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The State of Evidence-Based Design in Healthcare Interior Design Practice: A Study of Perceptions, Use, and Motivation

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THE STATE OF EVIDENCE-BASED DESIGN IN HEALTHCARE INTERIOR DESIGN PRACTICE: A STUDY OF PERCEPTIONS, USE, AND MOTIVATION

By

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A Thesis submitted to the Department of Interior Design in partial fulfillment of the requirements for the degree of Master of Fine Arts

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For Josh: Thank you for always believing in me.
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ABSTRACT

This study addresses the design strategy known as evidence-based design (EBD), and seeks to discover the current state of EBD use and perceptions of United States and Canadian healthcare interior design practitioners. The study also addresses the motivations of healthcare interior designers to use EBD, as motivations may lead to further understanding of EBD’s staying power as a strategy.

Several emergent points of this nationwide survey of healthcare interior designers provide support for the findings of other EBD surveys administered to other related populations. These points include:

• Most responding healthcare interior designers engage with evidence-based design at an elementary level as determined by analysis using Hamilton’s levels of EBD use (2009).

• Acceptable sources for evidence used to make design decisions vary, and some designers described that previous applied design practice experience (normative theory) is a valid source.

• EBD often assists practitioners in reaching a design decision, and most practitioners do not feel that EBD stifles their creativity.

This study found that there is generally a high level of interest in EBD. Most practitioners understand the basic underlying principle of EBD (using credible research to reach the best possible design solution). The majority of designers reported that they used EBD for 50% or less of their design decisions on any given healthcare project. Further, designers mostly use EBD within the schematic design and design development stages of the design process. Designers’ motivations for EBD use are both extrinsic and intrinsic in nature, and the majority of the participating designers believe that using EBD will improve their projects and also help sell their design solutions. Generally, results seem to confirm that EBD is likely in the early stages of making its mark on healthcare interior design. EBD has yet to reach widespread consensus in meaning and application, yet holds promise to provide enhanced validation to design processes.
CHAPTER ONE

INTRODUCTION

The healthcare industry is currently undergoing a significant transformation of its physical buildings. New construction of hospitals around the United States and other countries is currently thriving, prompted by outdated hospitals, shifting populations, the aging Baby Boomer generation, and growth of new medical technologies. The expected spending on new United States hospitals in 2007 was projected at more than $180 billion over five years, with healthcare construction costs anticipated to surpass $70 billion per year by 2011 (Jones, 2008).

This growth is not only associated with building new hospitals, but also with renovating existing buildings. Healthcare Leadership, a white paper series geared towards healthcare executives, reports that “many hospital facilities have simply come to the end of their useful lives, while, in several states, seismic requirements are mandating major facility upgrades” (Sadler, DuBose, Malone & Zimring, 2008, p. 2). In addition to updating and building new healthcare facilities, the pressure is increasing to create environments that are also economically efficient. Hospitals are looking to be leaner, more efficient models than the structures they are replacing, due to an increasingly competitive and transparent environment (Sadler et al., 2008).

An important aspect to this spending and construction is that these new hospitals will remain in place for decades. This has created a market for healthcare interior designers who can work with these healthcare leaders and create more efficient and thoughtful interiors, which represents a once-in-a-lifetime construction program (Sadler et al., 2008). This presents an opportunity to re-evaluate hospital design, and especially to consider how better design has the capability to improve patient and staff outcomes (Ulrich, Quan, Zimring, Joseph, & Choudhary, 2008). The current construction-oriented context of the healthcare industry, then, appears to embrace a new way of thinking about design decisions.
Designers are using information gathered from research to base their decisions for space planning, furniture, and other design features throughout a healthcare facility. This strategy, commonly referred to as evidence-based design, represents a shift in thinking about the design of a healthcare facility (Cama, 2009). This new approach to design differs from the creative, relatively unstructured way of making a design-decision that many associate with the design field (Hamilton & Watkins, 2009).

Evidence-based design (hereafter called EBD) has emerged from scientific research that spotlights how physical features can actually affect the experience of patients, their families and staff, and impact resource outcomes (Malone, Mann-Dooks, & Strauss, 2007). The topics of the research studies create a wide range of principles that comprise the body of knowledge for evidence-based design. The general EBD hallmarks are based on design decisions regarding patient and staff safety issues, outcomes, and satisfaction (Ulrich, Zimring, DuBose, Seo, Choi, Quan, & Joseph, 2008). A driving principle of EBD healthcare design is to create an environment centered on the patient and their family (Malone et al., 2007). Other principles include improving the safety and quality of healthcare, providing interaction with nature or positive distractions to improve the care of the patient, and creating a more effective and safe environment to create a positive work environment (Malone et al., 2007). These and similar evidence-based design principles aim to improve the built environment to produce more effective healthcare methods and facilities.

Overall, evidence-based design has become a popular topic and method for many design professionals and healthcare administrators (Hamilton & Watkins, 2009). Because of the potential for improved interiors, more hospitals and healthcare facilities are implementing evidence-based design strategies in their designs (Romano, 2007). Within the last 20 years, organizations and advocacy groups have been created under the umbrella of evidence-based design, including The Center for Health Design and Evidence-based Design Accreditation Certification. Interior design focused magazines such as *Contract Design* and *Healthcare Design* publish evidence-based articles on a regular basis. Also, many healthcare design projects are reporting the use evidence-based design, as seen in the entries to the 2010 Healthcare Environment Awards (Straczynski, 2010).
Evidence-based design, however, is not devoid of critics. There are design professionals and academics that question the validity and effectiveness of EBD. Some critics believe that the body of evidence is not large or rigorous enough to cite as scientific data (Stankos & Swartz, 2007). Others are concerned that design professionals claim to use EBD in order to convince a client to engage with them, but in practice but do not follow any valid method for acquiring credible research (Hamilton & Watkins, 2009). Some conclude that if the rigor of research and practice for evidence-based design does not grow exponentially, it seems to be more of a trend rather than an important tool for healthcare design (Hamilton & Watkins, 2009).

Considering the proponents and critics in the industry, there seems to be a debate on the integrity and longevity of EBD. There are many individuals and organizations that support the idea of EBD, such as the Robert Wood Johnson Foundation (RWJF, 2010). There are also individuals and groups that are hesitant to praise EBD, such as the American Society for Healthcare Engineering (ASHE, 2008). Therefore it is unclear if EBD a trend in the media or the beginning of a new era in interior design.

**Problem Statement**

Healthcare interior designers may be embracing EBD as a new tool for creating effective interiors (Straczynski, 2010; Whitemyer, 2010). However, it is unknown if EBD is only used by large-budget projects that capture headlines, or if it is a sincere area of interest by healthcare interior designers regardless of project budget or prominence. The author seeks to discover the perspectives of practicing healthcare interior designers to determine the relevancy of EBD. Also, it is largely unknown how healthcare interior designers perceive EBD, or how, or to what extent they use it in their practice currently.

**Purpose of the Research**

The purpose of this research is to discover and further understand the current state of evidence-based design in the field of healthcare interior design. This descriptive
research study will investigate the perceptions, use, and motivations of practicing healthcare interior designers with regard to EBD. This research expands on the goals of previous works (discussed in the following chapter) by exploring in depth designers’ perceptions and use of evidence-based design with a larger sample population. It also adds another dimension to the previous studies by addressing motivations for using EBD in practice. Lastly, it also acknowledges that not all decisions are evidence-based, and seeks to better understand how EBD use coincides with this situation.

**Justification of the Research**

It is intended that this research will help interior design researchers and practitioners better understand the current status of EBD and allow them to concentrate their energies on dispelling misperceptions and educating practitioners. In addition, this research will assist in determining areas of interest, use and opportunities for future EBD research. While EBD is a popular topic of continuing education at healthcare conferences, and is receiving a great deal of media attention, there are views regarding EBD that suggest the adoption of this strategy is not yet universal (Stankos & Swartz, 2007; Libassi, 2010). Similarly, recent survey results identify that healthcare interior designers are not, at this point, fully knowledgeable about EBD in general, the nature of its usefulness nor the process of its application to design decision-making (Kopec, 2010; Cama, 2009). Therefore, the researcher has initiated this study to determine and describe the current state of EBD’s definition and application amongst healthcare interior designers.

There are a number of reasons that this information would be helpful. First, some healthcare administrators and CEO’s are starting to request the implementation of evidence-based design strategies in their respective building projects by healthcare designers (Zimring, Augenbroe, Malone, & Sadler, 2008). With the growing frequency of this requirement, it is useful to better understand designers’ current perceptions of EBD, as it will increasingly affect their business success. Secondly, if the study uncovers inaccuracies in understanding, it will be helpful to pinpoint the nature of these beliefs in order to understand how to address and correct them. Thirdly, this project will
be a helpful tool in understanding the present use of EBD by practitioners, which may provide a direction for future research to advance EBD effectiveness.

The study also will also examine the details of EBD's application. Other EBD studies and writings identify that EBD is practiced in different ways and to varying degrees of rigor. According to Hamilton (2003), there are four hierarchies of an evidence-based practitioner, listed in Table 1.1.

Table 1.1: Hamilton’s 4-level model of evidence-based design.

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<th>Level</th>
<th>Interpret the research:</th>
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<td></td>
<td>Stay current with literature in the field; follow the evolving environmental research related to the physical setting; interpret the meaning of evidence as it relates to specific projects; use design concepts based on benchmark reviews of other projects; produce work that advances the state of the art by developing tangible examples of improved design.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Hypothesize and measure:</td>
</tr>
<tr>
<td></td>
<td>Hypothesize the expected outcomes of design decisions; measure the results; employ new design methods; understand the research and interpret the implications; be able to connect the design to a measurable outcome; resist the temptation to report success and downplay failure.</td>
</tr>
<tr>
<td>Level 3</td>
<td>Share unbiased results publicly: Report results publicly through writing or speaking; share information beyond the firm or client team; subject methods and results to scrutiny from others.</td>
</tr>
<tr>
<td>Level 4</td>
<td>Peer review/Academic standards:</td>
</tr>
<tr>
<td></td>
<td>Publish their findings in peer-reviewed journals; collaborate with academic social scientists; subject their work to the highest level of rigorous review.</td>
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Note. Adapted from “4 Level Model of Evidence-Based Design,” by D. K. Hamilton and D. H. Watkins, 2009, Evidence-based Design for Multiple Building Types, p. 28. Copyright Kirk Hamilton and WHR Architects, Inc.

The study will seek to identify the level at which responding interior designers are currently practicing EBD, as well as determine the standards that designers hold for
finding research and reporting their own findings. Finally, the study will attempt to understand a practitioner’s motivation behind employing EBD, categorized as intrinsic and extrinsic motivational orientation. Intrinsically motivated people are motivated to engage in a task largely by their own interest or for the challenge involved. An extrinsically motivated person is motivated to engage in a task primarily by reward or recognition received during or upon completion of the task (Amabile, 1985). It is possible that a person can be both intrinsically or extrinsically motivated. The exploration of motivation represents a new area of inquiry about EBD application by healthcare designers, but most importantly explores why designers are employing EBD, which in turn may speak to the longevity of EBD as a design strategy.

**Research Questions**

The study will gather data on the current understanding and use of EBD by healthcare interior designers in the United States and Canada, and motivations these individuals hold in engaging with its strategies. Four broad questions outline the study’s main areas of inquiry and are activated by specific sub-questions outlined below.

1. How is evidence-based design (EBD) understood and perceived by healthcare interior designers?
   1a. How do healthcare interior designers define EBD?
   1b. What levels or standards of rigor do healthcare interior designers apply to their selection of EBD research studies used for reference?
2. What are healthcare interior designers’ perceptions of EBD decision-making and non-EBD decision-making (such as historical, cultural and other creative decisions)?
   2a. Do healthcare designers perceive that EBD stifles or promotes creativity in the design process and solution?
   2b. How and at what point(s) is EBD used within the design process alongside non-EBD decision-making?
   2c. What percentage of decisions do healthcare interior designers estimate they make using EBD versus non-EBD?
2d. What types of decisions are most often assisted by EBD?
2e. What types of decisions are least often assisted by EBD?
2f. Do healthcare designers perceive that normative and/or positive theory represent a sound basis for EBD decision-making?

3. What is the current state of healthcare interior designers' use of EBD?
3a. How often do they use EBD within projects?
3b. What levels of involvement in EBD identified by Hamilton do healthcare interior designers currently engage in?
3c. What are the reasons that healthcare interior designers embrace or reject EBD as a decision-making tool?

4. What motivates healthcare interior designers to use evidence based design?
4a. Do healthcare interior designers perceive that EBD adds a sense of scientific validity to their field?
4b. Do healthcare interior designers perceive they secure more projects by referencing EBD?
4c. Do healthcare designers believe that using EBD strategies results in more effective projects?
4d. Are interior design professionals intrinsically or extrinsically motivated to use EBD?

**Assumptions and Limitations**

An assumption for this research is that EBD is an empirical decision-making strategy that can lead to reliable and valid outcomes and represents a potential tool for interior design decision-making. Another assumption is that EBD, when properly applied, can bring validity to interior design decision-making in healthcare projects and potentially strengthen patient and staff outcomes. This assumption makes this survey a valid undertaking, and that its conclusions can help further appropriate EBD use.

A limitation for this research is that the questionnaire will query healthcare interior design practitioners and results cannot be generalized to other project types. Further, respondents’ answers may be skewed by the fact that they are contacted for this study.
through their membership in several healthcare design-related organizations. The results will discuss only United States and Canadian perceptions through its sampling. Further assumptions and limitations are identified in chapter 3.

Summary

Evidence-based design has become a popular subject among many design professionals and healthcare administrators. This may correspond with the rise in healthcare construction and renovations, as many healthcare leaders are seeking to create more effective interiors for patients, families, and staff. There are many organizations and individuals that support the ideas behind EBD while others question its effectiveness. This research study will seek the perspectives of those practicing healthcare design in order to provide a snapshot of EBD from a practitioner’s viewpoint at this point in time.

This research will explore current perceptions held by practitioners, their use of EBD, and their motivations behind accepting or rejecting EBD in healthcare projects. This will establish information for understanding EBD in a contemporary setting, and add to the body of knowledge for future research and applications of evidence-based design.

Definition of Terms

American Society of Interior Designers (ASID):
A professional organization of interior designers committed to the advancement of the interior design profession through advocacy, education, knowledge sharing, and outreach (ASID, 2011).

American Academy of Healthcare Interior Designers (AAHID):
An organization that certifies healthcare interior designers based on work experience and education through an examination. After successful completion of an examination, members are considered Board Certified Healthcare Interior Designers (AAHID, 2011).
Evidence-Based Design (EBD):
The process of using of credible research to base decisions for the built environment, in order to achieve the best possible outcomes (EDAC, 2011).

Center for Health Design (CHD):
An organization comprised of healthcare and design professionals committed to advancing the idea that design could be used to improve end-user outcomes in healthcare environments (CHS, 2010).

Evidence-based Design Accreditation and Certification (EDAC):
“An educational and assessment program that tests individuals on their understanding of how to base healthcare building design decisions on credible research evidence and project evaluation results” (EDAC, 2010, para. 1).

International Interior Design Association (IIDA):
A professional education and networking organization comprised of interior designers, with chapters located in the United States and around the world (IIDA, 2011).

Military Health System (MHS):
A medical network within the Department of Defense that provides health care to military service members, veterans, and family members (MHS, 2010).

Nurture by Steelcase: A healthcare furniture company that provides user-centered solutions. Their focus is to create products that are research-driven, using evidence-based solutions to solve problems (Nurture by Steelcase, 2006).

Robert Wood Johnson Foundation (RWJF):
The nation's largest philanthropy devoted solely to the public's health. Guides private funds for use in the public's interest, develops a basis to organize grant-making practices and areas of focus (RWJF, 2010).
CHAPTER TWO

LITERATURE REVIEW

Introduction

Interior design has been used throughout history to create successful interior environments. The healthcare industry, in contrast, has only recently begun to explore interior design as the means to positive outcomes within the last 25 years. With some exceptions, a hospital is not the most pleasurable experience in one’s life. Hospital interiors often conjure up images such as green walls, sterile finishes, and unpleasant fluorescent lighting. However, many contemporary hospitals are changing their image to become more patient and family friendly. Some are even mimicking residential interiors to provide a more comforting experience. According to some writers, scientific research is guiding many of the interior changes to contemporary hospitals, referred to as evidence-based design (Cama, 2010).

Historic Context of EBD

Interestingly, the intersections of design and science are not new. ‘Evidence-based design’ is the third round attempt to ‘scientise’ design since the early 20th century, observes Nigel Cross. He writes about the relationship between design and science in history, and the historical concerns associated with trying to pair the two. “These concerns emerged strongly at two important periods in the modern history of design: in the 1920s, with a search for scientific design products, and in the 1960s, with a concern for scientific design process. The 40-year cycle in these concerns appears to be coming around again, and we might expect to see the re-emergence of design-science concerns in the 2000s” (Cross, 2001, p. 49).
As predicted by Nigel Cross, evidence-based design did indeed emerge in the 2000s. In fact, the study that many consider to be the pioneer of EBD research actually dates back to 1984 (Malone et al., 2007). It was then that Roger Ulrich published a report in the journal, *Science*, titled "View Through a Window May Influence Recovery from Surgery". Ulrich (1984) examined whether a view looking out to a natural scene versus a view of a brick wall affected the recovery of surgical patients. He discovered that “in comparison with the wall-view group, the patients with the tree view had shorter postoperative hospital stays, had fewer negative evaluative comments from nurses, took fewer moderate and strong analgesic doses, and had slightly lower scores for minor postsurgical complications” (Ulrich, 1984, p. 420). Because of that significant finding, many consider it a founding study in the realm of the current term ‘evidence-based design’ (EDAC, 2008; Malone et al., 2007; Cassidy, 2003). Following Ulrich’s research, there has been a growing body of research and literature based on the concept of how the built environment affects an individual or group of people. This body of research has grown well beyond Ulrich’s first pioneering study, and the literature is now commonly referred to as ‘evidence-based design’ by some individuals and organizations (Sadler et al., 2008).

This chapter will provide an overview of the current context, definitions and application of evidence-based design as a practice-enhancing tactic for healthcare interior design professionals according to sources that are currently writing about this strategy. It will be divided into the following headings: (a) perceptions of evidence-based design, (b) the use of evidence-based design, (c) motivation for using evidence-based design. The topics and their sub-headings will provide an exploration of the evidence-based design, disclose the spectrum of opinions on evidence-based design, review perceptions to understand the feeling toward EBD in practice, and review the potential motivations behind employing EBD.
EBD Definitions

Evidence-based design, or EBD, is a fairly new phrase in the interior design and architecture professions. This new expression is interpreted in a variety of ways. Kirk Hamilton and David Watkins describe a simple definition for evidence-based design as the thoughtful application of the best information to improve design decisions (2009). They also provide a more complex description: “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 and unique project” (Hamilton & Watkins, 2009, p. 9).

Rosalyn Cama, the author of Evidence-Based Healthcare Design (2009) and president and principal interior designer at CAMA, Inc., portrays evidence-based design as a decision-making process that analyzes current, relevant evidence from research or from the field. She further advises that EBD “does not provide prescriptive solutions, but rather a platform from which to add to an existing base of knowledge or to launch an innovation” (Cama, 2009, p. 7). From this existing knowledge base, she proposes that EBD is the right thing to do, and that its use supports an ethical responsibility to measure results and disseminate knowledge from design successes and failures in a peer-reviewed method. In this way, EBD is similar to academic inquiry (Cama, 2009).

Aside from individuals in the industry, several organizations also have their own definition of evidence-based design. The Center for Health Design is one of the largest advocacy groups promoting evidence-based design. Their mission is to create healthy and safe healthcare environments achieved through design education, research, and advocacy (CHD, 2010). They summarize evidence-based design as “the process of basing decisions about the built environment on credible research to achieve the best possible outcomes” (EDAC, 2010, para. 2).

The Military Health System (MHS) is a medical network within the Department of Defense that provides health care to 9.6 million military service members, veterans, and family members. It is comprised of 59 hospitals, 364 health clinics, and maintains a $50
billion budget (2010). It defines evidence-based design as an up-and-coming compilation of scientific knowledge that connects elements of the built environment with outcomes affecting patients, staffs and resources (Malone et al., 2007). From their definition, the Military Health System provides a basis for the use of evidence-based design in their current building projects.

These definitions for evidence-based design suggest that a variety of descriptions exist on the topic. Variety is also observed in the ways that professionals use EBD, which is described below.

Use

This section will describe others’ conclusions concerning the use of evidence-based design, EBD’s similarity to evidence-based medicine, and the process of integrating research into design. Following this discussion, the current practice of evidence-based design will be reviewed.

The application of evidence-based design is most prominently found in healthcare design (Whitemyer, 2010). According to the IIDA magazine, Perspectives, “it makes sense that EBD has its roots in healthcare, where lives are at stake and legal implications are palpable, outcomes are fragile, and decisions need to be justified by hard data” (Whitemyer, 2010, p. 10). Indeed, Ulrich et al. report that “…compared to 2004, the body of evidence has grown rapidly and substantially in recent years. This is encouraging given that the importance of EBD has increased markedly as the need for better healthcare facilities has grown and become more urgent… The evidence indicates that well-designed physical settings play an important role in making hospitals safer and more healing for patients, and better places for staff to work” (2008, p. 1, 4).

Parallels of EBD to Evidence-Based Medicine

Some believe that evidence-based design is growing in prominence in the healthcare design industry because of the similar emergence of evidence-based medicine. It has been proposed that just as evidence-based medicine is changing medical treatment, evidence-based design is altering the healthcare surroundings (Zimring et al., 2004). Both share their grounding in scientific discovery methods.
Evidence-based medicine (EBM) is “the practice of making medical decisions through the judicious identification, evaluation, and application of the most relevant information” (Friedland, Go, Davoren, Shlipak, Bent, Subak & Mendelson, 1998, p. 3). Kirk Hamilton also links EBD with EBM, relating that while healthcare practice has gradually moved toward evidence-based medicine by informing clinical choices with research, healthcare design is also progressively guided by studies that connect a hospital physical setting to healthcare outcomes, thus leading the way to evidence-based design (2003). Diana Anderson concurs, stating “as medicine has moved toward evidence-based practice, so too has hospital design, which is increasingly guided by research linking physical environments to health care outcomes through the process of evidence-based design” (2010, p. E535).

**Applications of Evidence-Based Design**

Some suggest that EBD can be applied to a variety of challenges in healthcare design. EBD healthcare outcomes may be improved through a range of design characteristics. These include single-occupancy rooms rather than multi-occupancy units, effective or improved ventilation systems and acoustic environments, suitable lighting, thoughtful ergonomic design, and better floor layouts and work settings (Ulrich et al., 2008). Some see further benefits in EBD that can be gained from the application of the scientific method. The emergence of the growing field of literature and evidence-based research has allowed for the collaboration of designers, end-users, healthcare providers, and researchers to review and assess the relevant literature in order to hypothesize and create design strategies for implementation on a project (Taylor & Keller, 2010).

**Methods of Applying Evidence-Based Design**

While there are various interpretations of the meaning and origins of evidence-based design, the application of evidence-based design is also interpreted in an assortment of ways. Hamilton gives an in depth description of the practice of EBD by creating four levels to distinguish the ways in which designers might work with evidence. Hamilton’s (2003) “Four Level Model of Evidence-Based Design” ascends in their rigor, as seen in Table 2.1. A practitioner must meet the requirements for the previous level(s) before advancing to a higher level.
Table 2.1: The 4-level model of evidence-based design.

<table>
<thead>
<tr>
<th>Level</th>
<th>Interpret the research:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>• Stay current with literature in the field.</td>
</tr>
<tr>
<td></td>
<td>• Follow the evolving environmental research related to the physical setting.</td>
</tr>
<tr>
<td></td>
<td>• Interpret the meaning of evidence as it relates to specific projects.</td>
</tr>
<tr>
<td></td>
<td>• Use design concepts based on benchmark reviews of other projects.</td>
</tr>
<tr>
<td></td>
<td>• Produce work that advances the state of the art by developing tangible examples of</td>
</tr>
<tr>
<td></td>
<td>improved design.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 2</th>
<th>Hypothesize and measure:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Hypothesize the expected outcomes of design decisions.</td>
</tr>
<tr>
<td></td>
<td>• Measure the results.</td>
</tr>
<tr>
<td></td>
<td>• Employ new design methods.</td>
</tr>
<tr>
<td></td>
<td>• Understand the research and interpret the implications.</td>
</tr>
<tr>
<td></td>
<td>• Be able to connect the design to a measurable outcome.</td>
</tr>
<tr>
<td></td>
<td>• Resist the temptation to report success and downplay failure.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 3</th>
<th>Share unbiased results publicly:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Report results publicly through writing or speaking.</td>
</tr>
<tr>
<td></td>
<td>• Share information beyond the firm or client team.</td>
</tr>
<tr>
<td></td>
<td>• Subject methods and results to scrutiny from others.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4</th>
<th>Peer review/academic standards:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Publish their findings in peer-reviewed journals.</td>
</tr>
<tr>
<td></td>
<td>• Collaborate with academic social scientists.</td>
</tr>
<tr>
<td></td>
<td>• Subject their work to the highest level of rigorous review.</td>
</tr>
</tbody>
</table>


Hamilton & Watkins (2009) also labels ‘level-zero practitioners’ as “those who make claims for an evidence-based process, or claim positive results, yet have no understanding of how to work in a design process that requires diligent searches, critical interpretation, hypothesized outcomes, and carefully measured results” (p. 33). In so
doing, they observe that a level-zero practitioner is simply pretending to use evidence-based design, thus giving their fellow interior designers and architects a bad name (Hamilton & Watkins, 2009).

Hamilton’s dissection of the use of evidence-based design illustrates the complexity of applying EBD strategies to practice. Without this knowledge, it may create a misunderstanding among practitioners, and also between practitioners and their clients. One designer may believe that they are using EBD, while another designer and/or client may not recognize that method as the correct or valid way. This creates conflicting views of what constitutes evidence-based design and the degree of research associated with using it.

The Integration of EBD into the Healthcare Design Process

In an effort to assist those practitioners who may a level one or two designer in Hamilton’s model, there are resources (though few in number) that seek to educate the practitioners on how to employ evidence-based design within their projects.

One such resource is *Evidence-Based Design for Multiple Building Types* that provides suggestions on how to integrate EBD into practice (2009). The reference takes steps to suggest to design practitioners that they are free to act as a ‘researcher’ through a variety of actions including field observations, case studies from similar studies to create a benchmark, conducting a survey, focus group, and pilot study (Hamilton & Watkins, 2009).

There are other guidelines that give advice on using evidence-based design in practice. The Center for Health Design has published *A Practitioner’s Guide to Evidence-Based Design* (2008). In this guide, the authors provide their framework for incorporating EBD into a project:

- Review the existing body of research literature to determine relevant findings and recommendations.
- Prioritize and balance referenced findings with primary data gathered from site visits, subject matter experts, and stakeholders.
- Hypothesize about the potential outcomes of design decisions, and then track those outcomes following design implementation (Harris, Joseph, Becker, Hamilton, & Shepley, 2008, p. 2).
A Case Study of Using Evidence-Based Design in the Healthcare Process

Given the variety of commentary on the application of EBD, an example of EBD used in a project may be helpful to general understanding, which is summarized below.

The Wellstar Paulding Hospital community hospital initiated a project involving three phases to establish important EBD features to include in their intensive care unit (ICU). Their process was comprised of a literature review, focus group interviews, and a financial analysis. In their first phase, the literature review recognized the EBD principles required for the best possible design of an ICU (Spikes & Aduddell, 2010). Their results are described in Table 2.2.

Table 2.2: Evidence based design features for ICU.

<table>
<thead>
<tr>
<th>Physical Features</th>
<th>Safety and Quality Advantages</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private in-patient rooms</td>
<td>Decrease infection rates and increase privacy</td>
<td>Zimring &amp; Ulrich (2005); AHRQ (2007)</td>
</tr>
<tr>
<td>Decentralized nursing stations and improved visibility of</td>
<td>Increase visibility of patient</td>
<td>Catrambone, Johnson, Mion, &amp; Mikkick (2009);</td>
</tr>
<tr>
<td>patient rooms from nursing station</td>
<td></td>
<td>Joseph &amp; Rashid (2007)</td>
</tr>
<tr>
<td>Unit configuration or fishbowl design. Electrical outlet</td>
<td>Promotes efficiency in care delivery process</td>
<td>AHRQ (2007); Hall, Doran, &amp; Pink (2004)</td>
</tr>
<tr>
<td>location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locale of hand washing stations</td>
<td>Increase and promote hand washing</td>
<td>Rashid (2006); Aiken, Clarke, Sloane, Sochalski,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&amp; Siber (2002)</td>
</tr>
<tr>
<td>Family area within patient room</td>
<td>Promotes communication among family/caregivers, fosters trust, and</td>
<td>Perrine (2009); Challis (2009)</td>
</tr>
<tr>
<td></td>
<td>promotes healing and positive nurse/patient satisfaction</td>
<td></td>
</tr>
</tbody>
</table>


The second phase of the project involved conducting focus group interviews from senior leadership and staff members of the hospital to identify the important needs of the stakeholders. They received comments from focus interviews that supported the idea of incorporating an EBD approach. Then they attempted to link the responses from
the interviews with literature from evidence-based research for improving the efficiency of the healthcare interior, staff, and patient outcomes, as seen in Table 2.3 (Spikes & Aduddell, 2010).

Table 2.3: Staff response from focus interviews.

<table>
<thead>
<tr>
<th>Dislikes of Current Unit</th>
<th>Suggestions for New Unit</th>
<th>Relation to EBD Approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small work space that the caregiver team must all utilize and share</td>
<td>Larger workspace for the caregiver team</td>
<td>Rashid (2006); Joseph &amp; Rashid (2007)</td>
</tr>
<tr>
<td>Not enough computers for everyone to utilize</td>
<td>Decentralized work stations for the nurses</td>
<td>Catrambone et al. (2009)</td>
</tr>
<tr>
<td>Lack of storage</td>
<td>More storage areas for supplies, linen carts, code cart, and equipment</td>
<td>Rashid (2006); Catrambone et al. (2009); Yundt (2009)</td>
</tr>
<tr>
<td>The small enclosed unit located off from the ED</td>
<td>Located in an enclosed unit with sufficient space</td>
<td>Reiling, Hughes, &amp; Murphy (2002); Yundt (2009)</td>
</tr>
<tr>
<td></td>
<td>Cameras placed in each patient room</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer workstations wall mounted in patient room</td>
<td>Rashid (2006)</td>
</tr>
<tr>
<td></td>
<td>More computers for caregivers to use</td>
<td>Rashid (2006)</td>
</tr>
<tr>
<td></td>
<td>Technical beds that rotate and turn patients</td>
<td>Aherns (2005)</td>
</tr>
</tbody>
</table>


In the third and final phase of the project for the Wellstar Paulding Hospital, the suggested changes were compiled into a report and given to hospital administration. The report spelled out the financial impact of using the suggested EBD features and highlighted some of the cost-saving features for using EBD. As seen in table 2.4, the report described that the numbers were not actual figures, but they provided a comparison of the costs for operating with and without EBD (Spikes & Aduddell, 2010).
Table 2.4: Suggested EBD features: cost and quality benefit.

<table>
<thead>
<tr>
<th>EBD Feature</th>
<th>Cost and Quality Benefit</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-bed rooms and decentralized nursing stations</td>
<td>Incur $12 million in new construction cost but return of investment is within 1 year of operation</td>
<td>Zimring &amp; Ulrich (2005)</td>
</tr>
<tr>
<td>Effect of EBD on unit layout/design</td>
<td>Statistics from hospitals included in the Pebble Project showed decrease nursing turnover rates from the 20th &amp; 30th percentile down to 3%-4%; appropriate staffing levels result in decrease in patient mortality</td>
<td>Center for Health Design (2006); Aiken et al. (2002)</td>
</tr>
<tr>
<td>“No manual lift” environment</td>
<td>Cost of patient handling injuries was estimated at $142,500; 3 years after the lifts were installed in more than 75% of the ICU rooms, only two injuries occurred related to patient handling</td>
<td>Joseph &amp; Fritz (2006)</td>
</tr>
</tbody>
</table>


Overall, this case study from Wellstar Paulding Hospital shows an extensive amount of research that was undertaken using EBD. A literature review produced research on specific design features, focus interviews allowed for input from staff, and finally a financial analysis compared the cost of proposed EBD features compared with the benefit. All of these EBD actions combined to complete the design of the ICU using EBD.

This case study is one example of how EBD may be used by healthcare design practitioners. However, not all projects have the time or money needed to undertake such extensive research. As mentioned previously by Hamilton & Watkins (2009), a small, detailed project could also be classified as using EBD by using a range of actions from conducting surveys to case studies.
Proponents for Using Evidence-Based Design

Evidence-based design has been accepted by some individuals and organizations in the interior design and healthcare industries. “Everybody’s talking about evidence-based design,” says Joseph Sprague, a senior vice president and principal at HKS, one of the nation’s top healthcare architectural firms by Modern Healthcare, in an interview with Michael Romano (2007, p. 24). He continues, saying “most everybody now wants to have some data that goes into design and really supports outcomes. For instance, if you do this, can you reduce infections? If you do this, can you reduce stress? Everybody’s working to incorporate evidence-based design to produce positive outcomes-- such as increased patient safety and staff efficiency” (2007, p. 24). The discussion below will suggest that evidence-based design has become a popular subject at healthcare conferences and events, and healthcare design companies are quoting EBD in their project descriptions frequently.

Healthcare competitions have embraced EBD. For example, Contract Magazine reported that evidence-based design was the star of their annual Healthcare Environment Awards as it has been in years past (Straczynski, 2010). The judges for the Healthcare Environment Awards articulated the ongoing need for the industry to integrate EBD into healthcare design while simultaneously adding research and innovation. The judges also described that “…designers now have a responsibility to find new ways of interpreting these concepts to provide both clients and patients with unique and functional environments” (Straczynski, 2010, p. 82). These competition comments were intended to urge designers to implement the use of EBD in healthcare buildings.

EBD is also the focus of some healthcare organizations. As acknowledged previously, The Center for Health Design is one of the largest research and advocacy groups promoting evidence-based design. They are a research and advocacy organization comprised of healthcare and design professionals who pursue the goal of improving healthcare quality through a building’s architecture and design (CHD, 2010). They partner with many different organizations across the industry including Vendome Group, LLC for publications and conferences, Nurture by Steelcase as an educational partner, California Health Care Foundation as project partners, AIA Academy of
Architecture for Health (AAH), Herman Miller Healthcare, and Facility Guidelines Institute as research partners. The Center for Health Design’s website provides evidence-based design resources such as books and magazines, webinars, job listings, related websites and request for proposal/request for quote listings. They offer the resources to create healing environments that they believe will impact many factors within healthcare including patient and/or staff safety and satisfaction, nurse retention, and medical outcomes (CHD, 2010). In short, the Center for Health Design is a consistent supporter of evidence-based design.

Organizations are also starting to provide grant funds that support the use of EBD, and the EBD movement now also has a system of certification. The Robert Wood Johnson Foundation (RWJF) has sponsored numerous grants and research involving evidence-based design. In fact, with funding from RWJF, The Center for Health Design created the Evidence-based Design Accreditation and Certification (EDAC) examination. Their mission is “to develop a community of accredited industry individuals through education and assessment of an evidence-based design process. Our vision is a world where all healthcare environments are created using an evidence-based design process” (ECAC, 2010. “About,” para. 5). This is an accreditation program that educates and tests an individual on their knowledge credible evidence to be used for design decisions. They clarify that the purpose of EDAC is not to assess an individual on information from current evidence published. Rather, their purpose is to educate and test an individual on the correct process to follow when using EBD: to find, hypothesize, apply, collect, and report the data connected to their project (EDAC, 2010). This attempt to certify designers on the EBD process is an example of how EBD is growing more popular in the healthcare design industry.

Evidence-based design research studies and projects have many variables, and it may be difficult to extract what can be replicated in another project (Terkildsen, 2010). This does not hinder many individuals from promoting the use of EBD. Roger Ulrich and Craig Zimring contend that

…Although many studies are not well controlled, the strength of evidence is enhanced by the fact that in the case of certain environmental factors, reliable patterns of findings across several studies emerged with respect to outcome
influences. Furthermore, these patterns were broadly consistent with predictions based on established knowledge and theory concerning environment and healthcare outcomes. For example, many studies have consistently found that high noise levels in hospitals worsen patient outcomes such as sleep quality, physiological stress, and satisfaction. It is important to note that validity is strengthened when findings tend to be reliable or consistent and are in accord with a priori hypotheses or predictions derived from previous knowledge. Thus, we believe the application of such findings in EBD should be encouraged despite the shortage of randomized experimental trials. On the other hand, future research should be carefully designed and controlled so that the independent role of specific environmental changes or interventions can be better understood (2008, p. 4).

Thus, some proponents of EBD believe that isolated studies will relate to other projects and ultimately improve the next interior environment.

Others predict that the embrace of EBD will also enhance the credibility of design professionals. Dak Kopec, for example, summarizes the importance of EBD by stating that “…evidence-based design has the potential to add another dimension of complexity to design that only an experienced professional could administer, thereby eliminating the legacy of a designer being merely a tradesperson” (Kopec, 2010, p. 159).

In summary, evidence-based design has received support from design organizations, grant sources, and some design practitioners within the interior design and healthcare industry. Competitions and magazines are created around the premise of EBD. The Center for Health Design has created a niche market in the industry through its promotion of evidence-based design. EDAC is attempting to transform the use of EBD into a certification process, to distinguish those designers who are certified. Individuals are researching and publishing their findings in hope of adding to the body of evidence. These examples demonstrate the support of using evidence-based design in the interior design field.

**Critics of Evidence-Based Design**

Not all commentators agree that EBD is the new direction for interior design. This section will describe the primary objections to EBD. These range from the use of
normative theory versus positive theory in practice, and skepticism on the credibility and amount of evidence.

The Limitations of Normative Theory. In design there are two different types of theories related to decision-making classified as ‘normative theory' and ‘positive theory'. Normative theories are tested solely by way of professional acceptance or longevity. They consist of a broad range of actions or ideas that are standard because of acceptance, or are considered ‘rules of thumb' (Groat & Wang, 2002). “Action is taken based upon tacit factors as ‘this is how we’ve always done it,’ or ‘this way is tried-and-true’… Normative theory is largely what motivates actions taken in design practice” (Groat & Wang, 2002, p. 78). When a design professional specifies a kitchen countertop height of 36 inches, this is an example of normative theory. The designer most likely did not research ergonomic countertop heights for cooking or food preparation, but instead the height of 36 inches was specified simply because that is the height accepted throughout the industry.

On the other hand, positive theories describe and explain an idea through connecting links or systems, and can calculate future performances of the object or idea in question. Positive theories are used for scientific theories, and are assessed according to the rules of empirical actuality. Positive theories differ from normative theories because they are subject to rigorous testing and support each action with research, rather than experience. (Groat & Wang, 2002). In sum, normative theories “cannot be said to have the logical rigor of positive theories, and they can lead to a great variety of empirical outcomes” (Groat & Wang, 2002, p. 78).

According to Stankos (2007), the purpose of positive theory in design is to facilitate designers to develop descriptive information from an explanatory statement in order to establish their design on a solid theoretical basis. This explanatory statement is built on tested, empirical evidence. Hillier (1996) concurs, and further warns that “a poorly founded analytical theory will not inhibit the designer in the creative phase of design, but it will lead him or her to look in the wrong place. It would also mean that the designer’s predictions would be unlikely to be supported by events when the building is built. This is why bad theories are so dangerous in architecture” (p. 63).

Basing one’s design decisions on normative or positive theory is a choice
designers make. Many practitioners successfully use normative theory in practice (Groat & Wang, 2002). Nevertheless, some suggest that practitioners should understand and distinguish between the decisions made with normative and positive theory when using EBD (Stankos & Schwarz, 2007). To ignore this is to risk basing decisions on faulty assumptions.

**Quantity of Existing High-Quality Evidence.** However compelling the body of research and evidence is in its current state, it is also important to address the limitations of the quality of existing evidence. In a newsletter addressed to its members, the American Society for Healthcare Engineering has addressed the growing popularity of evidence-based design (2008). They advised their members to impartially assess the validity of claims related EBD studies and raised concern about the insufficient amount of studies relating to healthcare environment operations or healing, which would be used to support design decisions (ASHE, 2008). A 2004 Center for Health Design research report supported this notion. This study conducted a review of all the available research for the use of evidence-based design and described that 600 rigorous studies existed that practitioners could use for decision-making (Ulrich, Zimring et al., 2004). In 2008, the study was updated and revealed that the number of rigorous studies had increased to approximately 1200 and identified that the body of research was indeed growing (Ulrich, Zimring et al., 2008). The topics included in this comprehensive report are described in Table 2.5. Nonetheless, ASHE asserts this as not enough evidence for evidence-based design, stating, “...these are very small numbers when spread across the myriad factors involved in the design of the health care physical environment. Drawing predictive conclusions from a small number of studies in any particular area is as problematic in evidence-based design as it has been in evidence-based medicine” (ASHE, 2008, p. 2). To put the 1200 EBD studies in perspective to the number of EBM studies, a generic search on a comprehensive EBM database, TRIP, yielded 741,340 studies (tripdatabase.com, 2011).
Table 2.5: Topics of rigorous research studies identified in a physical design & outcomes relationship.

<table>
<thead>
<tr>
<th>Healthcare Outcomes</th>
<th>Design Strategies or Environmental Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single-bed rooms</td>
</tr>
<tr>
<td>Reducd hospital-acquired infections</td>
<td>.</td>
</tr>
<tr>
<td>Reduced medical errors</td>
<td>.</td>
</tr>
<tr>
<td>Reduced patient falls</td>
<td>.</td>
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<tr>
<td>Reduced pain</td>
<td>.</td>
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<tr>
<td>Improved patient sleep</td>
<td>.</td>
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<tr>
<td>Reduced patient stress</td>
<td>.</td>
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<tr>
<td>Reduced depression</td>
<td>.</td>
</tr>
<tr>
<td>Reduced length of stay</td>
<td>.</td>
</tr>
<tr>
<td>Improved patient privacy &amp; confidentiality</td>
<td>.</td>
</tr>
<tr>
<td>Improved communication with patients &amp; family members</td>
<td>.</td>
</tr>
<tr>
<td>Improved social support</td>
<td>.</td>
</tr>
<tr>
<td>Increased patient satisfaction</td>
<td>.</td>
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<tr>
<td>Decreased staff injuries</td>
<td>.</td>
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<tr>
<td>Decreased staff stress</td>
<td>.</td>
</tr>
<tr>
<td>Increased staff effectiveness</td>
<td>.</td>
</tr>
<tr>
<td>Increased staff satisfaction</td>
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</table>


Other individuals also agree that there is an insufficient amount of quality research to constitute as evidence on which decisions are made. In reference to the Center for Health Design’s 2004 review of rigorous studies, Stankos & Schwarz criticize...
the body of evidence, noticing that there are a limited number of studies dispersed over many areas of focus, which cannot represent an essential compilation of knowledge for evaluation. They maintain that the available evidence base is too limited in quantity and quality to be portrayed a solid body of knowledge (Stankos & Schwartz, 2007). ASHE concurs, stating, “…it is unfortunate that some EBD proponents tout the results of a few loosely reviewed studies as facts that are beyond the challenge or interpretation of skeptics” (ASHE, 2008, p. 2).

**Current Lack of Widely Accepted Protocols and Appropriate Review.** Some report that another limitation in evidence-based design use is the process of assessing research procedures and the quality of these studies’ findings. The contrast between EBD and evidence-based medicine is revisited in comparing how theories are created and information is released. Evidence for medicine is tested in carefully controlled studies often with randomized trials producing a body of information from which predictive theories can be formed, repeatedly tested, and continuously evaluated (Sackett, Rosenberg, Muir Gray, Haynes, & Richardson, 1996). ASHE (2008) again writes that there is currently a lack of widely accepted protocols applied to developing evidence for design. Unlike the databases for EBM, there is no established EBD review process or database capable of evaluating research studies and reaching conclusions. They conclude that, “without the ability to create predictive theories, EBD is reduced to the application of anecdotal conclusions about how we would like the environment to be rather than how we can expect the environment to be” (ASHE, 2008, p.2).

With no established ways of assessing the validity of evidence, designers risk citing research or information that may not be correct. As described below, the result of using invalid or unrelated information can be consequential:

In building design, every project is unique and, even though some components may be similar, health care design projects are invariably assembled in different ways. If the course of treatment prescribed by a physician doesn’t work, the patient is usually available to come back for additional treatment. In a building project, the team gets one chance to get
the treatment right. If the design isn't good, it's unlikely a postmortem will be conducted and the results subjected to careful scrutiny. These factors make building design a process that depends on highly experienced and competent practitioners, who can consider research recommendations and apply them to improve the quality of a particular project. A major concern about EBD is that it could foster a cookie-cutter approach to the health care design process, one in which guidelines and formulas are substituted for carefully considered design decisions (ASHE, 2008, p. 3).

The challenges described above question evidence-based design, either on grounds that its framework is flawed or it is too early in the process to obtain reliable results.

In summary, the critics of evidence-based design imply that resolution is needed regarding the acceptance and place of normative and positive categories of theory. While EBD is intended to improve interior design, critics believe that there is insufficient evidence to hail it as the new standard in interior design and architecture. Also, critics contend that the lack of review process or comprehensive database limits to credibility of evidence-based design.

Overall, those who critique EBD and those who promote and engage in EBD do not agree upon its use. Proponents believe EBD has the ability to positively affect the built environment, and critics assess that the EBD knowledge base and validity need to grow before prescriptive solutions can be determined for interiors. Dak Kopec summarizes the larger picture inherent within the issues noted above: “Without human occupation the built environment would have no meaning, therefore to ensure that the built environment fulfills and accommodates the strength and weakness of the human condition the rigors of design research must be elevated” (Kopec, 2010, p. 159).

**Current Perceptions and Use of EBD by Educators and Practitioners**

The review of various interpretations, viewpoints, and research regarding evidence-based design above now permits an exploration of the current state of EBD as it is practiced and taught by interior designers. This section will identify the results of several recent studies that examined students’ perceptions and professional designers use of evidence-based design.
In 2010, Kopec presented a research study titled “Evidence Based Design in the Architectural and Interior Design Curriculum”. Kopec's goals in doing so were to determine whether design students are sufficiently prepared for rigorous research and if their design concepts are defendable with reliable and replicable information (Kopec, 2010). In so doing, Kopec maintained a fairly narrow focus of investigation and surveyed 131 design students to determine their differences in the understanding of evidence-based design from those taught by educators with professional versus academic credentials. The study's findings helped develop a base of understanding regarding design students' perceptions, including students' perceptions of their instructors' knowledge and attitudes toward EBD.

One result from Kopec's study reveals that more than half of the respondents (63.2%) desired to learn more about evidence-based design in their education while only a small percentage (4.5%) of respondents were opposed. Further, the majority of respondents (74.4%) believed that evidence-based design is important to the built environment. Kopec's study (2010) also revealed information about the respondents' instructors. Slightly more than half of respondents (59%) had heard of EBD in their academic preparation, while 34% had never heard the term “evidence-based design” from their professors. Another result shows that half of the respondents (52.6%) had particular instructors that seemed to understand EBD, and sometimes promoted its use. Less than a quarter of the responses (19.5%) revealed that the particular instructors who understood EBD always encouraged the practice, while slightly less (15.8%) replied that none of their instructors seemed to understand or promote EBD (Kopec, 2010). These findings are relevant for this research study because student EBD perceptions (and perhaps future use) may be influenced by their respective instructors' perceptions and attitude toward EBD.

Essentially, Kopec's results suggest that design students learn about EBD only some of the time from instructors, and yet the students desire to be informed about EBD and its procedures and details. In summarizing the study’s results, Kopec concluded that students were not being sufficiently prepared to use EBD, and “the reality is that the
academic design curriculum as it is currently structured may require a more robust “skills development” within research and evaluation in order for graduates to pursue careers in the practical application of evidenced based design” (Kopec, 2010, p. 159). He further recommended, “…to be prepared for evidence based design, the design curricula will need to alter at least one or more of its design studios to be research based as opposed to practice based” (Kopec, 2010, p. 159). Kopec’s work is notable to this study, in that it is one of the few previous surveys of knowledge and attitudes about EBD. The students in this survey are likely now entering the workforce, and some of these will likely become healthcare practitioners. Their perceptions of EBD may shape their approach to professional practice.

There is also a previous study that examines the use of EBD by a select group of healthcare practitioners. In 2010, Rosalyn Cama and Wing Leung conducted a survey of the firms on the “Forty Healthcare Giants” list over the past three years. The survey polled respondents on their use of an evidence-based approach to practice for the design of a healthcare facility (Cama, 2010). Cama’s 2010 study yielded an 80% response rate: 50 firms were invited to participate, and a total of 40 firms responded to the survey. From the collected responses, nearly all respondents (92.5%) indicated that they engage in evidence-based design (Cama, 2010). The specific responses were then categorized in a hierarchy according to Hamilton’s 4-level model of evidence-based design (Hamilton, 2009), described previously in this chapter. Figure 2.1 summarizes the results of this question, and suggests that most firms currently operate the lowest level of engagement with EBD, level 1. As the levels increased the percentage of qualifying respondents declined, with the least amount of respondents practicing at the most rigorous level four.
In addition to these results, the researchers noted concerns of respondents. According to the details of the study, half of the respondents commented that though they wanted to employ an evidence-based practice, they were faced with the dilemma mentioned previously in this chapter: that there is currently a narrow amount of data from which to cite evidence. They were also concerned that EBD is being marketed to clients before the established rigor is put in place for each project to establish an appropriate body of knowledge (Cama, 2010). Thus, these respondents appeared to echo some of the concerns of other writers described previously in this chapter.

Cama’s research is significant in the search to understand how evidence-based design is being used, but it is limited by targeting only the most successful firms as determined by *Interior Design Magazine*. Also by targeting only design firms as a whole, individual interior designers were not queried. Despite the suggested limitations, Cama & Leung’s 2010 research is a groundbreaking start in the attempt to pinpoint the state of evidence-based design in practice.

In summation, educators and practitioners appear to be only somewhat familiar with evidence-based design. However, the degree of its use and familiarity throughout
the design process is wide-ranging within existing research studies that examine this question. There seems to be much to learn in how practitioners use evidence-based design within their day-to-day projects, and potentially other questions to ask that bring enhanced specificity to the topic of EBD in practice. Chapter three will return to this point in further detail.

Motivation for Using Evidence-Based Design

Evidence-based design has many supporters and many critics. As reported in the literature above, it is a popular topic within the healthcare interior design profession. However, the reason(s) that motivate design practitioners to use EBD on a project is anecdotal, and currently unconfirmed through research. Uncovering perceived motivations held by design practitioners may be important, as it may speak to the movement’s staying power, or reveal that designers feel driven to EBD by client demand rather than wanting proactively engage with it themselves for self-improvement reasons. The following section first defines types of motivation, and then captures current views on designers’ motivations in using EBD that lend further justification to this topic.

Intrinsic and Extrinsic Motivation

Just as each designer has their own personal style of design, they may also have personal motivations for using or not using evidence-based design. General literature on motivation might be applied to the choice to use (or not use) EBD in design practice. These two contrasting motivational orientations are called “intrinsic” or “extrinsic” motivation, and are based in creativity literature (Amabile, 1985; Amabile, 1996).

Intrinsic motivation is driven by an individual’s self-determination, inquisitiveness, competency, enjoyment, and interest (Amabile, Hill, Hennessey, & Tighe, 1994). In other words, intrinsic motivation is “the motivation to engage in work primarily for its own sake, because the work itself is interesting, engaging, or in some way satisfying” (Amabile et al., 1994, p. 950). For example, a designer may be self-driven and seek to learn new information such as EBD in order to produce a more effective interior solution.
In contrast, extrinsic motivation consists of concerns with competition, assessment, acknowledgment, money or other tangible incentives, and control by others (Amabile et al., 1994). Extrinsic motivation is “the motivation to work primarily in response to something apart from the work itself, such as reward or recognition or the dictates of other people” (Amabile et al., 1994, p. 950). In this case, a designer may opt to use EBD when not required because they hope to secure future projects. Thus, perceived desire from clients for EBD may be prompting the growing adoption of EBD practices.

Table 2.6: An excerpt from the Work Preference Inventory (WPI) subscales.

<table>
<thead>
<tr>
<th>Intrinsic Subscales:</th>
<th>Enjoyment</th>
<th>Challenge</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want my work to provide me with opportunities for increasing my knowledge and skill.</td>
<td>The more difficult the problem, the more I enjoy trying to solve it.</td>
<td></td>
</tr>
<tr>
<td>No matter what the outcome of a project, I am satisfied if I feel I gained a new experience.</td>
<td>I enjoy tackling problems that are completely new to me.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Extrinsic Subscales:</th>
<th>Outward</th>
<th>Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I prefer working on projects with clearly specified procedures.</td>
<td>I am keenly aware of the income [or promotion] goals I have for myself.</td>
<td></td>
</tr>
<tr>
<td>I am strongly motivated by the recognition that I can earn from other people.</td>
<td>I am strongly motivated by the money I can earn.</td>
<td></td>
</tr>
</tbody>
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A person is not either solely intrinsically or extrinsically motivated, but rather one motivation orientation is usually dominant over the other. Therefore, an individual may identify with areas from both intrinsic and extrinsic motivational orientations for the same task, but will most likely lean more towards one orientation over the other (Amabile, 1996). In Table 2.6, the two types of motivation are detailed through Amabile’s Work Preference Inventory (1995).

As seen in Table 2.6, intrinsically and extrinsically motivated individuals have distinctly different driving qualities, and may also include a mix of both orientations. Intrinsic motivation is driven by enjoyment and challenge, while extrinsic motivation is driven by outward recognition and compensation (Amabile et al., 1994). However, the two types of motivation have not previously been researched in connection with the use of EBD. The analysis of a practitioner’s motivation to use EBD could help assess the longevity of EBD practice, especially given that EBD may be the third round of attempts to integrate science with design, as discussed in Chapter 2 (Cross, 2001).

Potential Motivation Catalysts

Economic efficiency. As stated in Chapter 1, the healthcare design industry is expanding as the Baby Boomer generation ages, and as specialized medicine is increasingly being practiced. As new buildings are being built or existing structures are renovated, healthcare administrators, who are likely squeezed by budget constraints, may be attracted by the economic analysis aspect of EBD and also its address and quantification of patient care excellence. For example, Rosalyn Cama identifies that “…the motivators that continue to impact health care are wrapped around how to deliver safe, efficient, effective health care. Health care providers want the magic bullet that allows them to deliver a higher quality of care in an efficient economic model” (2010, p. 66). Similarly, a publication by the Healthcare Financial Management Association has stated, “facility redesign and the incorporation of evidence-based design may provide opportunities to increase revenue and decrease costs while enhancing satisfaction of both patients and staff” (Land & Johnson, 2007, p. 1).

Other initiatives similarly point to the attractiveness of EBD to save clients money while taking steps to best ensure positive outcomes. The Robert Wood Johnson
Foundation funded the publication of a white paper series entitled “Healthcare Leadership”. In one paper, Sadler et al. (2008) write:

There is a powerful business case that supports making intelligent evidence-based design decisions. In addition to the multiyear cost-savings opportunities, it is important to consider the implications of several major forces beginning to change reimbursement formulas and require public reporting of quality-safety outcomes as well as comparable patient satisfaction scores (p. 4).

As seen in this quote and throughout the series of five white papers, evidence-based design is explained to CEO’s and healthcare administrators as a tool for success. In fact, there is growing evidence that health care providers are increasingly requiring that design firms use EBD by mandating its use (Spikes & Aduddell, 2010; Ulrich et al., 2008). It naturally follows that a firm or designer that uses EBD is more likely to secure contracts than one that does not. This phenomenon has not currently been verified by existing research, and adds another facet to the question of designer motivations that has yet to be addressed. The Amabile model described above would classify economic efficiency as an “extrinsic” design practitioner motivation.

**Self-improvement.** A potential intrinsic motivation to use EBD may be the possibility to improve a practitioner’s design and create a successful healthcare interior. As discussed previously in this chapter, there is research supporting the idea that the improved design of a hospital may reduce stress and improve outcomes, efficiency, and safety for patients, their family, and staff (Ulrich et al., 2008). For example, the groundbreaking study by Ulrich (1984) showed that post-operative patients recover faster when provided a view of nature rather than a blank wall. Following this knowledge, design features such as access to natural light and nature are now considered as a necessity for healthcare facilities (de Swaan, Jencks, Verderber & Betsky, 2006). A designer may use information like this in their designs to enhance healing within a healthcare interior environment. The motivation to improve designs could be classified as “intrinsic” by the Amabile model. However, this potential motivation to use EBD has not currently been verified by existing research.
Conclusion

The current perceptions of EBD, including the range of definitions, are varied among authors. Sources suggest that there are many ways to use EBD, and the degree of use can be evaluated through different means, such as Hamilton’s EBD practitioner levels and normative and positive theory. Many believe the use of EBD improves the design of healthcare projects and encourage its use, while others criticize the amount and quality of research in the existing body of knowledge. The motivation to use EBD may be categorized into intrinsic and extrinsic motivation. A practitioner’s motivation to use EBD may be telling with regard to EBD’s staying power within the design field, but this has not been explored by previous research.

There are two preceding studies that explore EBD perceptions and use. Kopec’s 2010 research suggests that graduating students are not sufficiently prepared to use EBD. Cama’s 2009 research suggests that the majority of successful healthcare design firms are practicing as ‘level 1’ practitioners, or they interpret the evidence but do not go further to measure results, share their results publicly, or meet academic standards.

The previous research by Kopec and Cama provides a start in the study of EBD, but more research is needed to analyze the current state of EBD in healthcare practice. Chapter 3 will present the methodology of new research and detail the instrument and data collection. This data will be helpful to explore practitioners’ EBD perceptions, use, and motivation.
CHAPTER THREE

METHODOLOGY

As discussed in chapters 1 and 2, evidence-based design (EBD) is a fairly new term used in interior design and is predominantly practiced in the healthcare sector at present. Promoters of EBD believe that it improves the quality of a building or interior by using research to inform the design decisions. EBD studies address areas such as interior space planning, finishes, products, acoustics, and lighting.

Chapter 2 describes that while there are a growing number of followers of evidence-based design, critics exist as well. These individuals argue several points. First, that the body of research and "evidence" is small in comparison to more scientific fields, such as medicine. Secondly, much of the research cannot be duplicated, or may only apply to the specific project being tested, thereby reducing the ability to replicate the study. Third, there are studies published that may not be rigorous, jeopardizing the validity of the research. Lastly, critics charge there is not a widely known standard for what constitutes "evidence."

As described in Chapter 2, two previous studies have been conducted by others that query designers or students about evidence-based design. The strength of Kopec's study is that he compiled graduating design students' perceptions of evidence-based design, providing a look into design learning and revealing that research and evidence have room to grow in the curriculum. However, this research was limited only to a small sample size of 131 current or recently graduated students who attended level one research universities, teaching colleges, liberal arts colleges, and career/professional schools (Kopec, 2010). The nature of this study did not capture perceptions held by interior designers of all ages and backgrounds. The research conducted by Cama surveyed the top forty healthcare design firms on the extent of their use of evidence-based design (2009). The strength of Cama's study is that she captured the use of evidence-based design in practice. However, this study was limited in that it only
engaged the most successful interior design firms in the country. The designers who did not work at these large design firms were not included in the survey; therefore, the survey results may not represent a true synopsis of the entire field. Overall, these two research studies shed light on perceptions and use of evidence-based design, but they are limited to narrow populations. The research conducted for this study will expand on these other efforts by providing a broader outlook of the healthcare interior design practitioner field, including designers regardless of their firm affiliation.

**Research Questions**

The study’s research questions address healthcare interior design practitioners’ understanding and perceptions of EBD as well as their current motivations to use EBD in their work. Sub-questions activate the four broad areas of inquiry. A justification for each area of inquiry is detailed below.

1. How is evidence-based design (EBD) understood and perceived by healthcare interior designers?
   1a. How do healthcare interior designers define EBD?
   1b. What levels or standards of rigor do healthcare interior designers apply to their selection of EBD research studies used for reference?
   Justification. Due to the variety of definitions and interpretations of evidence, this question seeks to narrow down the EBD definition with which healthcare design practitioners most relate. This question also seeks to explore the perception of standards used to assess evidence, which will allow for a comparison of scientific research standards with professional design practice standards.

2. What are healthcare interior designers’ perceptions of EBD decision-making and non-EBD decision-making (such as historical, cultural and other creative decisions)?
   2a. Do healthcare designers perceive that EBD stifles or promotes creativity in the design process and solution?
   2b. How and at what point(s) is EBD used within the design process alongside non-EBD decision-making?
2c. What percentage of decisions do healthcare interior designers estimate they make using EBD versus non-EBD?
2d. What types of decisions are most often assisted by EBD?
2e. What types of decisions are least often assisted by EBD?
2f. Do healthcare designers perceive that normative and/or positive theory represent a sound basis for EBD decision-making?

Justification. This question seeks to discover and differentiate between the type of decisions made with and without the use of research, such as the creative or cultural considerations within a design project. This question also addresses the debate around creativity and evidence, and seeks to discover the viewpoint from healthcare interior designers. These questions will assist in evaluating the usefulness of EBD according to decision types. Finally, this question revisits the attempt to assess practitioners’ level of rigor for EBD decision-making by evaluating the difference between normative and positive theory. This will assist in evaluating practitioners’ standards for citing evidence.

3. What is the current state of healthcare interior designers’ use of EBD?

3a. How often do they use EBD within projects?
3b. What levels of involvement in EBD identified by Hamilton do healthcare interior designers currently engage in?
3c. What are the reasons that healthcare interior designers embrace or reject EBD as a decision-making tool?

Justification. This question will assist in exploring the degree of EBD use based on Hamilton’s levels. It also seeks to determine how often EBD is actually used by practitioners and why they either use or reject EBD.

4. What motivates healthcare interior designers to use evidence based design?

4a. Do healthcare interior designers perceive that EBD adds a sense of scientific validity to their field?
4b. Do healthcare interior designers perceive they secure more projects by referencing EBD?
4c. Do healthcare designers believe that using EBD strategies results in more effective projects?
4d. Are interior design professionals intrinsically or extrinsically motivated to use EBD?

Justification. As reported in Chapter 2, there is a lack of research on the motivation behind using EBD. This question seeks to address the potential motivators behind citing EBD, both intrinsic and extrinsic. This will assist in evaluating the permanence of the EBD movement.

Sample

The study used a convenience sample selection method, accessed through professional organizations that were willing to advertise this questionnaire to their members. The American Academy of Healthcare Interior Designers (AAHID), the American Society of Interior Designers (ASID), and The Center for Health Design (CHD) granted the author permission to survey their members.

Data Collection

The invitation procedure to participate varied slightly for AAHID, CHD and ASID respondents. This was due to the requirements of each organization for disseminating information. The author sent an email to members of AAHID at the beginning of the two-week survey window, inviting participants to voluntarily complete the questionnaire (see Appendix A). A follow-up email was sent to AAHID members one week later to remind the participants that the questionnaire would be open for seven more days.

The method of invitation for CHD and ASID was different from the personal email invitation for AAHID. The Center for Health Design (CHD) sent the survey invitation to their entire list of members in an email combined with other CHD information and was therefore sent to more individuals than just interior designers. However, a heading was placed above the invitation specifying “healthcare interior designers” only (see Appendix A). Similarly, ASID distributed the survey invitation through their "eye on design" and "ASID NewsFlash" newsletters that go to all ASID members for whom they have active
email addresses. Similar to the CHD instructions, only healthcare interior designers were instructed to participate.

The online questionnaire was open for a total of 41 days, which exceeded the expected 2-week window. This was necessary in order achieve a larger response rate, because each professional organization had their own specific timeline for newsletter distribution. The members of ASID received their first invitation through ASID’s “eye on design” e-newsletter, and 10 days later through the “ASID NewsFlash” newsletter. The members of CHD received their survey invitation via email newsletter two weeks following the invitations for AAHID and ASID, due to their newsletter timeline. A response goal was set to exceed the sample size of the Cama study, which had a total of 40 responses. It was decided at the outset that a response of approximately 100 or more designers would be satisfactory for this study given the study’s necessary schedule.

**Instrument**

The researcher generated quantitative and qualitative data through a questionnaire provided in Appendix C. The questions were generated from the author’s research questions, which in turn emerged from literature review. The questionnaire was cross-checked to include at least one question for each research question. In order to confirm face and establish content validity, the questionnaire was pilot tested with three interior design faculty members at Florida State University. Improvements were made to the questionnaire based on this review, which included reducing the total amount questions and re-writing phrases and questions for increased clarity. Question types include Likert scale multiple choice, short answer and open response to provide respondents the opportunity to expand their answers with qualitative information. The survey was administered through the online service Survey Monkey and all responses were electronically recorded.
Checks and Definitions of the Study’s Methodology

Limitations

Due to the online-based survey, the author assumes the results may have an inherent bias toward technology-proficient respondents and against those who do not communicate through email. The results also exclude healthcare interior designers who do not receive AAHID, ASID, and/or CHD email correspondence. That is, this sample captures the responses of individuals who are active in professional organizations and/or healthcare certification processes. Therefore, it is logical to assume the sample is likely highly interested in their own professional growth, which may include their interest in ideas such as EBD. Lastly, it is appropriate to acknowledge that respondents may be compelled to put themselves in the best light. Because survey results are based on self-reporting, results can be influenced by omissions or distortions (Mertens, 2010).

**External validity.** The perceptions reported here may differ from other healthcare interior designers who do not belong to professional organizations. This descriptive study seeks to capture the perceptions of healthcare interior designers about EBD in the fall of 2010, and is not able to be generalized to other points in time or to other populations.

**Delimitations.** This study does not inquire about other aspects of respondents’ professional practice or procedures. This study is focused on evidence-based design in practice and not on other types of decision-making tactics.

Study Procedure

The online questionnaire titled “Evidence-Based Design in Healthcare Interior Design Practice” underwent expert review through pilot testing with FSU interior design faculty and was modified based on their comments. Following this pilot test, The Florida State University Institutional Review Board approved the questionnaire on November 30, 2010 (see Appendix B). The questionnaire was created and administered through the online service SurveyMonkey in order to reach respondents through digital means so as
to maximize ease and boost participation. The online questionnaire was limited to one submission per individual. An incentive was offered to prompt participation: a reference sheet providing a definition of EBD and sources for further reading was provided through an online link once the respondent had completed the questionnaire. This incentive piece is provided in Appendix D.

The information from the questionnaire results are communicated here through descriptive statistics, percentages, quantitative data, tables and graphs. Narrative responses are provided throughout the various sub-topics for clarification and in-depth analysis that permits inclusion of respondents’ write-in comments.

**Handling of Missing Data.** The online questionnaire was designed in a specific order (see Appendix C) and participants were not allowed to skip a question. Approximately 23% of participants did not complete the questionnaire; therefore the total number of responses for each question differs. Number of respondents for each question is reported in this chapter’s discussion. The author analyzed all provided data and calculated percentages based on those responding to each question.

**Reliability.** The questionnaire was pilot tested with 3 design educators before distribution and was improved based on their comments. Future applications of the questionnaire could further confirm reliability through application of Cronbach’s alpha test or other methods.

**Summary**

Questionnaire answers were collected electronically through the use of Survey Monkey. Qualitative data will be analyzed using interpretational analysis methods that include coding and repeated reassessment of emergent themes. Quantitative data from the questionnaire will be summarized and reported as descriptive statistics.

Information will not be listed or referenced in this research study that identifies respondents or associated professional membership. The individuals’ privacy has been protected through anonymity and the use of a password in the gateway to the online survey. However, respondents were given the opportunity to voluntarily provide their
name and contact information that will assist the researcher in follow up for later planned studies.

It is hoped that the results of the survey will provide an encompassing view of the state of evidence-based design in healthcare interior design practice. An understanding of the current EBD perceptions, use, and motivations will enable the interior design field to move forward with awareness, and build on this knowledge to continue creating informed and innovative interior environments.
CHAPTER FOUR

ANALYSIS

The data presented in this chapter are results from a descriptive-style survey designed to identify interior designers’ current perceptions and use of evidence-based design (EBD). The survey was administered in the form of an online questionnaire described below. This chapter will identify the procedure of the study, describe the sample population for the survey, and explain the results of the survey. The results from the survey will be organized into the categories of EBD perceptions, use, and motivation.

Description of the Sample Population

The study used a convenience sample selection method. This is because the sample was accessed through professional organizations that were willing to advertise this questionnaire to their members. Individuals were invited to participate by their healthcare interior design professional association, thus ensuring participants were healthcare interior designers. The American Academy of Healthcare Interior Designers (AAHID), the American Society of Interior Designers (ASID), and The Center for Health Design (CHD) granted the author permission to survey their members. The demographics of the sample population are listed in figures 4.1 – 4.3, indicating years of experience, square footage of healthcare projects the respondents undertake, and respondents’ healthcare design certifications.
Figure 4.1: Years of interior design experience as indicated by respondents (n=97).

Figure 4.2: Healthcare project size on which respondents most often work (n=97).
The demographics of the sample population show that the majority of respondents have over 15 years of interior design experience. Also, respondents most often work on projects over 30,000 square feet (45%) or alternately on projects in the range of 10,000 square feet or less (42%). Fewer respondents (13%) worked on projects between 10,000 and 30,000 square feet. 40% of respondents indicated they are AAHID-certified, and 15.3% identified themselves as being EDAC-accredited. It is possible for a respondent to be both AAHID and EDAC affiliated simultaneously. Approximately half of respondents participated in neither organization's program, which lends the study respondent diversity in healthcare certification status.

As seen in Figure 4.3, 13 respondents identified they are EDAC-accredited. EDAC is somewhat separate from membership in CHD, AAHID and ASID. The Evidence-Based Design Accreditation and Certification program “educates and assesses individuals on their understanding of how to base design decisions on available, credible evidence” (EDAC, 2011, para. 2). The goal of the program is not to test a person on their comprehension of current existing evidence, but rather to assess them on the knowledge of the correct process to follow in order to identify, hypothesize, implement, gather, and report the data related to their project (EDAC, 2011).
**Questionnaire response.** A total of 97 healthcare interior designers responded, describing their perceptions of, use of, and motivation for their use of evidence-based design. The author sent the survey to all 102 members of AAHID. The total number of designers invited to participate in this survey is unknown, due to the method of invitation through ASID (with a total of 34,000 members) and CHD (with a total of 8,224 email addresses on file through membership). The invitation was sent to all 34,000 members of ASID, and the number of members who are healthcare interior designers could not be obtained. Similarly, the invitation was sent to 8,224 email addresses associated with CHD, which is not limited to healthcare interior designers.

The response rate for invited members of AAHID is 40%, as 102 invitations were emailed and 34 respondents identified themselves as an AAHID certified. For ASID members, 34,000 subscribers were emailed the “Eye on Design” newsletter and 37 readers clicked on the invitation link to take the survey. Ten days later, the ASID “Newsflash” was sent to 22,600 ASID members and 16 clicked on the invitation link to take the survey. The response rate is also difficult to determine for CHD, as the invitation was included in an email sent to all of their members. Their membership is not limited to interior designers, and includes various types of membership levels including corporate, professional, individual, and student memberships.

From the collected 97 responses, 34 respondents identified themselves as AAHID certified, and 7 respondents identified themselves as a member of both the EDAC and AAHID organizations. When given the opportunity to list additional certifications that were not specified, respondents identified additional qualifications (see Fig. 4.4). Interestingly, respondents reported more frequent certification/accreditation with either AAHID or EDAC than have completed the NCIDQ which is an examination that is more broad in its interior design content than AAHID or EDAC.
Survey Results

The information gathered from the survey is divided into the following topics for analysis in this chapter which correspond with the organization of content from this study’s literature review:

1. Perceptions of EBD
2. Use of EBD
3. Motivation for accepting or rejecting EBD

The results will be discussed and emergent themes identified after the questionnaire’s data is reported.

Perceptions of EBD

Definition of EBD. As stated in Chapter 2, there are a variety of published definitions for EBD. The definition of EBD was included in the survey because the author wanted to determine if there is disconnect between those who write about EBD and those who practice EBD. Because the given definitions vary in specificity, the author sought to determine which definition practitioners perceived as most accurate. The three definitions listed in the survey were chosen because they are consistently found throughout current publications. The authors of the definitions are discussed.
numerous times throughout Chapter 2 due to their extensive knowledge and published writings on the subject of EBD (CHD, 2010; Hamilton & Watkins, 2009). However for the purpose of this questionnaire, the authors were not indicated in the actual survey question to keep the focus on the content of the definitions.

Respondents were asked to identify if each listed definition accurately describes evidence-based design (thus giving respondents the opportunity to agree with more than one) (See Fig. 4.5). 34.6% of the respondents totally agree that Hamilton and Watkin’s vague definition defines EBD and 48.7% of the respondents partially agree with the definition “The thoughtful use of the best available knowledge to improve design decisions” (2009). The questionnaire also listed a more specific definition by Hamilton (“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 and unique project”) with which 51.9% of the respondents totally agree and 36.7% partially agree is an accurate EBD description (2009). Finally, 66.3% of respondents totally agree that the Center for Health Design’s definition accurately defines EBD, and 27.7% partially agree with the definition: “The process of basing decisions about the built environment on credible research to achieve the best possible outcomes” (CHD, 2010).
Figure 4.5: Results from survey regarding perceived accuracy of EBD definitions (n=85).

The Center for Health Design definition received the highest percentage of responses indicating total agreement. When answers to “totally” and “partially agree” are combined, all three definitions received high ratings: 94% of respondents agree with the CHD definition, 88.6% agree with Hamilton & Watkin’s detailed definition, and 83.3% agree with Hamilton & Watkin’s vague definition. Therefore, after analyzing the combined percentages it appears that most respondents trend toward preferring the more specific definitions.

**Level of interest in EBD.** As ‘evidence-based design’ is described as a trendy concept in the interior design industry (Hamilton, 2009), it was prudent to determine from the sample if indeed there was significant interest in EBD as a design strategy.
Therefore, the author surveyed the respondents on their current level of interest in EBD. Specifically, the question was raised to explore whether EBD is actually significant to practicing professionals, or if it is just a fleeting idea in the research and publication field and merely a selling point for healthcare conferences (where EBD is often showcased as a prominent inclusion). However, responses identified that nearly all (97.6%) of the respondents were very or somewhat interested in using EBD in their own healthcare design practice (see Fig. 4.6). The results suggest that evidence-based design is indeed perceived as relevant to the responding practitioners. As this sample captured perceptions of individuals who are active in professional organizations and/or design certification, respondents’ interest in EBD was expected to some degree.

![Pie chart showing responses to interest in EBD](chart.png)

<table>
<thead>
<tr>
<th>Answer Options</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very interested</td>
<td>72.9%</td>
<td>62</td>
</tr>
<tr>
<td>Somewhat interested</td>
<td>24.7%</td>
<td>21</td>
</tr>
<tr>
<td>Neutral</td>
<td>2.4%</td>
<td>2</td>
</tr>
<tr>
<td>Not very interested</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td>Not at all interested</td>
<td>0.0%</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 4.6: Respondents’ reported level of interest in EBD (n=85).

Numerous respondents (32) commented further (at their option) regarding why they felt this way about EBD (from Fig. 4.6). Fifteen respondents (38% of total sample)
volunteered that they believe the use of EBD has the ability to improve the overall design of a project either holistically or for specific decisions to benefit the end user. One respondent wrote “the best part of the job is to positively affect the lives of people every day. EBD can assist us in making good decisions, so it makes sense to consider the research and see how it applies on a per project basis.” This captures the essence of many (15) similar responses and suggests that respondent designers are consciously considering the quality of their work and how it will affect those who interact with healthcare interiors.

However, four respondents (5% of sample) wrote that they are interested in EBD because clients are expecting it. This suggests that some practitioners may realize the marketability of EBD, and can use it to their benefit. One respondent elaborated on the business advantage of using EBD:

“It's all about the bottom line. Healthcare is very competitive right now and the clients want hard facts on what is going to give their patients the best care. They can then show that they used due diligence in their use of spaces by the patients. So in some ways it also about responsibility as well as liability. And of course it also helps them decide on budget. They may arbitrarily decide on a budget only to find that EBD would require a higher budget - thus sending them back to re-evaluate.”

Types of acceptable evidence. As discussed in chapter 2, writers of EBD content are specific about those types of information that constitute acceptable ‘evidence’ for applied use in interior design projects. Therefore, the author was curious about practitioners’ understanding of the definition of evidence. For authors of EBD, this distinction is one between positive information (usually conclusions derived from verifiable research studies based on experimentation or similarly acceptable methods) or normative information, which is based on experience, or ‘how designers have always done things’. An example of normative information is the 16” spacing of wall studs. No determinative study suggested this spacing was best—it has just always worked well this way. EBD authors identify that positive information is acceptable evidence, while normative information is not.
Respondents were asked to determine if a series of identified design decisions was based on evidence as identified in the definition of EBD without any further definition of positive or normative types of content (see Fig. 4.7). From the two examples given, one was based on experience and the other based on research. As expected, 89.3% of respondents specified that positive evidence (design decisions justified by empirical research) was indeed a decision based on evidence. However, 26.5% of participants reported they believed that normative evidence (design decisions justified on ‘this is how we have always done it’) is itself a form of EBD, which is contrary to the definitions they themselves previously indicated in the questionnaire. An interesting note to this result can be found in analysis of a subsection of respondents. Without exception, all EDAC-accredited respondents (13 of a total of 84 responses) identified the normative evidence example as “not evidence-based design”, and the positive evidence example as using EBD. This suggests that EDAC may be assistive in correcting errors in perceptions of EBD.
Summary: Perceptions of EBD. The findings from the survey regarding EBD definitions, level of interest, and acceptable evidence provide a base for analyzing foundation EBD perceptions. Respondents identified a range of specific definitions with which they agree. Also, nearly all of the respondents have an interest in using EBD in their healthcare design firm, and provided further insight into perceptions with many narrative responses explaining why they are interested in EBD. Finally, analysis of normative and positive evidence shows that practitioners vary in what they perceive to be acceptable evidence on which to base decisions. These perceptions will be linked with the results below from EBD use and motivation for further analysis in Chapter 5.

Use of Evidence-Based Design

Designers’ use of EBD is addressed in this questionnaire to determine if EBD is being used according to the definitions specified in the questionnaire and to evaluate levels of EBD rigor that practitioners engage in. As mentioned above, there are a range of EBD perceptions among practitioners, which could also signal a range of degree of
EBD use by practitioners. It is important to understand how designers currently use EBD in order to conjecture if the movement is still new or reaching maturity.

**Use of EBD sources.** The first topic in this section addressed sources of EBD evidence. The sources that healthcare designers reference for evidence are key to EBD application in general. Therefore, the questionnaire queried respondents about their assessments of various sources of information as appropriate. This question echoes a similar question issued by Kopek in 2010 to recent interior design graduates and educators.

The survey shows that responding designers vary in their willingness to cite certain sources as evidence for design decision-making (see Figure 4.8). Interestingly, a publication from a healthcare design advocacy group ranked slightly higher than peer-reviewed journal articles in the number of respondents who would always cite those sources as evidence (41.7% and 39.3%). Further, more participants responded that they would only “sometimes” use these sources as evidence (53.16% advocacy group and 56.0% peer-review) than would “always” use them (41.7% and 39.3%, respectively). A striking result from this question is that 34.5% of respondents would sometimes cite a Wikipedia article, and 41.7% would cite an article from the popular layperson magazine *Architectural Digest*. This result is interesting as *Wikipedia* is an open source site that permits anyone to add information to a topic regardless of the information’s verifiable accuracy (*Wikipedia*, 2011). While *Architectural Digest* has reporters and editors, it does not publish unbiased research studies. The majority of respondents indicated that they would never use Wikipedia (65.5%) or Architectural Digest (56.0%) as a source of evidence.

The question’s free response permitted respondents to identify various other sources of evidence they reference. Responses included findings presented at conferences (2), textbooks (2), seminars (1), AAHID forum information sharing (1), and university based research/white papers (1). Two respondents indicated they would cite personal experience or in-house project experience, which echoes the responses discussed above concerning positive and normative information.
Level of EBD use. The second topic in this section addresses the degree of EBD engagement by respondents. EBD sources suggest that practitioners practice EBD at a variety of levels (Hamilton, 2009). These levels are divided into the following four categories and make clear the point that there are two ways EBD can be employed within a design practice: (1) Referencing information from which to make decisions; and, (2) distributing new knowledge based on one’s new designs and their outcomes.
Table 4.1: The 4-level model of evidence-based design.

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Interpret the research:</td>
</tr>
<tr>
<td></td>
<td>Stay current with literature in the field; follow the evolving environmental</td>
</tr>
<tr>
<td></td>
<td>research related to the physical setting; interpret the meaning of evidence</td>
</tr>
<tr>
<td></td>
<td>as it relates to specific projects; use design concepts based on benchmark</td>
</tr>
<tr>
<td></td>
<td>reviews of other projects; produce work that advances the state of the art</td>
</tr>
<tr>
<td></td>
<td>by developing tangible examples of improved design.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Hypothesize and measure:</td>
</tr>
<tr>
<td></td>
<td>Hypothesize the expected outcomes of design decisions; measure the results;</td>
</tr>
<tr>
<td></td>
<td>employ new design methods; understand the research and interpret the</td>
</tr>
<tr>
<td></td>
<td>implications; be able to connect the design to a measurable outcome;</td>
</tr>
<tr>
<td></td>
<td>resist the temptation to report success and downplay failure.</td>
</tr>
<tr>
<td>Level 3</td>
<td>Share unbiased results publicly:</td>
</tr>
<tr>
<td></td>
<td>Report results publicly through writing or speaking; share information</td>
</tr>
<tr>
<td></td>
<td>beyond the firm or client team; subject methods and results to scrutiny</td>
</tr>
<tr>
<td></td>
<td>from others.</td>
</tr>
<tr>
<td>Level 4</td>
<td>Peer review/Academic standards:</td>
</tr>
<tr>
<td></td>
<td>Publish their findings in peer-reviewed journals; collaborate with academic</td>
</tr>
<tr>
<td></td>
<td>social scientists; subject their work to the highest level of rigorous</td>
</tr>
<tr>
<td></td>
<td>review.</td>
</tr>
</tbody>
</table>

Note. This model describes various degrees of engagement in EBD by designers. A practitioner must meet the requirements of the previous level(s) to advance to a higher level. Adapted from “4 Level Model of Evidence-Based Design,” by D. K. Hamilton and D. H. Watkins, 2009, Evidence-based Design for Multiple Building Types, p. 28. Copyright Kirk Hamilton and WHR Architects, Inc.

This survey echoes a similar question in Cama’s “Healthcare Giant” survey, discussed in Chapter 2. However, this survey expanded its question beyond the Cama study’s sample population boundaries (designers in the top 40 healthcare firms) to a larger variety of healthcare designer respondents. To increase reliability in responses, the respondents were given two different scenarios of participation for each level (see the complete questionnaire text in Table 4.3).
Similar to Cama’s results (2009), this survey suggests that the majority of respondents practice at “Level 1”, and decrease in frequency as the activities become more rigorous in levels 2 through 4.

Table 4.2: Percentage results regarding practitioner level of EBD.

<table>
<thead>
<tr>
<th>Definition of Practitioner Level</th>
<th>Respondent Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level 1:</strong> Makes an effort to understand and determine the validity of the research they reference, and interprets the meaning of the evidence as it relates to their colleagues and/or clients.</td>
<td>70.8%</td>
</tr>
<tr>
<td><strong>Level 2:</strong> Hypothesizes the anticipated outcome of their design decisions to clients or colleagues, and connects a design decision to a quantifiable result produced by research.</td>
<td>63%</td>
</tr>
<tr>
<td><strong>Level 3:</strong> Conducts research on their designs and subjects the methods and outcomes to scrutiny from others.</td>
<td>26.6%</td>
</tr>
<tr>
<td><strong>Level 4:</strong> Collaborates with social scientists on the research associated with their designs and publishes their research findings from design projects in peer-reviewed journals.</td>
<td>13%</td>
</tr>
</tbody>
</table>

Note. Answers to each two-question set for each respondent were averaged to generate these percentages. A practitioner must meet the requirements for the level 1, 2 and 3 practitioner before they can be a level 4 practitioner. Levels adapted from “4 Level Model of Evidence-Based Design,” by D. K. Hamilton and D. H. Watkins, 2009, Evidence-based Design for Multiple Building Types, p. 28.

These results suggest that most responding designers currently use evidence for design decision-making, but do not consistently undertake the extra effort of producing their own research, nor share that new evidence with their peers or clients. As Cama’s study queried the top 40 healthcare firms and reached a similar result, this study suggests it is possible that designers’ predominant level 1 EBD practice is not limited to the most successful healthcare firms (see Fig. 4.9).
Figure 4.9: Respondents’ reported levels of EBD practice (n=78).

Describe the extent of your participation in the following activities with regard to your healthcare projects.

**LEVEL 1**
- Take steps to understand and assess the validity of research and literature (M=4.08; SD=0.91 on a scale of 1 to 5.)
  - Always: 37.2% (29)
  - Usually: 29.5% (23)
  - Sometimes: 14.1% (11)
  - Rarely: 6.4% (5)
  - Never: 1.3% (1)

**LEVEL 2**
- Explain and interpret the meaning of evidence as it relates to specific projects to my colleagues and/or clients (M=3.79; SD=1.02 on a scale of 1 to 5.)
  - Always: 33.3% (26)
  - Usually: 28.2% (22)
  - Sometimes: 26.9% (21)
  - Rarely: 6.4% (5)
  - Never: 2.6% (2)

**LEVEL 3**
- Hypothesize (either verbally or in writing) the expected outcomes of design decisions to my colleagues and/or clients (M=3.79; SD=1.03 on a scale of 1 to 5.)
  - Always: 41.0% (32)
  - Usually: 33.3% (26)
  - Sometimes: 21.8% (17)
  - Rarely: 6.4% (5)
  - Never: 3.8% (3)

- Connect a design decision to a measurable result produced by research (M=3.67; SD=0.96 on a scale of 1 to 5.)
  - Always: 35.9% (28)
  - Usually: 33.3% (26)
  - Sometimes: 23.1% (18)
  - Rarely: 5.1% (4)
  - Never: 2.6% (2)

**LEVEL 4**
- Undertake research on my designs and subject these methods and results to scrutiny from others (M=2.87; SD=1.26 on a scale of 1 to 5.)
  - Always: 34.6% (27)
  - Usually: 17.9% (14)
  - Sometimes: 17.9% (14)
  - Rarely: 15.4% (12)
  - Never: 7.7% (6)

- Report the results of my evidence-based design decision-making publicly through writing or speaking (M=2.43; SD=1.25 on a scale of 1 to 5.)
  - Always: 29.5% (23)
  - Usually: 25.6% (20)
  - Sometimes: 21.8% (17)
  - Rarely: 15.4% (12)
  - Never: 7.7% (6)

**LEVEL 5**
- Collaborate with academic social scientists on research related to my designs (M=2.30; SD=1.06 on a scale of 1 to 5.)
  - Always: 35.9% (28)
  - Usually: 30.8% (24)
  - Sometimes: 20.5% (16)
  - Rarely: 10.3% (8)
  - Never: 2.6% (2)

- Publish findings from my research on my design projects in peer reviewed journals (M=1.86; SD=1.11 on a scale of 1 to 5.)
  - Always: 53.8% (42)
  - Usually: 17.9% (14)
  - Sometimes: 15.4% (12)
  - Rarely: 10.3% (8)
  - Never: 2.6% (2)
**Frequency of EBD use.** Practitioners vary regarding how often they have used EBD within the past three years on healthcare projects. 27.8% of respondents indicated that they have used EBD on 20% to 50% of their healthcare projects, which was the most frequent percentage for this question (see Table 4.3). Nonetheless, results on this question were fairly evenly distributed across the five response choices, from 20% or less to more than 80%.

Table 4.3: Survey results regarding the percentage of projects with EBD (n=79).

<table>
<thead>
<tr>
<th>What is the percentage of your healthcare projects that you have engaged with evidence-based design content in the last three years? (This engagement includes referencing EBD literature by others or producing evidence-based information yourself or through your firm.)</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>20% or less</td>
<td>17.7%</td>
<td>14</td>
</tr>
<tr>
<td><strong>Between 20% and 50%</strong></td>
<td><strong>27.8%</strong></td>
<td><strong>22</strong></td>
</tr>
<tr>
<td>Between 50% and 80%</td>
<td>21.5%</td>
<td>17</td>
</tr>
<tr>
<td>More than 80%</td>
<td>22.8%</td>
<td>18</td>
</tr>
<tr>
<td>I have not used evidence-based design in the last three years.</td>
<td>10.1%</td>
<td>8</td>
</tr>
</tbody>
</table>

This survey also sought to bring clarity to the often-ignored contextual aspect of EBD in practice at the micro level. That is, what quantity of decisions do practitioners make on a typical project that do—or do not—use EBD. 33.8% of respondents replied that a range of half to more than 80% of their decisions are made without the use of EBD. Interestingly, 35.1% of respondents use EBD for 50% or less of their decisions, and 16.9% use EBD for less than 20% of their decisions (see Table 4.4). This suggests that there are significant quantities of design and creative designs made by the designer without research or evidence to justify their decisions. Conversely, 31.2% of respondents indicate they make 70% or more of their decisions using EBD. These results again describe a fairly diverse distribution across the range of five response choices.
Table 4.4: Survey results on the amount of decisions made without the use of EBD (n=77).

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Response Percent</th>
<th>Response Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10%</td>
<td>11.7%</td>
<td>9</td>
</tr>
<tr>
<td>Between 10% and 30%</td>
<td>19.5%</td>
<td>15</td>
</tr>
<tr>
<td>Between 30% and 50%</td>
<td>35.1%</td>
<td>27</td>
</tr>
<tr>
<td>Between 50% and 80%</td>
<td>16.9%</td>
<td>13</td>
</tr>
<tr>
<td>Over 80%</td>
<td>16.9%</td>
<td>13</td>
</tr>
</tbody>
</table>

As seen in the results listed above, the frequency of EBD use is varied throughout the respondents. However, these results may be influenced by the inaccuracies as to what EBD really is, as perceived by the study’s respondents.

**Application of EBD information within the design process.** The questionnaire sought to gather information about the nature of respondents’ integration of evidence gathering and application within the design process to assist them with the design of a project. Results suggest that practitioners predominantly use EBD information in the early stages of the design process. Over half of the respondents use EBD often in the programming phase (68.5%), and reported the most frequent EBD use in the schematic design phase and design development phase (each at 76.7%) (see Fig. 4.10). The construction documents phase and site supervision stage are split between the practitioners that use EBD often (each at 39.5%) and those that hardly ever or never use it (38.1% and 52.7%). Despite the author’s expectations, only 53.3% of respondents often use EBD in the post-occupancy stage of the design process. This is surprising because the author anticipated that most practitioners who use EBD would follow up their designs with post-occupancy evaluations or interviews to determine the project’s successes and/or items for their own improvement. This number is quite different from the 76.7% of practitioners who reported frequent use of EBD in the schematic design.
and design development phases. Post-occupancy evaluations (POE) and interviews would provide an opportunity to evaluate the effectiveness of designs, products, finishes, etc, and may assist in making informed decisions on future projects.

**Figure 4.10:** Respondents’ reported use of EBD in the stages of the design process (n=77).

**EBD assistance with specific design process activities.** There are many important activities within each step of the design process, which require thoughtful and strategic decisions by a designer. Therefore, the questionnaire asked respondents to identify those actions that EBD helped them to undertake in order to better understand their specific use of EBD. The examples for this question were chosen because they are typical activities completed in a healthcare design project. From the results, respondents most often use EBD with space planning (76.7%) followed by furnishings, fixtures, and equipment specification (74.1%). (See Fig. 4.11). However, two respondents provided additional comments elaborating on the economic considerations.

<table>
<thead>
<tr>
<th>Stage of Design Process</th>
<th>Use of EBD (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-Occupancy</td>
<td>24.0%</td>
</tr>
<tr>
<td>Site supervision</td>
<td>20.0%</td>
</tr>
<tr>
<td>Construction Documentation</td>
<td>22.4%</td>
</tr>
<tr>
<td>Design Development</td>
<td>31.2%</td>
</tr>
<tr>
<td>Schematic Design</td>
<td>37.7%</td>
</tr>
<tr>
<td>Programming</td>
<td>30.3%</td>
</tr>
</tbody>
</table>

![Bar Chart](chart.png)
of furnishings, fixtures, and equipment, suggesting that practitioners are limited to the brands and/or selection offered by the vendors or contractors who were awarded the contract from a prior bidding process. Therefore, some practitioners may not have the authority to specify specific products, equipment or finishes that were recommended by the respective research.

An interesting result is that 68.9% of respondents reported frequent use of EBD to assist with color palette selection. However, four respondents stated that there is limited research on color theory, with one suggesting that color selection is based on cultural or anecdotal information. Another respondent stated, “we are struggling with the articles and research on color - most of the previous articles/research are being "debunked" and hearing that the affects [sic] of color cannot be definitively analyzed.” Two respondents elaborated on the general issue of limited research in the field. One commented “often, I need to explain to clients that there has been an over generalization of the limited research and that what is presented by others as EBD is just theory.” This recalls, as literature in chapter two discussed, the predicament of designers who may wish to use EBD, but are hindered by the relatively small amount of research to justify decisions with “evidence” (ASHE, 2008; Stankos & Swartz, 2007).
Figure 4.11: Respondents’ perceptions regarding their use of EBD to assist with specific design activities (n=77).

**Motivation for Accepting or Rejecting EBD**

The final of the three topics of the survey queried respondents on the reasons they either use or do not use evidence-based design. The motivation aspect of EBD is heretofore unexplored and may be important because understanding designers’ motivations for using EBD may assist in anticipating its staying power. As chapter 2 described, the ‘scientizing’ of design that EBD may represent is not new. That is, Cross describes that efforts to validate design may have occurred at two previous times in the 20th century. He explains the relationship between design and science in history, and that there appears to be a 40-year cycle of modern design being paired with scientific methods (Cross, 2001). That is, it is possible that interest in evidence-based design may once again subside as it has in previous eras.
The study also sought to discern whether practitioners are intrinsically or extrinsically motivated to use EBD. As mentioned in Chapter 2, an intrinsically motivated person is motivated “primarily for their own sake, because the work itself is interesting, engaging, or in some way satisfying” (Amabile et al., 1994, p. 950). For the purposes of this study, an intrinsically motivated practitioner is one that uses EBD for their own sake or for their own satisfaction of improving their design. Conversely, an extrinsically motivated person is motivated “primarily in response to something apart from the work itself, such as reward or recognition or the dictates of other people” (Amabile et al., 1994, p. 950). Therefore an extrinsically motivated practitioner may use EBD for recognition or reward. For this study, reward is interpreted as additional projects or revenue.

**Intrinsic Motivation.** The questionnaire reveals that almost all of the respondents (94.8%) agree that EBD helps them reach design decisions, which suggests a measure of intrinsic motivation, or their belief that EBD will help their own decisions be more successful (see Fig. 4.12 and Table 4.5). As stated in Chapter 2, there are critics of EBD who claim that its use stifles creativity in the field because research interrupts the creative process (Pati, 2010). However, 65.8% of respondents disagree with the suggestion that EBD stifles creativity in generating a healthcare design solution. In contrast to suppressing creativity, 81.6% of respondents agree that EBD adds a sense of scientific validity to the interior design field. These two results provide a concise look into two seemingly opposite effects of using EBD, showing that perhaps responding designers are able to maintain their creativity while integrating a scientific idea into a project.

It is also noteworthy that 84.2% of respondents agree that using EBD strategies results in more effective projects. This result suggests that practitioners may be intrinsically motivated to use EBD as a tool for project success, to create a better end result.

Several free responses suggest that EBD could also be a way to increase the credibility of the interior design field. One respondent stated: “EBD brings the best possible information to clients, and when your professional credibility is based on successful projects on all levels, why would you ignore it?” Indeed, two other
respondents wrote that they believe EBD provides a way to differentiate between the “designers” and the “decorators”. According to one respondent, “using EBD advances the field of healthcare design; also separating the decorators and those who claim they are healthcare designers, from those who really understand and put EBD into practice.”

The results discussed above reveal several possible intrinsic motivations for using EBD. In sum, designers may be intrinsically motivated to use EBD because it helps them make decisions while adding a sense scientific validity to their profession. In addition to this, findings suggest that responding designers sense that EBD results in more effective projects yet does not overly hinder creativity.

Table 4.5: Percentage results regarding practitioner’s motivation for using EBD (n=76).

<table>
<thead>
<tr>
<th>Statement (Intrinsic or Extrinsic indicated)</th>
<th>TA</th>
<th>A</th>
<th>N</th>
<th>PD</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I) EBD helps me reach design decisions.</td>
<td>39.5%</td>
<td>55.3%</td>
<td>2.6%</td>
<td>1.3%</td>
<td>1.3%</td>
</tr>
<tr>
<td>(I) EBD stifles creativity in generating a healthcare design solution.</td>
<td>2.6%</td>
<td>13.2%</td>
<td>8.4%</td>
<td>6.3%</td>
<td>9.5%</td>
</tr>
<tr>
<td>(I) EBD adds a sense of scientific validity to the interior design field.</td>
<td>40.8%</td>
<td>40.8%</td>
<td>13.2%</td>
<td>5.3%</td>
<td>0%</td>
</tr>
<tr>
<td>(I) Using EBD strategies results in more effective projects.</td>
<td>34.2%</td>
<td>50.0%</td>
<td>13.2%</td>
<td>0%</td>
<td>2.6%</td>
</tr>
<tr>
<td>(E) Including EBD references helps me sell the job.</td>
<td>32.9%</td>
<td>47.4%</td>
<td>14.5%</td>
<td>3.9%</td>
<td>1.3%</td>
</tr>
<tr>
<td>(E) EBD helps me assure the client that a decision is appropriate.</td>
<td>46.1%</td>
<td>47.4%</td>
<td>5.3%</td>
<td>0%</td>
<td>1.3%</td>
</tr>
<tr>
<td>(E) EBD is used only because it is required in projects’ RFP parameters.</td>
<td>1.3%</td>
<td>9.2%</td>
<td>30.3%</td>
<td>15.8%</td>
<td>43.4%</td>
</tr>
<tr>
<td>(E) My firm secures more projects by referencing EBD.</td>
<td>13.2%</td>
<td>19.7%</td>
<td>53.9%</td>
<td>7.9%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>

Note. I = intrinsic motivation; E = extrinsic motivation as defined by the study. TA = totally agree; A = agree; N =neutral; PD = partially disagree; D = disagree.
Extrinsic Motivation. The questionnaire queried respondents regarding extrinsically motivated reasons to use EBD. The vast majority of respondents (80.3%) agree that including EBD references help them sell the job. However, respondents seem hesitant to state that their firm secures more projects by referencing EBD, with 53.9% remaining neutral on this question (see Fig. 4.12 above). Three respondents
offered additional comments suggesting that they do use EBD in order to enhance their business and/or financial advantage. One respondent wrote “my firm secures more projects by referencing EBD: My firm does not actively market our use of EBD; however, I believe that we secure more projects based on client satisfaction because of our use of EBD.” Another respondent views it differently: “…I do not rely on EBD to sell a job, nor do I rely on a client to require it. It is part of my firm's process, not a selling point.” Finally, one respondent counters with an alternative idea: “We are currently using evidence based design in many of our healthcare project [sic], but bottom line on what gets a project (from our experience) is fee. EBD costs more.” Ultimately, one respondent commented with concern about the use of EBD as a market advantage:

“We are considered a thought leader in the field so I may be biased. We do find however that the many firms, architectural in particular, use EBD for marketing purposes only and as such the studios have not embraced its process methodology. Or one or two studios leading a firm to be noted as evidence-based but if the "B" team is assigned they revert back to their comfortable traditional silos. Also note that many clients do not know what they are asking for even though they feel compelled to put the service in their RFP. We are often brought in to balance that lack of knowledge. It is a good time to reposition the interior design profession by owning this design methodology and the baseline of design intervention knowledge that exists in the field.”

On a different note, the majority of respondents (59.2%) indicated that they do not use EBD solely because the client has requested it. This suggests again that these practitioners are genuinely interested in EBD, and are seeking ways of integrating it into their projects even when the client does not explicitly ask for EBD use.

The survey’s results strongly suggest that EBD is used to justify design choices to clients and secure their approval. Nearly all of the respondents (93.5%) feel that EBD helps them assure their client that a decision is appropriate. However, one respondent remarked that “good design decisions are made without the use of evidence from research studies on a daily basis. However, with that said, experienced based designs are as valuable and must not be overlooked in EBD discussions. Evidence provides
credibility, however, that is rarely required when experience and common sense speaks loud and clear”.

The survey’s results generally support the notion that responding designers are extrinsically motivated to use EBD because it helps sell the job and EBD assures the client that a design decision is appropriate. However, designers are not strongly motivated right now by requirements for EBD from clients and they are unsure if referencing EBD helps them secure more projects.

In summary, designers are responding to both extrinsic and intrinsic motivations for using EBD. Designers identified intrinsic motivations that drive them to use EBD, such as creating more effective projects. Designers also perceive that extrinsic motivations exist and that EBD will help them sell the job and assure clients. However, respondents identify that clients themselves (or RFP’s) are not particularly strong extrinsic motivators at this time. When both types of motivation are considered, results suggest that a strong drive to use EBD exists for responding healthcare interior design projects.

**Summary of Results**

From the author’s analysis of the survey, responding practitioners view evidence-based design with great interest and hold a variety of perceptions regarding its use. The practice of EBD is used in moderation by most respondents and at different levels of thoroughness. The motivation for referencing EBD is two-fold: it personally helps designers reach decisions and create more effective projects, while also giving more credibility to their work and possibly maintaining a competitive business strategy. The respondents from this survey generally hold the perception that EBD has the potential to improve the overall design and outcomes of healthcare projects. Yet, the questionnaire suggests that broad consensus does not yet exist on what constitutes acceptable evidence. Taken as a whole, these impressions paint a picture of a movement that is generally early in its development, yet is held in sufficiently high regard by designers that it may expand its influence and application as it becomes more defined in its definitions and procedures.
CHAPTER FIVE

CONCLUSIONS

This chapter will analyze the study’s data gathered from the administered questionnaire and discuss themes that have arisen from its findings. It will also summarize the previous chapters as well as provide recommendations for advancing EBD and ideas for future research.

The intent of this study was to determine the current state of evidence-based design within healthcare interior design practice. EBD’s previous literature, recommended use, and opinions were analyzed to establish the direction of the study, which revealed the need to survey practitioners. The questionnaire explored the perceptions currently held by an available sample of practitioners regarding EBD, how they engage with EBD, and their motivations for using EBD in their healthcare practice.

Emergent Themes

The following section will explore the primary emergent themes derived by the author from the survey results and narrative responses. They are intended to highlight the most pertinent information this study discovered regarding EBD perceptions, use and motivations. The author will also provide commentary on the importance of these outcomes and offer recommendations where appropriate. These themes might influence future studies, and should be subject to further testing to verify their results and extend their ability to be generalized.

Current Pervasiveness of Level 1 Practice

As reported in the results of this survey, the majority of responding practitioners are taking steps to understand the research they aim to use and some are even connecting design decisions to results. However there are only a small number of practitioners who are taking further steps to exceed the ‘level 1’ use of others’ evidence
and engage in level 2, 3 or 4 activities such as conducting their own research, permitting its review by others, and publishing their results. The study also found that most designers are practicing as a baseline ‘Level 1 Practitioner’ (Hamilton, 2009), which means they interpret relevant literature and relate their designs to research, but rarely go further in creating hypotheses, or sharing their findings with others.

This lends further support to similar findings in Cama’s 2010 study of the top forty healthcare firms. To increase the credibility of the interior design profession, an individual’s use of EBD should evolve to include the practice of sharing one’s own knowledge, information, or research for dissemination by fellow colleagues and researchers.

**Acceptable Sources of Evidence Are Varied**

Most practitioners agreed that peer-reviewed journals and healthcare design advocacy publications were credible sources to use as a reference from which to make design decisions. However, 35% of respondents also felt that Wikipedia would be an acceptable source to use as evidence for a project, which is surprising due to the large discrepancy in credibility between peer-reviewed journals and Wikipedia. This varies from generally acceptable definitions of EBD, which generally define acceptable evidence as empirical in nature or other styles of peer-reviewed research.

If a designer is misled by incorrect information found online from an unverified source or in a popular magazine, the result could be unfortunate and embarrassing. The questionnaire results suggest that most practitioners believe EBD adds a sense of scientific validity and credibility to the interior design field. This idea may be in contrast or potential dispute if a practitioner is willing to cite a wide variety of sources as evidence that expand beyond what is generally recognized as research.

A positive discovery from this survey is that EDAC accredited respondents have shown to be discerning in their choice sources. For example, all EDAC respondents rejected Wikipedia as an accepted source for evidence. This result suggests that EDAC passage could be associated with an understanding of evidence more closely related to accepted definitions of EBD.
**Personal Experience as Acceptable Evidence**

Respondents also interpret evidence in various ways with the majority distinguishing between normative (decisions based on experience, or because ‘we’ve always done it this way’) and positive theory (decisions based on testable, replicable studies) to cite evidence. However, 26% of respondents believe that normative theory represents a sound basis for EBD decision-making. This is contrary to accepted definitions of evidence-based design, which do not cite personal experience as a valid source of evidence. Additionally it was noted through narrative comments from three respondents that they consider personal or in-house experience to be sound evidence. One respondent wrote:

“Good design decisions are made without the use of evidence from research studies on a daily basis. However, with that said, experienced based designs are as valuable and must not be overlooked in EBD discussions. Evidence provides credibility, however, that is rarely required when experience and common sense speaks loud and clear.”

This may be a reflection of designers’ varying perceptions on the definition of evidence as illustrated by their answers to the EBD definition question, and also the question that queried designers about acceptable sources of evidence.

The question of the validity of personal experience is an area perhaps worthy of further discussion and inquiry within definition-setting bodies for EBD, especially as this study’s result may indicate that designers are uncertain that decisions made without EBD are defensible. A discussion about the very definition of the word ‘evidence’ may also be helpful.

**Extent of EBD Use**

This study also sought to understand both broadly and specifically healthcare interior designers’ engagement with EBD decision-making and non-EBD decision-making. This represents an area of EBD practice not explored in previous studies. The majority of designers use EBD to assist with decisions regarding space planning and fixtures, furnishings, and equipment specifications. They also most often use EBD in the schematic design and design development phase of the design process, while they
least often use EBD in the construction documentation and site supervision phase. This is somewhat surprising, given the usefulness of conducting post-occupancy evaluations in order to learn from a project, and not repeat the same mistakes again.

The results also revealed the degree of current overall EBD use by practitioners, with most respondents reporting they have used EBD on 20 to 50% of their healthcare design projects within the last 3 years. On a smaller scale, even though respondents indicated a high level of interest in using EBD, this study found that most designers are using EBD for less than 50% of their decisions. This could be because, as stated in Chapter 2, there are not many studies currently available for reference or citation (Stankos & Swartz, 2007). This is revealing and is the first known descriptive study that has sought to understand the extent of EBD use on projects. As such, this information brings a sense of reality to the pervasiveness of EBD in current conference literature, certifications, and published research, and lends a sense of reality-based context regarding EBD use in relation to other decision-making techniques.

**EBD Used as a Tool for Practitioners – Not A Replacement for Creativity**

Though it has been previously reported that some believe EBD takes the creativity out of the design process, the majority of these respondents disagree with that statement. This study found that most designers do not believe EBD stifles creativity within the design process. Yet, most respondents reported that they make over 50% of their decisions without the use of EBD. Therefore, EBD as a design decision-making tool is the current exception and not the rule. It is reasonable to conclude that for this questionnaire’s responding designers, EBD as a design process strategy is not currently poised to replace their intuitive skills and creativity, but instead may be realistically called a complement to their design process.

Most respondents identified with using EBD in the early stages of the design process, and most often used EBD with activities such as space planning and FF&E specifications. This suggests that EBD is used as a tool to inform decisions such as room adjacencies or suggested features, acoustical finishes, and ergonomic furniture. Free response questions at times reflected the problem of EBD evidence availability. For example, color studies were referenced, but their number and quality were noted by one respondent as a hindrance to EBD application. By using EBD as a helpful tool with
design decision making rather than replacing creativity, practitioners may be able to generate successful projects that showcase their creativity alongside informed design decisions.

**Intrinsic and Extrinsic Motivations for EBD Use**

The results of the survey indicate that most responding designers are motivated to use EBD to improve the overall design of their project. Respondents indicated that they do not use EBD only because it is required. Most of them agree that EBD creates more effective projects, and that its use helps them reach better design decisions. Therefore it may be concluded that these designers are motivated, at least in part for intrinsic reasons, striving to improve their designs beyond what is minimally expected in the parameters for their personal growth, and also for the better outcomes their projects might realize. Results also suggest that designers are using EBD to create a more effective project in order to attract new clients, sell the job, and attract new projects, and thus are extrinsically motivated.

Further detailed inquiry could help determine what is occurring regarding motivations, and also help determine if there is sufficient overall motivation for the movement to permanently become a component of design. If so, this would set the EBD movement apart from previous attempts in the 20\(^{th}\) century to ‘scientize’ design.

**Final Recommendations**

After reviewing the current body of research and the findings from this study, the author believes that EBD has the potential to expand within the interior design field. The EBD movement currently appears to be in a beginning phase with high interest from practitioners but varying perceptions of its meaning and use. The motivation for using EBD is both intrinsic and extrinsic, with designers agreeing that it helps them reach design decisions and create more effective projects, as well as assure their client and possibly secure future projects. Based on this analysis this section will offer recommendations for the advancement of EBD in the interior design industry and suggest related topics for future research.
EBD Advancement in the Profession

In order for EBD to advance in the profession, further evidence studies are needed. As discussed in Chapter 2, the concept of EBD in healthcare is drawing interest because it seeks to gauge the impact of specific designs on productivity, employee and patient morale, and patient outcomes. While it was revealed in this study that there is great interest in EBD from respondents, several respondents (6) also commented on the lack of studies or repeat studies, which would bolster the validity of the findings. For example, one respondent described, “research related to single patient rooms reducing hospital-acquired infection’s is limited (one of your previous questions used this as an example)”. The fundamental base for all of this research has been shown to be relatively small compared to other scientific fields. There is a lack of multiple studies to compare and draw a conclusion based on repeated research. The body of knowledge would grow at a faster rate if more practitioners began to document their own EBD studies, conduct research, and publicize this information.

The author suggests that expanding the body of research will create more informed decisions from multiple research studies to draw one’s own conclusion for a project. For example, the results from this study show that practitioners are using EBD less frequently in the post-occupancy evaluation stage compared to the beginning stages of the design process. POE’s give practitioners their own research to report on their projects. The author recommends that more practitioners should employ post-occupancy evaluations on their projects to learn how to improve future designs. The entire profession would benefit as well if practitioners were willing to share the POE results in hopes of elevating the proficiency of interior design. This would help increase the body of knowledge, and expand the breadth of EBD.

It must be noted, however, that no matter how large the body of research becomes, practitioners must become knowledgeable of correct research methods and acceptable sources. Perhaps as more practitioners become EDAC accredited, the comprehensive understanding and use of EBD will increase. This might not only better ensure the worth of EBD to design success, but make more likely that the EBD movement will continue to endure beyond its current ‘honeymoon’ phase.
Future Research

This descriptive study is a necessary step in better understanding the current state of EBD for healthcare interior design. However, there is more work to be done. A study involving EDAC-accredited professionals compared to non EDAC-accredited professionals would give greater insight into the world of EBD. As mentioned in chapter 4, 26% of respondents indicated that normative theory was acceptable to cite as evidence. However those respondents who identified themselves as being EDAC-accredited all identified that normative theory was not acceptable for referencing EBD, and that positive theory was indeed a correct way to reference EBD. This may suggest that EDAC is elevating the level of use of EBD in the profession. This study did not fully explore this distinction. After analyzing the results of this study, a different study involving EDAC members may be an area of future research relevant to the use of EBD.

Similarly, future EBD research could involve a survey of the entire interior design profession versus the healthcare design profession. This would give a broad scope of the design profession and perhaps reveal perceptions, use, and motivations for sectors of design that are also significantly (or not) using EBD. This study was limited only to professionals who work in the healthcare design field, therefore the results regarding the scope of EBD use, perceptions, and motivation is limited to one sector of the interior design industry.

A follow-up study to this one could also research EBD perceptions from clients or CEO’s in the healthcare industry. As noted in the narrative comments from this study, EBD is starting to be requested by clients, but they themselves may not know what EBD is. This could reveal client expectations for the use of EBD, and identify if and how design practitioners should assist in educating these clients.

Finally, another interesting future study could be a longitudinal one, undertaking an analysis of EBD use five to ten years from now. As referenced in Chapter 2, Cross (2001) describes particular movements in history when the design field attempts to incorporate science into the industry. A future research study could attempt to determine if EBD is just another cycle in the attempt to ‘scientize’ design. This study might also include an investigation of designers’ motivations to use EBD, following up on the initial findings this study yielded on this topic.
Conclusion

After analyzing the information collected from the previous chapters, the author proposes that EBD is in the early stages of making its mark on healthcare interior design. In general, healthcare designers are interested in EBD for a multitude of reasons and for varying motivation factors. They interpret EBD in a few different ways, but most understand the basic underlying principle: using credible research to reach the best possible design solution. Healthcare designers use EBD in fluctuating degrees of rigor, and mostly in the beginning stages of the design process. Motivated intrinsically and extrinsically, most designers believe that using EBD will improve their projects and also help sell their design solutions.

The author hopes that this study provides an insight into how the healthcare interior design industry perceives evidence-based design. By understanding perceptions, designers, researchers, and manufacturers can learn how to use better coordinate with each other.

This author hopes for several particular improvements in the practice of EBD by healthcare designers: First, designers will verify the validity of evidence and evaluate a study with a discerning eye before citing a source. Secondly, more healthcare designers will begin to use EBD in the post occupancy evaluation stage of the design process, thus expanding the body of knowledge for further improvement of EBD.

The author also proposes that more designers outside of the healthcare sector could use EBD. This study shows that designers do not believe their creativity is threatened by EBD; therefore, it could perhaps be expanded into other creative sectors of interior design such as retail, hospitality, office, and even residential. The author suggests that EBD can help guide basic decisions, but should leave room for unique ideas and solutions to succeed, which would not hinder the creative design solutions.

EBD is starting to be recognized and utilized within the healthcare design industry, but there is much more room for it to expand and adapt. The use of EBD is
helping designers make thoughtful decisions and is perceived to give more credibility to design decisions. It is the author’s hope that this study will help understand the current state of evidence-based design in the twenty-first century and encourage the growth of the interior design industry.
APPENDIX A

INVITATION TO POTENTIAL SURVEY PARTICIPANTS

AAHID Email Invitation

Dear Interior Designer,
My name is Emily Phares and I am an Interior Design Master of Fine Arts degree candidate at Florida State University. I am studying healthcare interior designers’ perceptions and use of evidence-based design in practice.

I would like to ask you to complete a survey that is an integral part of my thesis research. This survey takes only 10-15 minutes to complete, and it’s not necessary that you use evidence-based design in your current healthcare design activities to participate. The survey will be available online for two weeks, ending on December 17th.

As a thank you gift, you will be invited to download an evidence-based design quick reference sheet after you complete the survey. I would be happy to send you a report detailing the study’s conclusions if you wish when it is complete.

Please click the link below to begin the research survey. Thank you very much for your time and consideration.

http://www.surveymonkey.com/s/EBDsurvey

Sincerely,
Emily G. Phares
MFA Candidate
Department of Interior Design
Florida State University
Tallahassee FL 32306-1231
Healthcare Designers

You are invited to participate in an online survey about evidence-based design. This survey gathers healthcare interior designers’ perceptions of evidence-based design. It’s not necessary that you use EBD to participate. It will take approximately 10 minutes to complete, and as a thank you gift there will be a download to receive a guide about evidence-based design after you complete the survey. To complete the survey, click on this link:

http://www.surveymonkey.com/s/EBDsurvey
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: 11/30/2010

To: Emily Phares

Address: Florida State University, Tallahassee, FL
Dept.: INTERIOR DESIGN

From: Thomas L. Jacobson, Chair

Re: Use of Human Subjects in Research
The State of Evidence-Based Design in Healthcare Interior Design Practice: A Study of Perceptions, Use, and Motivation.

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 11/28/2011 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 Chair 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: Jill Pable, Advisor
HSC No. 2010.5350
APPENDIX C

QUESTIONNAIRE

Evidence-Based Design in Healthcare Interior Design Practice

This questionnaire will ask you about your attitude toward and use of evidence-based design (EBD) in healthcare interior design. Please note that it is not necessary that you personally use evidence-based design in your projects to complete this survey.

1. How many years have you worked as an interior designer?
   A. Less than one year
   B. 1-5 years
   C. 5-10 years
   D. 10-15 years
   E. Over 15 years

2. What square footage size of healthcare projects do you MOST OFTEN work on?
   A. Less than 5000 square feet
   B. 5,000 – 10,000 square feet
   C. 10,000 – 20,000 square feet
   D. 20,000 – 30,000 square feet
   E. Over 30,000 square feet
3. Identify the definition(s) that you feel accurately define evidence-based design.
   A. The thoughtful use of the best available knowledge to improve design decisions.
   B. 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 and unique project.
   C. The process of basing decisions about the built environment on credible research to achieve the best possible outcomes.

Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

Optional: If you if you prefer a different definition please indicate it here. [open response]

Please assume for the remainder of this questionnaire that EBD is defined as “The process of basing decisions about the built environment on credible research to achieve the best possible outcomes”.

4. What is your current level of interest in using EBD in your own healthcare design practice?
   A. Very interested
   B. Somewhat interested
   C. Neutral
   D. Not very interested
   E. Not at all interested

5. Why do you feel this way about EBD? [Open response]
6. Please indicate if you hold a certification in the following: (radio buttons with multiple responses possible)
   A. AAHID Certified (American Association of Healthcare Interior Designers)
   B. EDAC Accredited (Evidence-based Design Accreditation and Certification)

7. Identify those decisions below that you feel are based on evidence or not based on evidence, as identified in the definition of EBD. (Choices: Evidence-based design; Not evidence-based design.)
   A. A transaction counter is constructed at 44” high (in its non-accessibility portion) because this height has successfully been tested through its successful use in past projects created by many different designers. (Choices: Evidence-based design; Not evidence-based design.)
   B. Designing a hospital with single occupancy rooms rather than double occupancy rooms because an empirical research study identified that it reduces hospital acquired infections. (Choices: Evidence-based design; Not evidence-based design.)

8. Designers often use different resources of research for use on a project. Identify those sources you would be willing to cite as evidence for design decision-making on the topic of the effects of long corridors. (radio buttons with multiple responses possible)
   A. Wikipedia article [Always, Sometimes, Never]
   B. Peer-reviewed Journal article. [Always, Sometimes, Never]
   C. Article in Architectural Digest. [Always, Sometimes, Never]
   D. Publication from a healthcare design advocacy group. [Always, Sometimes, Never]
   E. Optional: Identify other acceptable sources [open response]
9. Describe the extent of your participation in the following activities with regard to your healthcare projects.

- Take steps to understand and assess the validity of research and literature I reference. [Always, Usually, Sometimes, Rarely, Never]

- Undertake research on my designs and subject these methods and results to scrutiny from others.
  [Always, Usually, Sometimes, Rarely, Never]

- Publish findings from my research on my design projects in peer-reviewed journals. [Always, Usually, Sometimes, Rarely, Never]

- Hypothesize (either verbally or in writing) the expected outcomes of design decisions to my colleagues and/or clients.
  [Always, Usually, Sometimes, Rarely, Never]

- Connect a design decision to a measurable result produced by research.
  [Always, Usually, Sometimes, Rarely, Never]

- Report the results of my evidence-based design decision-making publicly through writing or speaking. [Always, Usually, Sometimes, Rarely, Never]

- Explain and interpret the meaning of evidence as it relates to specific projects to my colleagues and/or clients.
  [Always, Usually, Sometimes, Rarely, Never]

- Collaborate with academic social scientists on research related to my designs. [Always, Usually, Sometimes, Rarely, Never]
10. What is the percentage of your healthcare projects that you have engaged with evidence-based design content in the last three years? (This engagement includes referencing EBD literature by others or producing evidence-based information yourself or through your firm.)
   A. 20% or less
   B. Between 20% and 50%
   C. Between 50% and 80%
   D. More than 80%
   G. I have not used evidence-based design in the last three years.

11. In what stage(s) of the design process do you use evidence-based design to assist you? Please select one response for each.
   A. Programming. [Very often; Often; Sometimes; Not often; Never]
   B. Schematic Design. [Very often; Often; Sometimes; Not often; Never]
   C. Design Development. [Very often; Often; Sometimes; Not often; Never]
   D. Construction Documentation. [Very often; Often; Sometimes; Not often; Never]
   E. Site supervision. [Very often; Often; Sometimes; Not often; Never]
   F. Post-Occupancy. [Very often; Often; Sometimes; Not often; Never]
12. How often do you use EBD to assist you with the following actions in your healthcare projects? Please select one response for each.

   A. Color palette selection [Very often; Often; Sometimes; Not often; Never]
   B. Development of a project concept.  
      [Very often; Often; Sometimes; Not often; Never]
   C. Space planning. [Very often; Often; Sometimes; Not often; Never]
   D. Cost-benefit analysis. [Very often; Often; Sometimes; Not often; Never]
   E. Life cycle costing analysis. [Very often; Often; Sometimes; Not often; Never]
   F. Furnishings, Fixtures and Equipment specification.  
      [Very often; Often; Sometimes; Not often; Never]

Is there anything you wish to add about your activities and EBD regarding this question? [Open response]

The following questions recognize that interior designers often make decisions that are not assisted by evidence. These include decisions related to aesthetics, historical, and cultural references, for example.

13. If you consider ON THE WHOLE the vast number of decisions you make on a typical healthcare project, what percentage of these decisions are made WITHOUT the use of evidence from research studies?

   A. Less than 10%
   B. Between 10% and 30%
   C. Between 30% and 50 %
   D. Between 50% and 80%
   E. Over 80%
14. How do you feel about EBD with regard to the following statements?

- Including EBD references helps me sell the job.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

- EBD helps me assure the client that a decision is appropriate.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

- EBD is used only because it is required in projects’ Request for Proposal parameters. Always, Nearly always, Sometimes, Rarely, Never
  - EBD helps me reach design decisions.

- EBD stifles creativity in generating a healthcare design solution.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

- EBD adds a sense of scientific validity to the interior design field.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

- My firm secures more projects by referencing EBD.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

- Using EBD strategies results in more effective projects.
  Totally Agree; Partially Agree; Neither Agree nor Disagree; Partially Disagree; Totally Disagree

Optional: Do you wish to explain your perceptions further? [Open response]

Would you consider being contacted for future discussion in regards to these issues? If so, please provide your name, firm, email, and phone number below. Your name, firm, and contact information will not be used in the reported findings of this study.

Thank you for your participation. Please click on the Download link to obtain your evidence-based design desktop reference of definitions and links.
APPENDIX D

INCENTIVE FOR QUESTIONNAIRE COMPLETION

This sheet was provided to respondents who completed the online questionnaire. It was made available for download.
REFERENCES


BIOGRAPHICAL SKETCH

Emily Phares received her Bachelor’s of Science degree in Apparel Design & Technology from Florida State University. While working in residential interior design as a junior designer for two years, she was inspired to pursue a Master’s of Fine Arts degree at Florida State University. Throughout graduate school Emily worked and interned with several architects and contractors. This has created a range of professional experiences including single and multi-unit residential design, hospitality, education, and retail design.

Emily is interested in pursuing a profession in healthcare design and hopes to continue research throughout her professional experience. She anticipates graduation in April of 2011 and is looking forward to contributing to a healthcare interior design firm.