THESIS

REVEALING ATTRIBUTES OF SUPPORTIVE HEALING ENVIRONMENTS IN INTERIOR

DESIGN: STAFF PERCEPTIONS IN HEALTHCARE DESIGN

Submitted by

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In partial fulfillment of the requirements

For the Degree of Master of Science

Colorado State University

Fort Collins, Colorado

Spring 2013

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ABSTRACT

REVEALING ATTRIBUTES OF SUPPORTIVE HEALING ENVIRONMENTS IN INTERIOR

DESIGN: STAFF PERCEPTIONS IN HEALTHCARE DESIGN

People seeking healthcare anticipate an environment supportive of healing and wellness in acute and ambulatory facilities. Such environments synthesize psychological, social, and physical components shown to effect perceptions of healing (McCullough, 2010). "Well-designed physical environments... foster wellness, whereas poorly designed environments... make people frustrated and thereby contribute to the possibility of illness" (Dilani, 2001, p. 34). Wellness factors need to be clearly identified in designing healthcare facilities, becoming an integral part of the therapeutic process (Dilani, 2001). By observing actual healthcare environments, *evidence-informed* (Nussbaumer, 2009) design strategies can enlighten stress-free environments by emphasizing strategic opportunities to impact the design of healthy facilities (Ulrich, 2000).

The purpose of this research study was to closely examine attributes and factors contributing to a healing environment from the perspective of healthcare staff in a campus ambulatory healthcare setting. The study sought to identify attributes critical to the process of designing healing environments and to examine the presence of a hierarchy of healing attributes to support healthcare designers in their problem-solving and design intentions.

Data were collected using an e-survey to the population of healthcare staff, with a response rate of 41% ($N = 57$). Study findings confirm Dilani (2000) and Ulrich's (1991) theoretical framework but suggest duplicity in the initial conceptual model incorporating these

attributes and factors, as derived from their research findings. As a result a revised conceptual

model was developed, which needs to be tested in future research.

ACKNOWLEDGEMENTS

I am appreciative to all who have helped me through this research. My committee of Katharine Leigh, Ken Tremblay, and Louise Jennings supported me through each step of the research process and I am grateful for all their time and effort. I want to thank my advisor Katharine Leigh who was enthusiastic and encouraging in every aspect.

I thank the CSU Health Network in agreeing to participate and be a part of this study. I appreciate the hours spent to communicate and pass judgment on the research; your input was beneficial to the success of this research.

To my friends, who not only supported me along the way, but also kept me laughing throughout the entire process. Meg Miller, you helped me above and beyond with this project. I appreciate all the answers you have given me.

To my family, I would not have been able to finish this thesis without you. You are my biggest support group and I am very thankful to have you cheer me along the way. I know it was not alongside the pool this time, but Dad, Mom, Jackie, and Tommy, you gave me the fire to keep on going. All of your support and love kept me inspired throughout the entire project.

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Council for Interior Design Accreditation (CIDA): accredited programs assure the public that interior design education prepares students to be responsible, well-informed, skilled professionals who make beautiful, safe, and comfortable spaces that also respect the earth and its resources (CIDA, 2012).

Environmental psychology: the effects of the physical, social, psychological, and behavioral environment on human performance.

Evidence-based design (EBD): research encompassing the collection of data through both fact finding and location of new evidence; applying that evidence to a design solution (Nussbaumer, 2009).

Evidence-Based Design Certification and Accreditation (EDAC): addresses how the design of responsibly built environments impacts the safety, operation, clinical outcomes, and financial success of healthcare facilities (The Center for Health Design, 2010).

Evidence-based medicine (EBM): the application of observations assessing strength of evidence regarding risks and benefits of treatments (including lack of treatment) and diagnostic tests.

Healing environment: the built environment has therapeutic attributes and enhances the behavior of humans in a positive manner.

Health: a balanced state of complete physical, psychological and social well being; not only the absence of illness.

Psychosocially supportive design (PSD): a theory designed by Alan Dilani (2001) which supports the built environment through meaningfulness, comprehensibility, and manageability.

Salutogenic perspective: focusing on factors supporting human health and well-being, rather than on factors that cause disease.

Supportive design theory (SDT): a theory designed by Roger Ulrich (1991) which explores the ways a designer can utilize the built environment to reduce stress; by providing users a sense of control, access to social support and access to positive distractions in physical surroundings.

Wellness factor: an aspect or component of the physical environment affecting emotions, experiences, and behavior of the quality of life among humans

CHAPTER I

INTRODUCTION

People seeking healthcare anticipate an environment supportive of healing and wellness in acute and ambulatory facilities. Such environments are a synthesis of psychological, social, and physical components shown to effect perceptions of healing (McCullough, 2010). Ulrich (1991) suggests the "amount of scientific research… on psychologically supportive health design is limited… [and] studies still need to be done on many important issues" (Ulrich, 1991, pp. 97-98). Ulrich specifically refers to a need for continued empirical investigation and research focusing on the identification of more refined and specific attributes enhancing patient, family member, visitor (McCullough, 2010), and healthcare provider knowledge, actions, and decisions. By observing actual healthcare environments, *evidence-informed* (Nussbaumer, 2009) design strategies can enlighten stress-free environments by emphasizing strategic opportunities to impact the design of healthy facilities (Ulrich, 2000).

The programming phase of the design process seeks and collects information to identify client/user needs with regard to tangible and non-tangible factors (Aspelund, 2006). However, empirical research concerning these variables and how these variables influence wellness appear limited in the research literature. More informed understanding of attributes and attribute relationships could inform health care promotion and could provide information about which factors are key and potentially describe a value hierarchy.

Evidence-Based Design (EBD) as a Tool for Health Care Planning

Evidence-based design (EBD) is a methodology that began in healthcare with evidence-based medicine as its foundation. Collecting information and evidence and using this evidence to shape the environment and its design parallels the programming phase in design problem-solving

(Nussbaumer, 2009). EBD allows decision making about the built environment to have "credible

research achieving the best possible outcomes" (Tannen, 2009). The design process defines the

identification of client needs and allows designers to discover the challenges of the project. EBD

hypothesizes the potential outcomes of these design decisions within a project, and tracks the

outcomes following each design implementation (Tannen, 2009).

By applying EBD, interior designers, faced with increasing challenges and opportunities

encompassing cultural diversity, globalization, sustainability, and technology (Nussbaumer,

2009), would have access to information assisting them in creating a greater understanding of

project challenges with targeted and focused solutions. "Research has become an important

component throughout the design process" (Nussbaumer, 2009, p. xix) with improvements

generating increased satisfaction among clients, staff, and/or patients having been successful

outcomes of EBD.

Developing empirical methods appropriate to healthcare settings is vital in addressing

design concerns related to supportive healing environments. Further, identifying key factors

influencing perception of care and wellness would provide designs with effective guidance in

their decisions and problem solving actions.

"Well-designed physical environments... foster wellness, whereas poorly designed

environments... make people frustrated and thereby contribute to the possibility of illness"

(Dilani, 2001, p. 34). Wellness factors need to be clearly identified in designing healthcare

facilities, becoming an integral part of the therapeutic process (Dilani, 2001). Well-designed

interiors affect human behaviors; therefore, positively experienced environments have the

potential to enhance the ability to cope with stress. "The quality and character of the designed

environment should be considered ...[as] a powerful instrument capable of improving and strengthening health processes" (Dilani, 2001, p. 35)

"For a healthcare facility, the design concept must relate to the design intent and to patient typology" (Nussbaumer, 2009, p. 80). Healthcare environments must create a welcoming, healing image and environment with an emphasis on the safety of patients, visitors, and staff. Hospitals have changed from an institutional feel or medical model to a more welcoming environment in recent years (Nussbaumer, 2009). This change invites healthcare designers to utilize EBD to enhance the built environment. "As leaders in EBD, healthcare designers realize the natural parallel of EBD to evidence-based medicine and its importance in creating healthy environments" (Nussbaumer, 2009, p. 191).

Problem Statement

Previous studies provide isolated and disconnected views of individual factors or influences impacting good health, wellness, and healing environments (Schweitzer, Gilpin, & Frampton, 2004, p. S-71). Further, there is a disconnection between theory and application of findings. Factors, or attributes, require categorization into tangible and non-tangible realms to be effectively applied during the design process. Design practitioners require information about which variables may have the greatest influence within healthcare facilities types. In educating designers, a focus on this hierarchy of attributes would ground design decisions with evidence rather than perceptions that may limit planning outcomes.

Psychology, environmental psychology, behavioral medicine, and other health-related domains help guide the principles of supportive design theory (Ulrich, 2000) with theory "serve [ing] as an organizing framework for discuss[ion]...of findings obtained from scientific research" in health promoting environments (Ulrich, 1991, p. 98). Translation of theoretical findings to

application creates more effective utilization. EBD directly supports theoretical implications and designers are expected to conduct such research (Nussbaumer, 2009).

Purpose of the Study

An opportunity to examine the presence of healing attributes came about on the campus of Colorado State University (CSU) when the healthcare facility suggested design services look broader at staff perceptions of healing qualities; staff were interested in basing future design decisions using evidence-based design. These activities offered a rich environment in which to examine attributes at work in a facility serving a university constituency and distinguish a hierarchy from the perceptions of the staff members on the healing attributes.

The purpose of this research study was to closely examine attributes, tangible and non-tangible, contributing to this healing environment from the perceptive of a staff member. The research study also sought to identify attributes critical to the process of designing healing environments; and to develop a hierarchy of healing attributes to support healthcare designers in their problem-solving.

Assumptions

Several assumptions frame the research inquiry. Dilani (2000) and Ulrich (1991) concur regarding tangible and non-tangible impacts of physical environments. Their studies measured distinct variables in specific environments challenging application to other environments, settings, or situations. However, clarity regarding the organization and weighting of these variables is broad and general, providing little guidance to transfer findings to enrich the knowledge of designers and healthcare professionals. This study was predicated on the premise of the physical environment's capability to impact people (behavior, perceptions, performance; Aspelund, 2006). In this study, the variables suggested by earlier researchers were selected for

examination. The research was also driven by the assumption that combinations of specific attributes may differ in different settings, and that certain attributes may have more significant or higher priorities in establishing positive healing environments. If relationships among attributes could be pinpointed, the findings would be more readily usable by practitioners in decisions affecting physical space; and clarifying the applicability of these attributes for designers.

Research Questions

Three research questions served as a foundation for this investigation of attributes in healing environments:

RQ1: What critical attributes are identified by healthcare staff related to Dilani and Ulrich's research findings?

RQ2: Is a hierarchy of attributes perceived by healthcare staff?

RQ3: Does the conceptualization of the factors and assigned attributes represent the perceptions of the healthcare staff?

Researcher's Perspective

My involvement in healthcare and wellness has been grounded through my life experiences as an athlete. As a swimmer, I developed first hand insights about the value of health and well-being. Nutrition, exercise, and injury prevention have been topics taught throughout my athletic career. Swimming as a major part of my life provided knowledge about positives and negatives in living a healthy life. My passion for design has been guided by an awareness of health and wellness factors directing me toward the purpose of this research.

During undergraduate studies, I developed a wellness facility as my senior capstone project. This facility integrated insights as an athlete having experienced injuries in the past, and perspectives as a student-athlete. This facility provided spaces supporting elements perceived from case study research and personal experience to be the ideal for an athlete and the everyday

person who desires to learn about and seeks a state of personal well-being. Decisions about elements and components included in this project integrated my prior knowledge as well as expanded investigations on the topic of wellness within physical environments. Learning and obtaining knowledge about healthcare design is challenging because only hands on experience provides a real and evidence-based context for the knowledge acquisition necessary to understand technical detail and subsequent application to design decisions and solutions.

A second experience impacts my perspective; I also engaged in interpretation of theories framing the conceptualization of the design in this capstone experience, introducing logic and comprehension of theory's role in influencing, shaping, or informing my awareness of healing environment characteristics. My discovery of the work of two researchers – Dilani (2000) and Ulrich (1991) – invited thinking about attributes critical in healing environments. However, while ideas were presented, actual attributes were unclear in the work of the authors suggesting an area for further investigation into how the factors they identified could help me to address and encompass positive factors.

Delimitations

The study included staff working in the CSU's health center facility (Hartshorn) and several staff actively working in two other locations, which was not included in the original parameters of the study. Healthcare facilities encompass a wide range of types, from small and relatively simple medical clinics to large, complex, teaching and research hospitals. Large hospital centers may include all the various subsidiary healthcare types that are often independent facilities. This study only focuses on one healthcare facility which is within a campus setting. In addition, data was collected from the senior capstone class in interior design,

in a Council for Interior Design Accreditation (CIDA) program. Generalization to other

healthcare center types may be limited to only those serving student populations.

CHAPTER II

REVIEW OF LITERATURE

"The concept of healing has broadened dramatically in the last century; ...result[ing] in striking changes in the design of healthcare environments and ... [creating] a positive effect on the healing process of individuals" (Dellinger, 2010, p. 45). The focus of healthcare design has been targeted to benefit physicians and nurses; however, the central focus of healthcare design today is directed toward the recipients of healthcare services - patients and their families (Dellinger, 2010). "Those who plan and design healthcare spaces ... [need to be] attentive to… evidence that verifies the effect of healing environments on patients, their families, and healthcare personnel (Dellinger, 2010, p. 45). Generally, healing environments are considered to be places:

  a) healing the mind, body, and soul;
  b) where respect and dignity are woven into everything;
  c) where life, death, illness, and healing define the moment; and
  d) the building supports those events or situations (Dellinger, 2010).

Administrators and staff in many healthcare organizations differ in their conceptions about what may constitute a healing environment. "Some believe a few cosmetic renovations, such as new flooring or a new color palette, qualify as meeting one of the elements of a healing environment" (Dellinger, 2010, p. 46). "Leadership ... [committing to] the principles behind [the] ... healing environments [is needed to]... ensure that these principles are incorporated into their entire organizational culture" (Zimring, Augenbroe, Sadler, & Malone, 2008, p. 8). Derived from evidence-based medicine, evidence-based design (EBD) presents health care designers and administrators with information based on observed facts to enrich decision-making.

The Value of Evidence-Based Design (EBD)

The physical facilities in which healthcare services are performed play an important role in the healing process. Evidence-based design in healthcare is a developing field of study holding great promise to benefit key stakeholders: patients, families, physicians, and nurses, as well as other healthcare staff and organizations (Ulrich, Berry, Quan, & Janet, 2010). "Proactive, evidence-based healthcare facility design is an important and growing trend in healthcare" (McCullough, 2010, p. 2), with a number of reasons for this growth, including:

a) need to replace aging facilities,
b) competitive marketplace for healthcare services,
c) need to improve staff and material flow to achieve operational efficiencies,
d) ability to accommodate technological advances,
e) consumer demand for privacy and family-centered care, and
f) need to reduce preventable, hospital-acquired injuries and infections (McCullough, 2010).

Hospital administrators constantly search for proven cost-effective strategies to: improve patient safety, improve patient outcomes, increase patient, family, and staff satisfaction, improve the efficiency and effectiveness of staff, and have a positive impact on the budget (McCullough, 2010). With the focus of healthcare design turning to evidence-based knowledge, basing decisions about the built environment on credible research to achieve effective outcomes in terms of health invited evidence-based design (The Center for Health Design, 2010). "EBD should result in demonstrated improvement in the organization's utilization of resources" (McCullough, 2010, p. 3).

Healthcare designers have realized the importance of collecting evidence and applying this information in creating safe, healthy environments for patients, visitors, and staff (Nussbaumer, 2009, p. xix). EBD emphasizes the importance of how to research areas relevant to a particular design project, since the quality of a design solution is introduced by the quality of

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such research. EBD research conducts investigations, reports findings, and applies findings to design solutions (Nussbaumer, 2009).

"Measuring the effect of a certain design element on a desired health outcome is a complex endeavor, one in fact that has yet to be fully accomplished" (McCullough, 2010, p. 3). One example of validating EBD principles occurred with the Pebble Project. The Center for Health Design's (CHD) research program showcases healthcare facility designs, making a difference in quality outcomes and financial performance (McCullough, 2010). The Pebble Project (2012) is CHD's main research initiative, aimed at diverse healthcare facility types and the:

a) improvement of quality of care for patients,
b) increase of clients,
c) recruitment and retention of staff,
d) increase of philanthropic, community, and corporate support, and
e) enhancement of operational efficiency and productivity.

Individuals and organizations support the idea of EBD (e.g., The Center for Health Design and the American Society for Healthcare Engineering). "EBD provides designers with suggestions for better design ...[without] guarantee[ing] better outcomes" (McCullough, 2010, p. 3). Another critical point is the same approach may not translate to the same outcome from one facility to another (Dellinger, 2010; McCullough, 2010). The literature presents polarized positions on EBD as a trend in the media or the beginning of a new era in the design of healthcare facilities.

Over 1,000 research studies suggest EBD can improve patient care and medical outcomes and can decrease medical errors and waste (Marberry, 2007). "The data from EBD in some areas is so compelling—particularly on reducing infections—that it would be almost criminally negligent not to use evidence-based design" (Marberry, 2007, p. 2). Critics of EBD, including

design professionals and academics, 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). Considering both proponents and critics of EBD, the debate on the integrity and longevity of EBD continues.

Planetree offers a supportive case; assessment linked to research based on decision making. This design model was created in 1978 by a patient. *Planetree* is an organization which partners with providers of healthcare and continuously evaluates the setting treatment, from the perspective of the patient, incorporating this perspective into both the culture of the organization and the facility over time (Schweitzer, Gilpin, & Frampton, 2004). This facility emphasizes a philosophy based on a simple premise: "care should be organized first and foremost around the needs of patients" (Plantree, 2012). Research done through this organization has been supportive to the healing process. The case studies reported patient dignity; warm, home-like, noninstitutional designs; and the removal of unnecessary architectural barriers. In addition, art, aesthetics, and elements that connect patients with nature are emphasized (Kopec, 2012).

EBD Evidence

The built environment has been shown to impact human health and behavior (Nussbaumer, 2009), therefore level of and responsibility for designers require the development of expertise and practical experience to protect the life safety and well being of end-users (Kopec, Sinclair, & Matthes, 2012). Case studies and design solutions are prevalent on demonstrating EBD elements supporting positive outcomes within the healthcare design industry. Attributes have been identified within current healthcare spaces, allowing research to guide future designers' decision making, based upon positive and negative outcomes of the built environment that give the design industry constructive guidance.

EBD Integration with Programming and Post-Occupancy Evaluations

Understanding the design process and how evidence-based design benefits a project,

allows for a cohesive design in a healthcare facility. "A designer's work is concerned primarily

with solving problems by developing and explaining ideas. The 'look' of a product is just one of

many possible problems" (Aspelund, 2006, p. 4). An idea travels throughout the entire design

process, including stages: inspiration, identification, conceptualization, exploration, definition,

communication, and production (Aspelund, 2006). "Designing is about ideas: needing and

finding ideas, examining and identifying their nature, and, most important, illustrating and

explaining them so they can be realized" (Aspelund, 2006, p. 5). A designer's job begins with a

problem that requires a solution. Finding the ideas and problems within a healthcare facility is a

difficult task, but the design process can help guide and support the journey that the designer

must take. EBD is found within each stage of the design process, since the end design has not

only a creative aesthetic, but also research and supporting results give positive and healing

aspects to the design.

Programming. The programming stage allows designers to conduct research and collect

positive and negative information about past designs in healthcare. Programming in the design

process of the built environment encompasses gathering client requirements and discovering the

challenges of the project. Case studies drive inspiration and knowledge impacting the design

process, but can also be a bad predecessor with EBD. History guides current problems occurring

within the conceptualization stage of present designs. "It is important for designers to explore

concepts fully and understand their impact before translating them into workable objects"

(Kopec, 2012, p. 7). Practical problems can tie up designs in search for solutions and can be

detrimental to the project (Kopec, 2012). Within the exploration and refinement stage of the

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design process, designers explore their solutions in more detail (Kopec, 2012, p. 7). Questions

occur and are examined surrounding environmental impact, sustainability, and healing support,

and need to be carefully reviewed.

     The Second Annual Research Report 2010 Survey of Design Research in Healthcare

Settings connects the positive influence of EBD in the programming stage of a project. The

collection of client requirements and needs found in the programming stage requires research of

the current project. A primary goal of the survey was to understand how research was being

generated and applied to healthcare design (Taylor, 2010). The survey was conducted in the first

quarter of 2010 and questions were structured to include:

a) awareness; design research and evidence-based design,
b) information sources; design strategies and healthcare design trends,
c) acceptance; definition and personal and industry opinions,
d) application of EBD features; use of specific design features and interventions,
e) data collection; formal research, methods, analysis, and barriers, and
f) dissemination; how is information shared (Taylor, 2010).

     The survey was announced through several e-mail list sources, including a posting

through the Vendome Publishing Email list, and weekly e-newsletters through The Center for

Health Design e-newsletter, the Pebble Project list, and the EDAC news flash (Taylor, 2010).

There were approximately 20,000-22,000 potential respondents with more than 1,000 completing

the survey (Taylor, 2010). Respondents who took the survey included: architects, interior

designers, researchers, hospital facility-related staff, healthcare consultants, medical planners,

hospital administrators, clinicians, and people in other relevant work categories. Of the

respondents, 93% indicated recent involvement with one or more healthcare design projects.

Two topics found in the survey – awareness of design research to improve healthcare outcomes

and awareness of the term EBD – had 71.1% of respondents indicating *sometimes or regularly*

using evidence based design (Taylor, 2010). Figure 1 shows the top EBD features *always used* in

healthcare facilities addressing healing attributes: art of nature settings (39.3%),

furnishings/waiting to promote social interaction (48.1%), and gardens accessible to staff,

visitors, and patients (32.8%) (Taylor, 2010).

EBD Features Always* Used in Healthcare Facilities

GENERAL Features

Feature	%
HEALING ENVIRONMENT: nurturing, theraputic, reduce stress	62.9%
GEL DISPENSERS: Alcohol-based hand-rub	57.6%
SURFACES AND FINISHES: reduce contamination	56.2%
FURNISHINGS/WAITING to promote social interaction	48.1%
WAYFINDING: integrated pre-arrivals, maps, signs	47.7%
ART of nature settings	39.3%
NATURAL LIGHT in staff support areas	36.5%
GARDENS accessible to staff, visitors, patients	32.8%
NOISELESS paging	19.1%

Features specific to INPATIENT UNITS (IPU)

Feature	%
HANDWASH SINKS that are highly visible	62.1%
GEL DISPENSERS: Alcohol based hand rub	61.1%
SEGREGATION OF AIRFLOW direction**	60.5%
SURFACES AND FINISHES to reduce falls	58.6%
PRIVATE patient rooms	54.0%
ZONED PATIENT ROOMS: clinicians, patient, families	53.6%
SURFACES AND FINISHES to reduce noise	46.9%
WINDOWS W/VIEWS TO NATURE in patient rooms	43.5%
HEPA (high efficiency particulate air) filters	41.5%
CONTROL OF LIGHTING for family/patient	40.9%
DOUBLE/WIDE DOORS at patient bathrooms	38.5%
MAXIMIZE SUNLIGHT for patients thru building orientation	38.1%
DECENTRALIZED NURSING stations	38.1%
DECENTRALIZED SUPPLY locations	36.0%
ACUITY ADAPTABLE rooms	29.3%
PATIENT LIFTS: mobile/ceiling mounted	20.0%
NOISELESS paging (question added to IPU in Year 2)	21.1%

* Combined Responses for "Always" and "Being Implemented"
** Question wording modified in Year 2 for additional clarity

Figure 1: EBD features "always" used in healthcare facilities (Taylor, 2010). [1]

Of those participating in the planning and design of a healthcare facility, more than 60%

of the survey participants indicated their organization conducted formal research to assess the

relevance of design strategies for a particular project (Taylor, 2010). This was a decrease from

the prior year survey's results. This significant change from 67% to 61% was a negative change;

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[1] From "Second Annual Research Report 2010 Survey of Design Research in Healthcare Settings," by Ellen M.
Taylor, 2010, *The Use and Impact of Evidence-Based Design, II,* p. 20. Copyright [2010] by Ellen M. Taylor.
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suggesting a shift must occur at the preliminary research stage of healthcare projects. The survey showed that fewer respondents not only set measureable goals, but they did not create literature reviews about existing research. This fact from the survey might correlate to the only 71.1% respondents that sometimes or regularly use EBD features.

Post-occupancy evaluation (POE). POE is the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time (Preiser, Rabinowitz, & White, 1988). "POEs focus on building occupants and their needs, and thus they provide insights into the consequences of past design decisions and the resulting building performance" (Preiser, Rabinowitz, & White, 1988, p. 3). POEs are intended to compare systematically the actual performance of buildings with prior stated performance criteria (Preiser, Rabinowitz, & White, 1988). The purpose of using POEs is to form a sound basis for creating better buildings in the future.

In *The Second Annual Research Report 2010 Survey of Design Research in Healthcare Settings*, respondents were asked what types of methods were used to evaluate design strategies during the planning and design process. The respondents indicated nearly everyone reviews past projects, tours and benchmarks other facilities, and learns about past and current research related to a specific design feature (Taylor, 2010). From the prior year, there was a decrease from a 50% to 43% in the respondents' indication of reviewing, evaluating, and summarizing research into a formal written report or conducting a systematic literature review (Taylor, 2010).

After completing a project, the "most common method used to measure the effectiveness of results against redefined measures continues to be POEs. However, this still remains a lower-rated item for gathering evidence about design strategies in the early phases of a project"

(Taylor, 2010, p. 27). Over 25% of respondents indicated design results are never formally

evaluated following project completion (Figure 2).
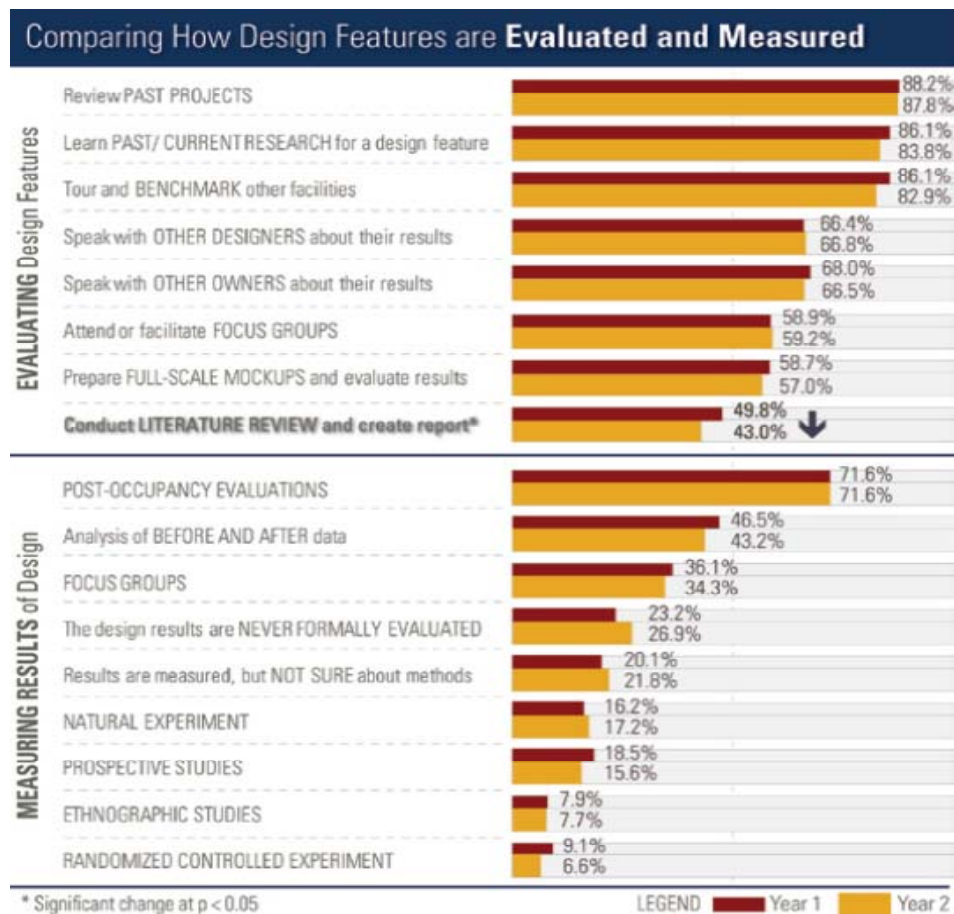
Figure 2: Comparing evaluation and measurement of design features (Taylor, 2010)[2].

Healing Attributes

Physical, psychological, and social psychological influences on patient well-being is a

characteristic of a healing attribute. A challenge due to the reinforcing of wellness among

patients within a healthcare facility is the lack of measurement among these attributes. Patients'

perceptions on healing attributes need to be measured more to find the important needs of

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[2] From "Second Annual Research Report 2010 Survey of Design Research in Healthcare Settings," by Ellen M. Taylor, 2010, *The Use and Impact of Evidence-Based Design, II,* p. 28. Copyright [2010] by Ellen M. Taylor. Reprinted (or adapted) with permission.

healthcare facilities. An emphasis on functional delivery is a mind-set of the healthcare industry. This awareness needs to be supported physically, psychologically, and socially among healthcare facilities. The attributes have been researched by Roger Ulrich and Alan Dilani through many studies. For this research study, the attributes have been selected to be divided into four different constructs: connection to nature, social support enhancement, stimulating design features, and complexity and coherence.

Connection to Nature

Incorporating aspects of nature within healthcare environments establishes a semblance of familiarity and evokes feelings of relaxation (Scott, 1993). Kaplan's model explains how complexity and mystery invite involvement within environments. Recognizing certain preferences for nature are pervasive human qualities, and are significant because of their role in human evolution (McCuskey Shepley, 2006).

Appleton's prospect-refuge theory also links aesthetic pleasure to experience of landscapes favorable to satisfaction of human biological needs (Scott, 1993). Appleton argues "seeing without being seen is an intermediate action necessary to satisfying basic biological needs; therefore offering opportunities for both 'prospect' and 'refuge' ought to be more pleasing and preferred than settings without these opportunities" (Scott, 1993, p. 8). Ulrich (1991) pays particular attention to views of nature in his research and how the connection to nature increases wellbeing of patients in healthcare facilities.

Research has documented that the appropriate use of nature "reduces stress, improves health outcomes, supports pain management, and promotes a sense of overall well-being among patients, visitors, and staff" (Smith, 2007, pp. 2-3). "The term 'biophilia' coined by Dr. Edward Wilson, an evolutionary biologist, refers to the innately emotional affiliation of human beings to

other living organisms" (McCuskey Shepley, 2006, p. S35). Nature views or visual access are most preferred when they "provide information and simultaneously enable the viewer to be located at a safe vantage point" (McCuskey Shepley, 2006, p. S35). Wayfinding, layout, and location of access (gardens, artwork, water features) needs to be legible and coherent for users to receive nature's full potential of healing elements.

"Intuitively-based beliefs that exposure to trees, water and other nature [al elements] tend to foster psychological well-being… date as far back as the earliest large cities (Ulrich, Simons, Losito, Fiorito, Miles, & Zelson, 1991, p. 204). Residents of ancient Rome wrote they valued contact with nature as a contrast to the noise, congestion and other stressors of the city (Ulrich et al., 1991). "Studies of non-patient groups (including university students) and patients have consistently shown simply looking at environments dominated by greenery, flowers, or water, as compared to built scenes lacking nature (rooms, buildings, towns) is significantly effective in promoting recovery or restoration from stress" (Ulrich, 2002, p. 3). Indoor plantings or pictures of nature incorporated into the context of the interior design, and aquariums and terrariums are occurrences of life that bring nature within reach of patients in healthcare facilities. Fountains and water features provide natural movement and sound to sterile institutional environments (Smith, 2007). Access to gardens also allows social interactions to occur among patients, staff members, and family guests in healthcare settings. A study of children with attention deficit disorder (ADD) found they functioned better after activity in natural settings, and the 'greener' the play area, the less severe ADD symptoms" (Shumaker & Czajkowski, 1994, p. S-76). The positive distraction of placing a garden area adjacent to a hospital gives a sense of escape and privacy for the patients in addition to a place of severe stress relief.

Social Support Enhancement

Social interaction is an attribute affecting the wellbeing of patients, staff, and family members in healthcare settings. "There is extensive research on the importance of social support, yet, hospitals have a long history of separating patients from families" (Schweitzer, Gilpin, & Frampton, 2004, p. S-72). Support system access and occurring interactions among patients/clients throughout the entire healthcare facility reinforces a sense of comfort. Furniture arrangements can support wayfinding aspects, and directly affect the potential for social interaction. "Sociopetal furniture arrangements encourage interaction [with] moveable components, provision of comfortable interpersonal distances, ease of eye contact, and physical comfort during conversation. Sociofugal furniture arrangements are inflexible and orient people in space so that eye contact is difficult or interpersonal distances are inappropriately close or [distant and] have the opposite effect, discouraging social interaction" (Evans & McCoy, 1998, p. 89). Entertainment features, such as television, music, media literature, and even access to pets allow for more interactive contact among users in healthcare facilities. Research regarding the health benefits of animal therapy have influenced facility policies to be more acceptable among hospitals (Schweitzer, Gilpin, & Frampton, 2004).

Patients admitted to healthcare facilities often experience a profound sense of loss, a fear of the unknown, and a feeling of vulnerability because of their condition that diminishes their sense of mastery (Kopec, 2012). Buildings can be designed to encourage social connectedness by providing opportunities for social contact and engagement. "Research has indicated that family and friends made longer visits to rehabilitation patients in carpeted patient rooms, as opposed to patient rooms with hard surface flooring" (Schweitzer, Gilpin, & Frampton, 2004, p. S-73). Flexible furniture options located in patient rooms where family members can stay the night

decrease the stress, and therefore increase the wellbeing of the patient (Ulrich, 1991). A Cleveland Clinic in Ohio used healing features in choosing certain design elements found within patient rooms. "Expansive windows, pullout futons supporting unrestricted family presence at the bedside, footwalls containing a large, easy-to-see flat screen television, large private bathrooms, and headwalls with recessed space to stow medical equipment out of sight, and additional storage for patients and staff hidden behind rooms walls" (Trochelman, Albert, Spence, Murray, & Slifcak, 2012, p. e3).

Nursing staff satisfaction with their work day and the physical environment support a positive connection between staff members and patients and their families. "Nurses cite relationship among staff members and between nurses and physicians as reason for leaving current jobs and the profession" (Schweitzer, Gilpin, & Frampton, 2004, p. S-73). Design that encourages positive interactions among staff, such as gardens and lounges, promote greater job satisfaction and impacts patient care. Incorporating day care facilities and sick-child day care into the design supports family relationships of staff members (Schweitzer, Gilpin, & Frampton, 2004). Including all different types of social interactions can conclude in "a 'good laugh' resulting in increased optimism, socialization and cooperation among patients, while decreasing the dependence on tranquilizers and pain-relieving medication and less burnout among health professionals" (Schweitzer, Gilpin, & Frampton, 2004, p. S-77).

Stimulating Design Features

Natural light or daylight within healthcare facilities creates a more supportive healing environment. Natural light has higher levels of illuminance, uniformity, and diffusion of light, variation of time, color, and amounts of ultraviolet radiation in comparison to artificial light (Schweitzer, Gilpin, & Frampton, 2004). A 1993 survey, with over 3,000 references to research

on light's affect on human chronobiology, including seasonal affective disorder (SAD), sleep disorders, and work disruptions, found that: "A natural circadian rhythm of light exposure influences health by regulating melatonin production, and influencing biochemical and hormonal body rhythms" (Schweitzer, Gilpin, & Frampton, 2004, p. S-75). A shorter period of daylight, naturally occurring during winter, has been shown to trigger SAD with symptoms of depression, irritability, and fatigue (Schweitzer, Gilpin, & Frampton, 2004). Architectural daylighting techniques, such as light shelves and clerestory windows need to be included in the design of healthcare facilities.

Different colors affect moods and behaviors; some encourage activity, while others promote passive behavior (Schweitzer, Gilpin, & Frampton, 2004). Use of colored light as a treatment modality is a rapidly growing area of experimentation for many acupuncturists. Ocular light therapy is being used to treat stress, anxiety, fatigue, and depression. Artwork is also a way for nature to be included in the interiors of healthcare buildings, yet studies have shown that certain types of artwork creates various moods from the viewers. A study by Heerwagen found that anxious patients in a dental clinic were less stressed on days when a large nature mural was hung on a wall of the waiting room in contrast to days when the wall was blank (Ulrich, 2002). Another study showed that abstract art contributes to less favorable recovery outcomes than viewing no pictures at all, and is consistently disliked by patients. The artwork displayed needs to portray a positive subject matter and convey a sense of security or safety (Schweitzer, Gilpin, & Frampton, 2004). In addition, "music, 'administered' at times of high stress, has an anxiolytic effect resulting in increases in patient comfort and endorphin levels, lowering of heart rate and anxiety, and reduction of the need for anesthesia" (Schweitzer, Gilpin, & Frampton, 2004, pp. S-76- S77).

Materials used within design can support social interaction among different cultures. For example, designers connected cultures by using symbols or pictographs that contain well-known culturally specific icons to expedite the admitting process of non-English speaking patients (Kopec, 2012).

Finishes need to address sanitary and cleanliness functions within healthcare facilities. Elderly patients may feel more comfortable walking on carpet, rather than hard or glossy materials such as linoleum (Ulrich, 2000). Slip resistance and perceived comfort are elements effecting the perception of quality of care from users in healthcare facilities.

"Growing competition among healthcare providers has prompted healthcare facilities to focus their attention on the patient as a consumer-ideally a satisfied one-of healthcare" (Arneill & Devlin, 2002, p. 345). A study investigated the effects of the physical environment of the waiting room on perceptions of the quality of care of the physician and the physical environment in the healthcare facility. This study tested different types of waiting rooms with certain design attributes present and not present to find the difference of perceptions among users and found "perceived quality of care and ratings of the environment will be significantly greater for waiting rooms that are nicely furnished, well-lighted, contain artwork, and are warm in appearance than are waiting rooms that have outdated furnishings, are poorly lighted, contain no artwork or poor quality reproductions, and are cold in appearance" (Arneill & Devlin, 2002, p. 348). This hypothesis was supported by the results of the study. Two factors with highest levels of satisfaction were "Attractive Lighting" and "Colorful and Neat" (Arneill & Devlin, 2002, p. 355) with waiting rooms described as, "well-lighted, professional, and colorful, with plants, decorations, and magazines" (Arneill & Devlin, 2002, p. 355).

Complexity and Coherence

Spatial relationships are integral to successful design within any large facility, therefore space planning needs to be consistent and easily understandable. "A healthcare facility's overall design should attempt to evoke a more residential feel, with flexible spaces allowing for functionality (i.e., those used for recreational and other social activities)" (Kopec, 2012, pp. 259-260). Creating architecturally diverse environments within a larger facility provide reference points to improve patient wayfinding. These key areas require clear sight lines, visually distinctive features, and recognizable furniture (Passini, Pigot, Rainville, & Tetreault, 2000). Each floor or department (Intensive Care, Surgery, Emergency, etc.) can be thought of as a district; nursing stations might serve as nodes from which people travel to and from. Landmarks, such as a local artist's work can be a source of inspiration with special meaning, and a way to help guide the users through the healthcare facility (Kopec, 2012).

Floor plan configurations can easily affect the wayfinding design of a facility (Kline & Lee, 2011). For example, a hospital with three different entrances resulted in confusion at the Main Entrance, the Heritage Wing, and the core of the hospital. Navigation in this facility gave users a negative perspective of the healthcare facility and its functionality. The hospital then focused on providing one-on-one care for the patrons as they entered the facility. Retired volunteers, referred to as "Redcoats" took patrons to their desired location upon entering the facility. "This convenience seemed to create a sense of relief and delight for the older users of the space" (Kline & Lee, 2011, p. 445). Wayfinding is one attribute guiding users' perceptions of the overall coherence of the healthcare facility.

"Coherence refers to the clarity or compressibility of building elements and form. Coherence enables users to make reasonable deductions about the identity, meaning and location

of objects and spaces inside of buildings" (Evans & McCoy, 1998). Stress can occur when

changes or disruptions in physical surroundings make predictions of patients, staff members, and

family guests difficult. The furnishings chosen for patient rooms, as well as the location of nurse

stations and wayfinding become important once arrival at the node destination is achieved.

Private rooms instead of group rooms in intensive care units have been shown to decrease

infection rates. The attribute of privacy is an essential element needed in the layout of facilities.

"Giving patients an opportunity to personalize their environment by bringing comforting items

from home help give patients a sense of control and familiarity" (Schweitzer, Gilpin, &

Frampton, 2004, p. S-72). Sense of control, safety, and familiarity are also attributes sometimes

in conflict which designers need to mix into a coherent and harmonious whole (Foque &

Lammineur, 1995).

Theoretical Framework

Two contemporary theories frame the inquiry for this research, uniquely integrating

social with physical aspects of the built environment. Supportive design theory (SDT) developed

by Ulrich (1991) and psychosocially supportive design theory (PSD) constructed by Dilani

(2001) specifically identify beneficial tools for use in the healthcare market segment, and direct

attention to variables measuring social and physical factors. Ulrich's and Dilani's research

examined critical challenges addressed by healthcare design to enable interior designers to fully

comprehend potential effects of healing environments. The promotion of these factors supporting

health and wellness reinforces the role of interior design in healthcare and identifies factors

leveraging quality of care and patient outcome.

Supportive Design Theory

Healthcare facilities have been designed traditionally with an emphasis on functional delivery following the medical model of design in environments considering user and non-user perceptions. The theory of supportive design explains the psychological needs of patients, visitors, and staff (Ulrich, 1991). There is, then, the need for awareness among interior designers to create environments promoting wellness, instead of heightening stress among users. "The effects of supportive design are complementary to the healing effects of drugs and other medical technology, and foster the process of recovery" (Ulrich, 1991, p. 97). Designers have the power to use the physical environment to increase healing within healthcare facilities. The theory of supportive design explores the ways a designer can utilize the built environment to reduce stress, providing an understanding about the physical needs of the users (e.g., need for outside connections, control of temperatures, and appropriate light levels). Strategies and approaches for achieving supportive design address diverse occupant needs (e.g., comfort, safety, and satisfaction) (Ulrich, 1991).

The "process of supportive healthcare design begins by eliminating environmental characteristics… known to be stressful or… [with] direct negative impacts on outcomes" (Ulrich, 2000, p. 54). Patients experiencing high levels of stress in healthcare facilities are considered and are the driving force of SDT. The theory emphasizes "the inclusion of characteristics and opportunities in the environment… research indicates can calm patients, reduce stress, and strengthen coping resources and healthful processes" (Ulrich, 2000, p. 54).

Healthcare facilities should be designed to foster successful coping mechanisms to reduce stress. Therefore:

a) Health facilities should not raise obstacles to coping with stress, contain features that are in themselves stressors, and thereby add to the total burden of illness.

b) Healthcare environments should be designed to facilitate access or exposure to physical features and social situations that have stress reducing influences.

c) Target groups should include patients, visitors, and healthcare staff (Ulrich, 1991, p. 99).

Certain psychological aspects, such as satisfactions, preferences, and attitudes are not measured in a similar manner. Therefore, focusing on the concept of stress linked with psychological, physiological, and behavioral dimensions of wellness refine the theory through which interior design must perceive spatial challenges and solutions (Ulrich, 1991). "By focusing on the concept of stress, a theory of supportive design conceptualize[s] human impacts of design in ways that are related directly to scientifically credible indicators or interpretations of wellness" (Ulrich, 1991, p. 99).

Three areas of focus described by SDT are

a) a sense of control with respect to physical-social surroundings;

b) access to social support; and

c) access to positive distractions in physical surroundings (Ulrich, 1991, p. 99).

Sense of control. Humans have a strong need for control and "the related need of self-efficacy with respect to environments and situations" (Ulrich, 1991, p. 100). Lack of control is tied with negative consequences, such as depression, passivity, elevated blood pressure, and reduced immune system functioning. Two types of stressors patients deal with in a healthcare building are illnesses and physical-social environments (Ulrich, 1991). In order for a person to have better health and less stress, a more controlled environment needs to be applicable. Sense of control can be at a low level if the healthcare facility is noisy, is confusing from the standpoint of wayfinding, invades privacy, and prevents personal control over lighting and temperature (Winkel & Holahan, 1986).

To promote wellness and overall healing, design strategies increasing controllability among patients include access to visual privacy for gown-clad patients in an imaging area, controllable televisions in patient rooms and visitor areas, gardens or grounds that are accessible to patients, headphones that allow personal choice of music, and control of room temperature and lighting that is reachable from the patient's bed (Ulrich, 1991). Not only should patients and visitors of healthcare facilities have controllable design features, but also staff. "Break or 'escape' areas for staff, and staff workstations designed and located to avoid frequent, unnecessary interruptions by visitors" need to be created for lower stress levels to occur (Ulrich, 1991, p. 100). Research has indicated, "…people who feel they have some control over their circumstances deal better with stress and have better health than persons who lack a sense of control" (Evans & Cohen, 1987).

Social support. Emotional support from frequent or prolonged contact with family and friends who are helpful or caring refers to social support (Ulrich, 1991). "Research has shown across a wide variety of situations… persons who receive higher social support generally experience less stress and have better health than those… more socially isolated" (Shumaker & Czajkowski, 1994, p. 23). Evidence showing benefits of social support across health-relevant contexts is convincing, but limited in application to healthcare facilities and not directed toward the design of the physical environment. Justification to implement research findings to mitigate stress and improve other outcomes in healthcare arenas appears grounded (Ulrich, 2000).

Design variables sustaining social support within healthcare facilities include: comfortable waiting areas with movable seating, convenient access to food, telephones and rest rooms, attractive gardens with sitting areas that facilitate socializing with patients, and convenient overnight accommodations (Ulrich, 1991, 2000). The use of these design approaches

invites social settings to develop, therefore decreasing stress levels while promoting wellness among patients. For staff members, comfortable seating within break areas and access to pleasant gardens that facilitate social interaction are variables that should be included in design decision-making (Ulrich, 2000).

Positive distractions. Environmental psychology addresses how stimulation levels, too high or low, produce stress or boredom. Research studies have demonstrated sensory deprivation is a root cause from windowless spaces (Ulrich, 1991). "Positive distractions are environmental features… eliciting positive feelings, holding attention and interest without taxing or stressing the individual… [and] block[ing] or reduce[ing] worrisome thoughts" (Ulrich, 1991, p. 103). Although perception of nature is multi-sensory, research to date has been limited almost completely to influences of viewing nature (Ulrich, 1991).

"The most effective positive distractions are mainly elements important to humans throughout millions of years of evolution (e.g., happy, laughing, or caring faces; animals; and nature elements such as trees, plants, and water)" (Ulrich, 1991, p. 102). Research from non-patient studies as well as patients within healthcare settings has "indicated that simply viewing certain types of nature can significantly ameliorate stress within only five minutes or less" (Ulrich, 2000, p. 52). The examples of other design variables for providing access to nature include: nature window views for patient rooms, waiting areas, staff spaces, an aquarium in a high-stress waiting area, an atrium with greenery and a fountain, and calming nature art mounted where bedridden patients can readily see it (Ulrich, 2000). A growing but limited amount of research on gardens in healthcare facilities suggest gardens tend to alleviate stress. But they must include "green or relatively verdant foliage, flowers, non-turbulent water, park-like qualities, compatible nature sound, and complimentary olfactory stimulation" (Ulrich, 2000, p. 55).

Psychosocially Supportive Design

The second theory, PSD, shows a shift in biomedical attitude from a pathogenic concept of disease to a more salutogenic perspective allows for a stronger integration of building design and care philosophy, as well as an "enhanced quality of medical care and strengthened health processes" (Dilani, 2001, p. 31). The old pathogenic perspective focused on patients as objects and concentrated on individual 'sick parts' of the human body, resulting in healthcare facilities to focus on reducing risks to exposure of diseases (Dilani, 2001). "Comparatively little priority has been given to calming the patients and making them feel relaxed in spite of traumatic hospital experiences" (Dilani, 2001, p. 31). Other consequences from this perspective include no psychological, social, or spiritual needs of patients in the design of healthcare facilities.

A different perspective has emerged that gives attention to the fact that disease is "seen as multifaceted and has a variety of causes or elements" (Dilani, 2001, p. 31). The salutogenic perspective developed by Antonovsky (1996) focuses on health promoting processes and has become more evident in the creation of new healthcare buildings. In this new paradigm, the focus is on the patients' physical, psychological, and social health needs. There is a growing awareness of the need to create "functionally efficient facilities that are also human-centered environments aimed at enhancing and initiating health processes" (Dilani, 2001, p. 32). "The salutogenetic interpretation asks the question of why some people survive when they are faced with hardship in their life, while others do not and what factors that persuade humans to remain healthy" (Dilani, 2005, p. 18).

Sense of coherence. Sense of coherence is the overall human understanding of life based on how comprehendible, manageable and meaningful it is (Dilani, 2005). This concept developed by Antonovsky (1996) focuses on coping with stressors, which is the main point of

psychosocially supportive design theory. "There is an important relationship between a sense of coherence and the characteristics of the physical environment that strengthen people's emotional well-being" (Dilani, 2006, pp. 56-57). The implementation of PSD supports coherence stimulating and engaging people, both mentally and socially (Dilani, 2006). Sense of coherence is related to the ability to value and handle stress factors which may affect overall health with a stressor. The person with a strong sense of coherence will:

    a) wish to, be motivated to, cope (meaningfulness);
    b) believe that the challenge is understood (comprehensibility);
    c) believe that resources to cope are available (manageability) (Antonovsky, 1996, p. 15).

"Comprehendible describes to what extent the world is experienced as understandable, in relation to both outer and inner stimuli" (Dilani, 2005, p. 18). This aspect is the controlling component in the concept of sense of coherence. There are different degrees of measurement for unpleasant and pleasant situations which can be understandable and describable (Dilani, 2005). "Manageable pertains to the experienced ability of having the resources to meet and manage surrounding stimuli" (Dilani, 2005, p. 18). This construct of sense of coherence may be in the form of personal qualities as well as social resources. Finally, meaningful refers to the "human perception that life has a meaning and that through life, when problems arise, life merits the investment of human effort or energy" (Dilani, 2005, p. 19). If an individual has a good sense of coherence, it is easier to manage tension and stress, and thereby achieve better health (Antonovsky, 1996). "Life is not a simple state of being but a dynamic process in which the individual tries to understand, manage and find meaning in life" (Dilani, 2005, p. 19).

Wellness factors. The basic function of psychosocially supportive design is to "start a mental process that, by attracting a person's attention, may eliminate or, at least, reduce anxiety,

bringing about positive psychological changes" (Dilani, 2006, p. 56). PSD should promote a

challenging thought-process that results in pleasure, stimulation, creativity, satisfaction,

enjoyment, and admiration in the physical environment (Dilani, 2006). "Aesthetic enjoyment

through well-being- of the eyes, the ears, touch, taste or smell- is a fundamental human need"

(Dilani, 2006, p. 57). If these senses are heightened, then personal insight is awakened;

"reflecting well on the value of a good environment" (Dilani, 2006, p. 58). Rejuvenating and

stimulating a person's mind and body, rather than only addressing risk and prevention factors, is

the focus of PSD (Dilani, 2006).

The 'ambiance' of a space has an effect on people using the space (Schweitzer, Gilpin, &

Frampton, 2004). The use of wellness factors, which are aspects or components of the physical

environment which may affect emotions, experiences, and behaviors in a positive manner, must

be utilized in the design of healthcare facilities (Dilani, 2005). Wellness factors include: access

to nature; art; colors; sound of music and nature; lighting; access to pets; use of culture;

familiarity; creating landmarks and references in buildings; aesthetics; harmonious and cheerful

color; social interaction and neighborhoods; spatial composition and articulation; and provision

of inviting spaces for social support (Dilani, 2006).

Conceptual Framework

The conceptual framework for this study reveals four major factors derived from the

attributes identified from the research literature (see Figure 3). *Connection to nature, social*

support enhancement, stimulating design features, and *complexity and coherence* are the four

factors needed to have a supportive healing environment. There are attributes organized in each

factor to give clarification in how healthcare environments need to be designed. Each attribute

can be categorized as tangible and non-tangible. Social support enhancements can be measured

as tangible (e.g., access to pets) or non-tangible (e.g., access to family spaces). Ulrich's (1991) and Dilani's (2000) theories guided these attributes to be emphasized in this model. Perceptions of patients, staff members, and families guide the level of attributes which are present in healthcare environments. Although the designs of healthcare facilities are evolving, the unfortunate truth is that they continue to effect behaviors through our perceptions (Kopec, 2012).

This model will be examined through the study to guide designers by giving an organized plan when creating healthcare environments. It gives guidance to new and current designers to focus on Ulrich's (1991) and Dilani's (2000) theories. Promoting wellness is the end result of this model, which takes the attributes (tangible and non-tangible) and fits them all together. Meaningfulness, comprehensibility, and manageability are a part of the attributes, giving designers guidance and support in designing a supportive healing environment.
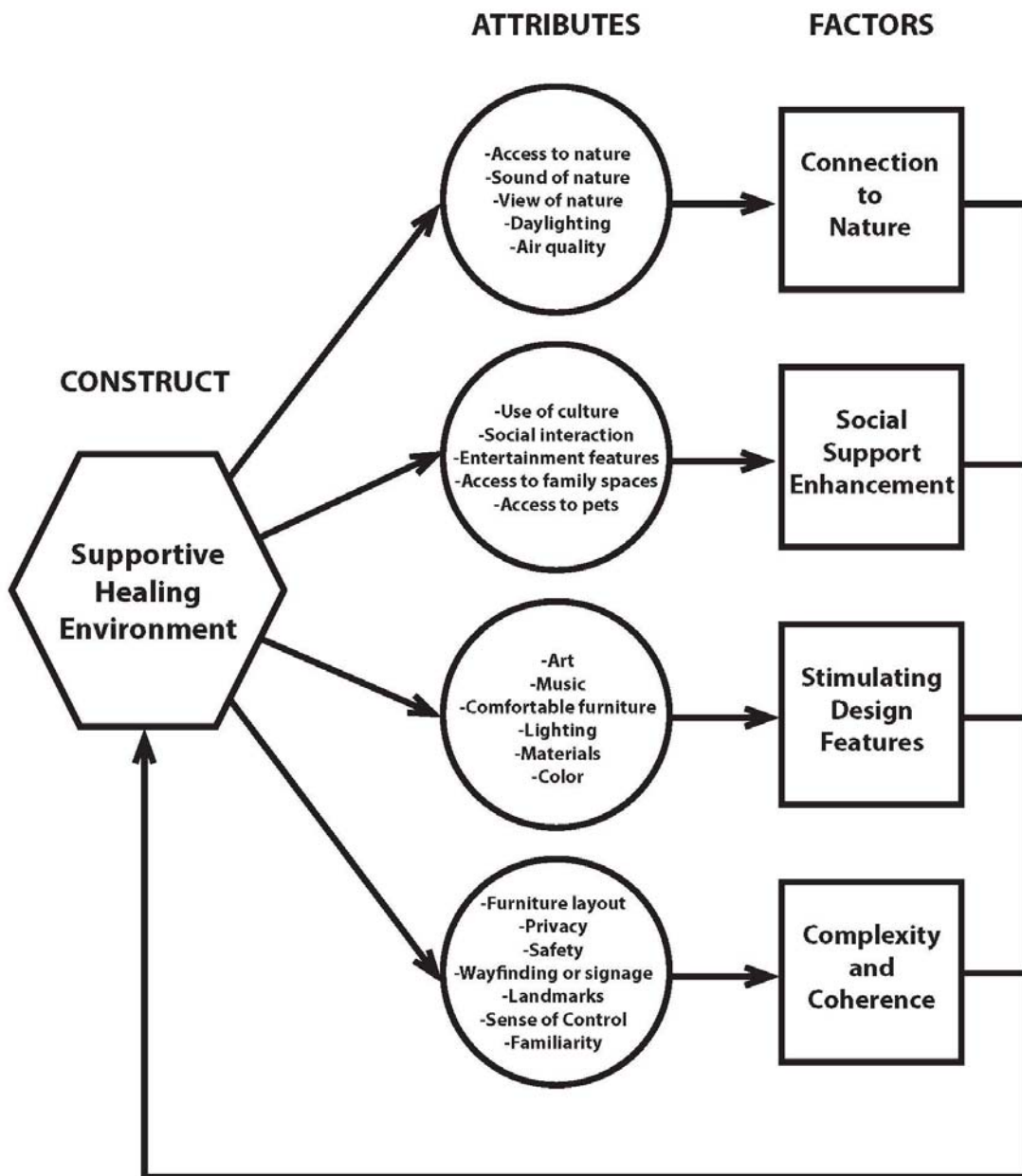
ATTRIBUTES

FACTORS

CONSTRUCT

Figure 3: A conceptual model of supportive healing environments with four factors encompassing attributes derived from Ulrich's and Dilani's theories.

CHAPTER III

RESEARCH DESIGN AND METHODOLOGY

Ulrich's (1990) and Dilani's (2000) research and theories conceptualize factors encompassing *connection to nature*, *social support enhancement*, *stimulating design features*, and *complexity and coherence*. These factors serve as the framework for an exploration of attributes of supportive healing environments in a campus ambulatory health services center. This research utilized mixed methods to collect qualitative and quantitative data to reduce method variance inviting evaluation of staff perceptions confirming potential theoretical connections to environmental attributes of supportive healing environments; second, the research design compares representation of a proposed model to these perceptions to identify degree of recognition and awareness on the part of staff. Finally, a hierarchy among attributes may be distinguishable and thereby be of use by design and health care planners.

Study Setting: Hartshorn Health Center

The Colorado State University Health Network is comprised of organizational components in three locations: Hartshorn facility, Aylesworth Hall, and Lory Student Center. Hartshorn Health Center, as the campus community recognizes the facility, is located on the main campus in Fort Collins, CO (Appendix A: Existing Floor Plans). The CSU Health Network is accredited by the Accreditation Association for Ambulatory Health Care (AAAHC) "... the preeminent leader in developing standards to advance and promote patient safety, quality and value for ambulatory health care through peer-based accreditation processes, education and research… [with a] vision is to lead the university community toward a healthy campus promoting student success by providing multidisciplinary healthcare to enhance all aspects of student well-being" (http://www.health.colostate.edu/).

Their mission is "to promote the complete physical and mental health of the CSU student community by providing quality health care and comprehensive health education and prevention programming. In addition, the Health Network offers educational opportunities and training programs for all levels of health professionals. Through ongoing research, the CSU Health Network evaluates programs and services and assesses student needs to meet the goal of continuous quality improvement" (http://www.health.colostate.edu/).

Figure 4: Existing reception lounge and patient treatment areas.

Hartshorn provides health support through programs including counseling services, the DAY program for substance abuse, health education, allergy/asthma services, and medical services (nutrition, optometry, pediatric, physical therapy, radiology, and women's health). Staff support a pharmacy, lab, medical records, accounting, cashier, appointment, travel clinic, referrals, in addition to the administration functions (see Appendix B: Organizational Chart). Figure 4 illustrates the existing main reception lounge and a patient treatment area. Hartshorn operates only as a day service facility, occupying 38,000 square feet on three levels.

Population

Data were collected from all staff working on CSU's main campus in all three locations, with a total workforce of 160 ($n = 160$). The primary interest of the committee and this study,

however, focused on Hartshorn, as the main and dedicated facility of the CSU Health Network and staff use of the facility as their primary workplace. Executive administrative staff (e.g., Vice President of Student Affairs) to whom the CSU Health Network Executive director reports, and staff working in an adjacent building were also invited to take the survey, at the request of health care center administrators. Appendix B illustrates CSU Health Network's organizational structure and unit relationships.

Administration Plan

Concurrent with the time frame of this research study, staff had formed a committee to look specifically at lounges and waiting areas, calling their group, the Healing Design Committee. The chair of this committee served as gatekeeper in the distribution of surveys to staff by sending an invitation (Appendix C: Staff Invitation Script) with a link to the survey site. To reach the maximum number of staff, an e-survey was used. The survey was sent to all staff including janitorial and maintenance staff; because the distribution was done using the Network's list serv, sampling the population was not necessary. Given the interest of the committee and staff of Hartshorn, a reasonable response rate was anticipated to be at minimum 30%.

Instrumentation

An e-survey (Appendix D: Staff E-Survey) was developed to collect information about environmental factors perceived by staff manifesting their vision of supportive healing attributes related to four factors identified as key in supportive healing environments. An initial draft was reviewed for language and contextualization by the Hartshorn Healing Committee prior to survey release. This committee membership included the Executive Director and heads of specific units, as well as other staff members representing a specific area in the Network. The researcher edited

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the survey using the committee's advice in language and terminology. The committee reviewed the final draft of the survey before it was released to the entire staff.

Hartshorn employees received an email from the chair of the Healing Committee inviting them to take the survey within 30 days. The survey encompassed demographic information, work and facility experience, interaction with the social and physical environment, work environment preferences and relationships, and perceptions of the physical and socio-behavioral environment. As an exploratory study, open-ended questions were included with quantitative responses. Question 21, for example, asked respondents to rank their perception of the top six characteristics.

Example Question 21:

Please rank the six most important features of supportive healing environments, using 1 as most important, 6 as least important.

-Access to nature
-View of nature
-Air circulation/flow
-Social interaction
-Spaces for family and friends
-Entertainment features (magazines, TV, snacks)
-Color affecting mood
-Appropriate lighting
-Material safety
-Signage/wayfinding
-Appropriate levels of privacy
-Sense of control
-Familiarity with services

-Sound of nature
-Natural light
-Acts of kindness
-Welcoming communication
-Accommodation for pets
-Art work
-Music
-Material aesthetics
-Furniture comfort
-Orientation to spaces (landmarks)
-Safety measures
-Familiarity with space

Gaining a clear understanding of attributes evident in this facility invited examination of attributes or clusters of attributes with potential to inform designers about relationships, qualities, and requirements when planning and designing to accommodate change in health care environments. Scale development, influenced by Ulrich (1991) and Dilani's (2000) work, also considered findings in the literature surrounding features of the physical environment as

influencing people's perception and satisfaction and performance in the workplace (Dul &

Ceylan, 2011). The survey which included specific demographic information also collected data

that would be used to define the importance of the four model factors:

- connection to nature
- social support enhancement
- stimulating design features
- complexity and coherence

E-surveys allow data to be easily recorded and analyzed (Jansen, Corley, & Jansen,

2007). Chizawky, Eastabrooks, and Sales (2011) found, among busy nursing staffs, a

significantly higher response rate was achieved using electronic surveys (84%) compared to

paper surveys (16%). Time in taking surveys decreased from 33 minutes on the paper survey to

22 minutes on the electronic survey, and more web respondents completed the survey on work

time versus using break time.

Human Subjects Approval

The protocol for this study was reviewed by the Research Integrity and Compliance

Review Office's Institutional Review Board (IRB) at Colorado State University and determined

to be in compliance with NIH CFR 46 and the federal regulations governing review of research

involving human subjects (see Appendix E: IRB Approval).

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Reliability and Validity

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Reliability

The instrument was developed for this research investigation, therefore a comparison

with additional studies, and their results are made. The staff survey repeats similar content

questions to establish measure reliability. Review by the committee members also contributed to

the reliability of measures in using language familiar to the staff.

Validity

       Face and content validity. Measures were reviewed by healthcare experts from the

Hartshorn Healing Committee, a design practitioner with over 25 years of healthcare experience,

and methodological experts to clarify content and meaning and confirm item relevance and

content validity.

<div align="center">

Trustworthiness and Credibility

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Trustworthiness

       Use of narrative responses allows the data to be trusted in explaining respondents'

perceptions. Multiple reviews of the committee member also contribute to the validity of the

staff responses. Question topics were distributed more than once in different question formats to

examine the trustworthiness of staff responses. The "Healing Committee" gave guidance into

language usage of CSU Health Network to structure study terminology.

Credibility

       The research findings by Ulrich and Dilani formed the foundation for credibility in the

study. In addition, the committee on Healing Design had unearthed a significant amount of

research in helping them to define healing attributes prior to taking the survey (J. Patrias,

personal communication, July 9, 2012).

<div align="center">

Approach to Data Analysis

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       Quantitative questions were summarized by the survey provider and indicated

frequencies of response with percentage of respondents. A thick read of all qualitative responses

allowed issues to surface during the analysis and for factor categories to confirm or negate the

importance of attributes perceived by staff. Narrative responses were axial coded using the

attributes included in the conceptual model. Each qualitative response was analyzed with

counting frequencies of attributes. If responses included more than one attribute in different factors of the model, a count went towards each individual factor. Once every qualitative response from staff was analyzed for frequency of attributes; factor totals were counted. Majorities were then measured for each qualitative question found within the e-survey.

Once factor percentages were found from qualitative responses; majorities were compared. Among all qualitative questions, frequencies of factor majorities were calculated to find hierarchy of the factors in the conceptual model.

Discussion

The intent of the instrumentation was to explore the presence of factors and attributes of the construct, supportive healing environments. The data analysis anticipates revealing insights of what features are found important to healthcare employees as well as the potential for a hierarchy of importance, based on frequency of response, among attributes. This study will identify evidence surrounding the healing attributes found in Dilani's (2001) and Ulrich's (1991) theories as important to healthcare users. The instrument used for the study provides evidence-based design attributes.

CHAPTER IV

DATA ANALYSIS AND FINDINGS

The study population encompassed staff (*N*=160) from the CSU Health Network working

in three physical locations on the CSU campus (Hartshorn, Aylesworth Hall, and Lory Student

Center). A response rate of 41% was achieved (*n = 57)* including partial responses; 41

respondents completed the survey in its entirety. According to Baruch (1999, p. 421) "top

management or organizational representatives have an average 36.1% response rate with a

standard deviation of 13.3%" suggesting efficacy of the research design.

CSU Health Network Staff

Gender

A majority of respondents were female (*n* = 33), with males representing a minority (*n* =

7). Staff who occupied and worked in the Hartshorn facility represented a majority (*n* = 29),

while 25.6% of respondents worked in the two other locations on campus, Lory Student Center

and Aylesworth Hall (*n* = 10). The survey respondents from these two secondary locations were

included in the study at the request of the Network's administrator. Since all staff has

experienced the Hartshorn and other healthcare facilities, this exposure to healthcare

environments was the critical element in perceiving attributes of supportive healing

environments.

Work Experience

Staff reported a significant extent of work experience in healthcare, with a majority

(61.5%) reporting work experiences in the healthcare field of more than 15 years (*n* = 24). The

study population therefore embodied significant depth in their experience and expertise

regarding healthcare practice. Figure 5 characterizes the length of work experience reported with

more than 74% having worked in healthcare for over 10 years. Respondents reporting less than 5 years, 5-10 years, or 10-15 years of work experience in healthcare presented similar response percentages of 10.3%, 12.8%, and 15.4%, respectively (Figure 5).
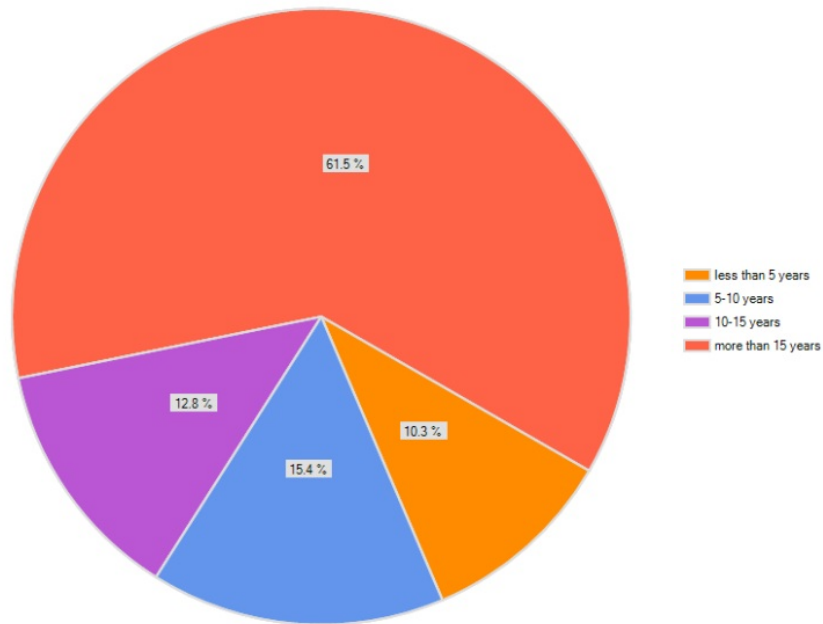

Figure 5: Total years worked in healthcare field.

Staff reported a diversity of work environments, in addition to their exposure to the Hartshorn facility. Thirty-eight percent had worked in one to two additional facilities (*n* =15), with 48% reporting experience in 3-6 facilities (*n* = 19). Fifteen percent had also experienced more than 7 other health care work environments (*n* = 6); therefore, over 90% of the respondents had experienced work environments beyond that of CSU's Health Network facilities. No respondents reported 3-4 years of experience, and a gap was evident between those with less than two years of experience and those with greater than five. Respondents were next asked about the length of time they had worked in the CSU Health Network facilities. Figure 6 shows 62% reported working in the Network more than 5 years (*n* = 25), and a majority with over 7 years of experience (*n* = 21; 52.5%). The extent of staff exposure to CSU Health Network facilities and

other healthcare work environments suggests staff embody an understanding of the physical facilities and the culture embodied within the CSU Health Network.
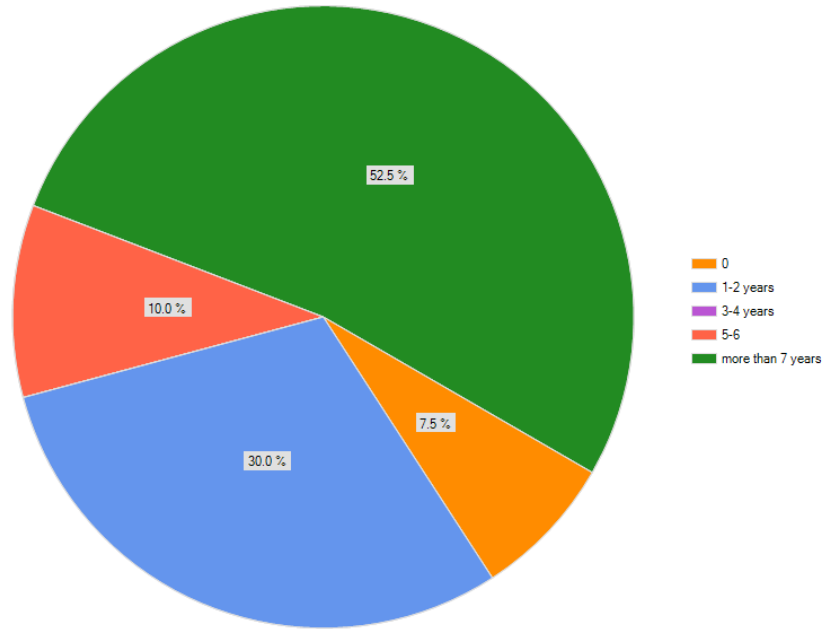

Figure 6: Total years worked at CSU Health Network.

Staff when asked to identify unit/department and role, referencing the Hartshorn organizational chart, appeared to be distributed across a majority of unit/departments, with small groupings from Administration, Medical Services, and Counseling. However, the diversity of self-reported role identifications presented challenges in distinguishing exact work location (Appendix B; Organizational Chart for CSU Health Network).

Education

Diverse educational backgrounds and preparation culminating in a degree or certification were reflected in levels of staff educational achievement reported across nine discrete categories. Respondents could select one or more of these categories: over 32% identified a BA/BS degree ($n = 12$; Figure 7) and 43% reported other educational training (e.g., Dental Assistant, Nurse Practitioner, or Medical Technologist).
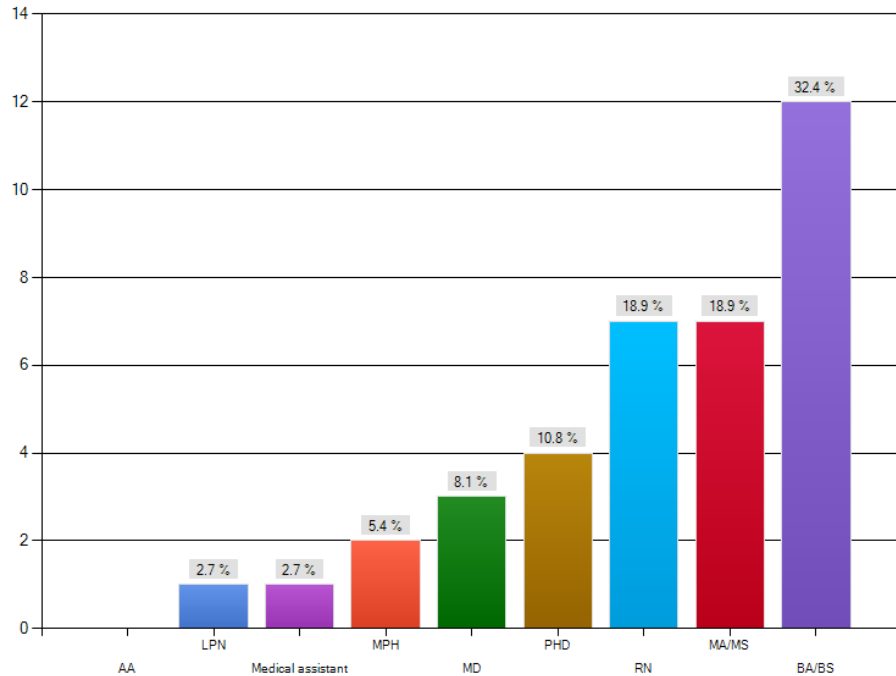
Figure 7: Type of training resulting in a degree or certificate held by Hartshorn employees.

Demographic Summary

The typical staff member working in the CSU Health Network can be characterized as female with considerable depth of experience in healthcare. In this study, which seeks an understanding of attributes and factors that create a supportive healing environment, study participants manifest qualifications, experience, and exposure to healthcare environments effective to express perceptions concerning the focus of the study.

Investigating Attributes in the Hartshorn Facility

To examine attributes, questions were formulated to seek information on physical and cultural dimensions of the CSU Health Network. Little empirical work on the impact of physical attributes can be identified in the literature (Dul & Ceylon, 2011; Evans & McCoy, 1998), with even less in the literature surrounding values and beliefs related to attributes of supportive healing environments. Specific elements of interest related to the physical environment of the

CSU Health Network, included personal work areas and public service areas. Information was sought about qualities in these spaces to obtain an understanding of their relationship to supportive healing attributes. Staff perceptions of values and beliefs contributing to an assessment of the importance of attributes were also examined. Although the study primarily focused on physical characteristics, attention was also made to the organization's business culture.

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Physical Environment

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Nine survey questions focused on the physical environment and were divided into personal work and public service spaces.

Personal Work Space

Hartshorn, as a two level structure with a basement, provided a majority of study participants with views to the exterior ($n = 31$; 79.5%) supporting Ulrich's view of nature as a significant part of a supportive healing environment. Respondents coincidentally (71.8%) identified an enclosed office as the prevalent work setting ($n = 28$). Only 20.5% responded they did not have a view ($n = 8$) from their work space, with an open desk area identified by 10.3% of respondents ($n = 4$) as their personal work space. The Hartshorn facility provides plentiful daylight and views to users who have private office spaces but those working within the interior work areas are provided with minimal opportunity to access nature in their work day.

In ranking (1 as most important, 10 as least) the importance of ten physical elements to carry out their work, a *computer* was the highest ranked ($n = 11$; 28.2%); *visual privacy* received 23.1%, as the most second important physical feature in their work environment ($n = 9$). *Acoustical privacy* (n = 10; 25.6%) was ranked third. Least important elements associated with conducting their work were *access to meeting space* ($n = 16$; 42.1%) and storage ($n = 12$;

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31.6%). Figure 8 demonstrates the mean ranking of elements found within or adjacent to their personal work space.

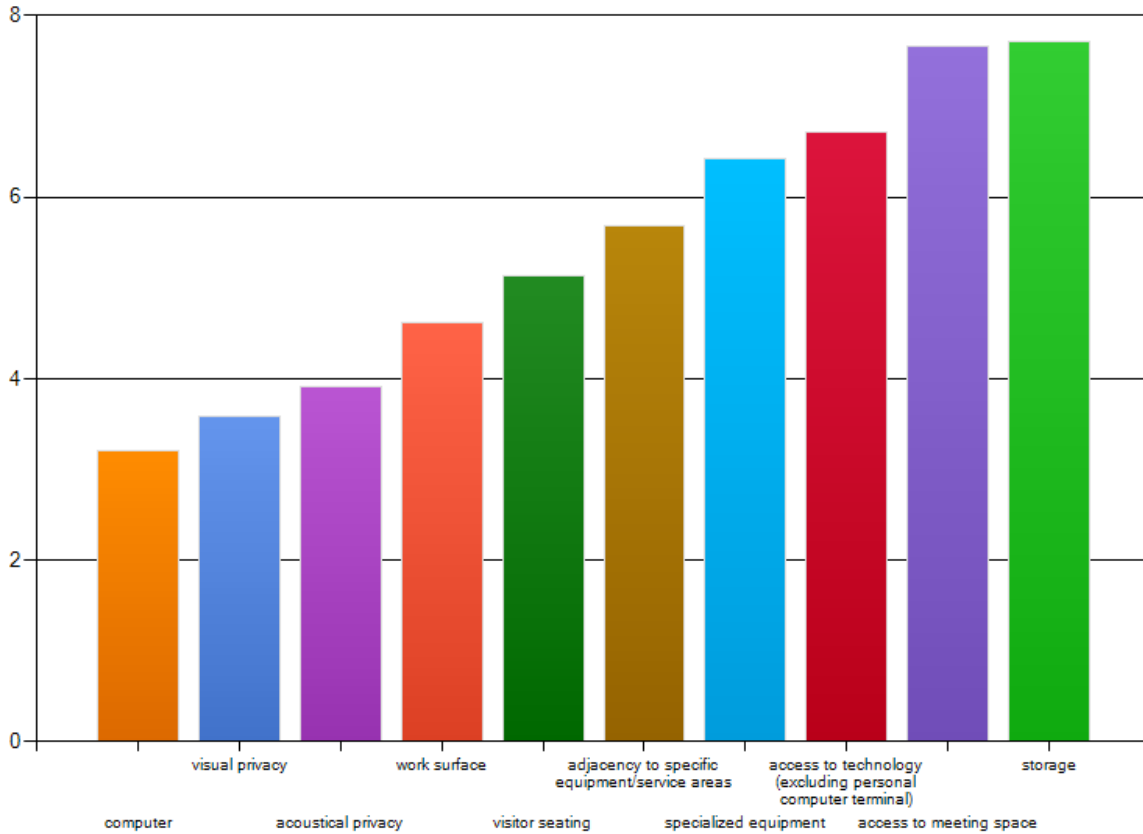*Figure 8:* Mean values ranking for work place elements (1 as most important, 10 as least).

The majority of participants (42.5%) reported inhabiting their work space *greater than 70% (n = 17)*. Figure 9 shows the percentage of time staff spends in their personal work area. Staff can be characterized as spending a majority of their time in individual personal work spaces which have access to exterior views.
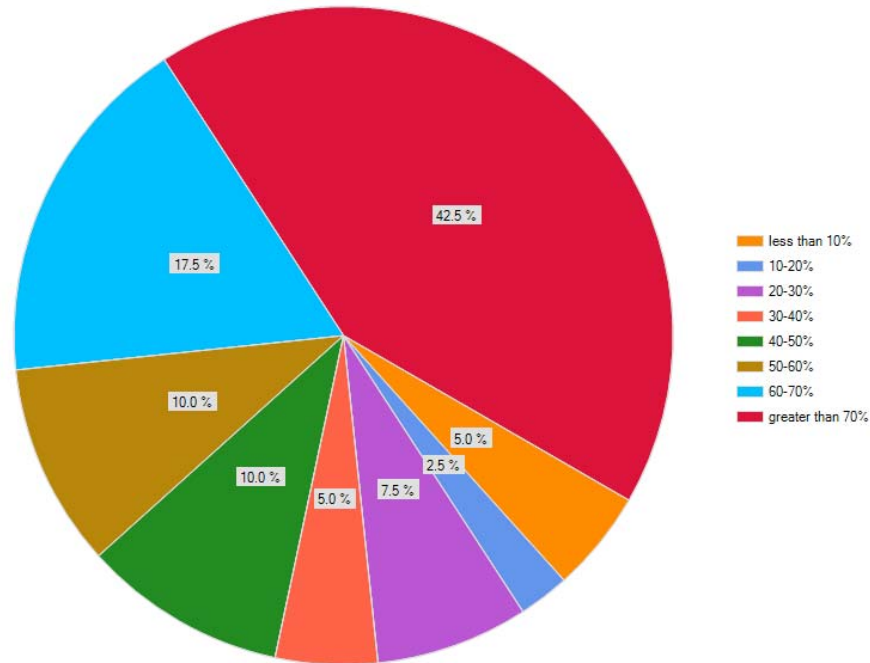
Figure 9: Percentage of time spent at personal work area.

Staff indicated they were satisfied with the furnishings provided in their personal work areas based on ratings of work seating, work surface, storage, and patient, guest, and colleague seating. Thirty-eight to forty-one percent of respondents rated each item of furniture as "efficient."

Area adjacencies were explored but are not reported in this study, having little to do with perceptions of attributes. It was evident that a core set of spaces comprised of frequently accessed areas encompassed the main reception and Pharmacy, Triage, Radiology/X-ray, and the Lab with their respective waiting areas. Spatial relationships, fundamental to successful design within healthcare facilities, are important but are not within the realm of this study.

Public Service Space

Elements related to Ulrich's and Dilani's work reference additional features of the healthcare environment and were examined as components of public spaces in which client needs are met through facility services.

Employees rated attributes supporting healing offered in the facility (i.e., physical environment attributes, artwork, furniture layout, complexity of wayfinding) from "very effective" to "very ineffective." A majority (47.5%) responded the building was "neither effective nor ineffective" ($n = 19$) with similar response for "very effective" and "neither effective nor ineffective" (25%; $n = 10$). One respondent perceived the facility displayed "very ineffective" healing attributes (2%).

When asked to what extent are the patient service activities undertaken at Hartshorn were supported by the physical environment, the majority (45%) of participants selected mid-range values for supportive vs. non-supportive physical environment ($n= 18$). Thirty-three percent of staff members responded the facility was not very supportive ($n = 13$); higher than the 22% of participants perceiving the physical environment is "very supportive" of patient service activities ($n = 9$). Also, 56.3% of participants identified features or fixtures inhibiting their activities in providing services to patients ($n = 18$). Privacy and acoustical problems (35.2%) was the feature most inhibiting participants' activities ($n = 6$).

In a study by Heerwagen (1990), anxious patients in a dental clinic were less stressed on days when a large nature mural was hung on a wall of the waiting room in contrast to days when the wall was [left] blank (Ulrich, 2002). Heerwagen's findings are supported in staff responses. Staff were asked to rank artwork themes in Hartshorn as most appropriate and desirable and included subject matter focused on nature. A majority (42%) chose Rocky Mountain landscapes

as the most appropriate artwork theme needed in the facility. Fort Collins, located at the foothills

of the Rocky Mountains, possibly influenced the specific choice of this subject matter; however,

the staff also preferred Colorado landscapes in comparison to abstract art (29%), considered to

be least desirable ($n = 9$). Figure 10 shows the mean ranking of artwork themes, with top choices

reinforcing the connection to nature.
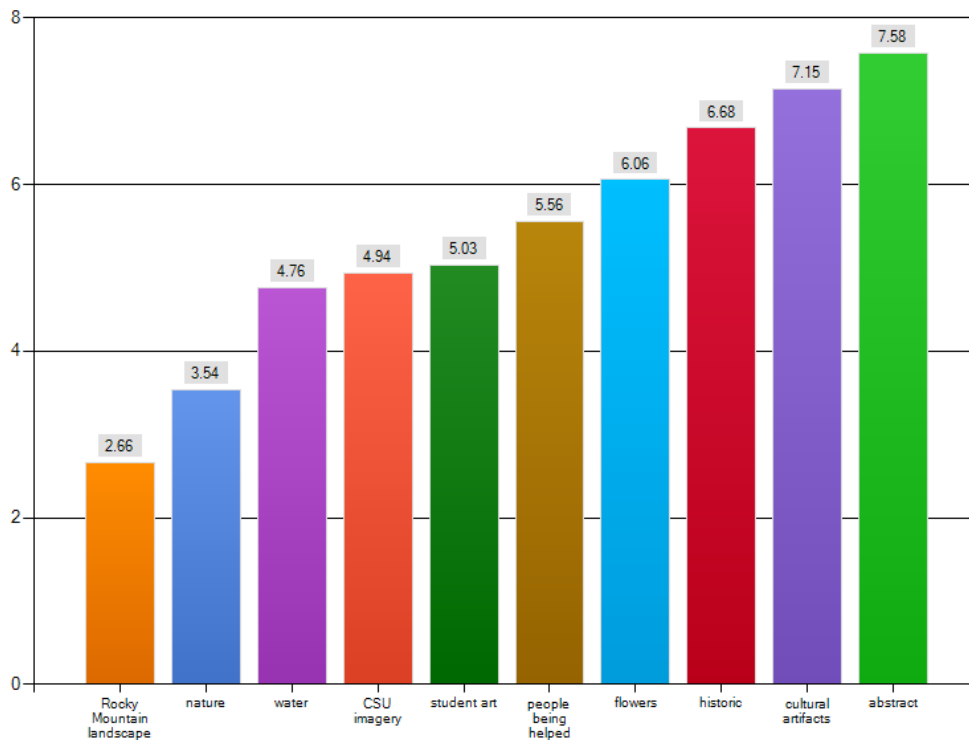
Figure 10: Mean ranks of artwork themes reinforcing a nature connection (1 as most important, 10 as least).

In responses to an open-ended question "what are the key or important

attributes/characteristics for waiting areas" a majority (46.9%) identified physical characteristics

as the most important ($n = 38$). "Comfortable" was a descriptive word frequently used in

responses including: "comfortable chairs, updated magazines or reading material, pleasant

surroundings." Responses are characterized in the following statements:

- Plants and running water, **comfort**, homeiness, warm clinical feeling
- Adequate seating, inviting, **comfortable**

- **Comfortable**, up to date, easy to clean, enough seating
- Good lighting and soothing colors

Staff were asked to rate features in Hartshorn; as very effective to very ineffective to gain an understanding about whether they perceive any order to the effectiveness of attributes referenced by Dilani and Ulrich. When staff rated twelve physical elements (Table 1), *maintenance* of the physical environment ($n = 20$; 51.3%) was identified with the highest response percentage as "effective" with *visual privacy* ($n = 18$; 45%) as the second highest effective physical element in the Hartshorn facility followed by *safety* (44%), *technology* (41%), and *lighting* (40%), *wayfinding* (33%) and *view to exterior* (33%). Rated as "neither effective nor ineffective" was *sense of control* (50%; $n = 19$) followed by *materials* (47%), *color* (45%), and *comfortable furniture* (43%). Rated as "ineffective" was acoustics (37%; $n = 15$). Staff responses to features were primarily positive (effective/very effective).

Table 1: *Rating of Twelve Physical Elements in Hartshorn Facility (n = 41)*

Physical Element	Model Percentage	# of Respondents	Name of Category
Maintenance	51.3	20	Effective
Visual Privacy	45.0	18	Effective
Safety	43.6	17	Effective
Technology	41.0	16	Effective
Lighting	40.0	16	Effective
View to Exterior	33.3	13	Effective
Wayfinding	33.3	13	Effective
Sense of Control	50.0	19	Neither Effective nor Ineffective
Materials	47.4	18	Neither Effective nor Ineffective
Color	45.0	18	Neither Effective nor Ineffective
Comfortable Furniture	43.6	17	Neither Effective nor Ineffective
Acoustics	37.5	15	Neither Effective nor Ineffective

Work Environment Culture

Participants were asked to describe how the Hartshorn facility demonstrates an environment supporting wellness and healing. Fifty-five percent of the narrative responses included characteristics of the factor *social support enhancements* among the staff and users of the building ($n = 16$). The employees understand and believe being supportive starts with staff's interaction with patients. Responses included statements such as:

- Friendly and helpful attitude to patients, capable employees
- Comprehensive care from a variety of disciplines all available under one roof
- Comfortable seating in a clean safe environment with good signage

Thirty-six percent of responses reflected negative perceptions of the facility and its capacity to support wellness and healing ($n = 8$):

- It doesn't. I feel sometimes we are just trying to move our patients through like cattle
- Colors in the building are very dull, boring
- Not very well, waiting areas are concerned. There is not nice seating throughout

Staff were asked to rate norms or values perceived as a constant feature in the Hartshorn work environment to understand their perceptions of social support and how they work among one another and with clients. The majority (46.2%) found *communication with patients/clients seeking services* as "always" consistent with regard to the work environment culture of the CSU Health Network ($n = 18$). In addition, a trait "always" identified by staff was *collaboration among employees within the same department* (41%; $n = 16$). Fifty-nine percent of participants believed *going out of your way to offer a 'helping hand'* was a trait "somewhat always" demonstrated in the facility ($n = 23$). CSU Health Network staff primarily perceived the work environment culture to reinforce positive aspects of norms and values of the organization (Figure 11).
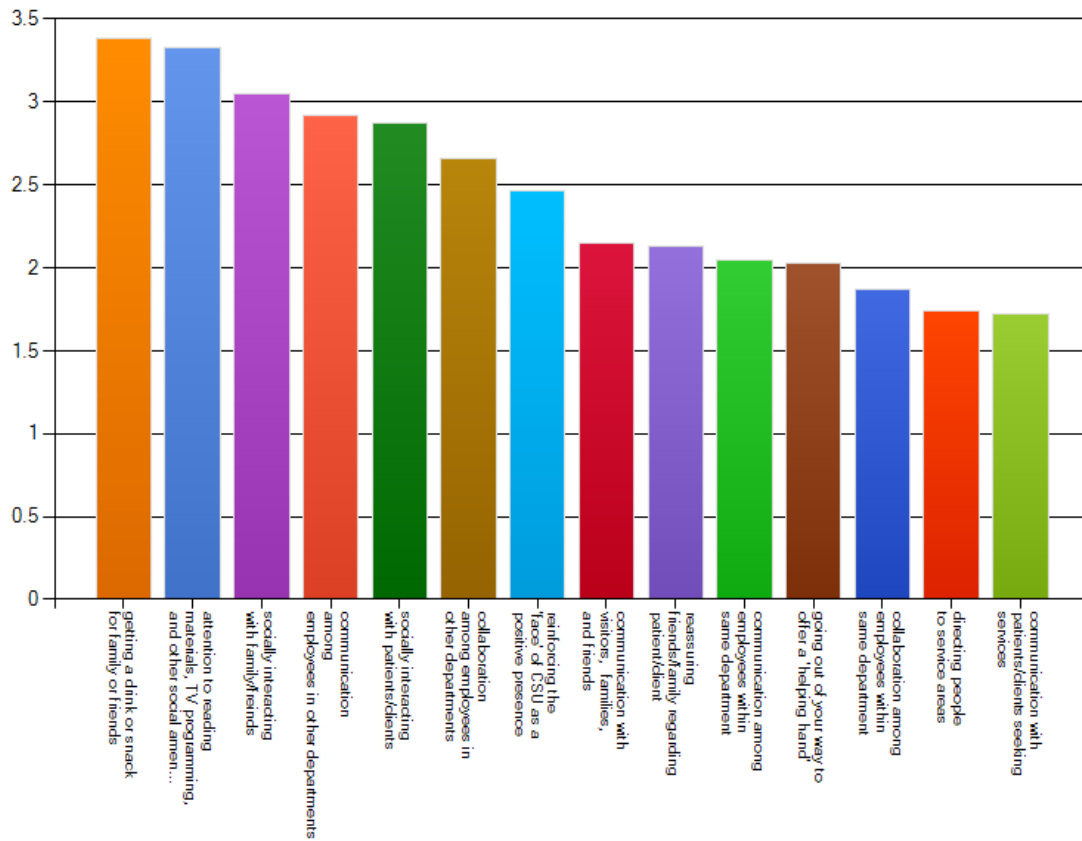
Figure 11: Mean rank of staff perceptions on the norms and values found in CSU Health Network (1 as most important, 5 as least important)

Connecting Attributes to Factors in the Hartshorn Facility

When asked "How do you in your work, reinforce patient/client well-being?" staff responded in only two of the four areas attributable to the conceptual model; *social support enhancement* and *stimulating design features;* "I try to act professional but also interact with the patient in a way to make them feel comfortable and cared about." Social support and stimulation of design are both embodied in this comment. The majority of responses, 57.7%, included attributes in the area *social interaction* ($n = 15$). The remaining 11 responses could be located in the *stimulating design features* category; "I try to make my private office inviting and comfortable." Although this statement is vague, it references design elements found within the space.

Seventy-eight percent of respondents believed that connection between employees and patients should be strengthened within the CSU Health Network (*n* = 25). An optional open-ended response to this question reflected a majority (83 %) of staff members desiring improvement to the relationship between employees and patients. To increase the connection, responses included ideas, for example, "staff wear name tags," "more marketing of the facility," "increase communication," and "increased employee numbers." These responses suggest diminished connection between users and employees in the Hartshorn facility at the time the survey was taken and suggests the importance of social enhancements for a healing environment.

When asked what changes to the Hartshorn facility are needed, responses (57.4%) included attributes within the physical environment. The factor *stimulating design features* had twenty-seven responses to this survey question. The staff in the CSU Health Network wishes to have a more supportive healing environment on campus.

- Some color changes and artwork to improve the sensory comfort for patients, in waiting areas especially
- Replace fluorescent lighting- or at least supplement with incandescent/natural/halogen lighting to accommodate those with light sensitivity
- More plants, water features, better signage little nooks and alcoves, more natural light
- Air conditioning, temperature control, more comfortable furniture, more clear signs directing people to where they are going

Attributes Contributing to Factors of Supportive Healing Environments

The conceptual model (Figure 3) suggests sets of attributes frame four factors derived from Dilani's and Ulrich's work; *connection to nature, social support enhancement, stimulating design features*, and *complexity and coherence*. The study examined individual attributes and now turns attention to staff perceptions of an aggregated understanding of their perceptions of the meaning they attribute to the construct of *supportive healing environments*.

When asked in an open-ended question to describe a "supportive healing environment," responses included attributes that could be located within the *social support enhancement* factor. Of 47 open-ended responses (40.4%; *n* = 19), a number of responses referenced culture and social interaction:

- Collaboration amongst all facets of a patient's health objective
- People are friendly, respectful, and culturally aware and treat every individual with courtesy
- Students/clients will be treated as an individual, not a number

A second most frequent factor was attributable to *stimulating design features* (*n* = 18; 38.3%) encompassing art, music, color, lighting, materials, and comfortable furniture, describing the physical environment. Responses included the following statements:

- Calming, soothing colors and plants
- Easily located signs, clean feeling, good lighting and friendly staff
- Calmness, music, aromatherapy, reduced lighting. Quietness within the halls

A small percentage of responses could be attributed to *complexity and coherence* (*n* = 6) "where I can feel safe when I am already feeling vulnerable and overwhelmed," and *connection to nature* (*n* = 4) "relaxing, peaceful, natural elements."

Participants were asked to select and rank the top six features they perceived to describe a supportive healing space. Twenty-two characteristics were provided in the survey question and respondents could write-in a response to "other" category. Some respondents ranked more than six features. "Safety and privacy characteristics" was ranked first by 41.4% of respondents (*n* = 12). This item was attributed to the factor of *coherence and complexity*. The second ranked item was "daylight and view to exterior" attributable to the factor *connection to nature*. The third ranked item was "sense of control" also attributed to the factor *complexity and coherence*. Table 2 visualizes items in ranked order, with 1 as most important, and because some respondents ranked all items, 22 as least important.

Table 2: *Ranking of Items Attributable to Factors of Supportive Healing Environments (n = 41)*

Rank Order	Item
1	Safety and privacy characteristics
2	Daylight and view to exterior
3	Sense of control
4	Sensory environment (smells, sounds, noise, temperature)
5	Indirect and natural lighting inside
6	Fresh air and ventilation
7	Wayfinding cues and signage
8	Calming and restful elements
9	Comfortable furniture
10	View to exterior through windows
11	Familiarity of physical environment
12	Colors in nature used in the building
13	Social interaction
14	Viewing nature inside (plantings, artwork)
15	Experiencing nature within the building (green areas)
16	Use of natural elements (water, wood, etc.)
17	Colorful artwork and materials
18	Variety in the environment
19	Flexible furniture arrangements
20	Positive distractions (TV, videos)
21	Music
22	Entertainment features

Study participants were given an open-ended question first when asked what a supportive healing environment means to them. A majority of their responses suggested a focus on two factors: *social support enhancement* and *stimulating design features*. However, when asked what a supportive healing environment means using a list of items, participants primarily focused on the two remaining factors, *complexity and coherence* and *connection to nature*. This dichotomy in their responses may suggest several interpretations. It is possible that *social support enhancement* and *stimulating design features* are more closely aligned with providing services and expected values and norms, as well as simple aesthetics or surface treatment of the environment. Factors *complexity and coherence* and *connection to nature* may in actuality be impacted by *social support enhancement* and *stimulating design features* (i.e., without

accomplishing selecting of artwork, impact on connection to nature cannot be achieved). Another explanation could be that the initial conceptualization of attributes requires re-examination, to avoid duplication or duplicity of attribute within one or more factor.

Discussion of the Connection between Factors and Attributes

The conceptual model derived from Ulrich's and Dilani's work suggested the presence of four major factors: *connection to nature*, *social support enhancement*, *stimulating design features*, and *complexity and coherence*. In surveying healthcare staff of the CSU Health Network, evidence to connect perceptions with attributes suggests duality influencing attribute integrity. For example, view of nature and privacy were attributed to two factors, *connection to nature* and *complexity and coherence*, respectively. A second example, in responses surrounding themes in artwork one can locate attributes of views of nature (*connection to nature*) and art, referencing *stimulating design features*. A second issue surfacing through the study finding contrasts an emphasis on physical attributes when staff was asked for their interpretation of the meaning of a supportive healing environment and the ranking of supportive attributes given to them within a multiple choice question.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

This research study was conducted to explore and examine supportive healing attributes as perceived by healthcare staff on a university's campus. The study references Ulrich's (1991) and Dilani's (2001) theories of supportive design proposed in a conceptual model developed for this study's investigation. The 41 participants in the study who fully completed the e-survey engaged in the collection of qualitative and quantitative data providing frequencies and modal responses to e-survey questions. The study's design used the conceptual model to code responses to examine evidence of supportive healing attributes found within an actual working health clinic environment.

Findings

Three research questions framed this inquiry into attributes describing the findings and theories presented by Ulrich and Dilani within one healthcare context primarily engaging one healthcare facility type and its staff.

RQ1: What critical attributes are identified by healthcare staff related to Dilani and Ulrich's research findings?

Critical attributes identified or referenced by the staff included: *view of nature, daylighting, social interaction with patients, comfortable furniture, color, art, wayfinding or signage, privacy, safety,* and *sense of control*. Questions surrounding these ten attributes were found throughout the data analysis. Other attributes were also provided by the researcher in the study questions: visual privacy, acoustical privacy, comfort, relaxing aesthetics, and respectful attitudes.

Duplicity in meaning surfaced in the analysis resulting in two different attribute hierarchies. Initially, of the four factors demonstrated in the conceptual model, two questions

asked respondents to select or report on attributes defining a supportive healing environment. In an open-ended question, staff rated attributes attributable to two of the four factors highly: *stimulating design features* and *social support enhancement.* Yet, in a subsequent survey question listing 22 possible attributes, a hierarchy appeared to be created when staff selected attributes (as the six most important features found within a supportive healing environment) of safety and privacy, daylight and view to exterior, sense of control, sensory environment, and indirect and natural lighting inside attributable to the other two factors: *connection to nature* and *complexity and coherence* as highly rated. Although staff appeared to recognize certain attributes when presented in a listed manner, findings indicated an inconsistency in their perceptions; when asked to mentally recall or define attributes, their selection differed from the response to a similar question asked in a different format. Staff selected attributes attributable to all four factors throughout the e-survey suggesting that attributes derived from the empirical literature comprising the study model were effective in capturing the construct of supportive healing environments.

RQ2: Is there a hierarchy of attributes perceived by healthcare staff?

In examining the responses from staff surrounding attributes perceived to describe a supportive healing environment, the two differing outcomes discussed above suggest and support attribute duplicity resulting in a lack of hierarchical clarity. The establishment of a hierarchy among the attributes and factors was not found due to this duplicity and invites a reframing of the study model.

Survey questions also were not equally weighted in terms of the number of attributes describing each factor and potentially impacted ranking, modal percentages, and frequency of attribute selection. Quantity of attributes found in each factor was not evenly distributed among

each of the four factors in the conceptual model. Also, each factor displayed a various range of topics. *Connection to nature* had similar attributes, while *complexity and coherence* included different types of attributes.

Evidence connecting perceptions with attributes suggested duality influenced the integrity of each attribute. Artwork was coded for the attribute "view of nature" in the factor *connection to nature* and art also referenced the factor *stimulating design features*. This concern influenced the presence of a hierarchy. Physical attributes were more heavily weighted in the closed-ended question concerning the hierarchy of attributes. When staff was asked to describe the meaning of supportive healing environment, attributes were unevenly distributed among the four factors. This issue did not support the existence of attributes being perceived in a hierarchal order from the staff.

RQ3: Does the conceptualization of the factors and assigned attributes represent the perceptions of the healthcare staff?

The conceptualization of *a priori* factors and attributes in the conceptual model appear to represent and support the perceptions of the healthcare staff; no mention of attributes or characteristics was identified by respondents suggesting the list of attributes may be comprehensive. Of the four factors: *connection to nature, social support enhancement, stimulating design features,* and *complexity and coherence,* the way in which responses were attributed may suggest alternative categorization of factors. The conceptual model was created to represent four important areas of the built environment suggested by the literature to be incorporated within a supportive healing environment. Some factors included a variety of attributes, while others included attributes with similarity to each other. For example, *connection to nature* has a smaller amount of attributes within the category. *View of nature, sound of nature, daylighting, access to nature,* and *air quality* are attributes with similar coding characteristics

identified during the data analysis. In comparison, attributes with similar coding characteristics for *complexity and coherence* had a greater variety of attributes. Privacy, for example, was coded under *visual privacy* and *acoustical privacy*, allowing for broader connections to be derived from the survey data.

Reframing the conceptual model. The conceptual model developed from Ulrich (1991) and Dilani (2001) was constructed with the goal of effectively incorporating staff perceptions, in this case, of healthcare workers in an ambulatory setting of attributes comprising supportive healing environments. While attributes appear to encapsulate a reasonable description of supportive healing environments, future reframing of the model may eliminate duplicity and overlap of attributes, as discussed above:

- Elimination of attribute overlap to create greater specificity among attributes related to factors; and
- Reconceptualization of the four factors and an even distribution of attributes related to each factor.

Potentially creating a fourth filter using physical, social, and behavioral categorizations, attributes may have greater specificity attributable to one of four factors voiding the potential for attribute duplicity and overlap (see Figure 12).
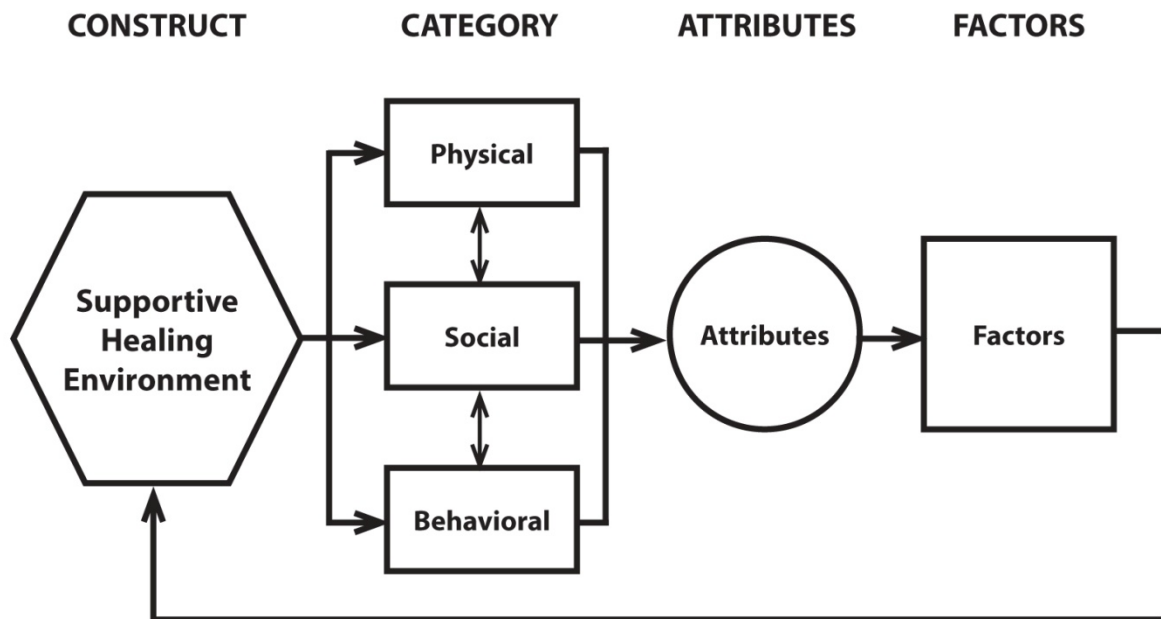
Figure 12: Filtering attributes further through a lens that considers physical, social and
behavioral categories is proposed in future research to eliminate duplicity.

The reframed conceptual model might incorporate characteristics of an attribute defined

by physical, social, and behavioral contexts to differentiate attribute meaning with greater clarity.

For example, *furniture* in a physical sense could be captured by *comfort*, in a social sense by

flexibility, and in a behavioral sense by *layout*. Artwork, in a physical sense, was captured by

placement; in a social sense by *theme*; and in a behavioral sense by *mood.* Figure 12 envisions

changes made to create the reframed model incorporating the considerations discussed above.

The conceptual model was beneficial to the research study, however, in seeking to identify

discrete sets of attributes to begin an examination of factor fit from the user (staff) perspective.

Implications

Ulrich's (1991) and Dilani's (2001) theories set a foundation for design practitioners to

identify and interpret design responses to physical, social, and behavioral actions creating a

context for wellness. Although the attributes appear to be a representation of a broad collection of elements, that in fact do construct a healing environment; a more defined set of attributes need to be created. Yet, this implication suggests there may be differing interpretations of attributes and their degree of impact. There may be a need to disengage overlapping attribute meaning from perceived users of healthcare facilities.

Study Limitations

Several limitations may have impacted the findings reported in this study. Limitations potentially affecting data collection and analysis of data during the study included: use of a convenience sample restricting generalization of survey findings, levels of commitments from staff surveyed, and limiting the survey data to staff rather than including other users.

A disproportionate distribution of attributes among the four factors included in the study and conversely impacting survey questions may have also impacted staff responses or interpretations by the researcher. Responses appeared to be skewed toward those factors with a greater number of attributes included in the questions and conceptual model. Given the nature, small size, and geographic location of this ambulatory facility, perceptions of attribute meaning, definition, or terminology may account for the duplicity discussed above.

Although the response rate was acceptable, participants were limited to one healthcare facility located on a university campus. Axial coding was established using the model component during data analysis which appears to potentially impact the duplicity issue. Refining attribute inclusion and including a broader spectrum of healthcare facility types and locations, and expansion of the population could potentially enhance the findings of future studies.

Summary and Future Research

This study is useful as a starting point for design practitioners to identify practical attributes to consider when designing health care facilities similar to that of the CSU Health Network. The "evidence" collected suggests a next step in clearly establishing the catalysts impacting wellness in this type of ambulatory facility. A greater understanding about the perceptions of work environments by healthcare staff could more effectively and specifically lead to the creation of spaces utilizing healing attributes and, as Dilani and Ulrich suggest from their research, manifest faster recovery times by reducing stress levels of facility users.

Supportive healing environments is a broad and complex construct defined by attributes and factors. Based on a review of literature and the findings of this study, healthcare designers, medical staff, patient, and clients of healthcare facilities would benefit from continued and expanded research further defining the specific attributes of supportive healing environments. This study could be expanded in the future to include a larger population or sample size; include staff from other university health care facilities in diverse regional locations to incorporate greater diversity of background, educational experience and physical setting; and encompass patient/client user perspectives of these facilities contributing to the construct. Encompassing other perspectives from client/patients would also benefit future research on supportive healing environments.

This research is part of a larger study which collected data from a student population attending the same university where the healthcare facility was located. The students engaged in learning about healthcare design within their senior year design studio. This data could serve as a comparative user group with which student perceptions of attributes could be examined. Future research efforts could address a plan to analyze and compare these student responses to those of

staff to further identify differences and similarities in their perceptions of attributes impacting

education and learning of facility designers.

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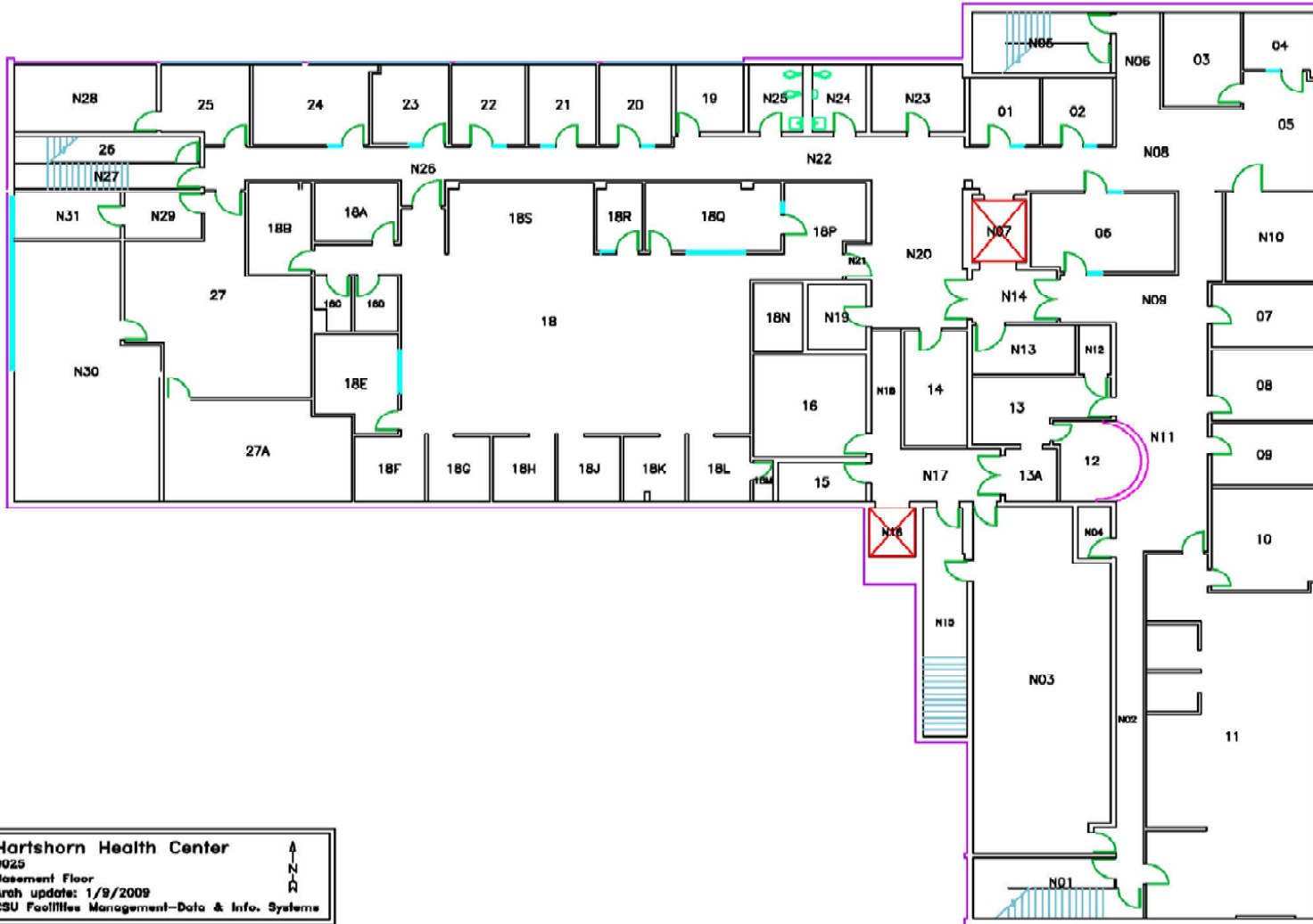
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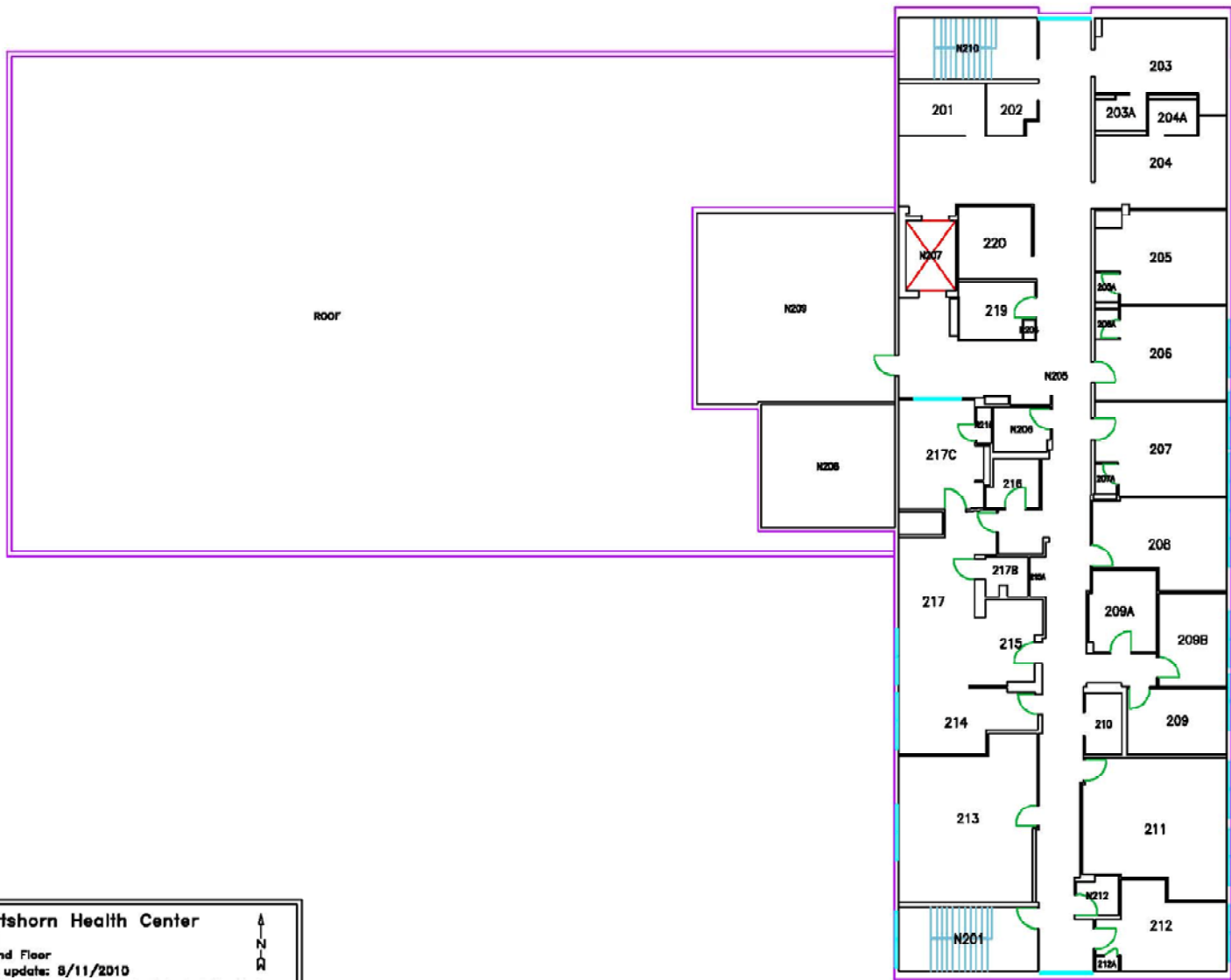
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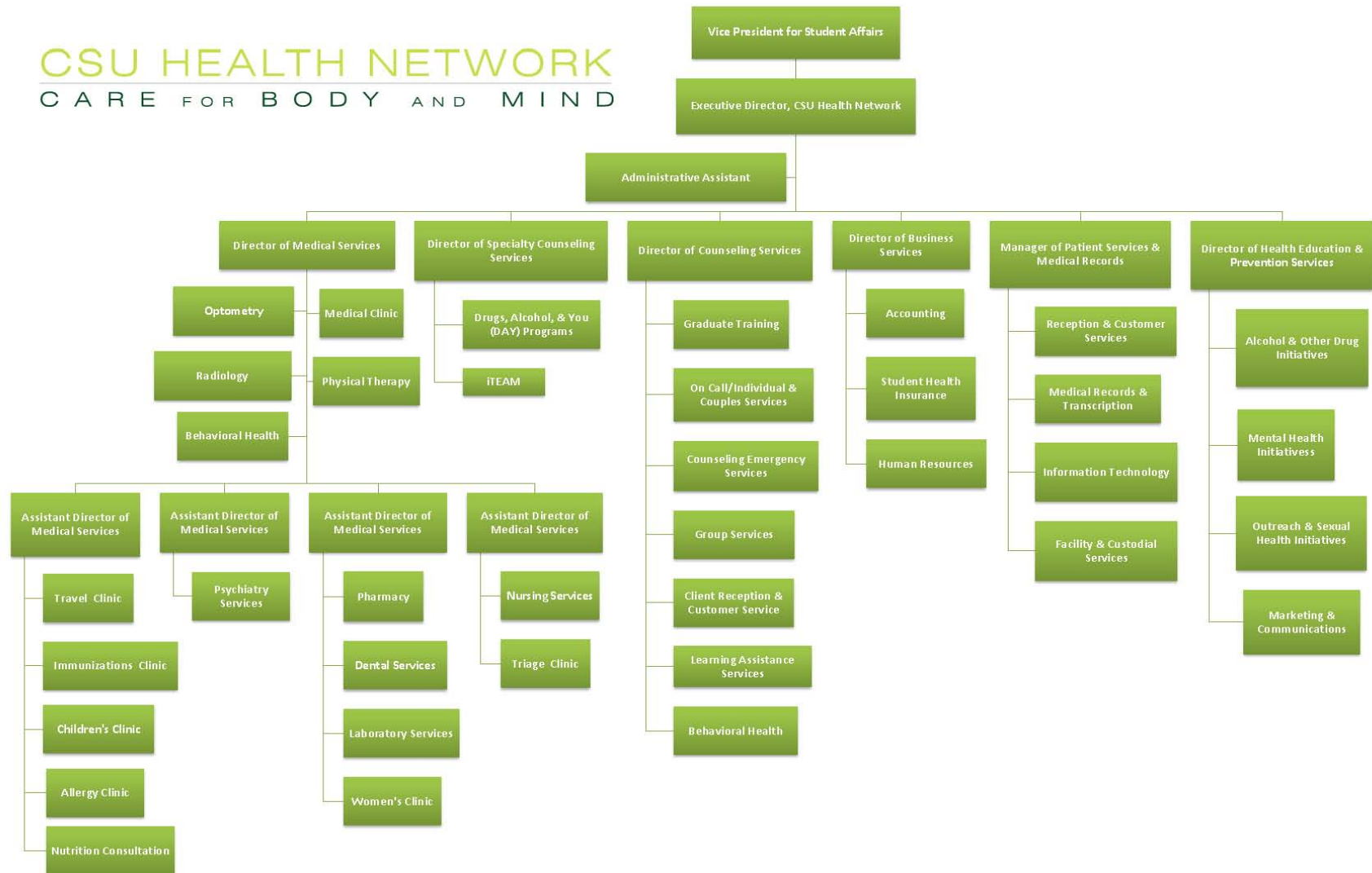
Hartshorn Health Center
0025
Basement Floor
Arch update: 1/9/2009
CSU Facilities Management—Data & Info. Systems

Hartshorn Health Center
0025
First Floor
Arch updates: 6/7/2012
CSU Facilities Management—Data & Info. Systems

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APPENDIX B: ORGANIZATIONAL CHART FOR CSU HEALTH NETWORK

CSU HEALTH NETWORK
CARE FOR BODY AND MIND

Vice President for Student Affairs

Executive Director, CSU Health Network

Administrative Assistant

Director of Medical Services
- Optometry
- Medical Clinic
- Radiology
- Physical Therapy
- Behavioral Health

Assistant Director of Medical Services
- Travel Clinic
- Immunizations Clinic
- Children's Clinic
- Allergy Clinic
- Nutrition Consultation

Assistant Director of Medical Services
- Psychiatry Services

Assistant Director of Medical Services
- Pharmacy
- Dental Services
- Laboratory Services
- Women's Clinic

Assistant Director of Medical Services
- Nursing Services
- Triage Clinic

Director of Specialty Counseling Services
- Drugs, Alcohol, & You (DAY) Programs
- iTEAM

Director of Counseling Services
- Graduate Training
- On Call/Individual & Couples Services
- Counseling Emergency Services
- Group Services
- Client Reception & Customer Service
- Learning Assistance Services
- Behavioral Health

Director of Business Services
- Accounting
- Student Health Insurance
- Human Resources

Manager of Patient Services & Medical Records
- Reception & Customer Services
- Medical Records & Transcription
- Information Technology
- Facility & Custodial Services

Director of Health Education & Prevention Services
- Alcohol & Other Drug Initiatives
- Mental Health Initiativess
- Outreach & Sexual Health Initiatives
- Marketing & Communications

APPENDIX C: STAFF INVITATION SCRIPT

Date

Dear Participant

The Sub Committee on Healing Design has endorsed a research study being conducted as part of thesis research by Emily Molzahn, a graduate student in the department of Design and Merchandising here at Colorado State University. She is conducting a study to research attributes of healing environments in healthcare settings. The Principal Investigator (PI) is Katharine Leigh, PhD, a professor within the department of Design and Merchandising and Emily is serving as the Co-Principal Investigator.

This survey asks questions about your perception of the physical spaces in Hartshorn. You were selected because you work in the facility and have direct contact with the physical building. The nature of these questions gauges your perceptions about health care environments and does not ask about personal or private matters. In addition, we would like you to provide permission to document your project outcomes as sources of information. Your participation in this project is voluntary and should you decide to participate in the study, you may withdraw your consent and stop participation at any time without penalty. Your work will in no way be impacted by your participation in the study. Your name and identification will remain anonymous and all data will be kept confidential in a locked cabinet by the PI.

There are no direct benefits for participating, but we hope to gain a better understanding of what attributes of healing environments are important to Hartshorn staff. Finally, while is not possible to fully identify all potential risk involved in these research procedures, the researcher(s) have taken reasonable safeguards to minimize any known and potential unknown risk to the participants.

We greatly appreciate your participation. If you have any questions or concerns regarding the research either at this point or at any time during the future, please feel free to contact me at 847.370.4801 or Professor Leigh at 970.491.5042. We would be happy to respond to your questions or concerns. If you have any questions regarding your rights as a volunteer in this research please contact Janell Barker, Human Research Administrator, at 970.491.1655.

Please click on this link to participate:

Thank you in advance, for your valuable assistance.

Sincerely,

Janelle Patrias
Sub Committee on Healing Design

Environmental attributes of healing at Hartshorn Facility

Participant Consent: You are invited to be in a research study examining your understanding of features, work settings and needs of the Hartshorn Health Center facility. This study is being conducted by Dr. Katharine Leigh, IIDA, Associate AIA, LEED AP BD+C, a professor in Interior Design and Emily Molzahn, Allied ASID, a graduate student in the Interior Design specialization of the MS program in Design & Merchandising at Colorado State University, Fort Collins, CO.

Background Information: Evidence-based design research informs healthcare providers about physiological outcomes related to sustainability (effects of light, noise, environment, privacy and control, user care, issues concerning safety) as well as positive distractions and healing (Nussbaumer, 2000). Attributes of 'supportive healing environments' (Dilani, 2000; Ulrich, 1990) provide the theoretical foundation for this research study. The purpose of this study is to gather perceptions of supportive healing environments by employees working in Hartshorn Health Center facility.

Procedure: If you consent to be in this study, please continue by accessing the survey and completing the answers to the questions. The survey takes approximately 20 minutes to complete. Voluntary Nature of the Study: Your participation in this study is entirely voluntary. Your decision whether or not to participate will not affect your current or future employment, and will not be shared individually with faculty or students. If you decide to participate, you are free to withdraw at any time without affecting these relationships. If at any point you feel that you would like to withdraw from the study, simply close the survey.

Risks and Benefits: The study has minimal risks. It is not possible to identify all potential risks in a survey procedure, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown risks. There are no direct benefits to you for participating. However, it is hoped that the information collected will help define what is required for a supportive healing environment.

Confidentiality: Your responses will be kept private. All data is processed by Zoomerang, and no identifiers are evident in data summaries. In any report we might publish, no information about specific participants is given. Contacts and

Questions: Researchers conducting the study are Dr. Katharine Leigh and Emily Molzahn; questions can be sent to emolzahn@rams.colostate.edu. You may contact the Research Integrity and Compliance Review Office at CSU: Janell Barker, Human Research Administrator, 970.491.1655; you may print this form for your records.

Environmental attributes of healing at Hartshorn Facility

✱1. An answer to one of these two choices is required to continue the survey.

◯ I understand this form and consent to participate. Take me to the next part of the survey.

◯ I do not choose to give my consent at this time. Please exit me from this survey.

Environmental attributes of healing at Hartshorn Facility

2. What is your gender?

◯ female

◯ male

◯ prefer not to disclose

3. In which location is the majority of your work located?

◯ Hartshorn building

◯ Aylesworth building

◯ other, please specify

4. How many years have you worked in the health care field?

◯ less than 5 years

◯ 5-10 years

◯ 10-15 years

◯ more than 15 years

5. How many health care facilities have you worked at, excluding Hartshorn?

◯ 0

◯ 1-2 facilities

◯ 3-4 facilities

◯ 5-6 facilities

◯ more than 7 facilities

6. How many years have you worked at the Hartshorn Network?

◯ 0

◯ 1-2 years

◯ 3-4 years

◯ 5-6

◯ more than 7 years

7. Using the Hartshorn organizational chart, please identify your unit/department and your role?

Environmental attributes of healing at Hartshorn Facility

8. What type of training resulting in a degree or certificate do you currently hold? Choose all that apply.

- [ ] LPN
- [ ] RN
- [ ] AA
- [ ] BA/BS
- [ ] MA/MS
- [ ] PHD
- [ ] MD
- [ ] MPH
- [ ] Medical assistant
- [ ] other, please specify

_____

9. Please check the type of work environment in which you spend more than 50% of your time.

- ( ) enclosed office
- ( ) work area with panels for privacy
- ( ) desk in an open area
- ( ) work area that is undesignated as yours
- ( ) lab bench
- ( ) I do not have a dedicated work area
- ( ) other, please specify

_____

10. Does this work area have a view to the exterior or outside?

- ( ) yes
- ( ) no

Environmental attributes of healing at Hartshorn Facility

11. To conduct your work, please rank the following, with 1 as most important and 10 as least important.

[ ]	work surface
[ ]	computer
[ ]	visitor seating
[ ]	storage
[ ]	acoustical privacy
[ ]	visual privacy
[ ]	adjacency to specific equipment/service areas
[ ]	specialized equipment
[ ]	access to meeting space
[ ]	access to technology (excluding personal computer terminal)

12. What percentage of time do you spend at your personal work area (e.g., desk)?

- ( ) less than 10%
- ( ) 10-20%
- ( ) 20-30%
- ( ) 30-40%
- ( ) 40-50%
- ( ) 50-60%
- ( ) 60-70%
- ( ) greater than 70%

13. Please rate the furnishings in your work area.

	Very inefficient		Neither efficient nor in efficient		Very efficient
work seating	( )	( )	( )	( )	( )
work surface	( )	( )	( )	( )	( )
storage	( )	( )	( )	( )	( )
seating (patient, guest, [internal/external], colleague)	( )	( )	( )	( )	( )

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Environmental attributes of healing at Hartshorn Facility

14. What are the top 5 work areas you would prefer to have close by your personal work area (e.g., immunization clinic, pharmacy waiting area, reception, dental services, IT)?

15. Please rank artwork themes as most appropriate and desirable for the Harshorn facility.

	CSU imagery
	flowers
	people being helped
	student art
	abstract
	historic
	Rocky Mountain landscape
	nature
	water
	cultural artifacts
	other:

16. What are the key or important attributes/characteristics for lounge and waiting areas?

Environmental attributes of healing at Hartshorn Facility

17. Please rate the degree to which the following norms or values are a constant feature at Hartshorn.

	Almost always characteristic of Hartshorn		Seldom characteristic of Hartshorn		Not characteristic of Hartshorn
collaboration among employees within same department	○	○	○	○	○
collaboration among employees in other departments	○	○	○	○	○
communication among employees within same department	○	○	○	○	○
communication among employees in other departments	○	○	○	○	○
communication with patients/clients seeking services	○	○	○	○	○
communication with visitors, families, and friends	○	○	○	○	○
going out of your way to offer a "helping hand"	○	○	○	○	○
directing people to service areas	○	○	○	○	○
reassuring friends/family regarding patient/client	○	○	○	○	○
getting a drink or snack for family or friends	○	○	○	○	○
socially interacting with patients/clients	○	○	○	○	○
socially interacting with family/freinds	○	○	○	○	○
attention to reading materials, TV programming, and other social amenities	○	○	○	○	○
reinforcing the "face" of CSU as a positive presence	○	○	○	○	○

Environmental attributes of healing at Hartshorn Facility

18. Please rate the following features that are currently in Hartshorn.

	Very Effective		Neither Effective or Ineffective		Very Ineffective
lighting	○	○	○	○	○
acoustics	○	○	○	○	○
visual privacy	○	○	○	○	○
materials	○	○	○	○	○
color	○	○	○	○	○
comfortable furniture	○	○	○	○	○
technology	○	○	○	○	○
safety	○	○	○	○	○
view to exterior	○	○	○	○	○
wayfinding	○	○	○	○	○
sense of control	○	○	○	○	○
maintenance	○	○	○	○	○

19. A supportive healing environment is an objective in the Hartshorn facility. What does a "supportive healing environment" mean to you?

[text entry box]

Environmental attributes of healing at Hartshorn Facility

20. Please rank the top 6 features of a supportive healing space, using 1 as most important, 2 as next most important.

[ ]	familiarity of physical environment
[ ]	sense of control
[ ]	safety and privacy characteristics
[ ]	flexible furniture arrangements
[ ]	daylight and view to exterior
[ ]	colorful artwork and materials
[ ]	social interaction
[ ]	entertainment features
[ ]	view to exterior through windows
[ ]	experiencing nature within the building (green areas)
[ ]	comfortable furniture
[ ]	wayfinding cues/signage
[ ]	sensory environment (smells, sound/noise, temperature)
[ ]	fresh air and ventilation
[ ]	colors in nature used in the building
[ ]	viewing nature inside (plantings, artwork)
[ ]	indirect and natural lighting inside
[ ]	use of natural elements (water, wood, etc.)
[ ]	calming and restful elements
[ ]	variety in the environment
[ ]	positive distractions, (TV, videos)
[ ]	music
[ ]	other:

Environmental attributes of healing at Hartshorn Facility

21. Please rate attributes that support healing offered at Hartshorn (physical environment attributes, e.g., artwork, furniture layout complexity of wayfinding; and social environment attributes, e.g., the way people are greeted at reception).

Very Effective   Neither Effective nor Ineffective   Very Ineffective

◯   ◯   ◯   ◯   ◯

22. To what extent are the patient service activities undertaken at Hartshorn supported by the physical environment?

Very supportive   Not very supportive

◯   ◯   ◯   ◯   ◯

23. Describe how the Hartshorn facility demonstrates an environment that supports wellness and healing?

24. Are there features or fixtures that inhibit your activities in providing services to a patient/client?

◯ yes

◯ no

please explain

25. Should connections between employees and patients be strengthened?

◯ yes

◯ no

please explain

26. How do you in your work, reinforce patient/client well-being?

Environmental attributes of healing at Hartshorn Facility

27. When engaged in your typical workday activities, have you ever experienced a loss of time while at work because you were enjoying the task?

◯ yes

◯ no

please explain

28. What changes would you like to see in the Hartshorn facility?

29. Is there anything else you would like to add to help us understand the need for environmental changes at Hartshorn?

Colorado State
University

DATE: June 26, 2012

TO: Katharine Leigh, Design & Merchandising
Emily Molzahn, Design & Merchandising

FROM: Janell Barker, IRB Coordinator
Research Integrity & Compliance Review Office

TITLE: Revealing Attributes of Supportive Healing Environments in Interior Design:
A Comparison of Staff Perceptions and Student Learning in Healthcare Design

IRB ID: 075-13H   **Review Date:**   June 26, 2012

The Institutional Review Board (IRB) Coordinator has reviewed this project and has declared the study exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2): Research involving the use of educational tests.....survey procedures, interview procedures or observation of public behavior, unless: a) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects.

The IRB determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**

- **You must carry out the research as proposed in the Exempt application,** including obtaining and documenting (signed) informed consent if stated in your application.

- **Any modification of this research should be submitted to the IRB Coordinator through an email prior to implementing any changes,** to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB protocol will need to be submitted and approved before proceeding with data collection.

- **Please notify the IRB Coordinator if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. **Only the IRB may make the determination of exemption, even if you conduct a similar study in the future.**

Research Integrity & Compliance Review Office
Office of Vice President for Research
Fort Collins, CO 80523-2011
(970) 491-1553
FAX (970) 491-2293

DATE: September 28, 2012

TO: Katharine Leigh, Design & Merchandising
Emily Molzahn, Design & Merchandising

Janell Barker

FROM: Janell Barker, IRB Coordinator
Research Integrity & Compliance Review Office

TITLE: Revealing Attributes of Supportive Healing Environments in Interior Design: A Comparison of Staff Perceptions and Student Learning in Healthcare Design

IRB ID: 075-13H   **Review Date:** September 28, 2012

_____

The Institutional Review Board (IRB) Coordinator has reviewed the <u>modification</u> of this project:

❖ to add questions to the post-survey and to verbally announce and confirm that the work/projects done during class will be used for research purposes.

and has declared the study remains exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b)(2). The IRB determination of exemption means that:

* **You do not need to submit an application for annual continuing review.**

* **You must carry out the research as proposed in the IRB application,** including obtaining and documenting (signed) informed consent if stated in your application or if required by the IRB.

* **Any modification of this research should be submitted to the IRB through an email to the IRB Coordinator,** prior to making <u>any</u> changes, to determine if the project still meets the Federal criteria for exemption. If it is determined that exemption is no longer warranted, then an IRB proposal will need to be submitted and approved before proceeding with data collection.

* **Please notify the IRB if any problems or complaints of the research occur.**

Please note that you must submit all research involving human participants for review by the IRB. Only the IRB may make the determination of exemption, even if you conduct a similar study in the future.