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Integrating the Built Environment and the Individual: A Holistic Approach to the Design of Interior Space

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INTEGRATING THE BUILT ENVIRONMENT AND THE INDIVIDUAL:
A HOLISTIC APPROACH TO THE DESIGN OF INTERIOR SPACE

By
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Dedicated to Daddy Bill, Honey, Kim, and Dimitrios,

for their love, and their unending support throughout this process.
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# TABLE OF CONTENTS

List of Tables ............................................................................................................................................. viii
List of Figures ............................................................................................................................................... ix
Abstract ......................................................................................................................................................... xi

## CHAPTER ONE: INTRODUCTION TO HOLISTIC INTERIOR DESIGN .................................................... 1

Problem Statement ......................................................................................................................................... 3
Statement of Purpose .................................................................................................................................. 5
Justification of the Research ....................................................................................................................... 6
Research Questions ..................................................................................................................................... 6
Assumptions & Limitations ............................................................................................................................ 8
Definition of Terms ...................................................................................................................................... 9

## CHAPTER TWO: REVIEW OF RELEVANT LITERATURE .............................................................................. 11

Holistic Interior Design ............................................................................................................................... 11
The Holistic World View ............................................................................................................................. 11
Historical Changes Leading to Holistic Interior Design ............................................................................. 14
  The Industrial Revolution & the Arts and Crafts Movement ..................................................................... 15
  Modernism & Post Modernism ................................................................................................................... 16
  The Sustainability Movement .................................................................................................................... 17
  Evidence-Based Design ............................................................................................................................. 18
  The Americans with Disabilities Act (ADA) ............................................................................................. 20
  Holistic Health Care .................................................................................................................................. 20
  Holistic Architecture ................................................................................................................................. 21
  Holistic Interior Design as an Emerging Practice ..................................................................................... 23
Holistic Interior Design Training .................................................................................................................. 24
  The Holistic Design Institute .................................................................................................................... 27
  The Limerick College of Further Education ............................................................................................. 29
Holistic Interior Design Practice & Methodology ......................................................................................... 30
  Feng Shui ................................................................................................................................................... 31
  Color .......................................................................................................................................................... 31
  Color & physical response ........................................................................................................................... 32
  Color & psychological response ................................................................................................................ 33
Sustainability ................................................................................................................................................ 35
Integration of Nature ................................................................................................................................... 37
  Views of nature ......................................................................................................................................... 37
  Indoor plants ........................................................................................................................................... 38
Light & Light Sources .................................................................................................................................. 39
  Light levels ............................................................................................................................................... 39
  Artificial light .......................................................................................................................................... 40
  Natural light ............................................................................................................................................ 43
Aromatherapy ............................................................................................................................................... 45
Sound Management ........................................................................... 46
Electromagnetic Radiation ................................................................... 48
Conclusion ...................................................................................... 50

CHAPTER THREE: METHODOLOGY ....................................................... 51

Research Questions ........................................................................ 53
Sample .......................................................................................... 56
Data Collection ............................................................................... 56
Instrument ..................................................................................... 56
Limitations ...................................................................................... 57
Assumptions & Delimitations ............................................................ 57
Study Procedure ............................................................................. 58
Summary ......................................................................................... 59

CHAPTER FOUR: RESULTS & FINDINGS ............................................. 61

Methodology & Demographics .......................................................... 61
Phase 1- Word Count ........................................................................ 61
Phase 2-Questionnaire ....................................................................... 63
  Limitations of the questionnaire .................................................... 63
  Participant recruitment ................................................................ 64
  Data collection ............................................................................. 65
Findings ............................................................................................. 65
  Space A Findings ......................................................................... 66
    Likert-style responses ................................................................. 66
    Open-ended responses- holistic improvements .......................... 68
    Open-ended responses- exhibition of holistic interior design ...... 69
  Space B Findings ......................................................................... 70
    Likert-style responses ................................................................. 70
    Open-ended responses- holistic improvements .......................... 72
    Open-ended responses- exhibition of holistic interior design ...... 72
  Space C Findings ......................................................................... 73
    Likert-style responses ................................................................. 73
    Open-ended responses- holistic improvements .......................... 74
    Open-ended responses- exhibition of holistic interior design ...... 75
  Space D Findings ......................................................................... 76
    Likert-style responses ................................................................. 76
    Open-ended responses- holistic improvements .......................... 78
    Open-ended responses- exhibition of holistic interior design ...... 78
  Summary ......................................................................................... 79

CHAPTER FIVE: CONNECTIONS & APPLICATIONS ............................... 80

  Answer to Research Question 1: Connections to Scientific Evidence ... 80
  Answer to Research Question 1.A-Color ............................................ 83
  Answer to Research Question 1.B-Light ............................................ 85
LIST OF TABLES

3.1 The WHO-5 Well-Being Index ........................................................................................................53

4.1 Frequency of Key Words .................................................................................................................62

4.2 Frequency of Common Practices ....................................................................................................62

5.1 PI’s Analysis of Visible Elements in Spaces A, B, C, & D ..............................................................82

5.2 Evidence from Scientific Research on Color, Light, Nature, & Noise ........................................82
## LIST OF FIGURES

2.1 Author’s Holistic Interior Design Model..........................................................12
2.2 Abraham Maslow’s Hierarchy of Needs (1943) .............................................13
2.3 Timeline Leading to the Development of Holistic Interior Design..............15
2.4 The Golden Rectangle..................................................................................22
2.5 The Golden Rectangle is seen in many Natural Forms..............................23
2.6 Florida State University Interior Design Graduate Program .....................25
2.7 Washington State University Interior Design Graduate Program ..............26
2.8 Holistic Design Institute’s 16 Lesson Program...........................................27
2.9 Limerick College of Further Education’s 10 Week Holistic Design Course ...29
2.10 Exposed Artificial Lighting Example 1.....................................................42
2.11 Exposed Artificial Lighting Example 2.....................................................42
2.12 Spectralight III by X-rite ...........................................................................43
4.1 Practice Locations of Participating Holistic Interior Designers...............65
4.2 Space A .......................................................................................................67
4.3 Average Participant Responses for Space A.............................................67
4.4 Space B .......................................................................................................70
4.5 Average Participant Responses for Space B .............................................71
4.6 Space C .......................................................................................................73
4.7 Average Participant Responses for Space C .............................................74
4.8 Space D .......................................................................................................77
4.9 Average Participant Responses for Space D .............................................77
5.1 Typical Waiting Spaces A, B, C, & D..........................................................81
5.2 Statistical Results on Color Across All Spaces.........................................84
5.3 Statistical Results on Light Across All Spaces.........................................86
5.4 Statistical Results on the Integration of Nature Across All Spaces ............88
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5</td>
<td>Statistical Results on the Reduction of Noise Across All Spaces</td>
<td>89</td>
</tr>
<tr>
<td>5.6</td>
<td>Unaltered Image of Space A</td>
<td>93</td>
</tr>
<tr>
<td>5.7</td>
<td>Rendered Image of Space A to Include Holistic Interior Design Changes</td>
<td>93</td>
</tr>
<tr>
<td>5.8</td>
<td>Unaltered Image of Space B</td>
<td>96</td>
</tr>
<tr>
<td>5.9</td>
<td>Rendered Image of Space B to Include Holistic Interior Design Changes</td>
<td>96</td>
</tr>
<tr>
<td>5.10</td>
<td>Unaltered Image of Space C</td>
<td>99</td>
</tr>
<tr>
<td>5.11</td>
<td>Rendered Image of Space C to Include Holistic Interior Design Changes</td>
<td>99</td>
</tr>
<tr>
<td>5.12</td>
<td>Unaltered Image of Space D</td>
<td>102</td>
</tr>
<tr>
<td>5.13</td>
<td>Rendered Image of Space D to Include Holistic Interior Design Changes</td>
<td>102</td>
</tr>
</tbody>
</table>
ABSTRACT

Holistic Interior Design is an interior design approach that integrates the functional needs of the built environment and the body, mind, and spirit of its occupants (Dossey, et al., 1998). The goal is to improve the quality of the built environment and the overall well-being of occupants (Montgomery, 2005; Schlacht, 2010; Trevelyan, 1998). As an integrative method, Holistic Interior Design requires a new understanding of the end users and their physical, psychological, and sociological needs (Hertzfeld, 2011). The goal of this study was to determine if a relationship exists between the empirical studies of evidence-based design on color, light, integration of nature, and noise and the practices of Holistic Interior Designers. This study explored relevant literature on the impact feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management in relation to Holistic Interior Design. Information gathered from practicing Holistic Interior Designers explored Holistic Interior Design methodology and perceptions of methods to enhance well-being, that were linked to evidence-based design studies.

For the purposes of this study, Holistic Interior Design was defined as interior design practices rooted in physiology, sociology, and psychology, that appeal to occupants’ body, mind, and spirit to enhance well-being. In this study, the history leading up to Holistic Interior Design, holistic healing, Holistic Architecture, Holistic Interior Design education, and Holistic Interior Design practice was explored. A word count was conducted of ten practicing Holistic Interior Designers’ philosophy statements and descriptions of methods, revealing the common practices of feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound.
management. Investigations were made into Holistic Interior Design’s use of feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management, and what current scholarly literature had to say about these issues. The information gathered from the literature was used to provide insight into the aspects of the built environment that were reported as impactful to physiological, sociological, and psychological states.

The word count of Holistic Interior Design methods led to the development of a questionnaire in which respondents assessed images of typical waiting spaces. The results described the levels to which the participants’ felt the waiting spaces rated in holistically applied color, light, integration of nature, and sound management, in relation to aspects of well-being, specifically, eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal. Also respondents’ suggestions for holistically improving these spaces were analyzed and graphically interpreted through digital renderings.

The comments of responding Holistic Interior Designers suggested that Holistic Interior Design is an intuitive and perceptual process to enhance the well-being of occupants. Despite the subjective nature of this process, suggestions to improve each space were rarely in contradiction, and were supported by empirical evidence from scientific studies. The gathered data revealed connections between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. This suggested a link between the intuitive practices of Holistic Interior Design and empirical data in these areas. This connection
suggested that Holistic Interior Design is a valid approach to improve well-being through the built environment.
CHAPTER ONE
INTRODUCTION TO HOLISTIC INTERIOR DESIGN

In recent time, western society has experienced an increase in interest in the holistic world view of the integration of physiological, sociological, and psychological factors (Cloninger, 2004; Correspondent, 2003; Regush, 1977). This regard was reflected in the advancement of the holistic health care movement (Newman, 2009), moving away from dependance on pharmaceuticals, and taking an integrative approach to incorporate the mind, body, and spirit (Gordon, 1990; Regush, 1977). This holistic method is now being explored by interior designers seeking to create holistic environments that improve the quality of the built environment and the well-being, or condition of good health, contentment, and security of occupants (Holistic interior design, 2008; Well-being, n.d.).

The National Council for Interior Design Qualification (NCIDQ) has stated that the goal of the interior designer is “to protect and enhance the health, life safety and welfare of the public” (National Council for Interior Design Qualification, Inc., 2004, p. 1). Thus, it is the interior designer’s responsibility to consider the end user’s physiological, sociological, and psychological needs in developing interior environments (“A comfortable wait,” 2011). This responsibility can seem an arduous burden to the interior designer; however, Clifford Moller (1968), author of Architectural Environment and our Mental Health, has explained “naturally the architect [designer] cannot be at the same time a trained psychiatrist, sociologist, and statistician. But the findings of these experts can be made clearer and more
readily accessible to him, along with sufficient time and funds for relating them to
the architectural environment generally and to the specific requirements of each
new design problem” (p. 144). The Americans with Disabilities Act (ADA) and
Evidence-Based Design have made progress in fulfilling Moller’s vision, integrating
the findings of various fields into accessible forms. These are further discussed
below.

The Americans with Disabilities Act (ADA) affected design practices by
implementing accessibility guidelines for disabled persons in public spaces (U.S.
Access Board, n.d.). The ADA has defined a disability as “a physical or mental
impairment that substantially limits one or more major life activities; a record of
such an impairment, or being regarded as having such an
impairment” (Mastroianni, 2011, p.1). In 2008, the ADA was amended to include
psychological reoccurring impairments such as bipolar disorder. However, while
the ADA has outlined highly specific means for designing for the physically
impaired, it has offered no guidelines as to the needs and requirements of the
psychologically disabled (Federal Register, 2009).

The marriage of research and design, especially in relation to health, safety
and well-being, has been the driving force behind evidence-based design (Fouts &
Gabay, 2008; Jarousse, 2010). Evidence-based design is a recent practice of using
the most appropriate information to make thoughtful decisions in design
applications (Hamilton & Watkins, 2009). By definition, “evidence-based design is a
process for the conscientious, explicit, and judicious use of current best evidence
from research and practice in making critical decisions, together with an informed
client, about the design of each individual unique project” (Hamilton & Watkins, 2009, p. 18). However, due to its formulaic nature, perceptions of the effectiveness of evidence-based approaches to design have ranged amongst critics. It is arguable that evidence-based design has its place in gathering data on individual aspects of interior design; however, critics have found this solution too restricted to be effective over all situations (Phares, 2011).

In this author’s opinion, Holistic Interior Design offers the opportunity to follow in the humanistic footsteps of the ADA design standards and evidence-based design. Within this study, Holistic Interior Design is defined as interior design practices rooted in physiology, sociology, and psychology, that appeal to occupants’ body, mind, and spirit to enhance well-being. It is an invitation to explore physiological, sociological, and psychological needs on a deeper level. Holistic Interior Design has incorporated many methods, including, but not limited to, feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management, to enhance the well-being of occupants (Trevelyan, 1998). Thus, the employment of Holistic Interior Design has the potential to benefit from the data presented by evidence-based design, as well as studies done in the fields of physiology, sociology, and psychology, and apply these findings in an integrated manner, encompassing many aspects of the human-environment experience.

**Problem Statement**

The modern client of interior design services is more aware of holistic practices, as made evident by the rise in interest in western society to integrative
medical treatments and holistic healthcare services (Cook, 2002; Dossey, Keegan, Kolkmeier, & Guzzetta, 1989). Today’s client is more aware of design processes than ever before and is more likely to employ a designer who possesses a knowledge base beyond that of his or her competitor. The National Council for Interior Design Qualification’s (NCIDQ) dictum that the goal of the designer is “to protect and enhance the health, life safety and welfare of the public” (National Council for Interior Design Qualification, Inc., 2004, p. 1) is only partially upheld by common current design practices. Of the humanistic design practices, the American with Disabilities Act (ADA) only offers minimums to which built environments must comply (Mello, 1994). These minimums only service basic physiological standards and offer little to improve or enhance psychological needs (Dilani, 2005; Verkerke, 2003). Similarly, evidence-based design is centralized on the individual’s interaction with the environment, but is removed from emotional human experiences and intuition (Hamilton, 2012). In the 1930’s, research revealed that the built environment effects the mental and physical health of its occupants (Antonosky, 1996). It has also been shown that, on average, people spend 90% of their time in built environments (Evans, 2003). Thus, more scientific research is needed that explores the impact of interior design methods that appeal to the occupant(s)’ body, mind, and spirit through meeting physiological, sociological, and psychological needs (Dilani, 2005; Evans, 2003).
Statement of Purpose

The goal of this study was to determine if a relationship exists between the empirical studies of evidence-based design on color, light, integration of nature, and noise and the practices of Holistic Interior Designers. This study explored relevant literature on the impact feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management in relation to Holistic Interior Design. For the purpose of this study, Holistic Interior Design was defined as interior design practices rooted in physiology, sociology, and psychology, that appeal to occupants’ body, mind, and spirit to enhance well-being. As a part of this study, a word count was conducted of ten practicing Holistic Interior Designers’ philosophy statements and descriptions of methods, revealing the common practices of feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management. The study sought to explore the links between a posteriori knowledge of evidence-based design and a priori practices of Holistic Interior Design in relation to the aforementioned Holistic Interior Design practices. This study reviewed evidence-based design studies on feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management in relation to Holistic Interior Design. The information gathered from the literature was used to provide insight into the aspects of the built environment that are impactful to physiological, sociological, and psychological states. Information gathered from practicing Holistic Interior Designers examined Holistic Interior Design methodology and perceptions of methods to enhance well-being.
Justification of the Research

At the time of this writing, there is little to no literature on Holistic Interior Design practice, its place in the interior design community, or scientific research of its claims to enhance healing and well-being. There is also no licensure or mandate that insures that an interior designer claiming to be a Holistic Interior Designer is actually practicing Holistic Interior Design methods. However, although unlinked to Holistic Interior Design, the information from evidence-based design studies, presented in chapter two, revealed that many of the practices of Holistic Interior Design have been shown to improve health and/or the well-being of occupants. It is intended that this research will link Holistic Interior Design practices with evidence-based design studies, to enhance understanding of Holistic Interior Design, make record of its practices, and provide insight into design methods that appeal to the mind, body, and spirit as well as the effect of these methods on well-being. It was hypothesized that evidence-based design data would bolster Holistic Interior Design practices, linking the empirical with the intuitive. If made, these connections would result in further validation of Holistic Interior Design approaches to improve well-being through the built environment.

Research Questions

The research questions of this study addressed practicing Holistic Interior Designers' Holistic Interior Design methods and the empirical findings of evidence-based design in relation to color, lighting, integration of nature, and noise in interior environments. These research questions are presented in the following:
I. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design?

A. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to color in interior environments?

B. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to lighting in interior environments?

C. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to the integration of nature in interior environments?

D. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to noise in interior environments?

II. When presented with images of typical waiting spaces, how will Holistic Interior Designers perceive these spaces in relation to Holistic Interior Design?

A. What about the space in the image is inline with the practices of Holistic Interior Design?

B. What about the space in the image could be improved by the practices of Holistic Interior Design?

It was hypothesized that the gathered data would reveal connections between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. The color, lighting, integration of nature,
and noise reductive properties of the four typical waiting spaces were analyzed by respondents in reference to their ability to illicit positive emotions, reduce stress, increase social interaction, and increase states of arousal of occupants. Elements present in each image were matched with information from preexisting studies, which allowed for individual hypotheses to be made for each space. It was further hypothesized that recommendations for improvements to each space made by Holistic Interior Designers would include the elements of color, lighting, integration of nature, and noise reduction.

Assumptions & Limitations

It was assumed, for the purposes of this research, that Holistic Interior Design is a valid practice and that its methods enhance occupant well-being. This assumption was bolstered by the relevant literature review in chapter two, which discussed physiological, sociological, and psychological information on color, lighting, integration of nature, sustainability, and the avoidance or removal of environmental pollutants in relation to well-being.

This study did not claim or aspire to be all inclusive, yet it was intended to be a launching pad for future studies within the field of Holistic Interior Design. It is hoped that the information gleaned will be of use for future scientific research. Due to the limited nature of this study, it did not purport that Holistic Interior Design methods will enhance or improve occupant well-being, but sought to make connections between evidence-based design studies and the practices of Holistic Interior Design.
Definition of Terms

The American's with Disabilities Act (ADA):
Legislation approved by the United States Government in 1990 that protects individuals from discrimination due to physical or mental disabilities. This encompasses employment, government services, public accommodations (Mosby, 2008).

Evidence-Based Design:
The practice of using credible research to make decisions about the built environment to arrive at desirable outcomes (Ulrich, Quan, Zimring, Joseph, & Choudhary, 2004).

Holism (Holistic):
The theory that the universe and natural organisms are interacting wholes, and not just a series of isolated parts (Holism, 2012).

Holistic Health Care:
Health care that takes into consideration the emotional, economic, physical, social, and spiritual needs of the individual (Mosby, 2008).

The National Council for Interior Design Qualification (NCIDQ):
A nonprofit organization that establishes standards of competence for interior design and interior architecture professionals since 1974 (What is ncidq, 2012).

Sustainability (Sustainable Design):
The quality of not having detrimental effects upon the environment or its resources in the effort to maintain ecological balance (Sustainability, n.d.)
Well-being:

The human condition of being in good health, possessing a positive outlook, and being emotionally sound (Well-being, n.d.)
CHAPTER TWO
REVIEW OF RELEVANT LITERATURE

Holistic Interior Design

Holistic Interior Design is an interior design approach that integrates the functional needs of the built environment and the body, mind, and spirit of its occupants (Dossey, et al., 1998). The goal is to improve the quality of the built environment and the overall well-being of occupants (Montgomery, 2005; Schlacht, 2010; Trevelyan, 1998). As an integrative method, Holistic Interior Design requires a new understanding of the end users and their physical, psychological, and sociological needs (Hertzfeld, 2011). In taking the first steps to reaching this new understanding, the history behind and leading up to Holistic Interior Design, holistic healing, Holistic Architecture, Holistic Interior Design education, and Holistic Interior Design practice was explored. Holistic Interior Design’s use of feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management, and what current scholarly literature had to say about these are examined in the following. First, to further understand Holistic Interior Design, the holistic world view is discussed.

The Holistic World View

The holistic world view is that the whole is greater than the sum of its parts (Dossey, et al., 1989). The holistic approach to meeting an individual’s physical, mental, and spiritual needs in a holistic manner requires a biopsychosocial tactic, a
method that combines the studies of physiology, psychology, and sociology (Cloninger, 2004; Correspondent, 2003; Regush, 1977; Vaughan, 2000), expressed in the author's Holistic Interior Design model [Figure 2.1]. The approach to satisfying physical, mental, and spiritual needs was detailed by Abraham Maslow (1943) in his hierarchy of needs [Figure 2.2]. In the hierarchy, human’s first attempt to resolve primal physiological needs, or needs of the body, then progress from the primal to attending to psychological and sociological needs, progressively graduating to more spiritual states. Evaluating Maslow’s hierarchy of needs in terms of the built environment revealed that the body’s first requirement is shelter. After this need is met, the mind requires more from the environment, including spaces that foster communication and

Figure 2.1. Author's Holistic Interior Design Model.
Source: Graphic by Judson Willoughby, 2012.
social interaction and spaces for reflection. In the holistic world view, the satisfaction of these needs impacts the individual’s health and well-being (Hinkle & Loring, 1979). Maslow (1999) contended that “man is ultimately not molded or shaped into humanness, or taught to be human. The role of the environment is ultimately to permit him or help him to actualize his own potentialities, not its potentialities” (p. 160).

Maslow spoke of a design built around competence, which humanistic psychologist Robert White (1959) defined as “an organism’s capacity to interact effectively with its environment” (p. 297). Thus, Holistic Interior Design seeks for the human and the environment to interact on all levels of the physical, sociological, and psychological in such a way that both are improved (Correspondent, 2003). This method may seem

![Figure 2.2. Abraham Maslow’s Hierarchy of Needs.](http://commons.wikimedia.org/wiki/File:Maslow's_hierarchy_of_needs.png)
novel, but this humanistic approach has reoccurred to throughout history. This is discussed further below.

**Historical Changes Leading to Holistic Interior Design**

Since the Industrial Revolution, progress has often led to a focus on individual parts and a view of humanity and the world as a machine (Banham, 1960; Massey 2008), in conflict with the holistic world view described above. The Ancient Greeks were knowledgeable of the healing potential of physical space (Van Mersbergen, 1998). Thus, those in need of physical, psychological, and/or sociological restoration in the nature surrounded temples of Aesulapius, which were settings for art, music, and social interaction (Fouts & Gabay, 2008). In the 1800s, Florence Nightingale recognized the need for an integral approach to health, and advocated the use of natural light and exposure to nature as environmental factors to improve health and well-being (Kozier, Erb, Berman, & Snyder, 2004). These examples suggest that holistic views have existed throughout known history, leading to the Holistic Interior Design issues being discussed in this writing. In the following, the Arts and Crafts Movement, Modernism, Post Modernism, the rise of the sustainability movement, evidence-based design, the American’s with Disabilities Act, and the holistic healthcare trend are discussed in relation to the birth of Holistic Interior Design. The timeline below, by the author, [Figure 2.3] shows the historical periods leading up to Holistic Interior Design.
The Industrial Revolution & the Arts and Crafts Movement

During the eighteenth century in Britain, industrialization arose, transforming an agricultural society into an urbanized population (Hinkle & Loring, 1979). Urbanization and industrialization had debasing effects, creating physically dangerous and unhealthy environments, increasing environmental pollutants, and decreasing life satisfaction (Anscombe, 1991; Banham, 1960). This resulted in a desire for better quality products and more humane environments (MacCarthy, 1995; Waggoner, 2003). This desire brought about the Arts and movement, a school of thought advocating a holistic lifestyle that was in harmony and coexisting with the natural world (MacCarthy, 1995). The Arts and Crafts movement valued not only the end product, but the
process of its production and the well-being of its creator (Waggoner, 2003). Similarly to Holistic Interior Design, the Arts and Crafts movement raised the bar for a new design standard and a better quality of life through the designed environment (Waggoner, 2003).

Modernism & Post Modernism

In the early 1900s, the Modern era arrived. Despite the progress made by the Arts and Crafts movement, society gave in to the easiness of machine based production, despite its depreciating effects (Massey, 2008). A rejection of nature became the trend (Abercrombie & Whiton, 2007). Designers moved away from the vernacular style, seeking universality, making all designs and architecture appropriate for any environment, culture, or location (Eaton, 2002). As an architect, artist, and designer, Le Corbusier was a product of this era, yet he held a different view from his peers. As a respected theorist, Le Corbusier sought to develop built environments that were grounded by research, thus creating an architecture that was socially relevant through applying psychological research to design. Much like the modern day Holistic Interior Designer, Corbusier incorporated design theory, research, and his own talent and expertise in his designs, exploring the psychology of space and applying humanistic principles (LeCorbusier, 2007).

In the 1960s Post Modernism further challenged the universal style of modernism (Abercrombie & Whiton, 2007). The result was a design and architectural style that no longer saw the individual as a machine, but as a part of a complex whole. The post modernists sought to create environments that held cultural significance and
psychological relevance (Larson, 1993). The acknowledgment of the complexity of the individual and the individual’s need for cultural and psychological representation has also been upheld by Holistic Interior Design (Trevelyan, 1998). The postmodernists view of the individual as part of an integrated whole was expanded upon by the sustainability movement, in which the individual as a part of humanity, is seen as part of the complex ecosystem (McLennan, 2004). This is discussed in the following section.

The Sustainability Movement

With the 1960s arose an elevated care and concern for the environment and humanity, known as the sustainability movement (Massey, 2008). The sustainability movement is equally concerned with the life quality as it is with maintaining ecological balance (“Caring for the Earth,” 1991). In 1987, the Brundtland Commission of the United Nations defined sustainable development as that which “meets the needs of the present without compromising the ability of future generations to meet their own needs” (United Nations, 1987, para. 2). The three pillars of sustainability, also referred to as the three E’s, are economy, society, and environment (Winchip, 2011). Another source includes culture as a fourth pillar of sustainability (Klingmann, 2010). Regardless of number, these three or four pillars imply the holistic nature of sustainability. In the 1970s, Walter R. Stahel coined the phrase “cradle to cradle,” a term used to describe a process of production that mimics nature, resulting in sustainable products (Stahel, 1981). Today, cradle to cradle is an adopted practice that is integral to sustainability (Lovins, 2008). The growth of the sustainability
movement showed a rise in concern with humanity’s interaction with the environment, a concern that is further investigated by evidence-based design.

Evidence-Based Design

While sustainability has focused on the creation of healthy eco-friendly environments, evidence-based design has revolved around the creation of healthy and/or productive environments (Ulrich, 2006). In 1984, a study by Roger Ulrich showed evidence of the relationship between environments and healing (Ulrich, 1992; Ulrich, 2002). This study was the first of many that became known as evidence-based design (Fouts & Gabay, 2008). C. M. Deasy (1974), author of Design for Human Affairs, explained that designers are faced with the task creating functional space but also to provide an interior that increases positive interaction and reduces stress. The creation of such an environment requires the combination of scientific research and the elements and principles of design (Deasy, 1974).

The marriage of research and design advocated by Deasy (1974) has taken shape in what is known today as evidence-based design. Evidence-based design is a recent practice of using the most appropriate information to make thoughtful decisions in design applications. As explained by the authors of Evidence-Based Design for Multiple Building Types, “evidence-based design is a process for the conscientious, explicit, and judicious use of current best evidence from research and practice in making critical decisions, together with an informed client, about the design of each individual unique project” (Hamilton & Watkins, 2009, p. 18). Evolving from environmental design research that began in the 1960s, evidence-based design
research has continued to increase steadily (Scalise, Thrall, Haught, & Runy, 2004). Between 1998 and 2004, 516 evidence-based design studies were published, and at the time of this writing, over 600 credible studies support and guide the practice of evidence-based design (Sadler, 2004). This research has yielded four main themes, revealing the importance of 1) the integration of nature, 2) the provision of distraction, 3) the occupant’s perceptions of control of the environment, and 4) the environment’s conduciveness to social needs (Fouts & Gabay, 2008). Though this has provided a foundation, the number of studies is low compared to the number of evidence-based medicine studies. Much work still needs to be done for evidence-based design studies to influence many aspects of design decision-making.

Perceptions of the effectiveness of evidence-based design range amongst critics (Phares, 2011). Unlike Holistic Interior Design, which invites the intuition of both the designer and the client (Trevelyan, 1998), evidence-based design relies solely on tested results, implying that the human experience can be quantified. Evidence-based design gives validity to the design process, yet the information gathered from research can also be misused, misunderstood, and be dehumanizing (Zimring, Ulrich, Zhu, DuBose, Seo, Choi, Quan, & Joseph, 2008). Thus, to increase the credibility of evidence-based design, D. Kirk Hamilton (2004), a Fellow of the Center for Health Systems & Design and Professor of Architecture at Texas A&M University, recommended progressively conscientious standards in the research and creation of healing environments. These standards, along with the increasing volume of evidence-based design studies, have continued to provide credible information to practice informed interior design.
The Americans with Disabilities Act (ADA)

Alongside evidence-based design, the Americans with Disabilities Act (ADA) and the Universal Design movement have made progress in the evolution of design practices. The ADA, first introduced to Congress in 1988, defines a disability as “a physical or mental impairment that substantially limits one or more major life activities; a record of such an impairment, or being regarded as having such an impairment” (Mastroianni, 2011, p.1). In 2008, the ADA was amended to include psychological reoccurring impairments such as bipolar disorder. However, the ADA has outlined highly specific means for designing for the physically impaired, while offering no guidelines as to the needs and requirements of the psychologically disabled in regards to the built environment (Federal Register, 2009).

Holistic Health Care

While the ADA is interested in isolated impairments, holistic health care is an integrative approach to healing that, instead of treating individual ailments, focuses on the individual as a whole, including physiological, sociological, and psychological states (Regush, 1977). This form of healthcare has ancient roots, but has seen a recent resurgence after it lost its mainstream hold due to the development of pharmaceuticals and improved scientific study (Haynes, 2009). In 1975, California held the first National Conference on Holistic Health (Trivieri, 2001). This sparked the holistic health care revival. In 1978, The American Holistic Medical Association (AHMA) was formed, creating a network of holistic medical doctors and fostering collaboration
(Haller, 2009). In 1989, the American Holistic Health Association (AHHA) was founded, a public service organization promoting holistic health principles and enabling consumers to access holistic wellness resources (Haller, 2009). This resurgence has laid the foundation for other fields, including interior design and architecture, to develop and utilize an integrative approach.

**Holistic Architecture**

Similar to holistic health care, Holistic Architecture is a humanistic approach that integrates the mind, body and soul (Holm, 2006). To accomplish this, Holistic Architecture has incorporated the concepts of sustainability, energy, and physics, introducing physical, spiritual, and emotional well-being into the built environment (Portugali, 2011). Holistic Architects begin with a site evaluation. This is key to maintain the harmony of the environment. For the Holistic Architect, it is critical that the structure and landscaping integrate with the natural setting (Pool, 2009). Holistic Architecture has also been concerned with the natural energies emitted by the site. The location of the structure is chosen based upon an analysis of these energies, also called an environmental magnetic map, to maintain the natural harmony of the energies of the site (Taylor, 2009). The topography of the site is also analyzed and used to determine the shape of the structure. The shape of the structure is to be a reflection of the site and maintain its harmony, creating a connection between the built environment and nature (Pool, 2009).

Another factor influencing the shape of a structure in Holistic Architecture is sacred geometry (Pennick, 1995). The Holistic Architect selects shapes that exist in
nature. One example of this is the golden ratio, also known as phi, approximately 1: 1.618... and the golden rectangle [Figure 2.4], a rectangle whose perimeter measurements are in the golden ratio (Livio, 2002). This ratio is found in nature in many forms, including the nautilus shell [Figure 2.5] and in ancient architecture such as the parthenon and the great pyramid (Pennick, 1995). The pyramid itself is an important shape to Holistic Architecture (Pool, 2009). The pyramid is composed of triangles, a shape structurally shown to possess great strength. Symbolically, the pyramid is associated with power, being the symbol for the giving and receiving of chakra in Chinese medicine, a symbol of connection between self and others, and a symbol of the connection between the metaphysical and the physical (Pool, 2009).

Figure 2.4. The Golden Rectangle.
Source: http://shirlebedient.wordpress.com/tag/visual-art/
Holistic Architecture is in its infancy as a growing humanistic method of understanding the built environment. However, these methods are gaining impetus in modern society (Taylor, 2009). It is this growing momentum that has created the interest seen in Holistic Interior Design today (Trevelyan, 1998).

Holistic Interior Design as an Emerging Practice

Holistic Interior Design is a burgeoning method, born from the historical changes detailed above. The Industrial Revolution brought about a change in lifestyle that resulted in many unhealthy environments (Banham, 1960; Hinkle & Loring, 1979). The Arts and Crafts movement evolved as a design revolution against such environments, and set new standards in design (Anscombe, 1991; MacCarthy, 1995; Waggoner, 2003). Modernism stood against the Arts and Crafts movement, advocating the machine, and opposing integration with nature and humanistic principles in design and architecture (Abercrombie & Whiton, 2007; Massey 2008). The

Figure 2.5. The Golden Rectangle is seen in many Natural Forms. 
Source: http://abyss.uoregon.edu/~js/glossary/golden_rectangle.html
post modern era moved design closer to holistic practice by restoring value in the design where culture and the psychology of the individual is valued (Larson, 1993). Simultaneously, sustainability, a crucial element of Holistic Interior Design became a mainstream concern (Massey, 2008). The development of evidence-based design gave quantifiable evidence of the benefits of interior design practices to health and well-being (Ulrich, 2006) and the American’s with Disabilities Act made progress in the development of environments where humanistic principles are valued (Mastroianni, 2011). The emerging popularity of holistic health care raised public consciousness of the importance of the interconnectedness between mind, body, and spirit (Dossey, et al., 1989). This resulted in the birth of new holistic practices, such as Holistic Architecture (Holm, 2006) and Holistic Interior Design (Chiazzari, 2011). Though still in its early stages, Holistic Interior Design is a growing force, resulting in the development of Holistic Interior Design education, Holistic Interior Designers and firms, and methodology as to its practice (Trevelyan, 1998). In the following section, Holistic Interior Design in education and training, practice, and methodology is discussed.

**Holistic Interior Design Training**

Traditional interior design education typically does not include a Holistic Interior Design course; however, many elements and methods of Holistic Interior Design are integrated into the curriculum. One example is the author’s masters degree institution, Florida State University. Florida State University’s CIDA accredited interior design undergraduate program and the institution’s graduate program, which was ranked in the top 10 programs in the United States (Fairhurst, 2011), offer a comprehensive
curriculum, including courses related to Holistic Interior Design such as “Social/Psychological Aspects of Design” and “Sustainable Design,” as seen in Figure 2.6 ("Florida state interior," n.d.).

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**Figure 2.6. Florida State University Interior Design Graduate Program.**
Source: http://interiordesign.fsu.edu/Graduate/Master-of-Science-First-Professional.

Another example of traditional interior design training is the Bachelor of Arts and the Master of Arts Interior Design programs at Washington State University. Similarly to the interior design program at Florida State University, the programs at Washington State University offer a CIDA accredited curriculum ("Washington state university," n.d.). These curriculums, for example the graduate program seen in Figure 2.7, do not...
possess courses in training for Holistic Interior Design, though included are courses that relate to Holistic Interior Design, such as “Philosophies & Theories of the Built Environment” which, according to the university’s undergraduate handbook, “focuses on systematic thought that may describe the behavior of the built environment” and “Interdisciplinary Seminar I” which, according to the university’s graduate handbook, “explores approaches to design thinking in the topic areas of people and place, history, theory and criticism, and physical design” (Ma interior design, 2011, p. 7, para. 16).

The program’s philosophy statement is also in line with Holistic Interior Design beliefs, “through the integration of design, research, and theory, interior design contributes to the betterment of the human condition from the individual to the global community” (“Program philosophy and,” 2013, para. 1). One of the objectives for the graduate program stated that, “graduates have the ability to ...contribute to the overall well-being of people as they interact with interior environments” (Undergraduate
student handbook, 2011, p. 6, para. 2). The concern with well-being in the above statement also correlates to Holistic Interior Design.

The Holistic Design Institute

The Holistic Design Institute, unlike the interior design programs discussed above, is centered around Holistic Interior Design training. The institute is a registered Learning Provider based in the United Kingdom, offering online training ("About the holistic," 2006). The Holistic Design Institute was founded in 1992, as a result of “the growing interest in healing and personal growth from those within the design profession" ("About the holistic," 2006, Our Distance Learning Programmes section, para. 2) and now has graduates in over 35 countries (Chiazzari, 2011). Students are eligible to enroll in the 16 lesson self-paced study, seen in Figure 2.8, at any time

![COURSE CONTENT](http://www.holisticdesign.co.uk/index.php?action=courses&id=8)

**Figure 2.8.** Holistic Design Institute’s 16 Lesson Program
Source: http://www.holisticdesign.co.uk/index.php?action=courses&id=8
throughout the year. The program is completed within six months to one year ("How to study," 2006), in contrast the four year undergraduate programs of Florida State University and Washington State University, which require over 80 credit hours of course completion before students are eligible to apply for graduation ("Florida state interior," n.d.; "Washington state university," n.d.). The Holistic Design Institute founder, Suzy Chiazzari (n.d.), explained, “this course compliments traditional Interior design study. Practicing designers will find this course allows them to use their talents in a new way and to offer their clients a more personalized service.” (para. 1).

Chiazzari described the program as “a totally different approach to Interior Design that is in keeping with modern trends and future needs in environmental design. Most Interior Design training concentrates on creating aesthetically pleasing spaces while Holistic Interior Design emphasizes the importance of creating interiors that are in harmony with the individuals who will be using them” ("Holistic interior design," 2006, para. 2). Chiazzari further explained, “the role of our environment in our physical and mental well-being has for too long been ignored” ("Holistic interior design," 2006, para. 2). The program is centered on the use of color, color therapy, and other design methods in relation to health and well-being, the integration of psychology and environmental design principles into interior design practices, and Gaia theory ("About the holistic," 2006), the hypothesis that organisms are interconnected with their environment as part of a complex self-regulating whole that comprises the entire planet (Lovelock, 1972; Marshall, 2002; Volk, 2002). Upon completion of the 16 courses, students who pass the final examination and complete a Holistic Interior Design studio project are awarded the Holistic Design Institute Diploma, are eligible to
use the post-nominal letters *Dip. HDI (Hol. Design)*, and advertise and market themselves as Holistic Interior Designers (“Holistic interior design,” 2006).

**The Limerick College of Further Education**

Holistic Interior Design training is not limited to the Holistic Design Institute. A certificate of attendance of the Holistic Interior Design course is offered by the Limerick College of Further Education, located in Limerick, Ireland. The ten week course, seen in *Figure 2.9*, is open to those wishing to increase his or her knowledge of Holistic Interior Design. The course begins by distinguishing Holistic Interior Design from

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**Course Description**

**WK 1** What is Holistic Interior design? How does it differ from Interior design? The role of the Holistic designer. Environmental awareness.


**WK3** Eco friendly paints, varnishes and wallpapers. Natural fabrics and flooring.

**WK4** Colour therapy for Interiors. Colour psychology, the impact of colour on mind, body and spirit. The colour wheel and the Chakra system.

**WK 5** Practical feng Shui. The principal of Yin and Yang. What is Chi’? Correcting bad Chi’ using fengshui “cures”

**WK 6** The importance of light and ventilation. Natural and artificial lighting. Benefits of full spectrum lighting.

**WK 7** Aromatherapy basics, the natural smelling home! Using essential oils as natural cleaning agents. Introduction to Healing crystals in the home.

**WK8** Designing a kitchen holistically and bathrooms as sanctuaries.

**WK 9** Creating natural mood boards to design a room of your choice using holistic principals.

**WK 10** Natural Mood boards.

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*Figure 2.9. Limerick College of Further Education’s 10 Week Holistic Design Course.*
interior design and explores the role of the Holistic Interior Designer. The course progresses with an exploration of the changing environment, the earth and our connection to it, sustainability, color therapy, feng shui, light, aromatherapy and healing crystals, holistic kitchen and bathroom design, and the use and creation of mood boards to design using holistic principles ("Holistic interior design," n.d.).

**Holistic Interior Design Practice & Methodology**

The practice of Holistic Interior Design is currently a gray area, in that, aside from the information provided by Holistic Interior Design educational institutes and non-peer-reviewed newspaper and magazine articles, there is little to no peer-reviewed scientific literature as to its practice or efficacy. There is also no licensure or mandate that ensures that an interior designer claiming to be a Holistic Interior Designer is actually practicing Holistic Interior Design methods. However, a review of the philosophy statements of many practicing Holistic Designers, information provided by the Holistic Design Institute and the Limerick College of Further Education, and newspaper and magazine articles revealed a commonality of methods. A word count that was analyzed on a spread sheet produced a list of common practices and methods employed by practicing Holistic Interior Designers. They were, in rank order, feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management. In the following, relevant literature relating to these methods along with information pertaining to electromagnetics, from the fields of physiology, psychology, sociology, holistic healing, interior design, and architecture, is presented.
Feng Shui

Feng shui is an ancient Chinese art that aims at balancing spacial energy, or Chi, to increase the health and well-being of occupants (Hale & Evans, 2008; Kreth, 2013). In the practice of feng shui, compasses and the Bagua, an energy map, are used as tools to achieve a balance of energy (Wong, 2001). S. Lee Wright (2013), principle designer of Holistic Interior Architecture, explained “Feng shui is an ancient practice that creates mindful arrangement of your space. The balance and harmony between our internal and external environments is the main purpose of feng shui” (Wind & Water section, para. 1). Denyne Sanville (2012b), of Denyne Designs, a Holistic Interior Design firm, has offered a Synchro Alignment process, aimed at discovering a client’s personal and environmental energies. Sanville explained:

Your home environment has a profound effect on your well being and the energy in your home can be used as a tool for transformation... This very personal consultation in your home will balance these two feng shui principals: to uncover the adjustments that need to be made, and to transform your home into a place that is vibrant, alive and supportive of your desires and intentions. (para. 1).

Despite feng shui’s use by members of the Holistic Interior Design practice, it has often been criticized as a pseudoscience by affiliates of the scientific community. Scientific evidence of its efficacy is often anecdotal and its methods require intense study (Dukes, 1971). In the defense of feng shui, practitioners have explained that many of the practices of feng shui are based in logic and common design principles (Chen & Nakama, 2004; Han, 2006; Han & Sinha, 1996; Shermer, 2002).
Like feng-shui, applied color has been associated with health and well-being and has existed since ancient times (The Advisory Board, 2007; Valdez & Mehrabian, 1994). Thus, color is integral to the Holistic Interior Design process, affecting human environment interactions (Barrick, Taylor, & Correa, 2002; Dalke, et al., 2006). Color elicits physiological, sociological, and psychological responses (Barrick, et al., 2002; Mahnke, 1996; Shin, 1999), affecting the mind, body, and spirit. In the following sections, physical and psychological responses to color are discussed.

**Color & physical response.** Chromotherapy, also known as light therapy or colorology, is the holistic treatment that uses color as a healing agent (Aking & Kuller, 1972). In this practice, color and light are used to balance physical and psychological states. The ability of color to effect physiological states is known as chromodynamics (Shinn, 1999). Chromodynamic studies have found relationships between color exposure and stress (Jacobs & Suess, 1975), arousal levels (Dijkstra, Pieterse, & Pruyn, 2006), physical task performance (Etnier & Hardy, 1997), heart rate and respiratory problems (Codinhoto, Tzortzopoulos, Kagioglou, Aouad & Cooper, 2009; Jacobs & Hustmyer, 1974), and the pituitary and thyroid gland function (The Advisory Board, 2007). A chromodynamics study by Kopec found that warm colors elicit more arousal in the human body than cool colors (2006). Other studies have shown that yellow and orange can energize a space, while blue and green hues tend to foster tranquility and stability (The Advisory Board, 2007). For example, evidence from specific studies has shown a relationship between the specular qualities of warm colors (red, orange, and yellow) and increasing appetites and feelings of anxiousness (Dijkstra, et al., 2006;
Chromodynamics has also shown to affect the perception of body temperature. Cool colored environments are perceived to be lower in temperature than warm hued spaces (Barrick, et al., 2002). Thus, under the previous stated definition of Holistic Interior Design, knowledge of color is useful in creating a holistic environment suited to physical needs (Chiazzari, 2011; Hertzfeld, 2011; “Holistic interior design,” 2008); however, Holistic Interior Design, as an integral method, also considers psychological needs (Portugali, 2011; Trevelyan, 1998), which is discussed in the following section.

**Color & psychological response.** As stated above, color can elicit psychological responses. The studies of these responses provided a window into elementary behavior of human beings (Luscher, 1969), which revealed a connection between personality and chromatic preference (Turoczi, 1985). Quantitative and qualitative data has shown a relationship between color stimuli and mood (Barrick, et al., 2002; Valdez & Mehrabian, 1994), performance on mental tasks (Etnier & Hardy, 1997), and anxiety levels (Jacobs & Susse 1975; Kopec, 2006). The following quote from Denyne Sanville (2012c), principle of Denyne Designs, has shown a Holistic Interior Design perspective on the psychology of color:

> Understanding color psychology and combining it with colors that inspire us can have a powerful effect on our well being and in the environments we create in our home. Color can have a profound effect on our lives from everything to our mood, how much we eat, how productive we are, how we rejuvenate our bodies and how we relate to each other. (para. 3).
Sanville (2012a) explained further, “...the colors surrounding us in our home have a powerful effect on our psyche. They can be calming, inspiring or invigorating... they also can cause us to feel depressed or agitated” (Services section, para. 1). Sanville’s subjective remarks were congruous with scientific evidence. For example, a study of color preferences revealed that those who scored high on an anxiety scale markedly favored desaturated colors in contrast to less anxious participants (Ireland, Warren, & Herringer, 1992). Psychological responses to color are due in part to the color temperature. Exposure to warm colors can raise anxiety levels (Kopec, 2006). Red hues can stimulate mental activity while exposure to cool colors, such as cool gray and purple, has been shown to be associated with depression (Codinhoto, et al., 2009).

There are other aspects of color, such as the intensity and brightness of color, that can effect psychological response. In a study by Baum and Davis (1976), two participant groups were placed in identical spaces, with the exception that one was painted light green and the other dark green. The participant group of the dark green space perceived it to be more crowded than the participants of the light green space. Another study by Kunishima and Yanase (1985) found that participants perceived brighter or more intense colors to be more refreshing than dark colors.

It has also been shown that color effects perceptions of space and form (Smith, 2003). The perception of color is not the color itself, but the output of light created by the color. The light is a product of its source and surroundings. Light and color as visual stimuli, regarding the built environment, have a large impact on well-being (McKahan, 1993). A warm hued light bouncing off of a cool wall may still emit warm light, whereas light emitted from a cool fluorescent lamp onto a cool surface will result
in a space that appears cold (Gordon, 2003). Thus, the chosen colors of the room need not be warm hued, but should be carefully chosen alongside light sources and natural light to produce warm light in the center of the space (Alexander, 1977).

Though further investigation is needed to determine whether human emotions are effected by color as a biological response or a response of our psychosocial culturing (Kopec, 2006), the studies above revealed a relationship between chromatic stimuli and physical and psychological responses. This supported the application of color as a method of Holistic Interior Design, according to this study’s definition of Holistic Interior Design. This is further supported by color’s second place ranking in this study’s word count. In the following, the word count’s third ranking method, sustainability, is discussed.

**Sustainability**

Sustainable interior design, a byproduct of the sustainability movement introduced above, is the practice of selecting products, materials, and design methods that protect or enhance both the ecological environment and humanity (Winchip, 2011). Practices of sustainable design have included the use of renewable resources, specifying products and materials, as well as using methods that have a minimum impact on the environment, and the creation of spaces that integrate people with nature ("Holistic interior design," 2006). This has been accomplished in part by the selection of low-impact and high-quality materials that are renewable, the consideration of air quality including natural ventilation and air refreshment, lowering energy consumption, reducing operation costs, and increasing occupant satisfaction.
(McLennan, 2004). This has included the selection of products that are low in VOC’s, or volatile organic compounds, and being aware of off-gassing (Winchip, 2011).

There have been many who advocate that holistic sustainable design requires a different approach that traditional sustainable design methods (Drexler & El Khouli, 2012). Anna Klingmann (2010), of Klingmann Architects and Brand Consultants design, explained:

A holistic approach to sustainability, however, has the potential to promote a more synergistic understanding of the environmental, social, cultural and economic factors of a certain location and how each of these factors leads to a more sustainable and healthy lifestyle of an area and its inhabitants. A reductive approach to sustainability, on the other hand, turns green design into a checklist — wildlife preservation- check, recycled materials- check, mixed-use planning- check— without really approaching what each of these techniques is trying to achieve. A holistic approach uses four pillars of sustainability—social, cultural, environmental and economic— together to create projects that work with, as well as within, an environment and lead to the growth of strong, integrated, healthy communities in every sense. (para. 2-3).

In this view, holistic sustainable design looks at the building’s occupant(s) and his or her place with in the community, and exponentially the world (Drexler & El Khouli, 2012). This interactive approach can seem beyond the scope of the designer's concern; however, it can be integrated into the built environment in many ways (Montgomery, 2005). One such solution is to consider the location of the building and how occupants will access it. Design that includes bike storage and an onsite shower
can make sustainable commuting easier (Winchip, 2011). Other aspects of concern are the future use of space. In today’s ever-changing world, flexibility in form and function can extend the built environment’s lifespan. Consideration of a space’s future also requires knowledge of technology. Allowing for technological advancement and current technology that may applicable to the current design solution but may be used in the future extends the life of the space, enabling it to adapt to future use or need (Whole Building Design, 2011).

While sustainable practices have been concerned with protecting the natural environment and humanity (Winchip, 2011), the fourth ranking method of holistic interior design integrates the nature with the indoor environment. This has often been accomplished through providing views of nature and indoor plants (Dossey, et al., 1989). Relevant literature pertaining to these two practices is discussed in the following.

Integration of Nature

**Views of nature.** The integration of the indoors and out can have physiological and psychological effects (Gilhooley, 2002; Sheets & Manzer, 1991). According to Christopher Alexander (1977), architect and respected theorist (Salingaros, 2006), it is very important to make a connection between the indoors and nature (Seamon, 2000). Physiologically, views of nature have been shown to reduce stress (Ulrich, 1984) and tension (Chang & Chen, 2005; Lohr & Pearson-Mims, 1996), and lower blood pressure (Lohr & Pearson-Mims, 1996). Psychologically, views of nature have been shown to increase well-being (Ulrich, 1984), induce optimistic emotions (Ulrich &
Wilson 2006; Ulrich, 2008), and distract from pain (Malenbaum, Keefe, Williams, Ulrich, & Somers, 2008), and have been shown to improve cognitive functioning (Berman, Jonides, & Kaplan, 2008; Wells, 2000). A study by Dravigne, Waliczek, Lineberger, and Zajicek (2008) found that workers of offices that had views of nature and/or interior plants perceived higher satisfaction with life employment and coworker interrelations than workers of offices without natural views or plants. Alexander suggested using window “places” to allow for views of nature. He saw these as a necessity in reducing our primal conflict of needing comfort while also being drawn to light. This has been accomplished through low window sills, window seats, bay windows, and glazed alcoves (Alexander, 1977).

**Indoor plants.** Interior environments with plants have been shown to be perceived as more comfortable and luxurious (Gilhooley, 2002). Plants act as a restoring force (Lohr, et al., 1996) and increase perceptions of privacy (Goodrich, 1986). Plants also enhance task performance and mood (Shibata & Suzuki, 2004), having a therapeutic effect (Relf, 2005). A study of commercial environments found that offices with indoor plants had less employee absenteeism than offices without indoor plants and inferred that plants can increase health and well-being among office workers (Smith, Tucker, & Pitt, 2010). In healthcare settings, plants have been shown to reduce recovery time, pain, and fatigue in patients (Park & Mattson, 2008; 2009ab), as well as reducing stress (Dijkstra, et al., 2008).

Indoor plants naturally cleanse the environment, removing airborne toxins (Wolverton, Johnson, & Bounds, 1989; Lohr, et al., 1996), absorbing carbon dioxide (Raza, Shylaja, Murthy, & Bhagyalakshmi, 1991), and reducing the amount noise
pollution (Costa & James, 1995). Studies have also revealed that plants can even manage the moisture balance of the indoor environment (Smith & Pitt, 2011; Wolverton, 1996). It has also been shown that plants and views of nature increase individual concern for environmental preservation (Lutz, Simpson-Housley, & DeMan, 1999). The evidence presented above explained why integrating nature is important to the practice of Holistic Interior Design. In the following, the fifth ranking method of Holistic Interior Design, light and light sources, is discussed.

**Light & Light Sources**

The lighting of an interior environment has the power to affect human beings both physiologically, psychologically (Flynn, Spencer, Martyniuk, & Hendrick, 1973; Gordon, 2003), and sociologically (Baron, Rea, & Daniels 1992; Rashid & Zimrig, 2008). As part of the built environment, lighting has a large impact on the circadian rhythm and sleeping patterns (Béphage, 2005; Higgins, Winkelman, Lipson, Guo, & Rodgers, 2007), and can effect overall well-being (Kuller & Laike, 1998). However, applied lighting design can utilize lights healing capabilities, stimulating and restoring body and mind (Fouts & Gabay, 2008). The impact of light on these factors has been attributed to light levels and sources, which are discussed in the following.

**Light levels.** The light level, or amount of light within a space has been shown to effect depression, fatigue, and degrees of alertness (Chaudhury, Mahmood, & Valente, 2009; Heerwagen, 1990). A correlational study found that as the level of light is increased, visual task performance also increased (Boyce, Hunter, & Howlett, 2003). Equally lit environments, or environments in which illuminance is uniform and does not
vary, have been perceived to resemble a cloudy day, and can induce depression (Gordon, 2003). Thus, a variety of light levels have been perceived as the most pleasing and are the most arousing or stimulating (Flynn, 1977). A study by Sloane and colleagues (1998) found that lowered light levels were associated with increased occupant agitation. Spaces where decisions must be made in wayfinding have been shown to require increased lighting levels. Transitions in lighting can imply zone changes, such as the transition from public to private spaces (Leibrock, 2000). A study by Coombes and Coombes (2005) found that patients in well lit hospital rooms had a shorter stay than patients in dimly lit rooms. Conversely, another study found that the average hospital does not dim lighting enough at night to meet the patients’ sleep needs (Southwell & Wistow, 1995). The evidence discussed above has suggested that light levels can effect aspects of well-being. Levels of light are emitted from light sources, which are discussed in the following.

**Artificial light.** Artificial light has been shown to disrupt circadian rhythm, resulting in fatigue, poor judgement and performance, and an overall decrease in health (Lieberman, 1991; Wakamura & Tokura, 2001). This has been highly associated with cool spectrum artificial lighting. Though they have ranked high in efficiency, cool fluorescent lamps have been associated with many health problems, including headaches, eyestrain (Wilkins, Nimmo-Smith, Slater, & Bedocs, 1989), and the development of melanoma (Beral, Evans, Shore, & Milton 1982). They provide a limited portion of the visible light spectrum and have been attributed with contributing to decreases individual states of well-being and a reduction in social interaction (Rashid & Zimrig, 2008). Because of negative effects, cool fluorescent artificial lighting has been
banned in healthcare facilities across Germany (Edwards & Torcellini, 2002). These effects are reduced when using warm spectrum artificial lighting, which has been shown to induce collaboration and reduce avoidance and conflict amongst workers. A study by Baron, Rea, and Daniels (1992) found that workers who worked beneath warm white artificial light were more likely to collaborate, while workers in an environment lit in cool hues exhibited avoidance and conflict. In addition, bright full-spectrum fluorescent and incandescent lights have been shown to reduce the symptoms of seasonal affective disorder (Lewy, Kern, Rosenthal, & Wehr, 1982; Wirz-Justice, Buchelli, Graw, Kielholz, Fish, & Woggon, 1986; Yerevanian, Anderson, Grota, & Bray, 1986) and depression (Kripke, 1998; Kripke, Mullaney, Klauber, Risch, & Gillin, 1992; Kripke, Risch, & Janowsky, 1983).

Holistic Interior Design is also concerned with the functions and aesthetics of lighting (Horwitz-Bennett, 2005; Trevelyan, 1998). As seen in Figure 2.10 and Figure 2.11, exposed artificial lighting can be harsh, cause glare, and give an undesirable institutional feel. Enclosed lighting systems emphasize the aesthetics of the room and its occupants, and are most often less expensive than exposed fixtures (Leibrock, 2000). Indirect lighting can diffuse light throughout the space in a similar way to natural light (Lowers, 1999). Artificial light that mimics the spectrum of natural light has resulted in increased performance and aided in calming and pleasing the occupants (Leibrock, 2000; Miller, White, Whitman, O’Callaghan, & Maxwell, 1995). This spectrum also contains ultraviolet light that has been shown to naturally sanitize surfaces by reducing bacterial contamination (Codinhoto, et al., 2009; Leibrock, 2000; Nuffield
Provincial Hospitals, 1960), increase metabolic rates, and increase bodily production of vitamin “D” (Veitch & McColl, 1993).

A possible solution to current lighting issues may be daylight corrected fluorescent lighting, which simulates the visible spectrum of daylight. As seen in Figure 2.12, X-rite manufactures SpectraLight III, a fluorescent product that is advertised as the “world’s most accurate simulation of daylight” (“Spectralight III,” 2011). However, the daylight corrected fluorescents create the visual spectrum seen during the middle of the day, not accounting for the cool wavelengths of morning light and warmer wavelengths of twilight. Cost is also a concern, as daylight-corrected fluorescent
lighting can be as much as six times more costly than other light sources and emit less luminance per unit of electricity (Veitch, 1993).

Another alternative for the Holistic Interior Designer is the use of color changing light emitting diodes, or LEDs. The LED’s transition spectral lightwave emittance is in correspondence with the daytime changes that occur in nature (Burnett, 2011). To accompany the benefits of the LEDs, daylight sensors can be specified in areas where adequate daylight is available. The sensors measure light levels of the floor, work surfaces, and ceiling, adjusting the artificial light in measure with the available natural light (O’Conner, Lee, Rubinstein, & Selkowitz, 2011).

**Natural light.** According to Alexander (1977), contemporary design has often neglected the concern for natural light, depending on artificial light as the sole light source. Alexander has explained that these are not suitable environments for daylight hours. Alexander has claimed that for people to feel comfortable in a space, windows supplying natural light must be positioned on different sides. Alexander has explained
that people reject windowless building design, and complain when they have no means of natural light (Alexander, 1977). In a study by Rapoport (1967), in which he gathered terminological data on participants perceptions of built environments, he found that people expressed more positive mind sets in rooms with windows than without.

Beyond the preference for natural light, natural light has been shown to reduce physical pain and reduce stress levels (Walch, Rabin, Day, Williams, Choi, & Kang, 2005), which are determining factors of emotional well-being (Cloninger, 2004; Diener, 1984; Gureje, Von Korff, Simon, & Gater, 1998; Stewart, et al., 1989). Exposure to natural light has also been shown to lower the contamination levels of harmful bacteria (Nuffield Provincial Hospitals, 1960), maintain circadian rhythms and increase the quality of sleep (BaHammam, 2006), and decrease employee distraction and error (Malkin, 2007). Also, like full spectrum artificial lighting, natural light has been shown to increase metabolic rates and bodily production of vitamin “D” (Veitch and McColl, 1993).

Maximizing natural light often includes carefully executed space planning and a site plan (Gordon, 2003). In the United States, south facing rooms receive the most natural light, with the southeast receiving morning light and the southwest receiving evening light. For new construction, the long side of the structure will receive the most natural light when facing south. In residential settings, efficient use of natural light includes space planning based on a spaces times of use (O’Conner, et al., 2011). According to Alexander (1977), spaces used primarily during the day should face south, morning spaces east, and spaces for evening use to the west. Kitchens need
more daylighting than other spaces. Kitchen windows that face the south and southeast provide natural lighting through the morning and afternoon, and can often be used to provide views of nature (Alexander, 1977).

The evidence above has suggested that the level of light, as well as the use of artificial and natural light sources can have physical, psychological, and sociological effects. In accordance with this study’s definition of Holistic Interior Design, and in conjunction with light being a method ranked within the word count, the use of light and light sources is a concern of the Holistic Interior Designer. Another concern for Holistic Interior Designers, which ranked sixth in the word count, is aromatherapy. Information pertaining to this method is presented in the following.

**Aromatherapy**

The Holistic Interior Designer may also address the olfactory senses of occupants through the practice of aromatherapy. As an alternative and integrative medical approach, aromatherapy has used essential oils and other aromatic substances to improve or treat overall health (Krebs, 2006), mood (Herz, 2009), depression, anxiety (McCaffrey, Thomas, Kinzelman, 2009), sense of well-being (Rho, Han, Kim, & Lee, 2006), and cognitive functioning (Erlich, 2011). The essential oils used in aromatherapy are highly concentrated plant extracts. Different plant extracts are used to achieve specific effects (Millet, Jouglard, Steinmetz, Tognetti, Joanny, & Arditti, 1981). For example, the essential oils of lavender, frankincense, and rose and have been shown to reduce anxiety and increase well-being (Atsumi & Tonosaki, 2007; McCaffrey, Thomas, & Kinzelman, 2009) and neroli oil has shown to stimulate
circulation (Hur, Oh, Lee, Kim, Choi, & Shin, 2007). There is currently no licensing in the United States for the practice of aromatherapy (Erlich, 2011), enabling the Holistic Interior Designer to employ this practice without additional training. Although there is little scientific evidence in support of aromatherapy (van der Watt, & Janca, 2008), studies have shown therapeutic benefits (Edris, 2007). Following aromatherapy, the seventh ranked method of Holistic Interior Design practice, sound management, is discussed in the following section.

**Sound Management**

Noise, or unwanted sound, as an environmental pollutant, has been shown to have physiological, psychological, and sociological effects (Christensen, 2007). Children, shift workers, those suffering from long-term illnesses, the elderly, and the impoverished are more likely to suffer from noise pollutants, although everyone is affected to some degree (World Health Organization, 2012). It has been recommended that daytime noise pollutants not exceed 35 A-weighted decibels (dB(A)), and less than 30 dB(A) at night. However, in 2012, 20% of the European Union population was exposed to daytime noise pollutants exceeding 65 dB(A) and over 30% of the population was exposed to nighttime noise pollutants exceeding 55 dB(A). Around 40% of the population experienced transportation related noise pollutants that exceeded 55 db(A) (World Health Organization, 2012).

Noise has been shown to have negative physiological effects on the cardiovascular and respiratory systems, elevating blood pressure, constricting vessels, and elevating heart rates (Coombes & Coombes, 2005; Rosen & Olin, 1965). High
noise levels over an eight hour period have been shown to raise blood pressure 5-10 points (Rosen & Olin, 1965). The decrease in health caused by noise pollutants has increased medical visits and dependance on pharmacological sleep solutions (World Health Organization, 2012). Noise has been shown to also cause hypertension, tinnitus, and hearing loss (Kryter, 1985). A study of workers who were exposed over time to significant noise levels in the work place showed significant hearing loss in comparison to a participant group who worked in quieter conditions (Rosenhall, Pedersen, & Svanborg, 1990). Another study, comparing Maaban tribe members with a sampling of the United States population, revealed the negative effects of urban noise, including transportation and industry, on hearing loss (Rosen & Olin, 1965).

Noise pollution has been shown to be psychologically devastating, increasing sleeplessness (Ersser, Wiles, Taylor, Walsh, & Bentley, 1999; Richards and Bairnsfather, 1988; Topf & Thompson, 2001), elevating stress levels (Kozarek, Raltz, Neal, Wilber, Stewart, & Ragsdale, 1997), decreasing productivity (Aaron, Carlisle, Carskadon, Meyer, Hill, & Millman, 1996; Pelletier, 1987), and causing sociological problems, including annoyance and aggression (Field, 1993). Noise can interrupt sleep cycles, reducing the quality of rest and the depth of sleep stages (BaHammam, 2006). In a study of productivity, reducing noise pollutants by 5 dB(A) within the range of 65–80 dB (A) showed a 10% performance increase in recall and reading and a 2–3% improvement in attention and memory (World Health Organization, 2012).

Holistic Interior Designers may deal with noise through the use of building materials and encouraging the occupant to invite in wanted sound. Studies have suggested that listening to music can improve health and well-being (Devlin & Arneill,
Listening to classical music can help create a relaxing atmosphere (Lee, et al., 2004), have pain reducing effects (Miller, Hickman, & Lemasters, 1992), and reduce stress (Miller, Hickman, & Lemasters, 1992). Other studies have shown that listening to sounds of nature reduced pain (Diette, Lechtzin, Haponik, Devrotes, & Rubin, 2003), stress (Kozarek, Raltz, Neal, Wilber, Stewart, & Ragsdale, 1997), and created a more pleasant environment (Schneider, Prince-Paul, Allen, Silverman, & Talaba, 2004; Waqar, 2007).

Noise, along with other environmental pollutants, is a problem that is of concern to Holistic Interior Designers (Cowan, 1993). The avoidance and/or removal of these pollutants requires knowledge of current studies and products and methods that can minimize their effects (Cowan, 1993). One such environmental pollutant is electromagnetic radiation. Though it did not appear significantly in the word count of Holistic Interior Designers’ philosophy statements and methodology, electromagnetic radiation appeared prevalently in literature pertaining to Holistic Interior Design. Thus, in this author’s opinion, it was also worthy of investigation, and is discussed further below.

**Electromagnetic Radiation**

Joseph H. Battocletti (1976), author of *Electromagnetism, Man, and the Environment*, has defined electromagnetic pollution as “the permeation of the environment (air, land, water) with undesirable static and alternating electric and magnetic fields” (p. 1). Electromagnetic fields are natural to the earth. The earth itself is a magnet, and the wavelengths of light and electromagnetic radiation are often
visible (Frey, 1994). However, in recent time, electromagnetic energy emissions have increased exponentially due to industrialization, emanating from many human interferences, including nuclear power plants and even televisions remote controls. The levels being emitted from these sources have been shown to vary, but the overall effect has become a new environmental challenge for which organisms, including humans, have not had a chance to evolve and adapt (Ghandi, 1990).

Organisms have their own electric charges and outputs, and these can be interrupted both beneficially and destructively by exterior electromagnetics (Durney & Christensen, 2000). Evidence has shown that the electromagnetic fields of the human heart may be what syncs the whole body, which has suggested that the heart may have emotional intelligence (Brusewitz, 2010). This was explained further by A. R. Liboff (2007):

There is a realization that the overall electric polarization of the body can be a useful measure of wellness. Second, it has been observed that the body’s electric polarization can be dramatically changed by the application of ICR [Ion Cyclotron Resonance] magnetic fields. (p. 324-325).

The evidence above suggested reasoning for electromagnetic radiation to be of concern to the practice of Holistic Interior Design. Electromagnetic fields are naturally occurring (Frey, 1994), but have been shown to be capable of being interrupted by human interference (Ghandi, 1990). Knowledge of the environment’s electromagnetic states have been reported to be a part of the holistic building and designing process (Taylor, 2009).
Conclusion

Holistic Interior Design is a humanistic approach to interior design, focusing on sustaining the well-being of occupants through design methods that appeal to the mind, body, and spirit (Correspondent, 2003; Dossey, et al., 1989). Holistic practices have permeated human history, and, following the decline of environmental standards brought about by the Industrial Revolution (Massey, 2008), new standards have led up to the practice of Holistic Interior Design, Holistic Interior Design education, and development of Holistic Interior Design firms. Holistic Interior Design practitioners and firms most frequently identified the elements of feng shui, color, sustainability, integration of nature, light, aromatherapy, and sound management as parts of their practices. Relevant literature also revealed electromagnetic radiation to be a possible concern for Holistic Interior Design. There are studies in these areas, documented here, that suggested these elements contribute to human well-being.
CHAPTER THREE

METHODOLOGY

As discussed in chapters one and two, Holistic Interior Design is a burgeoning design practice that has distinguished itself by extending beyond needs of form and function, to meet physical, mental, and spiritual (emotional) needs to improve the quality of the built environment and the well-being of occupants (Dossey, et al., 1989). The growth of Holistic Interior Design has included the founding of Holistic Interior Design education facilities and practicing Holistic Interior Designers and firms. Little to no scientific studies have been conducted in the field of Holistic Interior Design; however, as explored in chapter two, empirical studies have been conducted on elements of Holistic Interior Design practice, such as color, lighting, the integration of nature, and noise and sound management. More research is needed to investigate design methods that appeal to the mind, body, and spirit as well as the effect of these methods on well-being (Dilani, 2005; Evans, 2003).

A preliminary review of the content of the philosophy statements and websites of ten practicing Holistic Interior Designers or Holistic Interior Design firms revealed a commonality of Holistic Interior Design methods. A word count that was analyzed on a spreadsheet produced a list of common practices and methods employed by practicing Holistic Interior Designers. They were, in rank order, feng shui, color, sustainability, integration of nature, light, aromatherapy or the addressing of smell, and sound management. These were discussed in relation to interior design and well-being in chapter two. The issues of color, lighting, the integration of nature, noise or sound...
management were selected because of the availability of evidence-base design studies on the methods, and their ability to be identified in a photographic image. These issues were paired with relevant empirical literature from the fields of physiology, psychology, and sociology and evidence-based design studies in relation to well-being.

For this study, the WHO-5 Well-Being index was used to develop components of well-being. The Index is a validated Likert-style questionnaire used to assess well-being (Heun, Bonsignore, Barkow, & Jessen, 2001). The questionnaire has five items, presented in Table 3.1: (1) I have felt cheerful and in good spirits, (2) I have felt calm and relaxed, (3) I have felt active and vigorous, (4) I woke up feeling fresh and rested, and (5) My daily life has been filled with things that interest me ("Who-5 well-being index," n.d.).

Through the review of literature in relation to these five items, and a review of aspects of well-being in relation to the built environment, four were identified and used in development of this studies questionnaire. Thus the issues of color, lighting, the integration of nature, and reduction of noise or sound management were assessed for their ability to: (1) elicit positive emotions (adapted from the WHO-5 Well-Being Index’s #1), (2) reduce stress (adapted from the WHO-5 Well-Being Index’s #2), (3) encourage social interaction (adapted from the WHO-5 Well-Being Index’s #3 & #5), and (4) increase the states of arousal (adapted from the WHO-5 Well-Being Index’s #4 & #5). The gathered information was then used to develop the research questions below.
Research Questions

The research questions of this study addressed practicing Holistic Interior Designers’ Holistic Interior Design methods and the empirical findings of evidence-based design in relation to color, lighting, integration of nature, and noise in interior environments. These questions are presented in the following:

I. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design?

A. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to color in interior environments?

Table 3.1. The WHO-5 Well-Being Index.

<table>
<thead>
<tr>
<th></th>
<th>Over the last 2 weeks</th>
<th>All the time</th>
<th>Most of the time</th>
<th>More than half of the time</th>
<th>Less than half of the time</th>
<th>Some of the time</th>
<th>At no time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have felt cheerful and in good spirits.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>I have felt calm and relaxed.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>I have felt active and vigorous.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>I woke up feeling fresh and rested.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>My daily life has been filled with things that interest me.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: http://www.sayhelp.net/pdfs/1345285728_WHO-5 well being index.pdf
B. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to lighting in interior environments?

C. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to the integration of nature in interior environments?

D. What links can be drawn between the practices of Holistic Interior Design and the empirical findings of evidence-based design in relation to noise in interior environments?

II. When presented with images of typical waiting spaces, how will Holistic Interior Designers perceive these spaces in relation to Holistic Interior Design?

A. What about the space in the image is inline with the practices of Holistic Interior Design?

B. What about the space in the image could be improved by the practices of Holistic Interior Design?

It was hypothesized that connections would be drawn between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. The color, lighting, integration of nature, and noise reductive properties of four typical waiting spaces were analyzed by respondents in reference to their ability to illicit positive emotions, reduce stress, increase social interaction, and increase states of arousal of occupants. Elements present in each image were matched with information from preexisting studies, which allowed for
individual hypotheses to be made for each space. It was further hypothesized that recommendations for improvements to each space made by Holistic Interior Designers would include the elements of color, lighting, integration of nature, and noise reduction. These hypotheses were as follows:

- The cooler, brighter, and more saturated colors of Space C would be perceived as more capable of eliciting positive emotions, encouraging social interaction, and increasing states of arousal.
- The cooler, brighter, and desaturated colors of Space B would be reported as more capable of reducing stress.
- The lighting of Space C, which had brighter light levels, and had artificial and natural light, would be reported as more probable of eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal.
- The integration of nature depicted in Spaces A and B, which had two visible indoor plants, and Space C, which had views of nature, would be reported to have a higher capability of eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal.
- Spaces B and D, which had more noise reducing elements, would be reported as more capable of eliciting positive emotions, reducing stress, encouraging social interaction, and less capable of increasing states of arousal.
Sample

The respondents of this study were comprised of 53 interior designers who identified themselves as Holistic Interior Designers. The respondents were gathered through an exhaustive search of interior designer profiles and philosophies, and the Holistic Design Institute Practitioners member list. No limitations were placed on the age, location, education level, or interior design licensure of the respondents.

Data Collection

The sample of practicing Holistic Interior Designers was invited to participate in responding to an online questionnaire through their contact email addresses. After one week, a follow-up email was sent to those who had not responded, reminding them of their opportunity to participate. In an effort to gain more responses, three reminder emails were sent out to the remainder of the subject group who had not responded through out week two.

Instrument

Qualitative and quantitative data was generated through the questionnaire. To confirm face validity and establish content validity, the questionnaire was pilot tested by volunteer designers. The questionnaire was comprised of 20 Likert-type scale responses, 10 short answer, and 8 open ended questions to provide respondents with the opportunity to expand on answers and for qualitative data to be gathered. The questionnaire was designed to take no longer than thirty minutes to complete. The
questionnaire was administered through Qualtrics, a private research software company, and responses were electronically recorded.

**Limitations**

Due to the nature of the subject and its relation to respondents’ profession and livelihood, respondents may have been inclined to distort, exaggerate, and omit key information. It was also understood that, because of the employment of technology in the administration of the questionnaire, the results may have been biased against those who were not technologically proficient and/or did not have email accounts. Language proficiency also limited this study. The questionnaire was administered in the English language, and because of the global scope of the sample, language barriers could have obstructed or interfered with participant responses and/or understanding of the material. Another limitation that could have interfered with the results was the previous Holistic Interior Design education of many respondents within the sample. The prior educational experience may have influenced responses. Respondents may have been inclined to respond with methods learned through their education, rather than methods actually practiced.

**Assumptions & Delimitations**

For the purposes of this research, it was assumed that Holistic Interior Design is a valid practice and that its methods enhance occupant well-being. This assumption was bolstered by the relevant literature review in chapter two, which discussed physiological, sociological, and psychological information on color, lighting,
integration of nature, sustainability, and the avoidance or removal of environmental pollutants in relation to well-being. This study did not claim or aspire to be all inclusive, yet it was intended to be a launching pad for future studies within the field of Holistic Interior Design. Due to the limited nature of this study, it did not purport that Holistic Interior Design methods will enhance or improve occupant well-being, but sought to make connections between evidence-based design studies and the practices of Holistic Interior Design.

**Study Procedure**

A preliminary review of the content of Holistic Interior Designers’ philosophy statements and methodology was conducted. A word count that was analyzed on a spreadsheet produced a list of common practices and methods employed by practicing Holistic Interior Designers. They were, in rank order, feng shui, color, sustainability, integration of nature, light, aromatherapy/the addressing of smell, and sound management. The issues of color, lighting, the integration of nature, noise and sound management were selected because of the availability of evidence-based design studies on the topics and their ability to be identified in a photographic image. The results of the preliminary review of the content were used in conjunction with the research questions and the information gained from the review of relevant literature in chapter two to develop the questionnaire.

An online questionnaire was developed, and then reviewed and pilot tested by volunteer designers. Subsequently, the questionnaire was submitted to the Florida State University Internal Review Board for approval. Upon approval, Qualtrics research
The sample of practicing Holistic Interior Designers was invited to participate in responding to the online questionnaire through their contact email addresses. After two weeks, a follow-up email was sent to those who had not responded to remind them of their opportunity to participate. The subjects were asked to respond to the questionnaire online to the best of their ability. Subjects were not required to answer all questions. Subjects were asked to respond to a series of questions, evaluate photographs of existing spaces and explain how these spaces rate in relation to color, light, integration of nature, and noise. Qualitative and quantitative data was generated through the questionnaire. The questionnaire was comprised of 27 questions. There were 2 multiple choice, 16 five point Likert-style questions, and 9 open ended questions to provide respondents with the opportunity to expand on answers and for qualitative data to be gathered. The questionnaire was designed take no longer than twenty minutes to complete.

Summary

The online questionnaire was administered through Qualtrics Survey Software. Quantitative data was assessed electronically through Qualtrics Survey Software. Qualitative data was reported using recursive abstractions. This study valued the
anonymity of the respondents and all gathered data, reports, and listings were coded and anonymous, stored in a password protected file on the PI’s personal computer. It was hypothesized that the gathered data would reveal connections between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. The desire was for the research to bolster the validity of Holistic Interior Design practices by drawing connections to empirical evidence derived from evidence-based design studies.
CHAPTER FOUR

RESULTS AND FINDINGS

This chapter reports the data gathered from a word count of practicing Holistic Interior Designers’ philosophy statements and written methodology and the responses of participating Holistic Interior Design professionals to a questionnaire in assessment of images of typical waiting spaces. This chapter describes the degrees to which the participants’ perceived the waiting spaces to rate in holistically applied color, light, integration of nature, and sound management, in relation to aspects of well-being, specifically, eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal.

Methodology & Demographics

Phase 1- Word Count

In conjunction with the review of relevant literature presented in chapter 2, an exploratory content review of Holistic Interior Designers' philosophy statements and written methodology was conducted. This resulted in a word count that was analyzed on a spread sheet, seen in Table 4.1. The word count revealed a list of common practices and methods employed by practicing Holistic Interior Designers. They were, in order of frequency, feng shui, color, sustainability, integration of nature, light, aromatherapy or the addressing of smell, and sound management, as seen in Table 4.2. Shiatsu also held rank, following “light,” but was decidedly omitted, as it was only
referenced by one source, Elementals Holistic Living, and thus skewed the results and did not represent Holistic Interior Design methods as a whole.

Table 4.1. Frequency of Key Words.

<table>
<thead>
<tr>
<th>WORD COUNT</th>
<th>Aclectia de Lore</th>
<th>Denyne Designs</th>
<th>Elementals Holistic Living</th>
<th>Holistic Interiors Pvt Ltd</th>
<th>IAD Holistic</th>
<th>Kreative Ways &amp; Solutions, LLC</th>
<th>Relish Natural Home and Interior Design</th>
<th>S. Lee Wright</th>
<th>Wellness Designs</th>
<th>SUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holistic</td>
<td>7</td>
<td>16</td>
<td>7</td>
<td>13</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>12</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Interior Design</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Feng Shui</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>23</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>Health, Healing, Wellness</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>Color (Colour), Color Therapy</td>
<td>13</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Balance</td>
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<td>2</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Well-being (Wellbeing)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>12</td>
</tr>
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<td>Energy</td>
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<td>5</td>
<td>1</td>
<td>3</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>12</td>
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Table 4.2. Frequency of Common Practices.

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These topics of feng shui, color, sustainability, integration of nature, light, aromatherapy or the addressing of smell, and sound management became the guide.
for which the relevant literature in chapter two was presented. The issues of color, integration of nature, light, and sound management were used in development of the proceeding questionnaire because of the availability of evidence-based design studies on the topics and their ability to be identified in a photographic image. The results of the preliminary review of the content were synthesized with the research questions and the information gained from the review of relevant literature in chapter two to develop the questionnaire.

**Phase 2-Questionnaire**

The second phase of this study was to gather information from practicing Holistic Interior Designers that was compared with existing literature on color, integration of nature, light, and sound management in relation to well-being. This was accomplished through an online questionnaire. The questionnaire asked participants to interpret images of four typical waiting rooms. The participants were asked to rate the color, integration of nature, lighting, and sound management of each space’s capacity to elicit positive emotions, reduce the stress, encourage social interaction, and increase the states of arousal of the occupants. The participants were also invited to write, in short essay format, their reactions to each waiting space in terms of how it did or did not exhibit the principles of Holistic Interior Design. They were also asked to describe, in the same format, how they might improve each space based on the principles of Holistic Interior Design.

**Limitations of the questionnaire.** The participants were presented with one image of each space, depicting one view of a three-dimensional space. Also, the
questionnaire required the use of sight (viewing the picture) to infer the sensual
experience of being an occupant in the space. Thus, the gathered data was based on
the perceptions of participants of a two-dimensional photographic interpretation of a
three-dimensional space, and not responses to actually occupying the space. Another
limitation was the use of Qualtrics Survey Software because of its relative newness.
One subject emailed the PI, describing discomfort with opening the survey because of
potential computer viruses from unknown web-based services.

**Participant recruitment.** A total of 53 practicing Holistic Interior Designers
were invited via email to participate in the online survey. Of this subject group, 22
Holistic Interior Designers consented to participate, and 10 completed the survey. Of
these participants, seven held practice in the United States, one in Europe, and two
from Canada, as seen in *Figure 4.1*.

Thirty-one members of the subject group did not respond. This could be due in
part to the method used to obtain subjects’ email addresses. Thirty-four subjects’
emails were taken from the Holistic Design Institute’s Practitioner Members list, whilst
the other 19 email addresses were culled from practicing Holistic Interior Designers’
websites. The 34 emails gathered from the Holistic Design Institute had the potential
to be outdated. Also, holding a Holistic Design Institute Diploma does not ensure
practice. Thus, some of the 34 may have disqualified themselves without response
because they did not meet the requirement of being a practicing Holistic Interior
Designer.
Data collection. The data was collected using Qualtrics Survey Software. All responses were coded and saved to a secure file on the PI’s personal computer. Applicable responses were quantified using Qualtrics Survey Software and sorted and analyzed by each component of well-being by the PI. Written responses were analyzed and arranged by the topic they referenced by the PI. The collected data is presented in the findings below.

Findings

The goal of the questionnaire was to evaluate Holistic Interior Designers’ perceptions of four typical waiting spaces. The respondents were asked to assess the color, lighting, integration of nature, and reduction of noise pollution of each space in terms of their ability elicit positive emotions, to reduce the stress of, encourage social interaction, and increase states of arousal occupants on a Likert-style scale. The scale

Figure 4.1. Practice locations of participating Holistic Interior Designers.
ranged from zero to five, with zero representing “not at all” and five representing “extremely.”

The findings below were organized by the PI to show the rankings and respondents remarks on each space in terms of color, light, integration of nature, and noise relation. These rankings and responses revealed the respondents’ perceptions of these issues’ abilities to influence well-being, dissected into factors of emotions, stress levels, social interaction, and states of arousal. This data is presented in the following.

**Space A Findings**

**Likert-style responses.** The respondents were asked to evaluate the colors, lighting, integration of nature, and noise reductive properties of Space A, seen in Figure 4.2, in terms of their potential to elicit positive emotions, reduce stress levels, increase social interaction, and increase the states of arousal of users of the space. The results, as seen in Figure 4.3, revealed that the colors of Space A, were perceived to have little ability to elicit positive emotions, reduce stress, encourage social interaction, and increase the states of arousal of occupants. The perceptions of the lighting and reduction of noise pollution of this space to influence these aspects of well-being were also respectively low. However, participants perceived the integration of nature within Space A to have a more than a moderate capacity to reduce stress, and marginal ability to increase positive emotions and socialization amongst occupants.
Figure 4.2. Space A.
Source: http://farm9.staticflickr.com/8243/8525656492_7cb163349e_b.jpg

Figure 4.3. Average Participant Responses for Space A.
Open-ended responses- holistic improvements. The respondents were also invited to explain how they would improve the space based on the principles of Holistic Interior Design. 57% of responses suggested improving the space through color by changing the wall color and adding artwork. Proposals addressing the walls included using a warmer color, a deeper color, and using wall color to “add either vibrancy or calmness.” 29% of the responses suggested also bringing in color through artwork and entourage. 71% of responses advised improvements for lighting. Of those who provided lighting suggestions, 86% recommended increasing the amount or level of light. Recommendations included the incorporation of lighting fixtures, luminaires, and soft ambient and task lighting. It was noteworthy that no recommendations were made in reference to the inclusion or implementation of natural lighting. 57% of responses suggested improvements concerning the integration of nature. Of those responses, 25% proposed the addition of views of nature and 75% advocated changes to indoor plants. Advice included improving the presence of the existing indoor plants, changing their location, and adding views of the outdoors. Noise was addressed in 42% of responses. Responses advocated the inclusion of a rug and “sound absorbing textiles and materials.”

Other submissions were made to improve the Holistic Interior Design of the space that were beyond the confines of color, lighting, nature, and sound management. Concerns for social aspects included adding an area rug to increase “warmth and social engagement,” adding “seating to allow interaction and socializing,” and flooring considerations for “various age groups and mobility issues.” The use of sustainable
materials was also a concern. It was also advised that aromatherapy be addressed through the use of incense.

Several suggestions included changing the furnishings. 57% of responses suggested adding artwork, 71% proposed the addition of an area rug or carpeting, and 86% of suggestions included changing the furniture. Twice, the removal grandfather clock was specifically addressed. It was interesting to note that the grandfather clock was suggested to be removed for its symbolic qualities. One respondent explained, “The clock is ... a reminder of time, this is something most people do not want to be reminded of, it is usually a daunting interference of having a peace of mind.”

Overall perceptions of the space were poor. Respondents reported the space as “cold feeling,” “not very inviting or engaging,” and “cold and uncomfortable.” One responded shared, “I would be bored in this space and not feel at ease.”

**Open-ended responses - exhibition of holistic interior design.** Respondents were also asked to report how Space A exhibited elements of Holistic Interior Design. 83% of the responses stated that Space A exhibited Holistic interior Design through the integration of nature. This was noted through the indoor plants, their ability to purify the air, and the table top zen garden. Noise was only referenced once, regarding the plants adeptness to reduce the amount of noise in the space. 33% of responses listed color, while there was only one reference, “bright,” that could be attributed to light. It was also noted that the flooring, if it was natural wood, exhibited Holistic Interior Design principles.
Space B Findings

**Likert-style responses.** The respondents were presented with the same questions, but with a different image, Space B, as seen in Figure 4.4. The respondents were again asked to evaluate the color, lighting, integration of nature, and reduction of noise pollution in terms of their ability elicit positive emotions, to reduce the stress of, encourage social interaction, and increase states of arousal of occupants on a 5-point Likert-style scale. The results, presented in Figure 4.5, revealed that respondents perceived the colors Space B to be marginally capable of reducing stress and inducing positive emotions, while ranking low in their ability to encourage social interaction.
interaction, and even lower in their potential to increase the states of arousal of occupants. The lighting of the space was seen to be modestly able to elicit positive emotions, while the other factors fell shortly behind. The integration of nature was reported to have a moderate capacity to elicit positive emotions, reduce stress, and increase social interaction, and a slight ability to increase states of arousal. The noise dampening qualities of the space were ranked above the average on their abilities to elicit positive emotions, reduce occupant stress, and encourage social interaction. These qualities were perceived to have a lower means to increase states of arousal in occupants.

*Figure 4.5. Average Participant Responses for Space B.*
Open-ended responses- holistic improvements. In response to how they would improve the space based on the principles of Holistic Interior Design, respondents made suggestions to improve the color, lighting, and furnishings. No recommendations were made in reference to the integration of nature or noise pollution. 50% of responses suggested changing the wall color. Proposals included adding warmer colors, soft yellow, and energetic green; however, one respondent argued, “the color blue is calming and appropriate.” 50% also suggested adding light sources. Recommendations included the addition of natural light, softer light, and general lighting. 67% of suggestions called for changing the arrangement of furnishings. Reasonings for these tips included allowing “for interaction between people” and opening up the space to create flow.

Open-ended responses- exhibition of holistic interior design. Respondents reported that Space B exhibited the principles of Holistic Interior Design through color, lighting, the integration of nature, and noise reduction. 100% of the responses suggested the color exhibited Holistic Interior design principles. The color was reported as “safe,” “calming,” “cheerful,” “the perfect match,” and “soothing.” The lighting was also reported as “appropriate and comfortable to the eyes.” 100% of responses also motioned that the integration of nature in Space B exhibited Holistic Interior Design. All referenced the plants, and reported that the inclusion of plants in the space improved the air quality, were “calming and welcoming,” and created balance within the space. 40% reported that the artwork also exhibited nature. It was also noted that the artwork provided visual stimulation. One report described the space as “de-cluttered” and “functional.”
Space C Findings

Likert-style responses. The respondents were again asked to evaluate the color, lighting, integration of nature, and reduction of noise pollution of Space C, as seen in Figure 4.6, in terms of their ability to elicit positive emotions, to reduce the stress of, encourage social interaction, and increase states of arousal of occupants on a 5-point Likert-style scale, the results of which are presented in Figure 4.7. The color and light of Space C were rated as very capable of eliciting positive emotions, and more than moderately able to reduce the stress, increase the social interaction and states of arousal of occupants. The integration of nature in the space was reported as more than
relatively able to reduce stress, and moderately capable of eliciting positive emotions, encouraging social interaction, and increasing states of arousal. The noise reducing qualities of Space C were seen to have little ability to elicit positive emotions, reduce stress, increase social interaction, and moderate abilities to increase states of arousal in users.

Open-ended responses- holistic improvements. In response to changes that could improve the Holistic Design of Space C, respondents suggested improvements to color, lighting, the integration of nature, noise management, and the furnishings. 67% of recommendations dealt with integrating nature into the space. Of those proposals, 100% suggested the addition indoor plants. Other submissions included

Figure 4.7. Average Participant Responses for Space C.
integrating nature through artwork, an outdoor seating area, and potted plants along the exterior windows. Concerning color, it was advocated that the flooring color be changed to be more “engaging.” It was also noted that the red tiling was “jarring and unattractive.” Lighting changes included the “addition of screen window treatment for all seasons” that would “mitigate against the harshness of abruptness of window,” and to “change the fluorescent light or add other suitable lights.” Suggestions to better manage the noise within the space included the specification of “a flooring that withstands high traffic while reducing noise” and the use of “sound absorbing textiles and materials.” Other recommendations were the additions of artwork and tables.

**Open-ended responses - exhibition of holistic interior design.** Respondents were also asked to explain how Space C exhibited principles of Holistic Interior Design. 57% of the remarks expressed that the colors of the space exhibited Holistic Interior Design principles, describing them as “pleasing,” “soothing,” and “stimulating.” The colors of the chairs, flooring, and beams were specifically mentioned. 71% mentioned the lighting of the space. 100% of the responses discussed the natural light. It was described as “uplifting,” making “the space bright and cheery,” “welcome,” and the windows were reported as bringing “in a lot of natural light which creates soothing shadows in the room when the sun is out.” The overhead lighting was also noted as “soft.” 86% of the responses were about the integration of nature within Space C. All of these remarks were about views of nature, such as, the “exposure to nature outdoors is appealing.” Other responses stated, “the view of what appears to be a nearby green space is calming,” and, “this room connects to the outside, which is necessary for harmony and good overall wellness.” One response
communicated that the acoustical ceiling dampened noise. Other remarks claimed that the furniture arrangement of the space encouraged social interaction. It was reported, “the chairs ... seem to be light which can potentially allow for moving and congregating.” Responses to the general state of Space C included, “it is clean, simple ... feels spacious,” and, “this space has balance ... [and] could provoke much thought, and happiness, which is a positive attribute for the occupants...” It was also noted that “the earths elements are exhibited in a balanced manner.”

**Space D Findings**

**Likert-style responses.** The respondents were asked to assess the color, lighting, integration of nature, and reduction of noise pollution of Space D, as seen in Figure 4.8, for their capability to elicit positive emotions, to reduce the stress of, encourage social interaction, and increase states of arousal occupants on a 5-point Likert-style scale. The results, presented in Figure 4.9, showed that the colors and lighting of Space D were reported to have an average ability to elicit positive user emotions, to reduce occupant stress, and increase states of arousal. The colors were also seen to have moderate means to increase social interaction. The lighting was perceived to have a below average ability to reduce the stress of occupants. The space’s noise reducing elements were reported to have a moderate potential to reduce stress and encourage social interaction, modest ability to elicit positive emotions, and slight capability of eliciting positive emotions from patrons. The integration of nature within Space D was reported to have little to no capacity to elicit positive emotions, reduce stress, increase social interaction or states of arousal.
Figure 4.8. Space D.
Source: http://farm4.staticflickr.com/3290/2785107023_74b3ed9fcf_z.jpg?zz=1

Figure 4.9. Average Participant Responses for Space D.
Open-ended responses- holistic improvements. Regarding Space D, suggestions for improvement were made including changes in color, lighting, the integration of nature, noise pollution, and seating arrangements. 75% of responses advocated changes in color, describing the colors as “jarring” and “too saturated.” It was also suggested that the door color be changed to “a more welcoming one.” 50% recommended changes to the lighting, requesting “soft lighting” and the possible admittance of natural light by “open[ing] the window blinds.” 75% proposed the addition of nature, including indoor plants. Noise was referenced in relation to the fans, suggesting that they be removed. It was also recommended that artwork be included and the seating arrangement be changed for a less “stiff” format.

Open-ended responses- exhibition of holistic interior design. Respondents also provided information describing how Space D exhibited elements of Holistic Interior Design. These remarks included color, the integration of nature, and noise. Light was notably excluded, insinuating that the lighting of Space D did not exhibit principles of Holistic Interior Design. 80% of the comments discussed the colors. It was noted that contrasting colors were energizing. One comment noted, “The color is soothing - blue helps relax the occupants while the orange induces conversation and socialization.” Another response stated, “The colors used are active and this would be a great room to get people talking. This room has a positive energy, especially with the saturation of color.” One comment was made about nature in reference to the door. The response read as follows, “I love the large wood door, it truly represents nature to me. It works well.” It was also recognized that the flooring absorbed noise. While one respondent stated “This space seems fun,” others responded that the “application of
holistic design principles [are] not overly evident in this picture” and “I’m not sure that this room as shown does use principles of Holistic Interior Design.”

Summary

The results presented above reflected the responses to the questionnaire. The information gathered from a word count of practicing Holistic Interior Designers led to the development of this questionnaire in which respondents assessed of images of typical waiting spaces. This results, detailed above, described the levels to which the participants’ felt the waiting spaces rated in holistically applied color, light, integration of nature, and sound management, in relation to aspects of well-being, specifically, eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal. In the following chapter, these results are reintroduced and linked when possible, to supporting scientific research. Respondents’ suggestions for holistically improving Spaces A, B, C, and D were analyzed and graphically interpreted through graphic renderings, also presented in chapter five.
CHAPTER FIVE
CONNECTIONS & APPLICATIONS

In the following, the relationship of the data presented in chapter four with the findings of empirical scientific studies is discussed. These connections link the practices of Holistic Interior Design with the scientific findings of evidence-based design, thus linking the intuitive with empirical. Data presented in chapter four also included suggestions for improving Spaces A, B, C, and D, based on Holistic Interior Design principles. These suggestions are discussed and interpreted graphically through digital renderings.

Answer to Research Question 1: Connections to Scientific Evidence

One aspect of this study was the desire to connect the intuitive nature of Holistic Interior Design and the empirical evidence presented by scientific studies of the built environment. This exploration drew a comparison of the responses of Holistic Interior Designers on color, light, the integration of nature, and noise, as detailed in chapter four, with the existing research on these subjects, as presented in chapter two. This pursuit revealed that connections could be made between Holistic Interior Designers’ intuitive responses to space and the empirical findings of existing research on color, light, integration of nature, and noise. This information was valuable, in that the practices of Holistic Interior Design were bolstered by scientific evidence. This showed a connection, in this situation, where a priori knowledge was able to be connected to a posteriori knowledge.
The color, lighting, integration of nature, and noise reductive properties of the four typical waiting spaces, presented in Figure 5.1, were analyzed by respondents in reference to their ability to illicit positive emotions, reduce stress, increase social interaction, and increase states of arousal of occupants. Elements present in each image, as seen in Table 5.1, were matched with information from preexisting empirical research, presented in Table 5.2, which allowed for individual hypotheses to be made for each space.

Figure 5.1. Typical Waiting Spaces A, B, C, & D
Space A Source: http://farm9.staticflickr.com/8243/8525656492_7cb163349e_b.jpg
Space B Source: http://farm4.staticflickr.com/3234/3063800085_607848cdc1_z.jpg?zz=1
Space C Source: http://farm5.staticflickr.com/4023/4659848239_768851becb_b.jpg
Space D Source: http://farm4.staticflickr.com/3290/2785107023_74b3ed9fcf_z.jpg?zz=1
Table 5.1. PI's Analysis of Visible Elements in Spaces A, B, C, & D.

<table>
<thead>
<tr>
<th>VISIBLE ELEMENT</th>
<th>SPACE A</th>
<th>SPACE B</th>
<th>SPACE C</th>
<th>SPACE D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Cool</td>
<td>Cool</td>
<td>Cool</td>
<td>Warm &amp; Cool</td>
</tr>
<tr>
<td>Saturation</td>
<td>Desaturated</td>
<td>Desaturated</td>
<td>Saturated</td>
<td>Saturated</td>
</tr>
<tr>
<td>Brightness</td>
<td>Dim</td>
<td>Bright</td>
<td>Bright</td>
<td>Bright</td>
</tr>
<tr>
<td><strong>Light</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Low</td>
<td>Bright</td>
<td>Bright</td>
<td>Moderate</td>
</tr>
<tr>
<td>Artificial</td>
<td>No</td>
<td>No</td>
<td>Fluorescent</td>
<td>Fluorescent &amp; Incandescent</td>
</tr>
<tr>
<td>Natural</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Nature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># Indoor Plants</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Views of Nature</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Noise Reducing Element</td>
<td>None</td>
<td>Carpet, Acoustical Tile Ceiling, Textile</td>
<td>Acoustical Tile Ceiling</td>
<td>Carpet, Acoustical Tile Ceiling, Textile</td>
</tr>
</tbody>
</table>

Table 5.2. Evidence from Scientific Research on Color, Light, Nature, & Noise

<table>
<thead>
<tr>
<th>STUDY SUBJECT</th>
<th>Positive Emotions</th>
<th>Reduces Stress</th>
<th>Encourages Social</th>
<th>Increases Arousal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Color</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>Cool</td>
<td>Cool</td>
<td>Warm</td>
<td>Warm</td>
</tr>
<tr>
<td>Saturation</td>
<td>Saturated</td>
<td>Desaturated</td>
<td>Saturated</td>
<td>Saturated</td>
</tr>
<tr>
<td>Brightness</td>
<td>Brighter</td>
<td>Brighter</td>
<td>Brighter</td>
<td>Brighter</td>
</tr>
<tr>
<td><strong>Light</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level</td>
<td>Brighter</td>
<td>Brighter</td>
<td>Brighter</td>
<td>Brighter</td>
</tr>
<tr>
<td>Artificial</td>
<td>Full Spectrum</td>
<td>Full Spectrum</td>
<td>Full Spectrum</td>
<td>Full Spectrum</td>
</tr>
<tr>
<td>Natural</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Nature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Views</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Indoor Plants</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Noise</strong></td>
<td>Reduced</td>
<td>Reduced</td>
<td>Reduced</td>
<td>Increased</td>
</tr>
</tbody>
</table>
These hypotheses were as follows:

- The cooler, brighter, and more saturated colors of Space C would be perceived as more capable of eliciting positive emotions, encouraging social interaction, and increasing states of arousal.
- The cooler, brighter, and desaturated colors of Space B would be reported as more capable of reducing stress.
- The lighting of Space C, which had brighter light levels, and had artificial and natural light, would be reported as more probable of eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal.
- The integration of nature depicted in Spaces A and B, which had two visible indoor plants, and Space C, which had views of nature, would be reported to have a higher capability of eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal.
- Spaces B and D, which had more noise reducing elements, would be reported as more capable of eliciting positive emotions, reducing stress, encouraging social interaction, and less capable of increasing states of arousal.

The data in relation to these hypotheses and the scientific evidence that supported them is presented in the following.

**Answer to Research Question 1.A-Color**

As depicted in *Figure 5.2*, in terms of color, Space C was reported as very capable of eliciting positive user emotions, followed by Spaces B and D’s moderate
ability, and Space A’s less than moderate ability. The colors used in Spaces B, C, and D were more saturated and brighter than the overall colors of Space A. Scientific evidence has indicated that brighter, more saturated colors are more capable of eliciting positive emotions, alleviating depression and improving mood (Baum & Davis, 1976; Codinhoto, et al., 2009; Guilford & Smith, 1959; Kunishma & Yanase, 1985). Also in support of the perceptions of the colors of Space C to elicit positive emotion, scientific evidence has shown that cool hued colors are perceived as more pleasant and thus more capable of eliciting positive emotions (Adams & Osgood, 1973; Guilford, 1934; Guilford & Smith, 1959; Jacobs & Suess, 1975; Valdez & Mehrabian, 1994).

The predominately cool colors of Spaces B and C, were shown to have a moderate ability to decrease occupant stress than Space A, which exhibited some
warm and contrasting colors, and Space D, which was described as over saturated, and also had contrasting colors. Research has suggested that cool colors are more stress reducing than their warmer counterparts (The Advisory Board, 2007; Jacobs & Suess, 1975; Kopec, 2006; Valdez & Mehrabian, 1994), and particularly relevant for Spaces A and D, the colors red and orange were shown increase stress, causing discomfort and anxiety (Dijkstra, et al., 2006; Jacobs & Suess, 1975; Kopec, 2006; Wexner, 1954). It has also been shown that desaturated colors were less stress provoking (Ireland, et al., 1992; Profusek & Rainey, 1987).

In the cases of the encouragement of social interaction and elevation of states of arousal, the more bright colors of Spaces C and D were reported as moderately capable, whereas the less bright colors Spaces A and B were shown to have little ability. This was supported by evidence that showed brighter colors encouraged socialization (Gifford, 1988; Read, Sugawara, & Brandt, 1999) and increased arousal (Dijkstra, et al., 2006; Valdez & Mehrabian, 1994; Wright & Rainwater, 1962). As hypothesized, the warmer, brighter, and more saturated colors of Space D were perceived as capable of eliciting positive emotions, encouraging social interaction, and increasing states of arousal and the cooler, brighter, and the desaturated colors of Space B were be reported as capable of reducing stress; however, the colors of Space C were rated higher than, respectively, Spaces D and B on these aspects.

**Answer to Research Question 1.B-Light**

As seen in Figure 5.3, the lighting of Space C, which had brighter light levels, and had artificial and natural light, was reported as more able to elicit positive
emotions, reduce stress, encourage social interaction, and increase states of arousal, which supported the hypothesis. The lighting of Spaces B and D was reported as only moderately capable, and Space A showed little capability. Space C was the only image that had a visible natural light source. Space C also had artificial light sources, and high light levels. This was supported by studies which have shown that exposure to natural light increased occupant satisfaction and mood (Burnett, 2011; Rapoport, 1967), reduced stress (Walch, et al., 2005), and increased arousal (BaHammam, 2006; Malkin, 2007; Veitch & McColl, 1993). Brighter lit spaces, or those with higher light levels, such as those that were evident in Space C, have also been shown to elevate mood, (Chaudhury, et al., 2009; Gordon, 2003; Heerwagen, 1990), reduce stress (Kakooei, Rahimi, & Hosseini, 2009; Shin & Kim 2012), encourage social interaction.
(Sloane, et al., 1998), and reduce fatigue, increase degrees of alertness (Cajochen, Zeitzer, Czeisler, & Dijk, 2000; Chaudhury, et al., 2009; Heerwagen, 1990; Shin & Kim, 2012).

**Answer to Research Question 1.C-Integration of Nature**

Two main factors involving the integration of nature are the presence of indoor plants and views of nature (Dossey, et al., 1989). Within the images typical waiting spaces of this study, indoor plants were found in Spaces A and B, views of nature in Space C, and neither in Space D. It was hypothesized that the integration of nature depicted in Spaces A and B, which had two visible indoor plants, and Space C, which had views of nature, would be reported to have a higher capability of eliciting positive emotions, reducing stress, encouraging social interaction, and increasing states of arousal. As depicted in Figure 5.4, the integration of nature in Spaces A, B, and C was reported as moderately or more capable of inducing positive emotions, reducing stress, and encouraging social interaction, thus supporting the hypothesis. This was further supported by evidence that suggested indoor plants and views of nature effect these aspects (Berman, Jonides, & Kaplan, 2008; Chang & Chen, 2005; Dijkstra, et al., 2008; Dravigne, et al., 2008; Goodrich, 1986; Lohr & Pearson-Mims, 1996; Malenbaum, et al., 2008; Park & Mattson, 2008; Park & Mattson, 2009ab; Shibata & Suzuki, 2004; Ulrich, 1984; Ulrich, 2008; Ulrich & Wilson, 2006; Wells, 2000). Notably, only the integration of nature in Space C was reported as moderately able to increase arousal.
states, which suggested participants perceived views of nature as more arousing than indoor plants. Across all listed aspects of well-being, spaces with indoor plants or views of nature, Spaces A, B, and C, ranked higher than the one without, Space D.

Answer to Research Question 1.D-Reduction of Noise

Though sound is not emitted photographically, it was possible to identify noise reducing elements in each image. Spaces B and D had carpeting, while spaces A and C had hard floors. Spaces B, C, and D had acoustical tile ceilings. Thus, it was hypothesized that noise reducing qualities of Spaces B and D would be ranked as more capable of eliciting positive emotions, reducing stress, and encouraging social interaction, and less capable of increasing arousal. In agreement with the hypothesis,
the results showed that the noise reducing aspects of Space B were perceived as more than moderately capable of eliciting positive user emotions, reducing occupant stress, and encouraging social interaction amongst occupants, and slightly capable of increasing arousal, as seen in Figure 5.5. This trend was also seen in the results for Space D. Even though it was reported to be less than moderately capable to effect the factors listed above, it still ranked higher than A and C on emotions, stress, and social interaction, and lower on arousal.

Despite the noise reducing elements that were visible in Space D, such as the sound absorbing carpet, upholstery, and acoustical tile ceiling, respondents’ observations reported the presence of the fans in the image suggested machine-made

![Graph showing statistical results on the reduction of noise across all spaces.](image)

Figure 5.5. Statistical Results on the Reduction of Noise Across All Spaces.
noise. These results were supported by previous scientific research, which has revealed that the reduction of noise elicited positive emotions (Weinstein, 1980), reduced stress (Kozarek, et al, 1997), and encouraged social interaction (Field, 1993), while increased noise elevated arousal states (Coombes & Coombes, 2005; Rosen & Olin, 1965).

**Conclusive Answer to Research Question 1**

The first research question of this study addressed practicing Holistic Interior Designers’ Holistic Interior Design methods and the empirical findings of evidence-based design in relation to color, lighting, integration of nature, and noise in interior environments. It was hypothesized that the gathered data would reveal connections between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. The statistical and qualitative data gathered by the questionnaire, presented above, suggested, in agreement with the hypothesis, that links could be drawn between Holistic Interior Designers’ intuitive responses to space and existing research on color, light, integration of nature, and noise.

**Answer to Research Question 2: Application of Responses**

The spaces were digitally enhanced to provide graphic renderings of the interpreted suggestions to improve each space with Holistic Interior Design methods. To begin this process, the author set limitations for the graphic interpretation of each space. First, no changes were to be made to a space unless specifically suggested in
response to the questionnaire by a participating Holistic Interior Designer. Second, original elements of the space would be retained as much as possible to maintain the integrity and recognizability of the space. Because the images of each space were singular, it was assumed that the addition of windows or doors was not possible, thus suggestions to include views of nature were interpreted in other ways. These limitations, in conjunction with the respondent recommendations, resulted in the graphically interpreted results presented below.

**Space A Suggestions**

For improvements for the colors of Space A, seen in *Figure 5.6*, it was recommended to:

- Choose a warmer, deeper wall color that adds either vibrancy or calmness, and is inviting or engaging.
- Add colorful, inspirational artwork.
- Add color through entourage, including pillows to make the sofa more inviting, and extend red throughout the space.

In reference to the lighting of Space A, responses suggested to:

- Increase the light levels.
- Add task lighting.
- Add ambient lighting.

Responses to the integration of nature in space A proposed to:

- Alter or reposition the existing indoor plants.
- Provide views of nature.
For the reduction of noise, the following was recommended:

- Add an abstract, natural fiber area rug.

Other submissions for improvements included advisement to:

- Add seating with natural materials to allow for socialization.
- Select a low VOC higher quality coffee table.
- Remove the grandfather clock as a reminder of time.
- Address aromatherapy through the addition incense.

Reports in response to the exhibition of Holistic Interior Design were used to determine factors about the existing space that should remain. These elements included:

- the natural wood flooring,
- the presence of indoor plants,
- and the table top zen garden.

The graphic interpretation of these suggestions, seen in Figure 5.7, is discussed in the following.

**Interpreted Result**

The recommendations provided by Holistic Interior Designers were graphically interpreted in Figure 5.7. In accordance with recommendations, a wall color was chosen that was warmer and deeper, added vibrancy, calmness, and was inviting or engaging. The color selection began by exploring the color wheel for hues that were warm and deeper. The desire for the wall color to exude a calming sense also led to
Figure 5.6. Unaltered Image of Space A.
Source: http://farm9.staticflickr.com/8243/8525656492_7cb163349e_b.jpg

Figure 5.7. Rendered Image of Space A to Include Holistic Interior Design Changes.
the decision to use and analogous color scheme, that is, selecting colors adjacent on
the color wheel. The suggestion that it be inviting and engaging called for the final
choice of the amber hue, supported by color theory (Mahnke, 1996).

The criteria for the selection artwork above the sofa included that it be colorful
and inspirational. It was also noted that views of nature and the extension of red
elements would improve the space. In interpretation of this, the painting above was
selected because of its colorful depiction of nature and inclusion of red hues. The
suggestion to carry the red of the vase and baseboards throughout the room was also
accomplished in the area rug, throw pillows, painted beam, and pottery. The inclusion
of the pillows was a solution to the following recommendations: “Add pillows for color
or a colorful throw for textural comfort on the sofa,” and, “Change the sofa so that it
feels warmer and more inviting.”

The suggestion that ambient and task lighting be added to the space resulted in
the floor lamps and table lamp, respectively to the right and left of the existing sofa. In
an effort to maintain the integrity and recognizability of the space, the indoor plants
were not removed or repositioned; however, more interesting pots were added, as
suggested. Maintaining the previously stated foundations for the alterations, a window
could not be added to provide views of nature; however, the inclusion of the art piece
above the sofa provided a view of nature.

As suggested, a natural fiber, abstract patterned area rug was added. The rug
served the purposes of reducing noise, adding traction and color, and integrating the
existing red elements. The chairs above were selected to provide additional seating
and because they were made from natural materials. The coffee table was replaced
with a low VOC glass topped table, and accessorized with a table top zen garden and incense burner. The grandfather was removed, and replaced by two floor lamps made of organic materials.

**Space B Suggestions**

In reference to color, recommendations for holistic improvements to Space B, seen in *Figure 5.8*, included:

- Add a warmer color (soft yellow or energetic green) to the walls.

Suggestions for improving the lighting included:

- Add softer lighting
- Add natural light

Other comments suggested:

- Change the furniture arrangement.
- Add curved elements to the space.

Reports in response to the exhibition of Holistic Interior Design elements in Space B were used to determine what pre-existing elements should remain unaltered. These elements were:

- the “calming” blue flooring and upholstery,
- the artwork that “contributes another evocation of nature and appears to have a cheerful pop of color,” and, “visual stimulation,” and
- the plants, which lend “balance,” “nature,” and offer “IAQ [indoor air quality] benefits.”
The graphic interpretation of the suggestions is seen in Figure 5.9. These interpretations are discussed in the following.

*Figure 5.8. Unaltered Image of Space.*
Source: http://farm4.staticflickr.com/3234/3063800085_607848cdc1_z.jpg?zz=1

*Figure 5.9. Rendered Image of Space B to Include Holistic Interior Design Changes.*
Source: http://farm4.staticflickr.com/3234/3063800085_607848cdc1_z.jpg?zz=1. Adaptations made by PI.
**Interpreted Result**

In accordance with the changes presented above, the wall color was changed to a soft yellow. Softer lighting was added by adding an organic luminaire above the seating area and two table top luminaires. It was also recommended that natural light be added to the space; however, the image of Space B did not provide sight-lines of a natural light source. One solution to achieve the benefits of natural lighting was the specification full spectrum LEDs as added and repurposing of preexisting light sources (Burnett, 2011). In response to the suggestion to change the seating arrangement, two additional chairs that were able to be repositioned and a coffee table were added to create a more open seating area conducive to conversation. As proposed, curved elements were introduced into the space through the coffee table, the arms of the free standing chairs, and the luminaires.

**Space C Suggestions**

Several suggestions were made by respondents in reference to possible ways to alter Space C, seen in *Figure 5.10*, in accordance with Holistic Interior Design principles. Comments on improving the colors and reducing the noise of the space suggested:

- Change the flooring color and material.

Responses in reference to the lighting of the space recommended:

- Add screen-like window treatments.
- Add lighting or increase lighting levels.
To holistically improve the integration of nature in Space, respondents proposed:

- Adding indoor plants to incorporate nature within.
- Placing plants outside of the glass and create a seating area.

Other remarks included suggestions to:

- Add larger artwork.
- Add functional and aesthetically pleasing side tables.

Respondents also reported ways in which Space C exhibited of Holistic Interior Design elements. These comments were used to determine which aspects of Space C should be preserved. These elements were:

- the “pleasing,” “soothing” colors applied to the seating and exposed beams,
- the amount of natural light,
- the connection to the outdoors and nature,
- the “noise dampening” acoustical ceiling, and
- the seating arrangement, which “encourages social interaction” and allows “for moving and congregating.”

The graphic interpretation of the suggestions is seen in Figure 5.11. These interpretations are discussed in the following.

**Interpreted Result**

In response to the suggestions to change the flooring color and material, a commercial-grade broadloom was selected for the left side of the room to absorb noise and provide visual stimulation. By suggestion, the red flooring was replaced. The recommended roll down screens were placed over the expanse of
Figure 5.10. Unaltered Image of Space C.
Source: http://farm5.staticflickr.com/4023/4659848239_768851becb_b.jpg

Figure 5.11. Rendered Image of Space C to Include Holistic Interior Design Changes.
Source: http://farm5.staticflickr.com/4023/4659848239_768851becb_b.jpg. Adaptations made by PI.
windows, enabling occupant control over glare while still maintaining views of nature. As a solution to the recommendation to add lighting, hanging luminaires were installed to provide visual interest and well as additional lighting sources. As recommended, indoor plants were added, and potted plants and a seating area were added to the exterior.

**Space D Suggestions**

For improvements for the colors of Space D, seen in *Figure 5.12*, it was recommended to:

- Chose less saturated and fewer colors.
- Exchange the doors for a set with larger glass and a welcoming color.
- Add artwork.

In reference to the lighting, nature, and noise reducing elements of Space D, responses suggested to:

- Add soft lighting.
- Add indoor plants.
- Remove the fans as noise polluters.

Reports in response to the exhibition of Holistic Interior Design were used to determine factors about the existing space that should remain. These elements included:

- the contrast in the colors,
- the seating arrangement, and
- the use of carpet as a flooring material.
The graphic interpretation of the suggestions is seen in Figure 5.13. These interpretations are discussed in the following.

**Interpreted Result**

In accordance with the recommendation to chose less saturated and fewer colors, new upholstery was applied to the existing chairs in less saturated hues. The carpeting was also replaced with a neutral colored broadloom. The entry doors were replaced with a warmer colored set of double doors with larger translucent glass panels as a solution to the recommendation to exchange the doors for a set with larger glass and a welcoming color. As suggested, the window blinds were removed, allowing in softer light from the adjacent space. Additional soft light was provided by the installment of a floor lamp. The fans were replaced with indoor plants, a change that satisfied the noise concerns and problems with the lack of nature within Space D. Nature and the need for artwork were important suggestions, the solution to which resulted in the large scale art piece that was installed depicting a view of nature.

**Conclusive Answer to Research Question 2**

It was hypothesized that recommendations for improvements to each space would include the elements of color, lighting, integration of nature, and noise reduction. In agreement with this hypothesis, these aspects were addressed. Comments suggested the use of warm and inviting colors that were saturated without being overestimating. Proposals for lighting showed a preference for
Figure 5.12. Unaltered Image of Space D.
Source: http://farm4.staticflickr.com/3290/2785107023_74b3ed9fcf_z.jpg?zz=1

Figure 5.13. Rendered Image of Space D to Include Holistic Interior Design Changes.
Source: http://farm4.staticflickr.com/3290/2785107023_74b3ed9fcf_z.jpg?zz=1. Adaptations made by PI.
natural light and soft ambient light. It was also suggested that spaces have indoor plants and views of nature. Recommendations to resolve noise issues included the use of sound absorbing textiles and carpeting. Unexpected solutions included issues of addressing of aroma, furniture reconfiguration and quality, shape, additions of glass.

**Suggestions for Further Research**

This research is intended to be the beginning of a larger scale study of the application of holistic principles to the practices of interior design. There are many possibilities for research, a few of which are discussed in the following:

- New information could be gathered by presenting Holistic Interior Designers with the rendered images above and allowing for response.
- The images of this study depict typical waiting spaces. Further research could be conducted to investigate Holistic Interior Designers’ responses other spaces, both commercial and residential.
- Research that examines the responses of Holistic Interior Designers in comparison with the comments of evidence-based researchers and interior designers could also be conducted.
- One respondent remarked, “Issues of texture in furnishings and the role that shape plays in a balanced interior space was not under discussion in this exercise.” This is a potential area for further research.

The desired goal for future research is to gain more information about interior design practices that appeal to body, mind, and spirit to enhance well-being. In
this, the desire is to shed light on intuitive processes through empirical operations. Future research has capabilities to make connections, resulting in quantifiable data, to support the instinctive enhancement in well-being of the built environment.

**Conclusion**

The research questions of this study addressed practicing Holistic Interior Designers’ Holistic Interior Design methods and the empirical findings of evidence-based design in relation to color, lighting, integration of nature, and noise in interior environments. For the purposes of this study, Holistic Interior Design was defined as interior design practices rooted in physiology, sociology, and psychology, that appeal to occupants’ body, mind, and spirit to enhance well-being. Many of the recommendations to improve each of the typical waiting spaces were in agreement with this definition. Though some of the responses dealt solely with aesthetics, overall, the remarks suggested designs that put the well-being of the occupant first. Such concerns included level of invitation or warmth, balance, and conduciveness to social interaction. One response stated, “Holistic Design is not only an aesthetic quality that you can visually see. It is also a perceptual process, you must truly feel your surroundings with all of your senses, even your sixth sense. You must use and trust you instincts on all levels.” The comments of responding designers suggested that Holistic Interior Design is an intuitive and perceptual process to enhance the well-being of occupants. Despite the subjective nature of this process, suggestions to improve each space were rarely in contradiction, and were supported by empirical evidence from scientific studies. The gathered data
revealed connections between Holistic Interior Design practices and evidence-based design research on well-being, color, light, integration of nature, and noise. This suggested a link between the intuitive practices of Holistic Interior Design and empirical data in these areas.
APPENDIX A

RESEARCH INSTRUMENT

You are invited to be in a research study of holistic interior design. This study is being conducted by Judson Willoughby Faircloth, Graduate Student, Department of Interior Design, Florida State University.

You were selected as a possible participant because you are a Holistic Interior Design Professional. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information:

The goal of this study is to determine if a relationship exists between the empirical studies of evidence-based design on color, light, integration of nature, and noise and the practices of Holistic Interior Designers. This study also seeks to formulate a working definition of Holistic Interior Design that is agreed upon by a selection of practicing Holistic interior Designers. The survey is comprised of 27 questions and will take no more than 20 minutes to complete.

Procedures:
If you agree to be in this study, we would ask you to do the following things:
complete an online survey that will ask questions in relation to color, light, integration of nature, and noise of waiting spaces. Images of the waiting spaces will be used to answer the questions.

Risks and benefits of being in the Study:
There are minimal risk associated with this study.
The benefits to participation are to help in increasing general awareness holistic interior design, potentially increasing client and practitioner knowledge of holistic interior design, its practices, and its benefits.

Compensation:
There is no compensation associated with this study.

Confidentiality:
The records of this study will be kept private and confidential to the extent permitted by law. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study:
Participation in this study is voluntary. If you decide to participate, you are free to not answer any question or withdraw at any time.

Contacts and Questions:
The researcher conducting this study Judson Willoughby. If you have a question, you are encouraged to contact Judson Willoughby via email at XXXXX@gmail.com or the major professor, Marlo Ransdell, Ph.D. at XXX.XXX.XXX, or XXXXX@fsu.edu. If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at XXXX Levy Street, Research Building X, Suite XXX, Tallahassee, FL XXXXX-2742, or XXX-XXX-XXXX, or by email at XXXX@magnet.fsu.edu. You will be given a copy of this information to keep for your records.

Statement of Consent:
☒ I have read the above information. I have asked questions and have received answers. I consent to participate in the study. (1)

Q1 Where is your practice located?
☒ In the United States (1)
☒ In Europe (2)
☒ Other (3) __________________

Q2 Please indicate, if any, the following degrees or certificates that you hold:
☒ Interior Design (1)
☒ Architecture (2)
☒ Holistic Design Institute (3)

Please evaluate the space in the image below and rank your level of agreement with the following statements in relation to color, lighting, integration of nature, and the reduction of noise pollution.

Color: In this context, “color” refers to your overall perception of color in this space including degrees of saturation and color temperature. Lighting: In this context, “lighting” refers to your overall perception of lighting in this space including artificial and natural light sources. Integration of Nature: In this context, “nature” refers to your overall perception of nature in this space including views of nature and indoor plants. Reduction of noise pollution: In this context, because we cannot see noise in an image, “noise pollution” refers to your overall perception of the acoustical qualities of the space.
Q3 The ______________ in the above space has the potential to elicit positive emotions from its occupants.

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Moderately</th>
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<tr>
<td>Lighting</td>
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<tr>
<td>Integration of Nature</td>
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<tr>
<td>Reduction of Noise Pollution</td>
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</table>
Q4 The _________________ in the above space has the potential to reduce the stress of its occupants.

Q5 The _________________ in the above space has the potential to encourage social interaction amongst its occupants.

Q6 The _________________ in the above space has the potential to increase the states of arousal in its occupants.
Q7 Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.
Q8 Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Please evaluate the space in the image below and rank your level of agreement with the following statements in relation to color, lighting, integration of nature, and the reduction of noise pollution.

Color: In this context, “color” refers to your overall perception of color in this space including degrees of saturation and color temperature. Lighting: In this context, “lighting” refers to your overall perception of lighting in this space including artificial and natural light sources. Integration of Nature: In this context, “nature” refers to your overall perception of nature in this space including views of nature and indoor plants. Reduction of noise pollution: In this context, because we cannot see noise in an image, “noise pollution” refers to your overall perception of the acoustical qualities of the space.
Q9 The _______________ in the above space has the potential to elicit positive emotions from occupants.

<table>
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<td>Color</td>
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<td>Lighting</td>
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Q10 The _______________ in the above space has the potential to reduce the stress of its occupants.

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<td>Integration of Nature</td>
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Q11 The _______________ in the above space has the potential to encourage social interaction amongst its occupants.

Q12 The _______________ in the above space has the potential to increase the states of arousal in its occupants.
Q13 Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

Q14 Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Please evaluate the space in the image below and rank your level of agreement with the following statements in relation to color, lighting, integration of nature, and the reduction of noise pollution.

Color: In this context, “color” refers to your overall perception of color in this space including degrees of saturation and color temperature.

Lighting: In this context, “lighting” refers to your overall perception of lighting in this space including artificial and natural light sources.

Integration of Nature: In this context, “nature” refers to your overall perception of nature in this space including views of nature and indoor plants.

Reduction of noise pollution: In this context, because we cannot see noise in an image, “noise pollution” refers to your overall perception of the acoustical qualities of the space.
Q15 The ______________ in the above space has the potential to elicit positive emotions from its occupants.
Q16 The _______________ in the above space has the potential to reduce the stress of its occupants.

<table>
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Q17 The _______________ in the above space has the potential to encourage social interaction amongst its occupants.

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Q18 The _______________ in the above space has the potential to increase the states of arousal in its occupants.

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<td>Integration of Nature</td>
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<td>Reduction of Noise Pollution</td>
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</table>

Q19 Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.
Q20 Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Please evaluate the space in the image below and rank your level of agreement with the following statements in relation to color, lighting, integration of nature, and the reduction of noise pollution.

Color: In this context, “color” refers to your overall perception of color in this space including degrees of saturation and color temperature.

Lighting: In this context, “lighting” refers to your overall perception of lighting in this space including artificial and natural light sources.

Integration of Nature: In this context, “nature” refers to your overall perception of nature in this space including views of nature and indoor plants.

Reduction of noise pollution: In this context, because we cannot see noise in an image, “noise pollution” refers to your overall perception of the acoustical qualities of the space.
Q21 The ________________ in the above space has the potential to elicit positive emotions from its occupants.

Q22 The ________________ in the above space has the potential to reduce the stress of its occupants.
Q23 The _______________ in the above space has the potential to encourage social interaction amongst its occupants.

Q24 The _______________ in the above space has the potential to increase the states of arousal in its occupants.
Q25 Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

Q26 Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Q27 If you have additional comments in relation to Holistic Interior Design and/or this study, please respond here.
APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL

Office of the Vice President for Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

APPROVAL MEMORANDUM

Date: 08/19/2013
To: Judson Faircloth
Address: Dept.: INTERIOR DESIGN
From: Thomas L. Jacobson, Chair
Re: Use of Human Subjects in Research
Integrating the Built Environment and the Individual: A Holistic Approach to the Design of Interior Space

The application that you submitted to this office in regard to the use of human subjects in the proposal referenced above have been reviewed by the Secretary, the Chair, and two members of the Human Subjects Committee. Your project is determined to be Expedited per 45 CFR § 46.110(7) and has been approved by an expedited review process.

The Human Subjects Committee has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval does not replace any departmental or other approvals, which may be required.

If you submitted a proposed consent form with your application, the approved stamped consent form is attached to this approval notice. Only the stamped version of the consent form may be used in recruiting research subjects.

If the project has not been completed by 08/13/2014 you must request a renewal of approval for continuation of the project. As a courtesy, a renewal notice will be sent to you prior to your expiration date; however, it is your responsibility as the Principal Investigator to timely request renewal of your approval from the Committee.

You are advised that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report, in writing any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the chairman of your department and/or your major professor is reminded that he/she is responsible for being informed concerning research projects involving human subjects in the department, and should review protocols as often as needed to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

This institution has an Assurance on file with the Office for Human Research Protection. The Assurance Number is IRB00000446.

Cc: Marlo Ransdell
HSC No. 2013.10424
You are invited to be in a research study of holistic interior design. This study is being conducted by Judson Willoughby Faircloth, Graduate Student, Department of Interior Design, Florida State University.
You were selected as a possible participant because you are a Holistic Interior Design Professional. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

Background Information:
The goal of this study is to determine if a relationship exists between the empirical studies of evidence-based design on color, light, integration of nature, and noise and the practices of Holistic Interior Designers. This study also seeks to formulate a working definition of Holistic Interior Design that is agreed upon by a selection of practicing Holistic Interior Designers.
The survey is comprised of 27 questions and will take approximately 20 minutes to complete.

Procedures:
If you agree to be in this study, we would ask you to do the following things: complete an online survey that will ask questions in relation to color, light, integration of nature, and noise of waiting spaces. Images of the waiting spaces will be used to answer the questions.

Risks and benefits of being in the Study:
There are minimal risk associated with this study.
The benefits to participation are to help in increasing general awareness holistic interior design, potentially increasing client and practitioner knowledge of holistic interior design, its practices, and its benefits.

Compensation:
There is no compensation associated with this study.
Confidentiality:
The records of this study will be kept private and confidential to the extent permitted by law. In any sort of report we might publish, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

Voluntary Nature of the Study:
Participation in this study is voluntary. If you decide to participate, you are free to not answer any question or withdraw at any time.

Contacts and Questions:
The researcher conducting this study Judson Willoughby. If you have a question, you are encouraged to contact Judson Willoughby via email at XXXXX@gmail.com or Marlo Ransdell at XXX.XXX.XXXX, or XXXXX@fsu.edu.
If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher(s), you are encouraged to contact the FSU IRB at XXXX Levy Street, Research Building X, Suite XXX, Tallahassee, FL XXXXX-2742, or XXX-XXX-XXXX, or by email at XXXXX@magnet.fsu.edu.
You will be given a copy of this information to keep for your records.

Statement of Consent:
I have read the above information. I have asked questions and have received answers. I consent to participate in the study.
## APPENDIX D
### SUMMARY OF QUESTIONNAIRE RESULTS

### Statement of Consent:

<table>
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<th>Answer</th>
<th>Response</th>
<th>%</th>
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<tbody>
<tr>
<td>1</td>
<td>I have read the above information. I have asked questions and have received answers. I consent to participate in the study.</td>
<td>22</td>
<td>100%</td>
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</table>

Total | 22 | 100% |

### 2. Where is your practice located?

<table>
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<th>Answer</th>
<th>Response</th>
<th>%</th>
</tr>
</thead>
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</tr>
<tr>
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</tr>
<tr>
<td>3</td>
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Other
Canada
Canada

### Statistics:

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<tr>
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3. Please indicate, if any, the following degrees or certificates that you hold:

<table>
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4. The ____________ in the above space has the potential to elicit positive emotions from its occupants.

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<th>Answer</th>
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<th>Max Value</th>
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5. The ____________ in the above space has the potential to reduce the stress of its occupants.

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<th>Max Value</th>
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6. The _________________ in the above space has the potential to encourage social interaction amongst its occupants.

<table>
<thead>
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<th>Answer</th>
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<td>1.10</td>
<td>10</td>
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7. The _________________ in the above space has the potential to increase the states of arousal in its occupants.

<table>
<thead>
<tr>
<th>#</th>
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<td>10</td>
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</table>

8. Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

**Text Response**

- Add a natural fibre carpet, area rug for warmth and social engagement. In this regard must consider various age groups and mobility issues as a cold harsh surface can be an issue.

- as with traditional design a seating area with more chairs instead of just one sofa

- improve presentation of plants - two in different sizes is unbalancing

- improve quality of furniture pieces. Example, a glass coffee table (low VOC) would be more in keeping with contemporary style chosen than an out of scale piece above which may not be made of real wood.

- photo view of window/natural light source and an opportunity to examine window treatment options would be helpful
Add a warmer color to the walls. Integrate an area rug to help with noise pollution and add a level of warmth to the space. Add pillows for color or a colorful throw for textural comfort on the sofa. Remove the grandfather clock - it just doesn't go with the decor, nor does it add anything to the space from a sensory perspective. Add task and ambient lighting to the right and left of the sofa. Personalize the space with a colorful piece of art over the sofa.

Noise is a problem for this space. the inclusion of sound absorbing textiles and materials would be beneficial.

I would add texture to this space using organic material (rug, cushion). The color on the wall is not very inviting or engaging, that i would also change. I would also add art to at least one wall. and would add simple functional furniture (side table, lamp etc.). i would eliminate the metal side table and add a shorter more functional table in some from to encourage relaxation. would also pay attention to light fixtures.

I would incorporate more ambient lighting. I would also add some depth of color, and perhaps a focal wall with an inspirational piece of art would add more interest to the space. The flooring and lack of furniture creates a cold feeling. It would also be to noisy due to the wood flooring used.. An abstract patterned area rug could help this problem. I honestly due not like the use of the grandfather clock, it does not seem to fit with the contemporary feel of the space. The clock is also a reminder of time, this is something most people do not want to be reminded of, it is usually a daunting interference of having a peace of mind. Sticking with same design elements would help the flow of the room. The red vase is eye catching, however, the color red needs to be used in other areas of the space. The plants should have more interesting pots. The sofa seems cold and uncomfortable. There is not enough seating, most people do not want to sit next to each other. I would be bored in this space and not feel at ease.

This is a very limited view of the overall room. From what I see, I would change the seating, add an area rug, remove one of the plants or place in another area of the room. Add more lighting (soft) and choose a different coffee table.

<table>
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<tbody>
<tr>
<td>Total Responses</td>
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</tbody>
</table>

9. Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Text Response

- use of house plants to purify the air, help to reduce noise

- if flooring is natural wood, that would be in keeping with holistic design principles

- from the placement of furniture and accessories, it seemed visitors to the space are to engage with part of a room only - are we evaluating a vignette or a room space?

The space integrates nature with the plants and zen garden, it is clutter free, incorporates a bit color. Otherwise it needs a bit of help.

simple, de-cluttered, bright, contains organic material, easy energy flow, easy traffic flow, under furniture clear and clean,colors green and red used potentially to suit the occupants mood. the use of plants- though not fully integrated, is a positive step

The use of all of the elements are present and plants are included, which cleans the air, only if they are real.
I like the standing clock, the addition of bringing nature into the room and the tabletop zen garden.

<table>
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<th>Value</th>
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10. The ________________ in the above space has the potential to elicit positive emotions from its occupants.

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11. The ________________ in the above space has the potential to reduce the stress of its occupants.

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12. The ________________ in the above space has the potential to encourage social interaction amongst its occupants.

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13. The _______________ in the above space has the potential to increase the states of arousal in its occupants.

<table>
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</table>

14. Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

Text Response
- first would need to know the setting. Example, if this is a hospital waiting room the color blue is calming and appropriate
- group first 4 chairs differently - realign them with the others behind on back left and take them away from walking pathway
Add a warmer color to the walls.
would introduce curves either in furniture arrangement or art work, would change wall color to possibly an energetic green and change / add lighting
allow for interaction between people by re-arranging the furniture
introduce natural light

I would add a soft yellow color to the walls. This would create more warmth and a sense of ease to the people sitting in the space.
I would open up the seating arrangements, add softer lighting.

<table>
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<tbody>
<tr>
<td>Total Responses</td>
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</table>

15. Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Text Response
- if this is a hospital wait room, color choice of blue is safe and calming
- insertion of plants apart from IAQ benefits, is also calming and welcoming
- art piece on wall contributes another evocation of nature and appears to have a cheerful pop of color, not overwhelming
Nature is present with the plants, soft furnishings/carpeting for comfort and noise reduction, artwork for visual stimulation. de-cluttered, functional, art work of nature. plants and calming blue on flooring and seats

The use of blue is cool and calming, which is what you want in a waiting room. The use of lighting is appropriate and comfortable to the eyes. The plants used are perfect, just enough to create balance. The floor covering is interesting and perfect for noise reduction. The stain used on the wood is also the perfect match, and blends well. It is a beautiful fit with the chair coverings.
The colors are soothing, addition of nature with the tree.

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16. The ______________ in the above space has the potential to elicit positive emotions from its occupants.

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17. The ______________ in the above space has the potential to reduce the stress of its occupants.

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18. The ________________ in the above space has the potential to encourage social interaction amongst its occupants.

<table>
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</table>

19. The ________________ in the above space has the potential to increase the states of arousal in its occupants.

<table>
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<th>Answer</th>
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</table>

20. Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

Text Response

- would need to know more about flooring materials used as this is a high traffic waiting area, regarding noise control issues - solution is to choose a flooring that withstands high traffic while reducing noise
- although there is a generous exposure to outdoor plants, some placement of interior plants would be inviting
- addition of screen window treatment for all seasons would mitigate against the harshness of abruptness of window.
- back to flooring, choose a tile that is more engagement than flat gray. Abrupt transition to the red tiling that must represent a pathway is jarring and unattractive - find another tile to indicate this pathway

Even though this space has wonderful natural lighting and views of the outside, it is lacking nature within. Plants need to be integrated into this space somehow - even if it's just artwork showing landscapes or plants.

Again, noise is a problem here. Use sound absorbing textiles and materials.
plants inside. Larger art work with engaging messages, tables (functional & aesthetic) change the fluorescent light OR add other suitable lights, pot plants on the outside of large glass walls, add more plants on the inside, allow people access to the small terraced area outdoors by providing chairs and sitting area
I like this space. I would be happy in this space, especially looking outside in nature. I would have some seats facing outside toward the windows.
I don’t know the function of this space, so I feel somewhat limited in commenting. The chairs are lined up like little soldiers which discourages conversation and if the room is crowded with people, strangers would feel uncomfortable sitting so close to one another.

<table>
<thead>
<tr>
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<tr>
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21. **Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.**

**Text Response**
- exposure to nature outdoors is appealing
- generous exposure to natural light is uplifting

Noise dampening acoustical ceiling, colorful stimulation in the chairs and flooring, soft overhead and natural lighting makes the space bright and cheery, seating encourages social interaction. Natural sunlight is welcome! The view of what appears to be a nearby green space is calming.

colors of the seats, seating arrangement, windows (clean, unobstructed ), glass panels on doors, incorporation of color blue on horizontal bars on above it is clean simple and sleep, lots of natural light, feels spacious, the chairs are light and seem to be light which can potentially allow for moving and congregating

This space has balance, a pleasing array of colors and windows facing outside at trees and the urban surroundings. This space could provoke much thought, and happiness, which is a positive attribute for the occupants. This room connects to the outside, which is necessary for harmony and good overall wellness. The earth’s elements are exhibited in a balanced manner.

I like the soothing colors, the open window expanse to the outside and seeing all of the trees when one does look outside. The floor-to-ceiling glass also brings in a lot of natural light which creates soothing shadows in the room when the sun is out.

<table>
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22. **The ________________ in the above space has the potential to elicit positive emotions from its occupants.**

<table>
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</table>
The **Reduction of Noise Pollution** in the above space has the potential to reduce the stress of its occupants.

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The **Integration of Nature** in the above space has the potential to encourage social interaction amongst its occupants.

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The **Reduction of Noise Pollution** in the above space has the potential to increase the states of arousal in its occupants.

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Please explain how you would improve the space in the above image based on the principles of Holistic Interior Design.

Text Response
- three different upholstery colours for chairs is jarring - need to stay with two basic colours, possibly adding some pattern

- why are fans needed? add plants is appropriate places

- install some wall art
This space needs nature and soft lighting! I would lose the fans too as they are a visual distraction as well as an increase in the noise pollution. It also needs nature and artwork. wall art, plants, open the window blinds, remove large floor fan from that particular location, change door color to a more welcoming one (or increase glass panels on it)
Once again, what is the function of this room? The colors are too saturated, the seating placement is too stiff and the fans make me feel the room might be too warm. Will they be blowing into someone's face?

<table>
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27. Please explain ways that the space in the above image exhibits the principles of Holistic Interior Design.

Text Response
- use of red and 1 blue provide an energetic contrast that can be welcoming
- apart from flooring which may reduce noise, application of holistic design principles not overly evident in this picture
The color is soothing - blue helps relax the occupants while the orange induces conversation and socialization.
choice of colors, sky light, seating arrangement, choice of floor covering color
I love the large wood door, it truly represents nature to me. It works well. This space seems fun, the colors used are active and this would be a great room to get people talking. This room has a positive energy, especially with the saturation of color.
I'm not sure that this room as shown does use principles of Holistic Interior Design.

<table>
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28. If you have additional comments in relation to Holistic Interior Design and/or this study, please respond here.

Text Response

- there seems to have been only 1 residential setting and the others were institutional or commercial waiting rooms which are for visitors as opposed to "occupants". As such, issues of texture in furnishings and the role that shape plays in a balanced interior space was not under discussion in this exercise.

- a more fulsome discussion of holistic design principles involves the totality of the Subtle Atmosphere: Colour, Lighting, Sound (natural elements) Aroma (natural) & IAQ, Texture as well as the role of shape and the addition of plants to create wellness by design.

- I also blog on these topics and write for other organizations. I look forward to continuing our dialogue!

Done.

good luck

Holistic Design is not only an aesthetic quality that you can visually see. It is also a perceptual process, you must truly feel your surroundings with all of your senses, even your sixth sense. You must use and trust you instincts on all levels. When you enter a room, what is your first feeling? This will be your guide.

The critical issues to address in any design, commercial or residential, need to have the proper flow, function, and feel. The spaces you've shown all appear to be commercial. Not knowing the function, made it difficult to comment. However, I stand by the comments I made for improvements in any case.

<table>
<thead>
<tr>
<th>Statistic</th>
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REFERENCES


Shin, J. Y., & Kim J. T. (2012). In J. T. Kim (Chair). *Visual and non-visual effects of vertical eye-level illuminance and daylight spectrum on circadian potential*


BIOGRAPHICAL SKETCH

Judson Willoughby holds a Bachelor of Arts Degree in Psychology awarded from South Florida University. Following, he set forward to obtain a Master of Fine Arts in Interior Design from Florida State University. At the time of this writing, he has been a student member Interior Design Educator’s Council (IDEC) since 2011, and the American Society of Interior Design (ASID), International Interior Design Association (IIDA), and Interior Design Student Organization (IDSO), since 2010. During his graduate school years, he was employed as a teaching assistant for several undergraduate design courses. Willoughby also served as Graduate Liaison for the Florida State College of Visual Arts, Theater, and Dance Leadership Council, from 2011 to 2012, during which he was involved in the production of SIX 2012, an interdisciplinary collection of visual arts students’ works. During this time he was recognized for Best Portfolio, by Florida State College of Visual Arts, Theater, & Dance. In 2011, he was featured in IDgrad News, 1.3, “The Graduate Experience: Meet a Colleague, Judson Willoughby.” During this time he was also busy as a delegate in preparing a Digital Curriculum Vita on behalf of Jill Pable, PhD., and obtaining the Florida State Program of Instructional Excellence Certificate. In 2011 he was also awarded the Instructor Award of Merit for Technological Innovation & Prowess. While completing this thesis he is living in Thessaloniki, Greece, studying local culture and Modern Greek language. He intends to pursue an international career, both professionally and academically, in Interior Design.