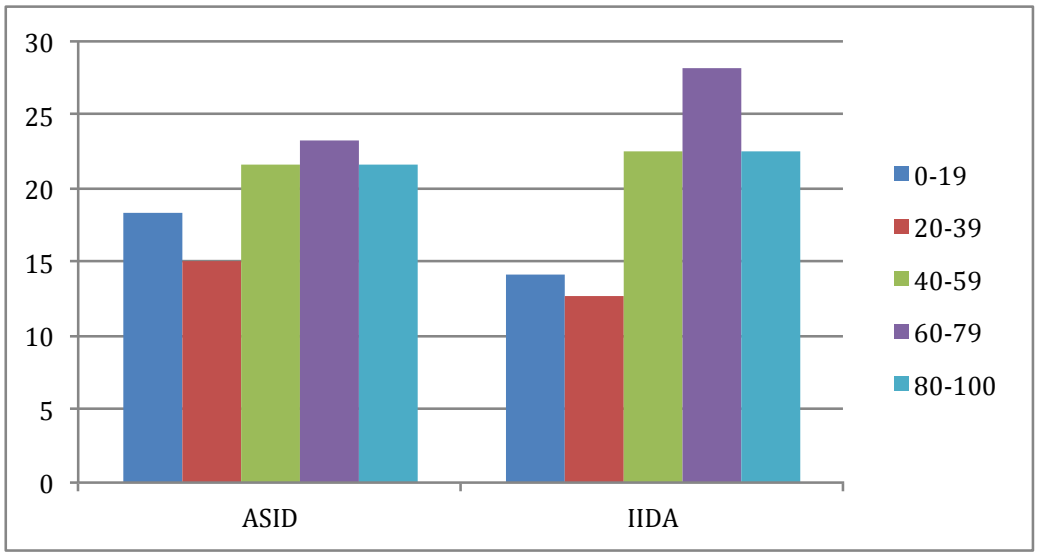


Figure 6. ASID respondent's combined mean perceived barrier scores compared to the percentage of time ASID respondents reported they use sustainable interior design practices. There was a negative relationship between the two variables. As barrier scores decreased, percentage of use increased.

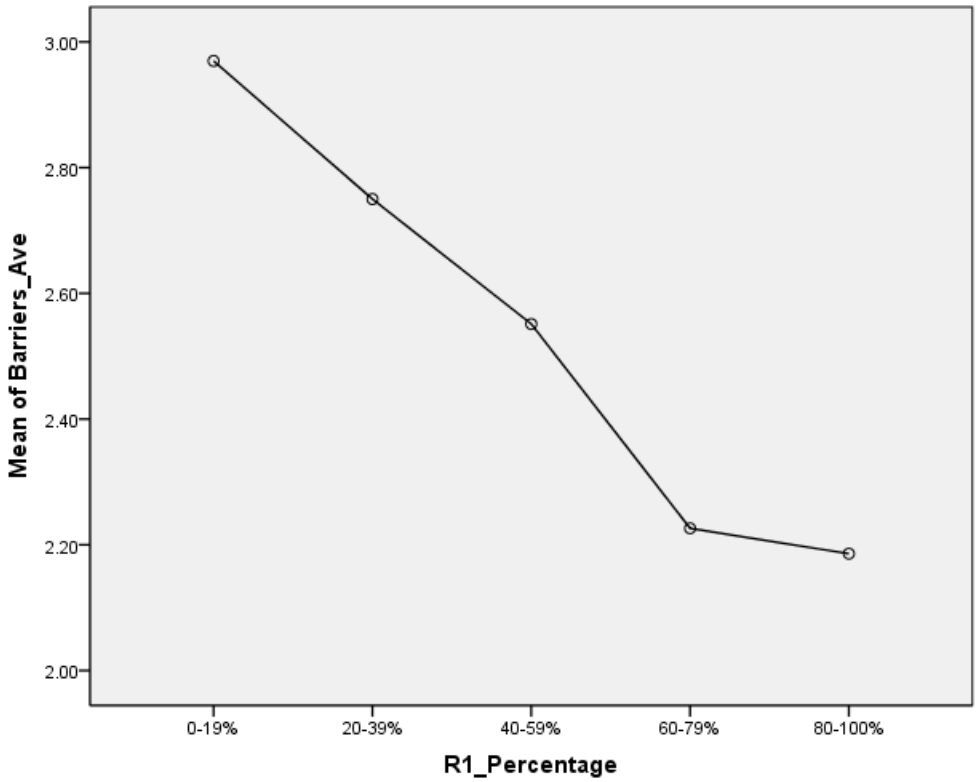


Figure 7. Mean attitude scores for ASID respondents compared to the percentage of time ASID respondents reported they use sustainable interior design practices. There was a positive relationship between the two variables. As attitude scores increased, percentage of use also increased.

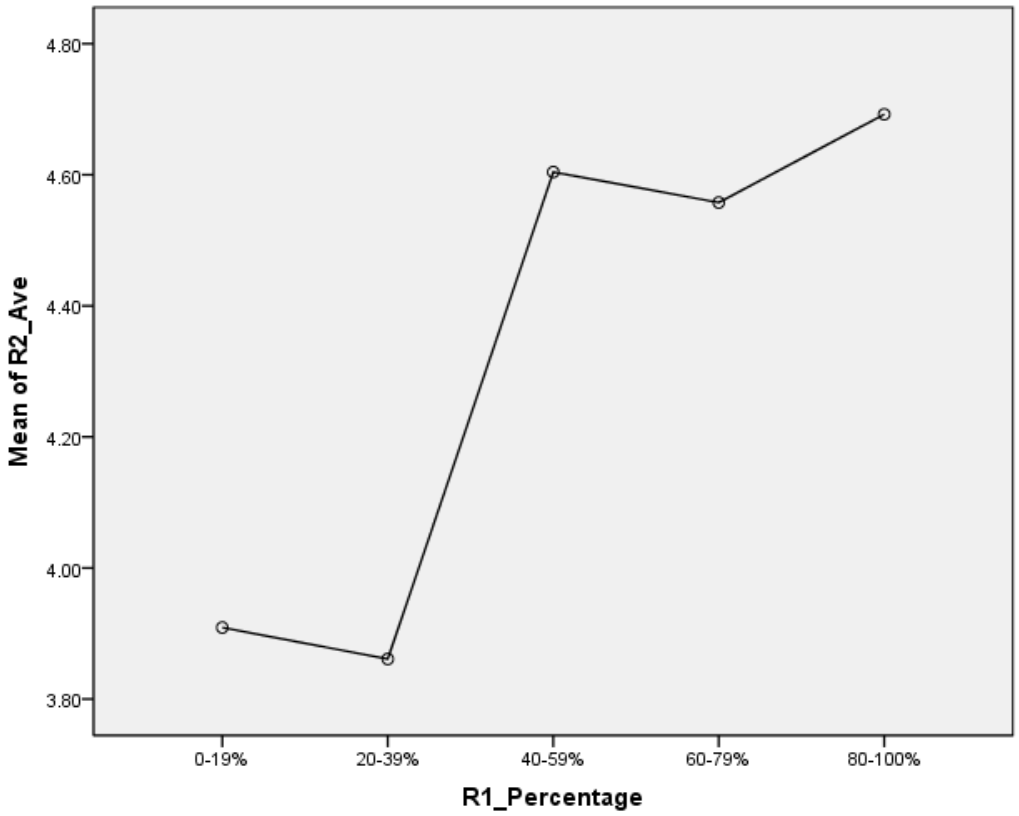


Figure 8. IIDA respondent's combined mean perceived barrier scores compared to the percentage of time IIDA respondents reported they use sustainable interior design practices. There was a negative relationship between the two variables. As barrier scores decreased, percentage of use increased.

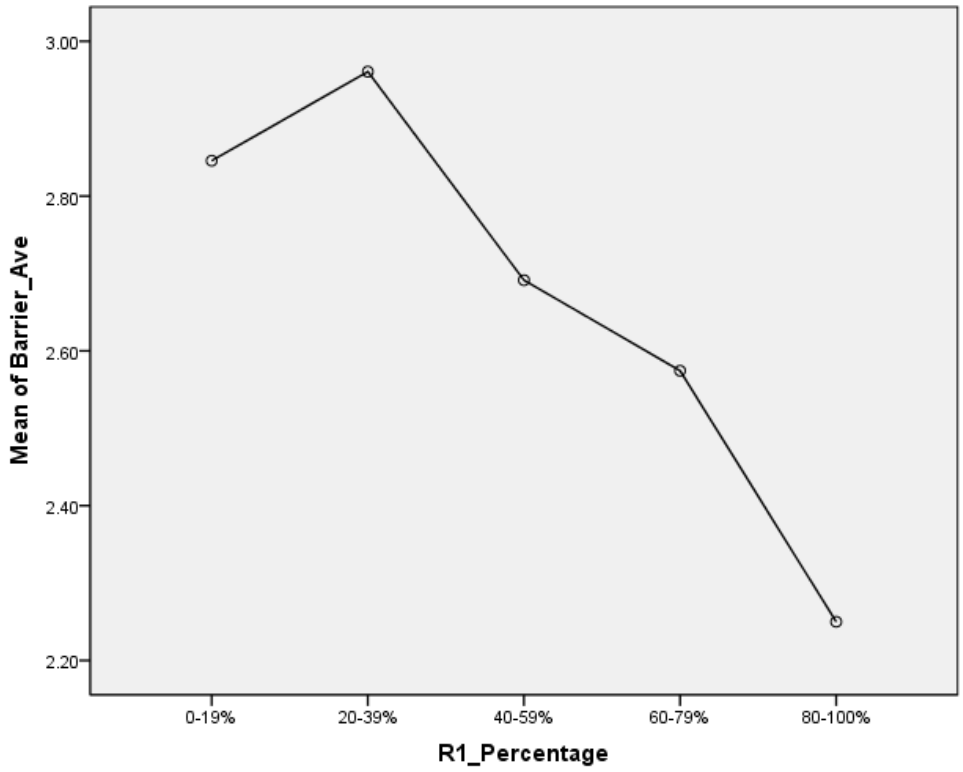
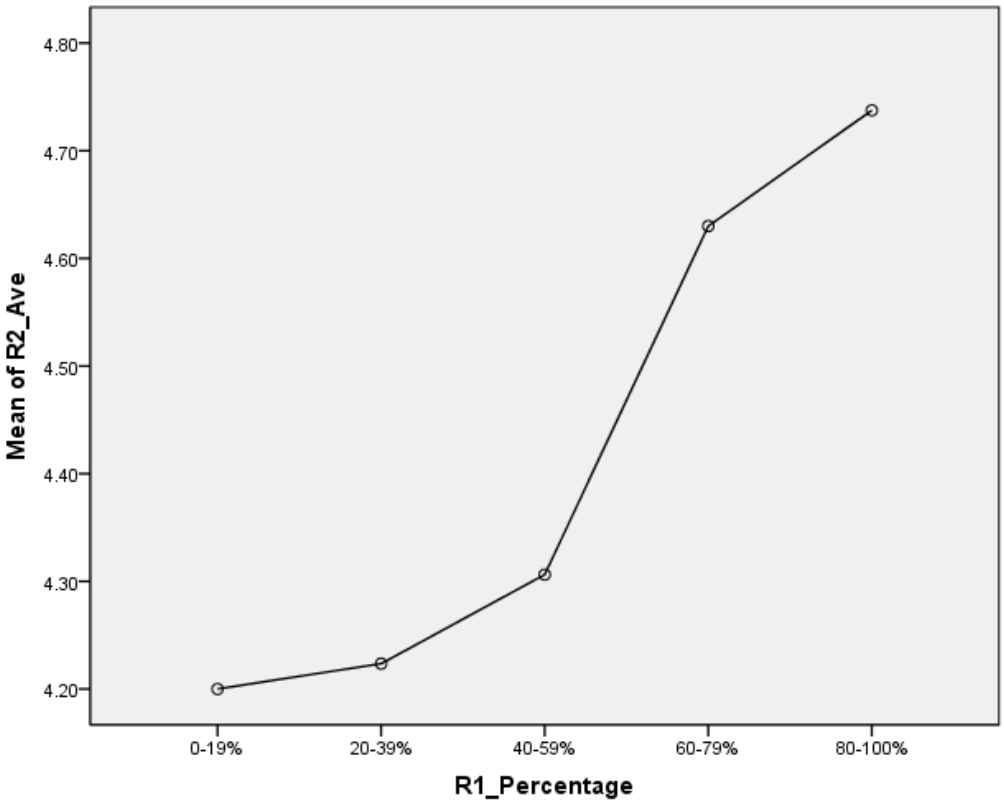


Figure 9. Mean attitude scores for IIDA respondents compared to the percentage of time IIDA respondents reported they use sustainable interior design practices. There was a positive relationship between the two variables. As attitude scores increased, percentage of use also increased.



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Appendix A

The use of Sustainable Practices in Interior Design [IIDA]

Sustainable Interior Design Practices are measures taken to create a balance among interior design practices and the use of Earths resources. Sustainable Practices benefit humans and Earth now and in the future.

Sustainable Practice Use

What percentage of the time do you use sustainable interior design practices?

- 0-19%
- 20-39%
- 40-59%
- 60-79%
- 80-100%
- Never

Attitude

How strongly do you agree with the following statements?

Sustainable interior design practices are important for preserving Earths resources.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I encourage co-workers and clients to use sustainable interior design practices on projects

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Sustainable interior design benefits the health and welfare of building occupants.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Sustainable interior design practices are NOT a passing trend.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

I am open to the use of sustainable interior design practices.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

Project Capabilities

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to your use of sustainable interior design practices?

The cost of sustainable materials and design features

1
2
3
4
5

Project schedule

1
2
3
4
5

Need for flexibility with last minute changes

1
2
3
4
5

Laws and policies requiring sustainable practices

1
2
3
4
5

Transition to Sustainability

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to my use of sustainable interior design practices?

Personal resistance

1
2
3
4
5

Resistance within my firm

1
2
3
4
5

Lack of motivation on my part to incorporate sustainable interior design practices.

1
2
3
4
5

Knowledge and Skills

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to my use of sustainable interior design practices?

My level of experience with sustainable interior design practices.

1
2
3
4
5

My level of success with sustainable practices.

1
2
3
4
5

My familiarity with ways to measure sustainability.

1
2
3
4
5

My current knowledge of sustainable interior design practices

1
2
3
4
5

Availability of resources about sustainable interior design practices

1
2
3
4
5

General

Region of employment by time zone:

Pacific
Mountain
Central
Eastern
Alaska
Hawaii

Gender:

Male
Female

Age:

Under 25
25-34
35-44
45-54
55-65
over 65

Education

Did you graduate from a CIDA (formerly known as FIDER) accredited program?

Yes
No

Year of Graduation:

Before 1980
1980-1984
1985-1989
1990-1994
1995-1999
2000-2004
2005-2010

Experience

My firm specializes in (check ALL that apply):

- Childcare (Pre-k/ daycare)
- Educational Facilities (K-12 and higher education)
- Hospitality/ Entertainment
- Financial Institutions
- Health Care
- Government/ Institutional
- Corporate/ Office
- Residential
- Religious
- Retail
- Recreational
- Other: (please specify)

How many years of professional experience do you have?

- 0-4
- 5-9
- 10-14
- 15-20
- over 20

Certifications

Are you NCIDQ certified?

- Yes
- No

Are you LEED AP certified?

- Yes
- No

Appendix B

The use of Sustainable Practices in Interior Design [IIDA]

Sustainable Interior Design Practices are measures taken to create a balance among interior design practices and the use of Earths resources. Sustainable Practices benefit humans and Earth now and in the future.

Sustainable Practice Use

What percentage of the time do you use sustainable interior design practices?

- 0-19%
- 20-39%
- 40-59%
- 60-79%
- 80-100%
- Never

Attitude

How strongly do you agree with the following statements?

Sustainable interior design practices are important for preserving Earths resources (e.g., using rapidly renewable resources in order to keep them for future generations).

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

I encourage co-workers and clients to use sustainable interior design practices on projects

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Sustainable interior design benefits the physical and mental health of building occupants.

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

Sustainable interior design practices are NOT a passing trend.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

I am open to the use of sustainable interior design practices.

Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree

Project Capabilities

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to your use of sustainable interior design practices?

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1
2
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Project schedule

1
2
3
4
5

Need for flexibility with last minute changes

1
2
3
4
5

Laws and policies requiring sustainable practices

1
2
3
4
5

Transition to Sustainability

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to my use of sustainable interior design practices?

Personal resistance

1
2
3
4
5

Extra time commitment that is required to perform sustainable interior design practices

1
2
3
4
5

Resistance within my firm

1
2
3
4
5

Resistance from client.

1
2
3
4
5

Habit (tendency to use unsustainable interior design practices because they are familiar)

1
2
3
4
5

Lack of motivation on my part to incorporate sustainable interior design practices.

1
2
3
4
5

Knowledge and Skills

On a scale of 1 to 5 (1 = not a barrier to 5 = very much a barrier) how much of a barrier is the following to my use of sustainable interior design practices?

My level of experience with sustainable interior design practices.

1
2
3
4
5

My level of success with sustainable practices (e.g. making choices with reduced environmental impact while meeting other design criteria (cost, aesthetics, code, client needs)).

1
2
3
4
5

My familiarity with ways to measure sustainability (e.g., LEED, Green Star, CRIs Green Label, Energy Star)

1
2
3
4
5

My current knowledge of sustainable interior design practices

1
2
3
4
5

Availability of resources about sustainable interior design practices

1
2
3
4
5

General

Location of projects by time zone (check ALL that apply):

Pacific
Mountain
Central
Eastern
Alaska
Hawaii

Gender:

- Male
- Female

Age:

- Under 25
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Education

Did you graduate from a CIDA (formerly known as FIDER) accredited program?

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- 2005-2010

Experience

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- Financial Institutions
- Health Care
- Government/ Institutional
- Corporate/ Office
- Residential
- Religious
- Retail
- Recreational
- Other: (please specify)

How many years of professional experience do you have?

- 0-4
- 5-9
- 10-14
- 15-20
- over 20

Certifications

Are you NCIDQ certified?

- Yes
- No

Are you LEED AP certified?

- Yes
- No