REFLECTING THE BEST OF THE PAST AND THE PRESENT: EXPLORING
STUDENT LEARNING IN A DESIGN STUDIO FOCUSED ON DEVELOPING
INTERIOR DESIGN COMPATIBILITY ON A HISTORIC CAMPUS

By

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To David and Grandma
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Reflecting the Best of the Past and the Present: Exploring Student Learning in a Design Studio Focused on Developing Interior Design Compatibility on a Historic Campus

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Interior design is a specialty field of professional practice and inquiry that addresses the design and condition of the interior environment of buildings. Interior designers create environments that balance the needs of the people who will occupy those environments with the conditions of a building and its site. This study examines the design processes and outcomes interior design students’ create when designing interiors within a historic building. Interior design education, the foundation of practice, centers on studio learning. In studio, students demonstrate their growing knowledge and expertise about the practice of interior design. One of the significant challenges in interior design practice is creating compatible new interiors for existing and historic buildings. Compatible new interiors combine the best of past and the present to create an aesthetically pleasing and functional new interior combined with selected character defining features. This research explores a number of factors that may enhance the outcomes of interior design students as they create compatible new interiors for existing buildings. Then, this study examines which studio learning opportunities as well as the experiences and personal preference factors that may positively influence the
compatibility of students’ design solutions, provides insight into participating students’ learning processes, and uncovers potentially new and better ways to help students create compatible interior design solutions for historic buildings. Twenty-four students participated in this study over the course of a twelve-week studio project conducted in their capstone senior studio class in a CIDA accredited interior design program in the southeast. Students completed eight instruments, including standardized surveys and open-ended questions. This study found that analyzing the historic designer’s concepts and intentions and being pleased with the final design solution is related to the relative compatibility of students’ design solutions. Working compatibility and creatively with historic structures were significant issues for students. Evaluators focused on complete, three-dimensional design solutions and presentation quality when analyzing students’ completed design solutions. Findings suggest issues that designers and design educators can address to promote the creation of compatible interior design for historic structures.
CHAPTER 1
INTRODUCTION

Interior design is a specialty field of professional practice and inquiry that addresses the design and condition of the interior environment of buildings. Interior designers create environments that balance the needs of the people who will occupy those environments with the preexisting conditions of a building and its site. Interior designers are professionals who must be educated and licensed in order to ensure their ability to protect the health, safety, and welfare of the public (National Council for Interior Design Qualification [NCIDQ], 2009). The education of interior designers is important because a designer’s education is the foundation that prepares them to develop solutions to real design problems. The skills, methods and abilities an interior designer learned and developed in school form the base as he/she create the interior spaces that the public will live and work in.

Interior design usually takes place within the walls of a preexisting building, either in new construction or an older building that has perhaps gone through various owners and renovations. Designing new interiors for older, historic buildings is challenging; designers must address the historic architectural and aesthetic style(s), construction and finish materials, and signs of layers of use. Then, they must design for new uses and users. Although interior designers rarely have control over the preexisting conditions of an older building, they must recognize what character defining features o save, continue, or eliminate in their interventions and rehabilitation.

Currently, there are few resources for studio faculty to consult when focusing on interior design within a historic building. The most available texts for studio instructors, each with sample interior design studio projects, are written by Scalise (2003) and
Temple (1992). Together, Scalise (2003) and Temple’s (1992) texts include sixty-seven sample interior design studio projects, but only three occur within a historic building and they are not specifically designed for upper division students. This study expands the literature by transition from sample student assignments to explore how senior students work on an interior design historic preservation project.

This study explores issues surrounding developing and assessing compatible designs, studio learning processes, and the effect of sense of connectedness, an emotional construct from environmental psychology. Literature from these areas was used to establish a set of factors that were then tested for associations of compatibility in students’ design solution outcomes for a rehabilitation project in a senior interior design studio class. A rehabilitation is “the process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property that are significant to its historic, architectural, and cultural values (U.S. Department of the Interior, NPS, no date). The Secretary of the Interior’s ninth standard for rehabilitation requires “[n]ew additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment” (U.S. Department of the Interior, NPS, no date). The purpose of this study is to understand which studio learning, experience and personal preference factors may positively influence the compatibility of students’ design solutions, gain insight into participating students’
learning processes, and potentially uncover new and better ways to help students create compatible interior design solutions for historic buildings.

**Compatibility**

Historic preservation is the preservation and maintenance of historic structures and sites, particularly those over fifty years old (U.S. Department of the Interior, NPS, no date). Historic preservation can occur in many ways that range from the meticulous safeguarding and restoration of a historic home as a house museum to the regular rehabilitation of a downtown storefront for new renters. Maintaining buildings as museums ensures the future of significant historic buildings, such as Mount Vernon and Monticello. However most historic buildings will remain in use and be repeatedly reused as a vital part of rural and urban communities. This research focused on a class of senior design students as they rehabilitated two Frank Lloyd Wright buildings that are still in use on the Florida Southern Campus in Lakeland but currently in need of rehabilitated interiors.

Functioning historic buildings need to be maintained as a result of both human and environmental events that can degrade them over the years. When a historic building is renovated or rehabilitated, its function may change: for example, when a historic warehouse is converted into loft apartments. These changes from the original function can keep a historic building in use by rehabilitating it, even though such functional changes can present challenges to designers who must plan how to integrate the new building functions with existing conditions. Many buildings undergo repeated major rehabilitations, forcing designers to deal with multiple layers of restoration, redesign and removal of building elements. In the best designs with compatible elements, new functions integrate smoothly with the existing older building; these new
designs are not historical replicas, but a recognizable part of the reused building.

Significant features are preserved, and new designs are informed by the past while also retaining the character of their own time and place. This study addresses the challenges related to developing a compatible design solution as well as the pedagogy of preparing student designers to meet this goal. Compatibility and student learning processes are discussed in Chapter 2.

**Studio Learning**

Student learning and studio classroom experiences are a complex congruence of factors. This study examines the nature of studio versus lecture classroom experiences and learning engagement opportunities. Active, student learning is part of interior design studio class practice; studio classes are defined at the end of Chapter 1. This type of learning supports student engagement and the development of intrinsic motivation by letting students work on complex problems with the potential for multiple good solutions. Student engagement, including self-directed pursuit of solutions, enjoyment and involvement in the learning process are central factors to active learning. This study used theoretical understanding of active studio learning processes to frame questions surrounding students' studio experiences, learning and the relationships between these factors and individual design solutions. The learning theory literature used in this study is explained in Chapter 2.

**Sense of Connectedness**

Psychologists explain sense of connectedness as an emotional connection (Mayer et al., 2004). When people share an emotional connection, they are more likely to be empathetic and helpful. To research and explain pro-environmental behaviors, environmental psychologists expanded sense of connectedness from a person-person
emotion to a person-environment emotion (Mayer et al., 2004). This study further developed the concept of sense of connectedness to explore potential person-historic building emotional connections. This study examines students’ developing sense of connectedness to historic buildings and their cultural context to understand how a sense of connectedness to the historic built environment may relate to the compatibility of students’ design solution outcomes. Together with compatibility and studio learning, these constructs are further discussed in Chapter 2.

**Statement of the Problem**

The Council of Interior Design Accreditation’s (CIDA) Professional Standards (2009) define the minimum knowledge that interior design students need to achieve entry-level competency to practice interior design. Fifteen CIDA standards cover requirements for student knowledge in major areas of the profession, including history and spatial features. CIDA Standards also define required, minimum levels of student learning in core areas.

CIDA’s eighth standard requires that entry-level interior designers apply knowledge of interiors, architecture, art, and the decorative arts within a historical and cultural context” (CIDA, 2009; II-17). Apply is defined as “competent entry-level skills that must be demonstrated in completed student work” (CIDA, 2009; I-10). The explanation of the eighth standard continues, explaining that students need to understand historical design, identify major movements, and be able to “use historical precedent to inform design solutions” (CIDA, 2009; II-17). This study expands upon CIDA’s Standard 8: students’ ability to apply and use historical precedent in their design solutions. The majority of a designer’s professional practice currently takes place within existing buildings; in 2004 the American Institute of Architect’s Future Visions 2000
forum estimated that over 80 percent of future design work in the United States will occur in historic buildings (Vision2000, 2004). Thus a student’s ability to learn about and then practice design within a historical and cultural context is important throughout their careers. Therefore, this study exceeds CIDA’s eighth standard by having students go into the studio to practice designing a rehabilitation project for a historic building. A practice-based approach aims to help students identify the social and physical historical context they need to generate compatible designs for historic buildings. While CIDA Standards require the application of historical knowledge gained in lecture classes, this study assesses the studio processes that students practiced in a 12-week studio rehabilitation project to design a compatible interior within a historic building. Lecture and studio classes are defined at the end of Chapter 1 and further discussed in Chapter 2.

Interior design programs typically teach students the history of interior design through slide and lecture based courses (Beecher, 1998,1999; Margolin, 1995). Pile’s (2009), Blakemore’s (2005), and Harwood’s (2001 & 2008) textbooks all provide a historical overview from pre-history to the present, but do not consistently instruct students on how to design compatibility with historical traditions. Pile’s (2009) four hundred and fifty page text devotes two paragraphs to historic preservation. Pile’s (2003) and Binggeli’s (2007) overviews of the profession both include chapters on historic interiors. These textbooks cover the history of interior design and its major historical movements, but they do not discuss how students can apply this knowledge to their design solutions. Application, including contemporary historic preservation practices, is beyond the prevue of history courses, which expand student awareness
into the rich content of global design history. Prior studies looked for processes that integrate creative design practices into history courses, but found that they were limited by the lecture format and short class time available in the curriculum of most programs (Beecher, 1998).

Interior design students primarily struggle with design problems and develop solutions in studio, not lecture-based courses; therefore, if they “use historical precedent to inform design solutions” (CIDA, 2009; II-17), they will do so in project based studio classes. Guides for studio instructors to lead interior design students in developing holistic, historically informed designs are limited. There are two major collections of sample interior design studio projects in print, Scalise (2003) and Temple (1992). Scalise’s (2003) collection of thirty studio projects includes two historic sites. Temple’s (1992) collection of thirty-seven projects for first and second year students includes one historic project site. This researcher did not find any texts providing historic sites for studio projects appropriate for upper division students. Specialty texts discuss technical aspects of historically informed design; for example, lighting (Moss, 1988), textiles (Nielson, 2007; Nylander & Nylander, 2005), and structures (Fischetti, 2009). Historic preservation literature usually either provides an overview of the history and philosophy of the movement (Murtagh, 2006; Stipe, 2008; Ligibel, Tyler & Tyler, 2009) or technical knowledge of historic structures preservation (Young, 2008). This case study aims to bridge the gap between interior design studios, history classes and historic preservation education. It assesses the degree to which a student’s own interests, active learning-by-doing and developing sense of emotional connection to historic sites can transform
students’ learning experience and the compatibility of outcomes within a studio focusing on a preservation project.

Assumptions Underlying the Study

Several assumptions underlie this study. First, the researcher assumes that the sample class of participating students is representative of senior interior design students in a CIDA accredited program at a large public university. Second, that the rehabilitation project selected reflects reasonable senior level work at an institution of this kind, and it is significant enough to inspire students. Third, that faculty members teaching studio aim to help students create new design solutions in accordance with currently recommended preservation practice, which includes compatibility as a design criterion. Fourth, that students and evaluators will provide accurate answers truthfully reflective of their feelings and opinions. Fifth, that evaluators are making expert judgments on the qualities of students’ design solutions, particularly those qualities related to compatibility. Finally, that although this study was a single case study in an educational setting, the findings will inform future studio rehabilitation project settings, including professional design practice.

The Study

This study explored twenty-four interior design senior students’ interests, learning activities, opinions, processes, and outcomes during their work in an upper-division studio on a historic preservation rehabilitation project. The study setting is a CIDA accredited professional program that resides in a College of Design, Construction and Planning in a large public university in the Southeast. The primary objective of this study was to ascertain how relative compatibility of design outcomes for a rehabilitation studio project relate to design, learning and emotional preferences. Throughout their
rehabilitation project, students completed evaluations on their level of interest in their projects, self-reported insights from studio learning activities and described their sense of emotional connectedness to the historic built environment. At the end of the project, professionals in architecture, interior design and preservation evaluated students’ completed design outcomes for multiple types of key compatibility features based on accepted principles of design. Experts’ evaluations provided feedback on the level of compatibility of students’ designs. By comparing expert evaluations with student self-reports, this study aimed to provide new information about processes that can positively aid faculty in developing historic rehabilitation projects that encourage students to learn to create compatible interiors for historic buildings. In addition, new insights into student-designers working processes were explored.

This study examined the following three questions:

- How do issues surrounding student interest in a rehabilitation project relate to the compatibility of design outcomes and students’ learning experience?
- How do students’ learning activities relate to the compatibility of their design outcomes and their learning experience?
- How does students’ emotional connection to issues concerning their rehabilitation project relate to the compatibility of their design outcomes and their learning experience?

Each of these questions is further discussed in Chapter 2 and subdivided into multiple questions in Chapter 3.

**Significance of the Study**

Designers and design educators recognize the need to prepare future designers to work on projects in historic structures. In their review of the state of architectural education, Boyer and Mitgang (1996) cited being able to work with existing structures as
an important educational goal. Historic and older existing buildings are a significant percentage of U.S. building stock. The American Institute of Architects (AIA) estimates that eighty percent of future design work will take place within the context of a historic building (Vision2000, 2004). Currently, any significant building constructed before 1960 is considered a historic building (U.S. Department of the Interior, NPS, no date); less significant buildings are often referred to as older or existing buildings. For the purposes of this study, a historic building is one over fifty years of age, regardless of its currently recognized level of significance and whether or not it has been placed on the National Register of Historic Places or is located within a historic district. Historic and older existing buildings do not usually receive special protections unless they are on the Register or in a protected district. Despite their lack of legal protection, a large percentage of professional design work is expected to come from historic buildings. Preparing interior design students to work compatibility with these structures will be important to their success in professional practice. Hopefully, the processes students learn in studio can be applied in their professional practice and help them design for existing, older, and historic structures throughout their careers.

Despite the challenges, the continual preservation of historic buildings is important for many reasons. Historic buildings provide a physical record of a community’s history, development and dynamic change over time. They show an area’s evolution and allow residents to connect in the larger community by maintaining a diverse physical environment that illustrates the past visions of many residents (National Trust for Historic Preservation, 2009). Living and working in historic structures allows people to enjoy places that matter to them and that may have mattered to the community for
generations (National Trust for Historic Preservation, 2009). Preservation success stories across the country often begin when a community comes together to protect the continued existence of a shared built environment (National Trust for Historic Preservation, 2009). For example, community support led to the preservation of Cincinnati’s historic public schools (Flischel, 2001). Community members held fundraisers and public events in support of the city’s nineteenth and early twentieth century schools. Public action encouraged the school system to stop closing and demolishing its historic schools and led to the reopening of some school buildings.

From a sustainability standpoint, reusing historic structures is better for both the natural and built environment. The maintenance and reuse of historic buildings encourages urban areas to remain within their existing footprint and not to continue sprawling into undeveloped land. This allows communities to slowly develop an integrated residential and commercial infrastructure, rather than becoming a victim of another boomtown. New building materials, such as wood, metal, cement and gypsum, are energy and resource intensive to develop. New building construction is wasteful; about four pounds of building material enters a landfill for every square foot of new construction (National Trust for Historic Preservation, 2009). By continuing to use existing buildings and only updating the interiors when needed, millions of pounds of construction materials will not be created or enter landfills. New buildings can be more energy efficient to maintain, but because so much energy is needed to build them, it may be many years before genuine energy savings begin. Keeping existing buildings in use through preservation, maintenance and rehabilitation provides space for human
activities, maintains the vitality of urban neighborhoods and curbs unchecked growth in undeveloped areas.

Designing new interiors for historic buildings requires interior designers to work with an existing building, just as they do with almost all projects. But with historic buildings there are additional considerations; historic buildings can present unique challenges since they are already part of a community with some longstanding residents who remember past owners and uses. Historic buildings have shared in the social and physical life of a community. These buildings were built with aesthetic principals that may be unfamiliar to contemporary designers and design students. For example, designers of Colonial Revival buildings were deliberately working to create buildings that invoked feelings and images of America’s past. In contrast, modern designers created buildings for a new future, opposed to historical associations. Undercurrents of architectural theory and ideology inform past and present design decisions. Inexperienced designers may be unknowingly designing in buildings with one or more design bases different from their contemporary experience.

Decades of use, aging, changing owners and renovations may leave many historic building interiors in need of a new compatible rehabilitation. The challenges of preserving historic buildings and the pressures of popular contemporary architectural design often encourage designers to gut interiors. Designers need help, not just with the technical aspects of historic materials, but also with how to design within a historic structure and through continuity or transformation use significant design elements of the historic structure in their new designs. This study will complement the available preservation literature by creating a new framework to assess the processes that
interior design faculty and students can learn to renovate historic structures. For greater relative compatibility

**Delimitations**

A senior interior design studio class in a CIDA accredited interior design program in a large public university in the southeast was chosen to participate in this study. The participating class had many advantages: the primary instructor had prior experience teaching and working on historic preservation projects and with the site. Both the instructors and individuals at the rehabilitation project site, the Florida Southern College, had spent almost a year preparing for this project and were excited to offer students the opportunity to develop rehabilitations for two Wright buildings. The combination of an experienced historic preservation studio instructor and a high-profile project site make this an optimal research setting. However, this study’s findings may also aid faculty less experienced in historic preservation rehabilitation projects to transfer the findings to more mundane building sites. Students had twelve weeks to work on their studio rehabilitation project. During these twelve weeks, students completed their design outcomes and a series of pre-design phase activities designed and monitored by the studio instructors. All twenty-eight students were asked to participate in this research, but only the twenty-four who completed the majority of their survey instruments and received at least five final project evaluations were included. Instruments measuring students’ and evaluators’ perceptions are the primary measure. Most assessments are original to this exploratory research and this is their first application. Assessments were designed based on the literature review in Chapter 2.
Definitions and Operational Terms

**Character defining spatial features**: the physical features of a building or site that are significant to its architectural significance. Example features include roof type, fenestration, ornamentation, materials, or spatial layout. Features can be physical, such as roofing material, or spatial, such as the size and proportions of an auditorium.

“Rehabilitation standards focus attention on the preservation of those materials, features, finishes, spaces, and spatial relationships that, together, give a property its historic character” (NPS, “Introduction: Choosing an appropriate treatment for a historic building,” no date).

**Connectedness**: an emotional construct explaining a person’s feeling of inclusion, we-ness, or connection with other. This term is most often used to explain interpersonal feelings; however, Chapter 2 discusses how it can be expanded to environments.

**Compatibility**: a significant criterion for new construction and rehabilitation in historic buildings and districts. The Secretary of the Interior’s Standards do not define compatibility; most local guidelines do not either. The researcher uncovered only two guidelines that directly address the word compatibility. The City of Bolivar historic district guidelines explain compatibility as when a feature is “similar in character to existing or known historic examples” (City of Bolivar historic district standards and guidelines, no date; 2). University of Florida guidelines explain that compatibility is “based not on individual preferences but on accepted principles of design. These include scale, proportion, massing, materials, color and value, texture, geometric form, and context. Further, understanding of the extant language of detail and form is key to compatibility” (Tate & Dixon, 2007a). Compatibility will be further discussed in Chapter 2.
Compatibility is not recreating or mimicking a historic or faux-historic interior. Compatibility is the combination of a contemporary interior with the best elements of the historic building. Both historic and contemporary elements are distinct halves of one design. Contemporary interior elements exist in their own right while showcasing the best, most significant, elements of the historic building.

The three CIDA student-learning levels:

- **Awareness** – familiarity with specified data and information that is demonstrated either in student work or in student interviews.
- **Understand/Understanding** – a thorough comprehension of concepts and their interrelationships, shown through student work and/or interviews.
- **Apply/Ability/Able** – competent entry-level skills that must be demonstrated in completed student work. (CIDA, 2009, II-9)

**Historic building**: The U.S. Secretary of the Interior’s Standards (NPS, The Secretary of the Interior’s Standards, no date) uses the fifty-year mark as a guideline to help define significant historic buildings. For the purposes of this study, a historic building refers to any existing building fifty years old or older, regardless of its currently recognized significance. For students enrolled in interior design programs today, buildings built in the 1960s will qualify as historic structures. As this cohort progresses through their careers, buildings from the 1970s, 1980s and so on will become historic structures. Hopefully, students will be able to use the techniques learned while participating in this research to work compatibility with all existing buildings, regardless of age.

**Lecture course**: Lecture courses, also called content courses, refer to courses in design curricula that are primarily based on a lecture format of instruction. These courses support interior design studio practice by exposing students to new, specific
content areas. Students come to a designated classroom only during class times, and instruction is primarily given—students take notes as the instructor lectures—rather than discovered, as in studio courses. Lecture courses supplement studio courses by presenting a large quantity of content materials, such as history of design, building systems, and business practices.

**Building Significance as used in the Secretary of the Interior’s Standards versus the definition used in this study:** This study does not address issues regarding the broader, cultural significance of historic buildings. This study begins when the designer begins work on a project and assumes that any building that is being professionally maintained deserves its designer’s care and skill. Within this study, a historic building is not limited to buildings deemed significant and listed on the National Register of Historic Places or similar lists, but includes all buildings over fifty years old (National Trust for Historic Preservation, 2009). When the term significance is used throughout this study, it is referring to the relative significance of aspects or elements of a project building, not a building’s overall significance to a culture, society, history, or architecture.

**Studio:** Studio is both a place and a type of course with a distinct pedagogy based on the assumption that students learn to be designers by doing design projects. As a location, studio is usually a large classroom where students have a personal work area stocked with personal belongings, can work on any type of project or just hang-out, and have constant access (often 24-7) throughout the semester. As a type of course and classroom instruction, studio begins with the instructor(s) introducing a complex design project, similar to the type of project encountered in practice. Next, students may
complete a series of preliminary exercises designed to increase their understanding of the depth of the specific problem and some issues that the solution must address. Finally, students begin developing a solution, called the design phase. Pre-design phase instruction may include short presentations by instructors and classmates, as well as prescribed learning activities. During the design phase, students primarily receive instruction through individual discussions with their instructors and observations of other student’s discussions. Schon (1987) includes several dialogues between an architecture instructor and students; these types of exchanges are representative of this type of instruction. For example, faculty may demonstrate hands-on designing while drawing a student into a design process dialogue, or ask a student questions to explore and develop a logical design plan.

Studio learning is active and discovery based; students explore the design problem and slowly develop a unique solution. Studio projects have no single answer, but experts can gauge the strength of a design. Students discover answers through pre-design research and then defend their final solutions. Design solutions are shared through presentation drawings, such as floor plans, elevations, and perspectives, models, short written explanations, and verbal presentations.

Summary

Interior design within historic structures challenges designers to combine the best of a building’s past with a new design. Compatibility is this successful combination; historic and new features are each products of their own time, but together they create an aesthetically pleasing and appropriately functional interior environment. This study examined an upper-division interior design studio completing rehabilitations in two historic buildings. What inputs affected the relative compatibility of student rehabilitation
project outcomes? What potential factors identified by literature on compatibility, studio learning processes and environmental psychology contributed to the degree of compatibility in students’ completed rehabilitation projects? Students’ self-evaluations throughout the studio process provided insights into their interest, most useful studio-learning activities and sense of connection with their projects. As discussed in Chapter 3 and Chapter 4, these factors were tested to see how they interacted with the compatibility of student design outcomes. Evaluations of completed student projects by experts from the allied design fields balanced students’ opinions and provided informed opinions on degrees of compatibility they saw in student designs. Together, this case study provides insights into what students and experts believe is happening as students learn to create new interiors within historic structures.
CHAPTER 2
LITERATURE REVIEW

Compatibility

Interior designers create architectural spaces within existing buildings, including new buildings as well as ones undergoing their first or fiftieth renovation or rehabilitation. Interior design professionals are distinguished by their ability to work with existing structures and as part of a larger design team that may include architects, engineers and tradespersons. Working with historic structures can be a daunting and sometimes confusing task with different building systems, the aesthetic preferences of multiple owners and users and layers of outdated interior materials and finishes. What should be kept for the next iteration of the building? Should everything be removed, allowing a fresh start? Should spaces be meticulously preserved as they are, with equal treatment given to every design feature and material? How should the building be changed and rehabilitated to serve its new purpose? If the building should be changed, then how does one proceed?

Preservationists, including interior designers who work primarily in historic preservation, struggle with these and other questions (Murtagh, 2006; Stipe, 2008). In the early decades of preservation efforts, emphasis was placed on meticulous preservation, even recreation, of historic materials and features (Murtagh, 2006; Stipe, 2008). While prominent public buildings and sites, such as Mount Vernon and Colonial Williamsburg, benefitted from being fixed in time and place, there are thousands of buildings that need to remain in use to serve their owners and communities. These buildings need regular maintenance and appropriate alterations to remain functional and relevant for contemporary uses and standards. For buildings that are both historic and
actively used structures, preservationists depend on a guiding design goal of compatibility (NPS “Introduction: Choosing an appropriate treatment for a historic building,” no date).

Compatibility seeks to combine and recognize the importance of the old and new physical architectural features of a building. Compatibility allows alterations and additions to be made to a building, while guiding designers and owners to preserve the most significant, noteworthy, elements of the historic features. For example, after the restoration of historic Anderson Hall on the University of Florida campus, classrooms were stocked with new furniture and lighting, against a backdrop of original wood paneling. New lighting was comparable with historic lighting in size, scale and material finishes, but it was distinctly new in appearance and functionality, as shown in Figure N-1. New furniture was typical of other campus classrooms, allowing the uniqueness of the historic paneling to stand out. Significant spaces, such as the entrance shown in Figure N-2, were preserved and fully integrated into the new design and function. This combination of old and new into a contemporary, functional design is the focus of this study. This study addresses the challenges designers encounter when designing rehabilitations for existing historic structures and explores how both faculty and students can use compatibility as a design goal that will lead to the creation of new interiors that reflect the best of the past and the present.

Defining Compatibility through Preservation Literature

Communities across the country have developed preservation literature, primarily in the form of historic district design guidelines, to aid owners and designers who are modifying existing structures or building new ones in or near historic buildings. When a designer is working in a recognized historic area, historic district design guidelines are
the primary tool available to develop new designs. Most guidelines are based on a set of federal standards and enhanced to address the area’s context (NPS “Introduction: Choosing an appropriate treatment for a historic building,” no date). Within both the federal standards and local district guidelines, compatibility is the overarching design goal. Compatibility is primarily presented as a designed, architectural response to the physical parameters of a building’s character-defining features. Character defining features are the physical and/or architectural features that distinguish a building, or give it character (NPS “Introduction: Choosing an appropriate treatment for a historic building,” no date; Jandl, no date; Nelson, no date). For example, the roofline, interior paneling and fireplace or a particular sequence of interior spatial layouts with traditional proportions could all be character-defining features on one building, but less significant in another building. Distinguishing a building’s character defining features is part of the task of designing in an older building. The “Secretary of the Interior’s Standards For Rehabilitation” and the National Park Service’s Preservation Briefs Series provide general guidelines to owners and designers for identifying the character-defining from less significant features (NPS “Secretary of the Interior’s Standards For Rehabilitation,” no date; Jandl, no date; Nelson, no date). These sources provide general knowledge, but since each historic building and project site is unique, applying general information may be daunting. Once owners and designers have a specific project site, identifying the specific context and design elements can help them develop locally compatible designs. Local guidelines may be important tools for designers working in historic districts. If a project building or new construction infill site is located in a historic district, there should be a local set of guidelines for the historic district. A historic district is an
area of land protected at either the local, state or federal level (NPS “Secretary of the Interior’s Standards for Rehabilitation,” no date). Historic districts can range in size and composition from a fairly unified college campus to a sprawling rural community. Some historic districts have buildings constructed over several decades or centuries; others contain only buildings constructed within a short time span. In most historic districts, the exterior of existing and new construction is protected and changes must be approved—usually by a local Historic District Commission or Board. The lack of current legal protection for historic interiors does not negate their significance; it is a reflection of the extent of American private ownership rights. Historic districts on university campuses are currently leading the way toward protection of interiors and including interiors in their historic district guidelines (University of Florida [Tate & Dixon, 2007a], Miami University [Darbee, Rechie, Rickey, Williams & Loversidge, Jr, 2009] and John Muir College [2008] for examples.)

The researcher examined the content of over thirty historic district guidelines to inform this study. Previously, the researcher helped write guidelines through a Getty Campus Heritage Grant for the historic University of Florida campus (Tate & Dixon, 2007a) and as part of a class fieldwork experience in the City of Gary, led by Professor Roy Graham (2005). As part of those projects and this study, the researcher examined the content of historic district guidelines to assess how that content may relate to the creation of compatible interiors, guide the creation of compatible interiors and be used to assess the compatibility of design solutions. Figure 2-1 brings together some ways in which knowing the content of historic district guidelines may help interior designers and students create relatively more compatible interiors.
Like interiors in most historic buildings, historic structures that are not recognized individually or as part of a historic district currently receive no formal protection. However, both information and methods developed to design compatibility for protected buildings could be used to design for unprotected ones as well. This research is expanding the boundaries of current preservation practice by emphasizing compatible new designs inside historic buildings, regardless of their protected status. Interiors are a vital part of both a buildings’ architecture and its users’ experiences in the built environment (Malnar & Vodvarka, 1992). By expanding the standards of compatible design to include interiors, people can gain a holistic and pleasurable experience as they move throughout the refurbished building.

Local historic district guidelines can be particularly helpful when designing because local guidelines provide specific detail about recognized features and techniques for working compatibility in a district. Many historic district guidelines for rehabilitation, alterations and new construction share a similar content structure that requires the designer to investigate the district’s social history, identify the district’s major architectural styles and also to analyze the most significant architectural elements in the district. The history section should include information about noteworthy individuals, the community’s growth and shared social history, i.e. the human story (for examples, see City of Annapolis [Hole et al., 2004], City of Bolivar [City of Bolivar historic district standards and guidelines, no date], & Hyde Park [Tampa Architectural Review Commission, 2002]). For example, the Ybor City Florida historic district guidelines include both pictures and the history of the community’s historic clubs (City of Tampa, 2010). In the early twentieth century, major immigrant groups, including Italians,
Sicilians and Greeks, each ran a social club; membership included invitations to social events, free access to a staff doctor, life insurance and mortuary services. Clubs vied with each other to create grand, ornate buildings. The historic district guidelines help readers appreciate the grandiose architecture of club buildings as a combination of influences from popular American and home-country styles, and a significant statement of social cohesion and group success in the New World. The stories and histories told in historic district guidelines do more than provide information, these stories also help owners and designers connect with the district and their project site. Historical narratives help explain the significance of the district- why the place matters (Allison & Allison, 2008; Dohr & Portillo, 2011; National Trust, 2011). Caring about historic buildings and working to preserve places that matter have been significant elements in many successful preservation stories. For example, the ongoing Place Matters (2007) program in New York City allowed locals to nominate the historic places that they care about. This process has led to a broader understanding of the significance of New York City’s history and added new historic literature and protection for some nominated structures. By learning local history, interior designers and students may better connect with their project site and see it as a real place with significance before and after they complete their project. This insight may lead designers to greater engagement with their work and feelings of empathy, caring and helpfulness for the historic project building (Mayer et al., 2005). Figure 2-1 lists some ways in which engagement with a project and feelings of empathy, caring and helpfulness may help interior designers and design students create relatively more compatible interiors.
Section two in many historic district guidelines discusses the architectural styles and may even include labeled drawings of a typical building in each major style. Labeled drawing or photographs call out significant features of each style, as expressed in the historic district, and demonstrate how to discuss the style (for examples, see City of Annapolis [Hole et al., 2004] and Skidmore and Old Town Historic Districts [City of Portland Bureau of Planning, 2008]). The concept of architectural styles has come under criticism within the preservation community in recent years because identifying buildings by style may oversimplify the complex and varied history of architectural aesthetics (Longstreth, 1999). However, style sections and their terminology can be helpful to teach design students as well as practitioners the importance of a major architectural style and its evolution in the context of the historic district (Blumenson, 1990; Blakemore, 2005).

In their text on those qualities and experiences that most impact the design process and interior environment, Dohr and Portillo (2011) noted that place identity, including the qualities that give a building a sense of place, were significant for imparting meaning and engaging users and designers. Significant local architectural features contribute to sense of place and provide cues to identify the local place. For example, decorative iron balcony railings immediately conjure up images of New Orleans’s French Quarter; while, wooden shot-gun houses with carpenter Gothic detailing suggest New Orleans’ Ninth Ward. In these examples, altering the significant architectural features changes place identity, history and a host of connected meanings. Interior designers working in a historic context need to know and understand the character-defining features of the local district. Then, designers can create new interiors...
that respond to significant existing features to maintain and develop an ongoing place identity.

Section three in most historic district design guidelines includes sketch drawings demonstrating specific design elements and showing both compatible and incompatible new design features. The exact features illustrated vary by historic district, but typical examples include: scale, massing, fenestration, roofs, entrances, and materials (the National Alliance of Preservation Commissions’ Online Design Guidelines [no date] for access to multiple examples).

Although the design elements and principles in section three are primarily applied to a building’s exterior, this study expanded their applicability into the building’s interior (Ching, 2007). Among other things, this research assessed to what extent students were able to identify the significant architectural elements typically discussed in historic district guidelines and then apply them to design new interiors for a historic building. The Evaluator’s Questionnaire (Appendix H) brings together in one place the design elements necessary for examination of the concept of relative interior design compatibility. The next study sections explain how compatibility is currently assessed in practice as well as how current practice informs how compatibility was assessed in this study.

Assessing Compatibility

Despite the relative uniformity of information in historic preservation guidelines throughout the US and decades of local experience practicing and implementing guidelines, there is no compatibility meter to be used by inexperienced designers. Owners and designers trying to work compatibly in historic districts are given written guidelines, sketch drawings showing simple outlines of acceptable and unacceptable
design elements, and sometimes even a series of questions to ask themselves as they work. For example, the guidelines for the City of Bolivar have owners/designers ask themselves whether or not features of their new designs are “compatible: is the feature similar in character in existing or known historic examples?” (City of Bolivar historic district standards and guidelines, no date). The absence of a shared definition for compatibility may be problematic. It leaves the criteria for designing and winning approval amorphous; however, it also leaves local ordinances with leeway to interpret and create solutions within historic districts.

When faced with new construction or major changes to existing structures, historic districts around the country rely on local Historic Preservation Commissions or Historic District Boards. These local bodies usually contain a mix of local residents, architects, designers, historians and interested volunteers. Individuals planning construction in a historic district must have their new designs approved by their local board, which can pass, veto, or suggest a revision and resubmission of a new design. Boards arrive at their decisions after an often-lengthy public discussion and hearing, during which time the board, local residents and a property’s owners and designers discuss the suggested construction, its degree of compatibility and possible impact on the district. While public forums can be slow and imprecise, they allow local stakeholders to retain some control over their shared architectural heritage. Forums provide owners and their neighbors the opportunity to discuss possible new construction and alterations, including owners’ needs and budget. Forums also allow for a shared, ongoing discussion on how a historic district should evolve and adapt. Through these forums, discussions about compatibility are ongoing and held with public input. They evolve as the members and
locals’ understanding of compatibility change over time. District guidelines in use today represent the latest knowledge and understanding of goals for a compatible district and how to share those goals to guide owners and designers working on new construction or alterations in historic districts.

**Assessing Compatibility in this Study**

This study drew on historic district design guidelines and historic district board assessment processes to develop an original questionnaire to assess the compatibility of interior design students’ project outcomes. The Evaluator’s Questionnaire (Appendix H) covers site history and accepted principles of design. It is applicable to many different types of interior design projects: by selecting ‘not applicable,’ evaluators can adapt the instrument to fit a specific project. The Evaluator’s Questionnaire used in this study required the eight evaluators to examine the relative compatibility of the checklist of features possible in each student’s project outcome. By using the same checklist, each evaluator’s attention was directed to the same set of design features on each student’s project. This questionnaire simulates the structure of historic district guidelines: social history, architectural history and design elements, recognizing the relative nature of compatibility, each question that is scaled and answers from multiple evaluators can be averaged by project. Compatibility is not absolute, but rather exists only in degrees, both for specific features and a design as a whole.

The Evaluator’s Questionnaire developed for this study improves upon current assessment practice by directing each evaluator to assess the same criteria on each project—criteria cannot be forgotten during an open debate and must be consistently examined and assessed. Additionally, evaluators can provide scaled assessments on elements of compatibility and holistic compatibility. The scale allows evaluators to
provide subtle answers about discreet elements of design outcomes. Each of the four subsections, social context compatibility, architectural history context compatibility, architectural context compatibility and holistic compatibility, of the Evaluator’s Questionnaire begins with an introductory paragraph explaining the subsection’s issues and questions.

The first question in the Evaluator’s Questionnaire asks about historical-social compatibility: does the student’s design tell the story of past building users or important human events that took place in the building. For example, Foster Auditorium on the University of Alabama’s campus was an important site of civil rights action, when local officers blocked the door and tried to stop African American students from entering. As Foster Auditorium is renovated and maintained in the coming decades, this important story should be prominent if the design is scored high on social context compatibility.

The second question on the Evaluator’s Questionnaire asks about architectural style—was the student aware of the larger architectural aesthetic trends that may have influenced the project buildings? For example, on the Florida Southern College campus, Frank Lloyd Wright’s twelve buildings are a unique collection that he designed specifically for the campus. However, some features—notably the extended eaves and cast architectural ornamentation—may reflect the influence of the geometries of modernisms and aesthetics of the Prairie style, developed by a group of Midwestern architects as a new American style. Wright was a leading member of the movement decades before beginning the campus. However, his campus designs reflect an ongoing use of Prairie style aesthetics, the geometries of modernisms and contemporary field-wide developments in materials’ technology. Students developing
compatible design solutions could use these features as inspiration for their new designs. For example, modernism or Prairie geometries could inform a new floor pattern plan.

Questions three through ten in the questionnaire ask the evaluator to examine specific design elements and gauge the design’s relative degree of compatibility. The design elements of architectural context compatibility on the Evaluator’s Questionnaire are:

- **MASSES AND VOLUMES.** Including: the relative size of different rooms and circulation spaces to each other and the building or/and the relative mass of built-ins and furniture to a spatial volume

- **SURFACE FORMS, SUCH AS ROOFS AND WALLS.** Including: sizes, shapes, colors and textures of interior surfaces, including floors, walls, ceilings, furnishings and built-ins

- **WINDOWS AND VIEWS.** Including: window sizes, placement and framing; relationship of windows to internal openings; views between spaces within the building; window materials and colors

- **ENTRANCES AND INTERIOR CIRCULATION.** Including: exterior and interior doorways; interior movement within and between spaces; relationships within circulation and between circulation and adjacent spaces; colors, materials and textures of these spaces

- **PROPORTION AND SCALE.** Including: relative proportion and scale of furnishings to interior spaces; interior spaces to other interior spaces and the whole building; fenestration and interior openings to walls and spaces

- **ARCHITECTURAL ORNAMENTATION.** Including: interior and exterior detailing, decoration, colors and trim

- **MATERIALS.** Including: Finishes, furnishings and materials throughout

After assessing the compatibility of seven measures of architectural context, evaluator’s were asked to take everything into consideration and give an average score for the design’s degree of holistic or total compatibility. The holistic measure allowed them to summarize, and perhaps go beyond their assessments of discreet measures.
Because evaluators are experienced in design and preservation, their holistic assessment may be particularly insightful.

The original Evaluator’s Questionnaire builds on historic district guidelines by including similar content for all participants. It improves upon current practice by guiding evaluators through a consistent measure for every project, and it ensures that the content of guidelines is also the criteria for assessment. Furthermore, by making the evaluation criteria clear, the Evaluator’s Questionnaire can include everyone in the assessment process. In future applications, design students could use the questions as a self-assessment measure throughout the design process, and faculty could use the questionnaire to target their instruction. In this study, the first test of the Evaluator’s Questionnaire, evaluators used the tool to guide their assessment process. The researcher used completed Evaluator’s Questionnaires to average views from multiple evaluators and operationalize the compatibility for each measure of each student project as a mean score.

The Evaluator’s Summary Questionnaire (shown in Appendix I) is an original instrument designed to complement the Evaluator’s Questionnaire. Each evaluator used the Evaluator’s Summary Questionnaire to list the most and least successful student design outcomes and explain why the projects were selected. Evaluators used these open-ended questions to add their criteria, viewpoints and values to the scaled questions of the Evaluator’s Questionnaire. These data are important because they allowed the assessing experts to contribute their knowledge to this study and future iterations of the assessment instruments.
Compatibility and Creativity

As an interior design educator, this researcher frequently hears students express their concern that historic preservation projects limit their original input and creative expression. Students say they don’t want to copy something old, but feel that they must to respect the historic building. Copying historic features and retaining the original principles seem like the safest solutions. These feelings, that creativity and compatibility are at odds with one another, may even be found among experienced designers and design instructors as well. A dichotomy between compatibility and creativity shows a lack of understanding of compatibility and creativity. A creative design solution is one that is novel and appropriate (Hennessey & Amabile, 1988). Preserving elements of a historic building is appropriate, but how historic elements are transformed in a new design allows opportunity for novelty- in addition to the creativity needed to create a contemporary interior. Successful compatible designs require a designer’s full creativity and skills to see and develop the potential of what is already in place and imagine new ways to use that potential. Figure 2-1 is a framework that illustrates some elements necessary for being engaged and working creatively on a historic building project. This study tested the degree to which these elements helped interior design students create relatively more compatible interiors.

Compatible designing has the potential to push interior designers and students to their creative boundaries. In a monograph on creativity for teachers, Hennessey and Amabile (1987) explain that in addition to interest and motivation, creativity needs domain knowledge and the recognition of constraints and opportunities to develop and grow. The challenges of learning the technical knowledge needed to design compatibility for historic buildings can provide students with the extra momentum they
need to strengthen their creative design skills. Too few criteria or constraints for a project can result in limited challenges and students need challenges to push their creativity further. By designing compatibility, student’s options are constrained but not eliminated. Indeed, significant spaces and features should be enhanced as students explore molding and harmonizing their design in partnership with the historic building. These types of explorations push design students to fresh, creative constructions (Hennessey & Amabile, 1987; Nakamura & Csikszentmihalyi, 2009; Carmel-Gilfilen & Portillo, 2010).

In their research on flow, an enjoyable psychological state of harmonious creative working, Nakamura and Csikszentmihalyi (2009) state that to enter flow a person must be challenged to stretch their existing skills. Additionally, they must be provided with clear goals and given feedback about their progress. An interior design studio class that is assigned a historic rehabilitation project can supply all of these ingredients. Compatibility and creative design solutions go together. The struggle to design compatibility forms the challenge that stretches a student’s skills and pushes him/her forward to find creative solutions (Nakamura & Csikszentmihalyi, 2009). Creativity is significant to this study because working creatively and experiencing flow are enjoyable processes. As the following section discusses, active learning theory suggests that enjoying the learning or design process contributes to engagement in the studio project. Engaged students may be less likely to settle for their first solution. They will return to their project and continue developing their solution; ultimately, this may lead to a more compatible design outcome.
Creative design solutions, ones that are both novel and appropriate (Hennesey & Amabile, 1988), reflect compatible design solutions or ones that use the best of the past by creating a succinct transition to the present. Where and how past and present interact in a space could provide multiple creative design opportunities for novelty and appropriateness. How designers preserve historic architecture and how they connect their new designs to historic architecture provide many opportunities to develop creative design solutions. Examples from the work of architect I.M. Pei illustrate how new buildings can reflect and respond to local historic architecture while being creative expressions of their own time. Pei’s 1978 East Wing of the National Gallery in Washington D.C. is an example of how a creative solution, novel and appropriate, and a compatible solution, can be developed together. Pei’s East Wing continues the relative scale, massing, materiality, and circulation pattern established by the 1930s West Wing; however, the two buildings are clearly unique architectural products of their own times. Pei’s 1997 rural Miho Museum of tea ceremony artifacts reflects Japanese architectural traditions and its contemporary origin. For example, interior ceiling treatments are intersecting metal rods. The rods’ scale and intersection pattern mirrors traditional rural Japanese bamboo ceilings, which continue to be used in traditional rural teahouses. In both ceiling treatments, color, construction and scale are compatible, but Pei’s use of metal diverges from the vernacular solution to create a subtle transition to the new interior. The ceiling is a creative design solution. The use of metal is novel, and how it is used is appropriate as well as compatible with local historic architectural traditions. By mirroring ancient construction techniques, Pei has created an interior that is a
compatible reflection of the rural region’s historic architecture and a contemporary museum space.

In contrast to the Miho Museum’s clear, physical reflection of local architecture, Rem Koolhaas’s Seattle Public Library disappointed many residents, who believe it expresses a global, corporate style and ignored their local architectural traditions (Mattern, 2003). Through public forums and newspaper letters-to-the-editor, residents discussed their frustration with the downtown library. Many felt it was a replication of Koolhaas’ aesthetics, rather than of their community’s preferences and architectural traditions. In other words, despite its creative design, many Seattle residents were upset by the building’s lack of compatibility with local architecture (Mattern, 2003).

Compatibility and creativity can be achieved in a single project, and creativity alone is not always enough to develop successful architecture and interior design. A designer working creatively and compatibly can use the best of the past to create a powerful transition to contemporary design ideas and appropriate architectural elements. The goal is to generate spaces that go beyond one individual’s creative potential and successfully create a compatible design encompassing multiple creative minds.

Another example can be drawn from the University of Florida campus. The recent rehabilitation of the Hub on the University of Florida campus illustrates how significant historic features can be preserved and used to inspire new features that integrate old and new into a single design. The Hub has served many functions since it was built in 1950 including a post office, ballroom, bookstore, and administrative offices. During its most recent rehabilitation, the post office was converted into a food court, and the bookstore and offices were converted into new student-help centers, shown in Figures
N-5 and N-6. A significant character defining feature, the pink marble staircase shown in Figure N-3, was preserved in the center of the building. Throughout the new office and student centers, the brushed tubular railings of the stair inspire framing and architectural features, as shown in Figures N-4, N-5 and N-6. The curving post office floor pattern plan was preserved and used to guide the new food service counters. Inspired by the original post office, curves were used throughout the student services area to guide students to help desks, as shown in Figure N-6. The HUB design is a creative solution. It is novel, with new furnishings, materials and fixtures, and appropriate for preserving the best of the historic building and using its design language to enhance the appropriate contemporary furnishings and fixtures. This study aimed to contribute to the development of creative interiors that compatibly combine the best of the past and the present by revealing new processes that may help design students achieve compatibility design solutions for a historic rehabilitation project.

**Summary**

Compatibility is a design goal for designing new construction in a historic building or within a historic district. Compatibility combines the best of the past and the present by preserving significant features and integrating them with a new design. New designs and the historic elements within them are each clearly products of their own time. Compatibility is defined as a design goal in the preservation literature produced at both the federal (NPS “Secretary of the Interior’s Standards for Rehabilitation,” no date), and local (National Alliance of Preservation Commissions’ Online Design Guidelines, no date) levels.

Guidelines for designing compatibility with historic structures are typically composed of three principal sections covering the area’s social history, the area’s
architectural history, and an analysis of significant local character-defining features repeatedly found in the district. Compatibility is not an absolute quality; designs can be compatible along some criteria and not others, and compatible to different degrees. In most protected historic districts, a board of local residents and experts must approve designs for alterations and new construction. This study drew on how compatibility was presented and assessed by using multiple area experts to gauge the relative compatibility of student project outcomes. The assessment instrument developed for this study used the content of historic district guidelines to guide evaluators through a uniform assessment process and to calculate a mean score from multiple assessments. This new process is important because it standardizes the assessment criteria and process as well as ensures that the content of guidelines is also the criteria of assessment.

Compatibility is a unique design goal that requires the designer to consider and combine historic features with a new design. Designers may design more compatible outcomes if they care about their project and want to learn about significant local features. As an interior designer studies a historic building project site and develops a new design, there are many opportunities for engaged practice and creative expression. Compatibility is not a recreation of historic or faux-historic features; rather both new and old should be clearly differentiated by transitions. The new design, as well as how a designer connects and relates the new and historic features can provide opportunities for designs that are novel and appropriate, i.e. creative. Creative, compatible designs can preserve the best of the past, provide a harmonious experience for users and showcase the best in contemporary design.
Studio Learning

As discussed in proceeding sections and shown in Figure 2-1, this study proposed that relatively more compatible design outcomes are produced by designers and design students who care about their project, are engaged with their work and understand local conditions. But how do interior design students develop the traits to support a relatively more compatible design outcome? Are current teaching practices already promoting this goal, or is something else needed? The following section examines the studio learning experience to explain 1) why current history teaching practices fail to prepare students to practice in a historic building and 2) how to engage interior design students in a historic preservation project that facilitates active learning about the local historic and architectural conditions of their project. The reviewed research that follows suggests that students learn through 1) active and project-based assignments that are 2) context and content specific, such as a historic building rehabilitation project, 3) based on complex, content-rich real problems that students can immerse themselves in and 4) that students are practicing with feedback from instructors and peers. Examining studio practice and learning is necessary to explain both why current practices may be failing to prepare students to create compatible interiors as well as how to prepare students to design well-conceived historic preservation projects. Later, Chapter 2 examines the significance of emotional connections between designers and their project buildings.

Significance of the Studio Setting and Context-Based Real-World Projects

Interior design classes usually operate as two parallel systems of studio and lecture courses. In theory, lecture based courses should inform and broaden students’ understanding of specific content areas and reinforce their studio practice. The Council of Interior Design Accreditation (CIDA) organizes student-learning requirements along
three continuous learning levels: awareness, understanding and application. Tests from lecture courses can demonstrate awareness; papers and projects can demonstrate understanding. Studio projects demonstrate understanding and application. CIDA sets minimum standards of student learning for accredited institutions (CIDA, 2009). CIDA Professional Standards (2009) require both studio skills, such as drawing and space planning, and evidence of awareness or understanding of theoretical knowledge from content areas that support designing; such as color, light, history, codes and building systems. CIDA standards suggest that studio and content courses should work together, united in student understanding, with evidence of student understanding and learning displayed in student design projects, especially studio project outcomes (CIDA, 2009).

Research in interior design education suggests a more complicated and disparate relationship between content and studio courses. In studies from multiple interior design content areas (discussion following), interior design faculty discuss students’ struggles to integrate content knowledge into studio projects and their own attempts to develop methods to help students to combine content knowledge and studio practice. Instructors in accessibility and universal design found that students struggle to combine content knowledge, such as codes from the ADAAG and preferences of special needs populations, with studio practice (Kriebel, 1983; Stiffler, 1990; Brent et al., 1993). Kriebel (1983) designed a course in accessibility for interior design students after finding that students lacked experience working with accessibility guidelines, as evidenced in their studio work. The course combined lecture, class work, site visits, guest lecturers, and design projects. Kriebel (1983) had mixed success improving student
understanding and project outcomes, and concluded with proposals to modify the course, such as increased testing on technical content. Stiffler’s (1990) course on designing for special needs populations included in-class lectures, site visits to healthcare facilities and residences, and a studio design project. Through pre- and post-tests, Stiffler (1990) found student improvement in several areas, particularly awareness of and empathy with special needs populations, but a weak improvement in students’ knowledge and application of technical design knowledge. Students now wanted to make their designs accessible but still struggled to put best-practice knowledge into their studio projects. Brent, Eubank, Danley, and Graham (1993) designed a three-day workshop for students and professionals to learn about ADA codes and apply them in a small project. Their workshop used a variety of teaching methods, but pre- and post-testing showed only a 25 percent improvement in ADA understanding. Brent’s (1993) results illustrate the difficulties instructors face when trying to increase student knowledge of a content area and to require them to apply that knowledge in studio practice. These three studies each found that lecture and studio teaching are not being integrated into students’ studio project outcomes, despite an attempt to use multiple teaching methods to bridge the gap between content knowledge and studio practice.

Color and light is another content area where students struggle to fully integrate technical knowledge into their studio designs. As with issues of accessibility, CIDA 2009 Standards require knowledge of color and light, and interior design faculty experiment with methods to teach the theory and practice of using color and light in designs (Poldma, 2009). While framing learning issues students face regarding color and light, Poldma (2009) states “too often light and color elements and theories are taught as
separate design features.” This leads students to treat them as “applied elements introduced [in studio projects] after planning may already be complete” (Poldma, 2009; 20). Poldma calls for integration between studio practice and color and light learning and application; separate learning in content courses leads to separate application in studio courses (p. 21). Poldma presents course methodology and exercises focusing on applying color and light theory to experience in studio projects and real interior spaces. Teaching practices are explained for their ability to help students apply their learning in studio practice and discussion calls for an early integration between studio practice and theoretical learning (Poldma, 2009).

Poldma’s (2009) underlying assumption, that studio is where students practice and integrate their content knowledge, was drawn from Fontain’s (1997) attempts to teach architecture students to integrate lighting theory and concepts into their studio learning and projects. Fontain (1997) found that studio was a “dynamic situation” and students “put their best energy into the studio project and have little time for their other courses” (Fontain 1997; 179 in Poldma, 2009; 21). This echoes Schön’s (1987) observations in MIT’s architectural design studios. The studio is where students learn, practice, and relearn. Figure 2-2 illustrates the dynamic learning situation of the studio. Schön’s (1987) work on architectural education and thinking was based primarily on observations of what architectural faculty and students were already doing, but it has shaped and influenced understanding of what happens in design studios, and appreciation of studio as the core of design education.

Like the courses discussed above, history of interiors courses are lecture based, and content specific. CIDA standards require awareness of interior design history.
Application or history or preservation knowledge is not required. If students encounter a historic preservation project in studio, they often struggle to integrate history into their studio learning (Lichtman, 2009; Margolin; 1995; Morgenthaler, 1995). As a lecture course, history classes are separated from studio classes. As shown in Figure 2-2, class structure, course assignments, and student demonstrations of learning—studio projects versus history tests—are different in history and studio courses (Lichtman, 2009). Lichtman’s multi-part study surveyed and interviewed design history instructors throughout the United States and conducted a case study analyzing student feelings, assignments, and classroom activities in Parsons’ design history from 1850-2000 survey class. Lichtman (2009) found that most instructors believed a lecture-based course was necessary to introduce students to the material and provide them with an overview of the discipline. However, this lecture-based, survey format is “creating a rift between academic goals and creative practice.” It can leave students struggling to find any relevancy to their studio practice (Lichtman, 2009; 342). This study concluded that the primary method history faculty use to teach their courses is a ‘masterpieces’ approach. Faculty members discuss masterpieces of design and master designers, with canon organized chronologically and into historical styles, such as Gothic, Romanesque, or Beaux Arts.

The masterpiece instruction method can provide a clear organizational structure for students and faculty to unify the content of history survey courses. Both Lichtman (2009) and Margolin (1995), in his overview of the history and purpose of design history courses, discuss the pros and cons of the masterpiece method. It was developed when history of design courses were first established in the 1970s and is based on a
traditional art history model. Design history faculty often come from history or art history, not design practice, backgrounds (Lichtman, 2009; Margolin, 1995). In art history, lecture-based survey courses focus on showing students the ‘best of the best,’ analyzing the superior qualities of each piece, and sorting art works into discreet styles. Instructors try to give students a historical overview, not inform their design work (Margolin, 1995). Margolin (1995) states that this distinction—giving students a historical overview versus informing their design work—is an important, if unacknowledged classroom objective. It may help explain why design students find little relevance in their history classes (Lichtman, 2009; Margolin, 1995).

Unlike accessibility, color, and light content courses, history courses are deliberately separated from studio learning and practice. Margolin (1995) traces this development to Bauhaus teaching pedagogy, which emphasized designing from principles, such as form and mass, rather than historical inspiration. Dunbar (1989) provided further credence for this theory by examining the writings and teachings of Bauhaus director and Harvard Graduate School of Design instructor Walter Gropius. Dunbar (1989) examined Gropius’s principles and traced their influence through interior design education. He found that Gropius’s teaching practices and philosophy remain important influences in interior design education in the twentieth century.

Design history faculty concerned about a disconnection between history and studio learning experimented with different teaching methods to help design students connect their history and studio learning. Morgenthaler (1995) examined architectural design history courses and used a case study to develop a non-chronological, thematic approach based on studio concepts with a goal to “unleash the creative potential of
architectural history” (p.218). Beecher (1998) critically examined the history of interior design teaching, available textbooks, and the limits of the masterpiece-chronological teaching structure. Like Morganthaler (1995), Beecher wanted students to be inspired by the process of design history, finding that the “linear construction of history often promoted by interior design texts potentially limits students’ abilities to understand the connection between the creative processes used in design activity and those used to study the past” (Beecher 1998, 4).

Beecher (1999) continued her research in history of interiors teaching practice through a case study with two sequential history courses. The courses still focused on masterpieces, but instead of a chronological presentation, sites were grouped into four themes that included examples from different time periods and cultures. Beecher expected that these groupings should help students see connections between different works and between studio processes and the processes used by historic designers. Lucas (2009) shared a similar case study course at the Interior Design Educators Council South Regional Conference. He also grouped sites into four themes, with each theme meant to relate to the design process and outcome, such as geometric and organic, instead of a chronological or historical style. Lucas also asked students to create building analysis posters, calling out the design elements from multiple buildings within each group. Lichtman (2009) found that while most design history instructors used a masterpiece-chronological method to organize their history course content, several still used a masterpiece canon, but separated the course content into thematic groupings, like Beecher (1999) and Lucas (2009). While this study was informed by these developing classroom practices to improve history learning, this study is different
from previous research. This study enters the studio classroom to examine learning outcomes in a real-world, active learning studio setting. By expanding upon previous attempts to improve history courses by focusing not on the content prepared by instructors, but on the outcomes generated by students, this study examines an active learning situation.

The subdivision of interior design curricula into studio and content courses presupposes that students need lectures rather than studio courses to learn technical material and that they will later be able to integrate content learned in lecture courses into studio projects. Both assumptions have been shown to be faulty in attempts to improve ADAAG, lighting and color etc. First, while the passive learning that students experience in lecture courses may seem to transfer large quantities of information to students, once each course is complete, students may not actually remember very much (Scanzoni, 2005). Secondly, while CIDA (2009) expects students to unify knowledge from these two types of classes in their projects, faculty from multiple content areas share a concern that students are not integrating knowledge learned in different settings into the studio, which is the primary location of student learning and where students apply their learning through practice. In comparison to other interior design content areas, history faculty members face an even greater challenge than instructors of lighting, building systems, or technical design standards. Interior design history knowledge is not presented in an application-ready format and students are not generally expected to apply their history knowledge to studio projects. History faculty members continue to experiment with teaching methods and in-class assignments that may make the material more applicable to students’ studio work; however, Morgenthaler
(1995), Beecher (1999) and Lucas (2009) each reported being limited by the class time and structure of the history course. Their experiments did not bridge the lecture-studio gap, and they did not test their new teaching practices on students' studio project outcomes. Meanwhile, history faculty members agree that they need available course time just to present an introduction to their material (Lichtman, 2009). History instructors' concerns about covering their materials implies that until the expected content and format of history courses change to allow time for exploratory projects and practice, students will need to practice working with historic buildings in their studio courses. Because studio is where students are active and energized learners practicing design, this study is going beyond CIDA's Eighth Standard, which requires awareness of historical trends and influences. This study assumes that higher order thinking is needed when designing in a historic preservation context. Compatibility is a real-world design goal. If students are to achieve compatible designs in their professional practice, they most likely need to practice with context based real-world projects in studio.

Studio learning allows students in the act of designing to learn through complex, content rich problems. This is a significant feature of studio learning. Engagement in studio with real, complex problems should actively absorb students in their learning and promote long-term student learning and recall (Norman & Schmidt 1992). Real-world context-based projects are the foundation of studio projects, as shown in Figure 2-3. Real-world context-based projects are complex, rich with content and detail for students to actively explore and discover. Because of the richness of these problems, students can pose multiple questions and solutions; questions and answers are not closed and fixed, as they sometimes are in lecture-based history classes. Learners may find active,
discovery-based learning—finding questions and solutions—more engaging (Lindfors, 1999; Scanzoni, 2005). Working on real-world projects can promote a genuine interest in learning and practicing design; students’ work is engaging and meaningful (Lindfors, 1987, 1999).

Compatible designs are developed in the real-world, in response to local situations and design guidelines. Designing compatibility requires an engaged designer actively learning the local history and design features relevant to the project site. Context-based studio rehabilitation projects, unlike lecture material, encourage students to seek out new information and respond to the specific context of their problem. Students engage in practice, rather than memorization. Figure 2-3 provides a conceptual framework illustrating the transition from real-world historic building design problems to studio projects and studio project outcomes.

**Interior Design Studio Processes: Learning through Practice**

Interior design professionals work on a series of real problems, each with both known and unknown design parameters. Practicing designers learn about their project by asking questions in order to discover a project’s scope and its solution (Schön, 1984). Interior design students learn how to practice design through active inquiry by practicing on their studio projects (Schön, 1987). As Figure 2-3 shows, students begin a studio project based on a real-world problem: then they engage in multiple studio activities and processes. Students’ studio learning process is active learning, characterized by student-self-directed inquiry. When active learning is occurring, students are inquiring and exploring, rather than being given knowledge by an instructor. Since instructors do not completely control the inquiry process, students given problems based in whole systems will focus selectively on those aspects of the
system that interests them (Lindfors, 1987; 226). However, working on a context-rich problem, with interconnected questions and solutions, imparts meaning and aids learning (Lindfors, 1987; 226).

Learning stems from the discovery process where students are guided, not instructed, by their teachers (Scanzoni, 2005; 136). Higher-order learning, as John Dewey observed, is demonstrated by the student’s ability to do something such as complete a studio project and not merely repeat information (Scanzoni, 2005). Just as student learning should end with students being able to do something, it begins with their attempt to do something. Students learn to solve realistic, complex problems by tackling similar problems in guided classroom settings (Scanzoni, 2005). This real, learning-by-doing approach is the cornerstone of an active learning situation. By placing students in greater control of their classroom learning, they can be immersed in complex problems and follow their own interests toward the solution (Scanzoni, 2005; 149). Creating a compatible design solution is a challenge. Practicing on a historic building in studio allows students to explore problems, so that they will be prepared to tackle the making of a compatible interior in their professional practice.

In their review of literature addressing the psychological basis for problem-based or active learning, Norman and Schmidt (1992) found that problem-solving skills are content specific. Problem solving skills learned for one type of material will probably not be applied to other different content (Norman & Schmidt 1992, 558-60). Applied to interior design, this suggests that not only is it important for students to practice solving interior design problems, it may also be important for them to practice on a wide variety of problems and techniques used in developing design solutions. In other words,
designing contemporary buildings may not prepare one to design in a historic structure. Without classroom studio practice on historic structures, students may not learn how to address the unique problems of historic structures. Norman and Schmidt's (1992) finding supports this study's emphasis on the importance of historic building design practice. History content learning and contemporary design practice are probably not adequate preparation for practice in a historic context. CIDA's awareness of history requirement may not translate into ability to design compatibility in a historic building.

In support of context-based learning, Norman and Schmidt (1992) found that “elaboration of knowledge at the time of learning enhances subsequent retrieval” (p.559). Even though students may not seem to need ‘extra' information for their classroom problems, immersing them in complete problems aids their learning (Lindfors, 1989; Norman & Schmidt, 1992). Learners remember more when they solve complex, real problems and they recall more of what they learned (Norman & Schmidt, 1992; 559). Learners also improve when they receive feedback on their solutions, making an active, participatory studio environment important for student success. Students’ interests and learning may increase by letting students talk together about both their problems and the proposed solutions (Norman & Schmidt, 1992). Lindfors (1987, 1999) urges teachers to allow students to have open discussions about their projects to help create stimulating learning environments. The studio-learning environment, unlike a history lecture course, provides a place for instructor feedback, as well as individual explorations and group discussions (Schön, 1987).

In both early language and design learning, neophytes are immersed in a rich, complex environment- whether of words or buildings. Without institutional or formal
instruction, almost all individuals will acquire language and the ability to use it in a wide
variety of situations. Similarly, before beginning formal studies, design students already
have an innate, functioning knowledge of buildings. Most beginners can navigate
through large airports and behave appropriately as guests in new homes. Students
already understand the spatial concepts common to their culture and communities, such
as hallway circulation and the difference between public and private spaces. Yet despite
their functional competence in the built environment, many students struggle to design
when they begin formal design coursework. Design education broadens students’
exposure to the built environment and develops their ability to develop creative new
solutions to design problems. The struggle to design, rather than use, may begin again
when students transition from contemporary to historic project building sites.

In lecture-based classes, students are rarely instructed through immersion in the
same ways that they acquired knowledge outside of the classroom. Instead, lecture-
based classes subdivide a whole environment, whether language or design, into
smaller, discreet units. Design history instructors subdivide historic buildings into
discreet, abstract styles and require the students to memorize the significant features of
each fixed style. Buildings are often not looked at in their setting, where different types
of buildings surround them, and pure examples are preferred, not buildings that are a
conglomeration of additions and styles. In practice, students will find that styles are less
discreet and uniform and more context specific. Completing a real design project in
studio may help prepare students to work in the context-specific real world.

Lindfors (1987), an early childhood educator and language arts and acquisition
researcher, discussed how difficult it can be for students to transition from learning
through immersion in the whole system to classroom practices with abstract and discreet elements. In school, language learners must take language, which kindergarteners have already begun to acquire through immersion and exploration, and then dissect and label their intuitive language knowledge. Similarly, despite living in the built environment their entire lives, students usually find themselves unprepared for studio instruction methods and media. In studio, design students are asked to first learn the spatial elements of architecture, such as compression/expansion of walls and ceilings as well as intentional views and circulation routes. Architectural textbooks, such as Ching (2007), note the grammar or lexicon of architecture, with different chapters providing brief explanations and myriad sketches illustrating each element. Historic district guidelines assume a working knowledge of many elements of designs. Guidelines refer to design terms such as massing, volume, proportion and rhythm. While developing their design vocabulary and grammar, students need to learn to apply these abstractions to buildings, use them to analyze and breakdown existing designs into discreet components, and build new appropriate designs from parts. Students build abstract models and draw sketches using such new communication tools to demonstrate how architectural concepts can be realized through their designs.

Comparatively, school children use language arts exercises, such as worksheets that direct them to find all the articles, to demonstrate their competency with language.

Both design studio and language arts classrooms can be daunting for many students. Students with a functioning knowledge of buildings and language may find themselves struggling to discuss and manipulate the abstract elements of these systems (Lindfors 1987, 222-23). Knowing how to use a complex system and being able
to discuss its elements are two different skills (Lindfors, 1987; 81). Lindfors’ (1987; 81-6) discussion of how children learn language suggests that providing students with context-based learning problems may allow students to apply and expand the implicit, functioning knowledge they bring to the classroom. Historic buildings are unique systems, different from contemporary buildings. Historic buildings are based on different aesthetic and technical systems. Working in historic buildings requires new, often site-specific, knowledge. Lindfors’ (1987) research suggests that to design compatibly, students need to use, practice and experience manipulating the complex elements specific to a historic building project.

Likewise, studio projects set in older buildings and developed in a real-world context should begin with what students already know and allow them to improve by practicing purposeful communication through design media. As students explore the older building, they can expand their general design knowledge into system abstractions specific to the historic building. For example, previously acquired knowledge about creating rhythm in design could be used to understand and learn from the rhythm of surviving neo-classical interior plasterwork on a project building. If students begin with context-based projects before trying to manipulate isolated abstractions, language acquisition researches suggests that a foundation of context-rich work should make this transition easier and increase learning (Lindfors 1987, 81-6).

In lecture–based history courses, the instructor plays an active role- seeking out relevant projects to show, asking and then immediately answering questions about the significance or architectural features of a building, and finally, generating test questions and preparing students to memorize the answers. The instructor’s processes, shown in
Figure 2-2, are active and engaged, while students are passive memorizers of supplied content. In studio courses, these roles are reversed (Figure 2-2). In studio, the instructor introduces a design question based on a real-world problem. Then the instructor provides introductory guiding exercises to help students begin researching and engaging with the project site. Throughout the project, students move toward greater engagement and self-guidance. Instructors provide critiques, but they do not lead students’ learning or classroom experience. This may cause some instructors to believe that they are not teaching, but design professors teach by modeling the skills and thinking processes they want their students to acquire. This is a fundamental difference between lecture-based and studio-based courses. In lectures, instructors provide content; they model knowing. By doing so, instructors can raise and develop students awareness of design issues. In-depth lecture based courses and related projects can help student transition from awareness to understanding. For example, interior design programs often offer an introduction to interior design course. This course covers a wide range of content, from color theory to building systems. In introductory courses, the instructors’ goal is to raise students’ awareness of the myriad issues pertaining to interior design. Throughout their program of study, students will later take specific content courses; developing their knowledge level from awareness to understanding. In studio courses, students demonstrate their ability to apply knowledge. In studio, students discover content; instructors model discovery processes. This is why students need to complete historic building projects in studio. Students need to learn and practice successful processes for working with historic buildings, which are different from contemporary buildings. Later, students can use their process knowledge to design
compatible solutions for different historic buildings. For example, students need to learn how to locate and use historic district design guidelines; they do not need to memorize a set of guidelines. When designing, students need to practice responding to existing features, not memorizing a set of features.

In Schön’s *Educating the Reflective Practitioner* (1987), he observed students learning in MIT’s architectural design studios. Students would sketch their design, then try and explain themselves to their professors, who would then sketch while talking about what the students were doing and planning to do next. Observed faculty used their monologue to demystify their thinking process and their sketches to show students how those thoughts appear in a drawing. To instruct, professors combined speech and sketching to model how an architect thinks. The monologues that Schön observed professors using to explain their in-progress sketching were a vocalization of their internal dialogue. By vocalizing a normally internal thinking process, professors demonstrated the design discovery process for their students and provided them with a scaffold to connect students’ familiar language thinking to the new medium of sketching and content of architectural design.

In Vygotsky’s (1986) discussion of inner speech, he explains how monologues, like those by the observed design professors, are inner speech or thoughts framed in words. Inner speech emerges and evolves throughout development both during a child’s early language acquisition and when adults learn new knowledge. Inner speech allows conciseness and the development of thought; it is a tool learners can use to explore and expand their own learning. By modeling design inner-speech while drawing, professors demonstrate to students how to approach a design problem, use design
elements and work through multiple solutions. Schön (1987) found that vocally modeling their design thinking process was one of the major ways instructors used classroom time, and when successful, it built a scaffold to lead students toward their own conscious design thinking. If instructors include elements of compatibility as part of their demonstrations, students should learn how to design compatibility while they are developing their designs. Compatibility should be recognized as a goal by design faculty leading a studio. They will then model compatible designing, thus teaching their students to learn how compatible designers think and how to create compatible design outcomes.

Bakhtin (1986) analyzed the problem of speech genres, or spheres in which language is used (Bakhtin 1986, 60). Speech genres exist in many forms, such as the difference between written and spoken language or between popular and academic presses. Language acquisition can be envisioned as the process of acquiring and appropriately using a collection of speech genres: ones for school, parents, friends, etc. As students mature in school, they acquire speech genres for multiple school and social groups. Students’ mastery of subject knowledge is linked to how much of each subject’s speech genre they have acquired. Like mathematics or biology, design has a speech genre that users learn to communicate within unique ways distinct from general language use. New design students must learn to use certain terms and thought processes in order to become part of the design language community and develop into mature designers. In studio, students practice working within their new design speech genre. They use new words and make new mental connections that allow them to practice and expand their knowledge while completing studio work. By practicing their
new design speech genre, students can actually expand their knowledge. Once students have mastered their speech genre, they can freely use and manipulate it (Bakhtin 1986, 80).

Language is a powerful tool for design students, and they practice using it to expand their knowledge, leading to more sophisticated practice. Because of this, students should practice using the particular speech and media of historic preservation projects, such as, historic district guidelines explaining history and character defining features, and *Preservation Briefs* discussing compatible design and construction techniques. History lecture-based classes and awareness of historical movements, as required by CIDA, do not allow students to practice the language or use the media of contemporary historic preservation practice. Students need the engaging practice of a studio environment to find and develop new skills in historic preservation.

Design students need to actively engage with the ideas they are learning. It seems that learning occurs best as students begin to express themselves, either through speech, writing, or drawing, and then begin to intentionally modify, shape and form these early expressions (Lindfors, 1999). Interaction and discussion with classmates and teachers, as well as the student’s own self-reflection can all help the learner interact with new thoughts and design ideas. As students practice giving their thoughts form, their ability increases because they can consider their developing project and develop ideas through oral, written and graphic media. The active interaction with learning found in language, where students learn by revising their writing or discussing their ideas with others, can also be found in studio, where students edit their designs, discuss them with their instructor and classmates, and refer back to the design project site for new ideas.
Suwa and Tversky (1997) examined what architects and architecture students see in their own drawings and sketches. They filmed architects and students designing a space by creating a series of sketches, a standard working method. Participants then watched their video and explained to the researchers what they were thinking in each part of the design process. This study found that professional architects, when compared to students, saw more in their sketches and were able to make more connections between their sketches and an imagined built design. By verbalizing what they saw in their sketches, the practicing architects demonstrated the strong connections they made between the process of drawing and their internal visualizations. Due to their greater experience with sketching as a communication and planning tool, these experienced practitioners used their sketches to imagine a more detailed design than the students did. Students need practice to use their design skills to see potential in a historic building and design a compatible solution.

Suwa and Tversky (1997) found that both architects and student-architects used their sketches to clarify their thinking; sketch development was a dialogue with oneself. That architects saw and remembered more detail in their sketches than the students demonstrates how learning continues throughout designers’ careers and that practice enhances thinking. This mirrors a language acquisition process. As students interact with and shape new ideas, they are able to conceive of increasingly complex ideas (Lindfors, 1999). Early language and design learners’ developing ability to elaborate internally and externally is one of the primary goals of education. Their growing imaginative and elaborative ability allows students, and junior professionals, to create new and increasingly complex thoughts and designs. Whether or not participating
students are able to create compatible designs in this research study, their efforts and practice presumably will leave them better able to create compatible designs in the future.

**Summary**

CIDA standards organize Interior design student learning into three levels: awareness, understanding and application. Standard 8 requires students to be aware of design history. Students develop awareness and understanding through history lecture courses exposing them to the vast history of interior design. Application, the ability to apply knowledge, is not required in current CIDA standards. This study examines how students can go beyond knowledge of interior design history to historic preservation practice. This leap, from lecture to studio, understanding to application, presents challenges to students, but it also furthers their professional education and prepares them for practice with existing and/or historic buildings.

Creating a compatible design solution requires a student designer who is engaged with the project and understands local conditions, including the history and significant design elements. Designing compatible solutions can be a challenge, by requiring design students to work with historic and contemporary elements to transform the space into a new interior. Students may be motivated to engage with the design process and learn about their project site if they have a context-rich studio project based on a real world problem and discover design solutions in an active-learning studio. In an active learning studio, students immerse themselves in the complexities of their design problem, explore questions and answers as they discover solutions, and receive feedback through discussions with their instructors and peers. Active-learning,
exploratory studios may allow students to discover how they can use their historic project building to create a new interior design.

**Sense of Connectedness**

Working with the historic built environment requires engagement in the design project and knowledge of the history and architectural features of the site, but knowledge alone might not be enough to engage designers in the process of creating compatible designs. Designers’ ability and desire to create compatible designs may be improved by a feeling of connection to the historic built environment. An emotional sense of connection may inspire local stakeholders to want to preserve their historic structures (Place Matters, 2007; Dohr & Portillo, 2011). If designers share in a sense of connection, the designer may be able to combine design skills and site knowledge with the empathic sensitivity to create a compatible design.

Through research into a historic project site, designers may learn that they can work with a historic building to create a compatible design that reflects the best of today and the past. By learning about and analyzing their project building before beginning design, designers may be able to recognize the building’s significant qualities and visualize opportunities to integrate both new and existing features into a compatible whole. If designers can imagine ways they can work with the existing building, connect their new designs to it through appropriate transitions, and emphasize the best features of the old and new, they will have succeeded in creating a compatible design. While much of the design will be informed by their knowledge and ability, the potential importance of creating an emotional connection between the historic building and designer is underscored in recent research in environmental psychology. Frantz, Mayer, Norton and Rock (2005) researched feelings of connectedness to nature and pro-
environmental impulses. For example, participants with higher CNS recycled, donated to environmental charities and voted for pro-environmental measures. Frantz’s work begins with an extensive review of psychological literature findings in which one person’s feeling of connectedness to another person was shown to increase empathy, caring, and helpfulness. Simply stated, we help those we feel a connection to. Frantz (2005) asked if this impulse, to help where we feel connected, could be extended from a person-to-person connection to one of person-to-environment. Through multiple studies, both reviewed in the literature and conducted in their studies, they found that people who feel connected to nature, a “we-ness,” also show more pro-environmental impulses. Those who do not feel a connection to nature exhibited significantly lower pro-environmental impulses; those with the lowest feeling of connection were anti-environment. From the field of environmental psychology, Frantz (2005) begs the questions: should designers feel emotionally connected to the built environment? What happens when designers are connected? Through their work, designers have the potential to help or damage historic buildings. If designers can make historic buildings part of their “we-ness,” then buildings will benefit from knowledgeable and empathetic designers. Figure 2-4 illustrates how sense of connection may contribute to compatible design outcomes.

**Measuring a Sense of Connectedness**

Mayer and Frantz (2004) introduced their Connectedness-to-Nature scale (CNS) as a measure of individuals’ feelings of connectedness and community with nature. In this introductory study, they tested their fourteen-question instrument on large classes of students and members of the community. The test has since been used in several other studies. Frantz (2005) used the scale to examine the connection between nature
and a feeling of community or ‘we-ness’. They found that individuals who can feel a larger connection to nature can also feel a greater connection to the larger community and are less individualistic. This is significant because individuals who feel a connection are more capable of making decisions during difficult environmental dilemmas and those included in that individuals’ we-ness will profit from own-group biases toward positive evaluations and greater moral consideration and rights (Tajfel & Turner, 1986; Devine-Wright & Clayton 2010). If these findings can be applied to the historic built environment, designers who feel a greater connection to the historic built environment should be better able to make design decisions and consider the historic building more in their decision making process. This kind of connection could help designers make more sensitive and compatible design decisions in the historic built environment. Nisbet, Zelenski and Murphy (2009) provide further support, from the field of environmental psychology, that individuals’ sense of connection may explain their personal behavior. They found that individuals with a greater sense of connectedness were more likely to engage in pro-environmental behaviors such as recycling, donating, and voting for environmental measures. In Mayer, Frantz, Bruehlamn-Senecal and Dolliver (2009), the CNS was administered as part of a larger study to examine the positive relationship between finding time in nature beneficial and a high CNS score.

Milfont and Duckitt (2010) review several measures of environmental attitudes, beliefs, and/or feelings. Almost every instrument they reviewed is not applicable to other studies because each instrument tests for multiple factors, usually both general and topical concerns, knowledge and beliefs. Unlike other environmental attitudes scales, Mayer and Frantz's (2004) CNS is particularly appropriate for this study because of its
single factor (connectedness) analysis, wide past use, and ability to be transformed to test sense of connectedness to something else (Gosling & Williams 2010).

Perrin and Benassi (2009) published a critical review of the measure based on their five-part study. Perrin and Benassi agree with Mayer and Frantz (2004) that the CNS measures one factor, but Perrin and Benassi argue that the factor is less an emotional and more of an intellectual connection to nature. Their analysis is based on how the word “feel” is used in the scale and cross-examined with similar scales. They conclude that the CNS “is not a measure of an emotional connection,” but “it taps a connectedness to nature dimension” and “provides a measure of people’s beliefs about their connection to nature” (Perrin & Benassi, 2009; 439). They believe that the CNS may tap a more cognitive, rather than emotional, interest in nature. Even if the CNS measures a more cognitive connection, its results can still prove useful because “an interest in nature motivates a desire to explain and understand phenomena in the natural world” (Perrin & Benassi, 2009; 439). The relationship between intellectual and emotional connections is still being understood in this context. Returning to the historic built environment, ‘a desire to explain and understand’ the historic built environment could be an excellent first step for a designer trying to develop a compatible design for a historic building.

The Connectedness to Historic Buildings Scale used in this research was adapted from Mayer and Frantz’s (2004) Connectedness to Nature Scale. Gosling and Williams’ (2010) adaptation of the CNS to test connectedness among farmers to their farms was used as a demonstration of how to modify the context of the CNS instrument while maintaining it as a reliable measure of connectedness. Gosling and Williams (2010)
results slightly indicated that farmers who felt a greater sense of connectedness with their farms managed native vegetation differently than those who did not. This finding and Gosling and Williams’ literature review further suggests that connectedness and CNS instruments may be correlated to behavior as well as feelings. The Connectedness to Historic Buildings Scale will be used to examine students’ sense of connectedness before and after completing their designs for a historic building.

**Significance of a Sense of Connectedness**

Current history teaching practice may not foster a feeling of connection to the historic built environment. Beecher (1998) found that history textbooks and class lectures feature a collection of the “unique and elaborate.” Lichtman (2009) similarly found that the masterpiece canon focused on exceptional pieces, and textbooks presented each masterpiece as something unique, unrelated to most people’s lives either then or now. A criticism of the masterpiece canon is that it focuses on the products of Caucasian, Euro-American culture; however, most attempts to remedy this situation only add examples of the unique and elaborate from other cultures or female designers (Brandt, 1998). Lichtman (2009) reviewed several textbooks that discussed their inclusion of pieces by female designers and non-Western cultures in their introduction. Nonetheless, these books contained only a few new examples and continued to emphasize the exceptional nature of all pieces. Brandt’s (1998) interior design history class case study explores the instructor’s evolving belief that the masterpiece canon of Caucasian, male, Euro-American designers and artifacts is increasingly irrelevant to diverse classes of minority and female students. In the described case study, Brandt (1998) introduces designs from a more diverse source of cultures and designers, and begins presenting each site within a set of themes, rather
than a chronological approach. In a review of Lichtman (2009), Dilnot (2009) explains why developing a more diverse collection of masterpieces will not solve the essential problems with this teaching methodology. Underlying the masterpiece collection is the implicit idea of the 'other,' and it is this separateness that keeps students from finding relevancy in masterpieces, regardless of the culture or creator (Dilnot, 2009). Beginning with two 1984 essays, Dilnot has called for faculty to explore teaching methods and content that encourage students to see themselves in history and see historical designs as a source of inspiration, not memorization (Dilnot, 1984a &1984b). This philosophy is particularly relevant for historic preservation practice: a designer who feels a connection to historic buildings and history may design for historic structures with empathy.

Feeling empathy may be significant to the design process (Dohr & Portillo, 2011). While reviewing designers’ experiences working with clients, Dohr and Portillo state that “design thinking and the experience of interiors are remembered well where empathy is in force” (Dohr & Portillo, 2011; 122). Designers feeling empathetic can holistically work with and respond to their clients’ needs; they also remember the project well, and can learn from it (Dohr & Portillo, 2011). An emotional connection, including feeling empathy is the extra puzzle piece that helps a project come alive for a designer and affects their design processes over time. While feelings of empathy, caring and helpfulness are typically studied in personal relationships, this study uses literature from environmental psychology to expand research into the feelings designers have in a person-site relationship.

By working in studio on a real project, instead of in lecture-based history courses, students may be able to integrate their knowledge of building design and history to
bridge the gap between studio and content learning. Students may begin to increase their connectedness to historic buildings by completing a real project set within a historic building. In a review of environmental research on increasing connectedness to nature, Schultz (2004) found that “a considerable amount of environmental research has demonstrated the transforming ability of encounters with nature” and calls for educational activities that will promote a sense of connectedness (Schultz et al., 2004, 41). By having a design encounter with historic buildings in studio, design students may be positively transformed, increase their sense of connectedness to the historic built environment and create compatible design outcomes. By having a design encounter with a real-world historic building and the users that can be visited and interviewed, students may also be transformed by the experience.

Through this project and future research, teaching and learning strategies could be developed that build on Frantz’s (2005) research into the importance of a feeling of connectedness and “we-ness,” modified for the historic built environment. Frantz (2005) conclude their discussion with a call to researchers to develop strategies to help people increase their feeling of connectedness to the environment. Current research suggests that as people learn more about the environment and become more comfortable with it, they may increase their feeling of connectedness; however, further research is needed to confirm these suggestions and develop strategies to increase that feeling (Frantz, 2005). Developing a positive attitude is important for pro-environmental behavior. Hinds and Sparks (2008) found the strength of an individual’s emotional connection with nature to be a strong predictor of environmental engagement, such as spending time outside and supporting environmentalist causes. If this can be applied to the historic
built environment, designers with a positive emotional connection with historic buildings may spend more time discovering the positive aspects of their historic project building and developing designs to showcase its potential. In contrast, Costarelli and Colloca (2004) found attitudinal ambivalence to be one of the strongest predictors of behavioral intentions. In other words, unless individuals care, they will not assert themselves in a positive manner. Both the natural and built environments need active, positive individuals to manage their preservation and future. Having practitioners who care and are passionate about working on historic buildings could result in more compatible designs and better-satisfied users and clients.

In studying individuals’ responses to climate change and global warming, Whitmarsh (2009) found that people who were genuinely concerned with the environment made seemingly pro-environmental life changes. However, ignorance of how their actions contribute to global warming led study participants to make life changes with no real beneficial impact on the environment. This finding underscores the need to increase caring and knowledge; whether working with the natural or built environment, if individuals and designers lack the technical knowledge to truly help, it is not likely that their ‘best guesses’ will have a positive impact. Similarly, Brent, Eubank, Danley and Graham (1993) found that the empathy and desire to help persons with disabilities greatly increased among the interior design students and professionals who participated in their ADA workshop; however, participants’ technical knowledge only increased by 25 percent after completing the program. Follow-up examinations were not conducted to see how time, and practice, affected participants’ knowledge. Without more technical knowledge, practicing designers may care about universal design;
However, their design decisions will lack the best-practice information that would have allowed them to use their professional capacity to make a positive difference for others. For this reason, this research project examined both students caring and learning about historic buildings.

History and studio courses could be developed to help students find history relevant to design practice and to help them feel a connection to the historic built environment. Frantz’s (2005) psychological literature review of studies that increased empathy and connectedness between people suggests several sources for inspiration: changing perspectives, stories of personal distress, group identification, finding similarities, and a sense of interdependence (p. 428). Multiple studies support the effectiveness of each factor to increase connections between people. Story and Forsyth (2008) also used person-to-person psychology in an environmental application. They framed environmental engagement with a local watershed as helping behavior. Psychological factors that increase helping, caring, and empathy could inspire class or studio assignments in interior design history courses. Many could probably be integrated within a masterpieces and/or chronological history survey course. For example, within a history course, students could change their perspective and write the story of a building’s history from its point of view, what it has seen and experienced, or the point of view of its original designers, who saw it when it was new. Through this exercise, students could discover that what they have first viewed as a dilapidated old dump is instead a building that has a rich history and was loved and created by real people. Many masterpiece as well as vernacular structures have stories of distress. Some survived bombing in the World Wars (European cathedrals), being used to store
explosives and then bombed (the Parthenon), vandalism after régime or religious changes (English cathedrals, Afghan Buddhist shrines, Versailles, Incan cities), as well as damage from natural disasters. If history instructors share vivid stories, or students learn through their own investigation about a building’s personal stories, they may become sympathetic and gain personal knowledge of history. In studio projects, students can learn these stories about their project building, giving them a chance to learn local history while they practice creating a compatible new interior design.

Human and environmental psychological research has identified factors that may increase feelings of empathy, connectedness, and helpfulness. Using this research, interior design faculty could design assignments and present course material to help students develop a sense of connectedness. With a sense of connectedness, students may find relevancy in their learning and practice connecting their content learning to their studio practice. In turn, students who feel a connection to the historic built environment should be more inclined to work compatibly with it in studio and professional practice.

**Summary**

Historic preservation practice relies on individuals who care about the historic places in their community (Place Matters, 2007; Allison & Allison, 2008; Dohr & Portillo, 2011; National Trust, 2011). For decades, preservation, including adaptive reuse of historic structures, has occurred because individuals cared. They wanted to save their historic buildings and help them stay active parts of the built community. If an interior designer possesses the same feelings that motivate locals to preserve, their design solutions may show caring and empathy to the historic building and therefore be relatively compatible to the historic building.
By measuring students’ sense of connectedness to the historic built environment, this study will be able to test a newly adapted CNS type instrument. With this new instrument, the study can examine the potential relationships between sense of connectedness to the historic built environment and the creation of relatively compatible interiors. If there is a relationship between a greater sense of connectedness to the historic built environment and relatively more compatible designs, this research will be able to provide further support to interior design faculty members developing curriculum to enhance students’ sense of connectedness to the historic built environment.

**Study Framework: Unifying the Literature**

Chapter 2 discussed the literature to create a framework for how a compatible interior design solution may be created. In Figure 2-5, the study’s goal, a compatible design solution, is created by a student designer with 1) feelings of empathy, caring, and helpfulness and 2) knowledge of the local history and architectural conditions. In addition to acquiring knowledge and feeling an emotional connection, the designer also needs to be engaged in the design process, with a willingness to keep trying new ideas and to work creatively. These three qualities-- feelings, knowledge and design process engagement-- were originally developed from preservation literature. First, the researcher examined preservation literature, including texts on how to preserve through architecture and community engagement. Preservation guidelines provide designers with the content to make informed design choices. Stories of successful preservation based on community engagement suggest that preservation outcomes are improved if designers and the public feel an emotional connection to the historic place. An emotional sense of connection empowers the public to preserve their built heritage. For designers, an emotional connection may help them stay engaged and connected to a
project site. An emotionally engaged designer may be willing to work through the challenges of designing compatibility to develop a design solution that serves new building users by reflecting what they loved in their historic structure and what they need today.

Compatibility was established as a design goal for working with historic structures and the three qualities of feelings, knowledge and design process engagement were proposed as necessary qualities for an interior design student to possess and develop while designing a compatible interior for a historic structure. But how are these qualities encouraged? Can they be developed? Later in Chapter 2, the researcher examined how these three traits may be formed and developed. Learning theory literature expanded on 1) how a student designer with knowledge is created and 2) how to keep a student designer engaged and creative throughout the design process. The literature suggested that active learning in a studio setting was critical to both of these qualities. By practicing with, not just memorizing, new content on a historic building project through a real-world problem, students can become engaged design practitioners who learn to do a project, not an exam, with their knowledge. Figure 2-5 illustrates how studio processes develop the study’s goal of understanding how to create a compatible design outcome.

Next, the researcher examined the third quality proposed to help a student designer create a compatible design outcome: feelings. Feelings of empathy, caring and helpfulness strengthen people’s connections between each other. Feeling empathetic can also improve a designer's ability to work with a client and learn from their design process (Dohr & Portillo, 2011). Together, empathy, caring and helpfulness are markers
of a sense of connection. Psychological literature has examined person-person sense of connection in depth; environmental psychological literature is beginning to develop instruments and an examination process to study sense of connection between people and their environment. This study drew from recent research in environmental psychology that could be extended to create a sense of connectedness to the historic built environment, shown in Figure 2-5. These qualities: a feeling of community, desire to understand and explain, positive encounters and a positive attitude toward historic buildings, may take longer than one studio class project to develop. Students' development of these qualities may not be apparent over the timeframe of this study. However, the studio class examined in this study may form the foundation for student's burgeoning sense of connectedness.

Figure 2-5 summarizes Chapter 2’s review of the literature and frames the study questions proposed in Chapter 3. The study questions listed in Chapter 3 are varied, but they work together to increase our understanding of what specific emotional, knowledge and studio processes may contribute to the creation of a compatible design outcome.
Figure 2-1. Conceptual framework illustrating how student designers may create relatively more compatible design outcomes.
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**Key to Figure 2-2**

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Figure 2-2. Illustration of different process experiences for teachers and students in studio versus lecture classes.
Figure 2-3. Conceptual framework illustrating how this study's compatibility and learning theory combine to support relatively more compatible design outcomes.
Figure 2-4. Conceptual framework illustrating how the study's compatibility and sense of connectedness theory combine to support relatively strong compatible design outcomes.
Figure 2-5. Conceptual framework illustrating how the study’s compatibility, learning theory and sense of connectedness combine to support relatively more compatible design outcomes.
CHAPTER 3
RESEARCH METHODOLOGY

Compatibility between past and present forms and styles is a design goal for new construction and alterations in historic buildings and districts. Historic district design guidelines are produced across the nation to support owners and designers who develop compatible new construction in and around historic buildings. This research addresses some of the complex issues in the teaching of compatibility in the interior of older buildings. The primary objective of this study is to ascertain to what degree interior design students are able to create compatible design proposals for a historic building. This study explores the relationships among different types of compatibility features and learning interests, practices and design outcomes. Chapter 3 outlines the research study design, discusses the setting and participants, and explains the instruments used in the study. The procedure for collection data and analyzing results, and the limitations thereof are also discussed.

Study Design

This study was conducted as a single case study in a regularly scheduled and taught senior-level studio in interior design. The Institutional Review Board (IRB) approved this study and each participant completed informed consent forms. Informed consents and IRB approval are in Appendix K-M. The studio assignment was to complete the interior rehabilitations for two historic buildings based on current owners’ planned building function changes. This study primarily measured student opinions and evaluated their outcomes during the different phases of the project assignments. While engaging in their normal studio activities, students completed eight self-reflective assessments. Project outcomes for this study were evaluated outside of regular
classroom time and therefore did not influence students’ grades. Students’ grades were not used in or influenced by this study. The researcher did not interact with students and minimally altered their studio experience.

The study used a mixed-methods approach to evaluate the potential relationships among student self-reported learning, their interest in historic preservation and sense of connectedness to the project. Student generated variables were then compared to find the degree of relative compatibility scores given by a team of outside evaluators who assessed each completed project. With the exception of one instrument, discussed below, assessment measures were locally designed. Quantitative analyses were used to assess each survey question. Quantitative analysis provided information about whether or not learning, interest, or connectedness impacted compatibility in student design outcomes. Analyses of multiple factors, measured through eight student completed survey instruments and students’ evaluated compatibility outcomes allowed for comparisons within and between student participants in the studio. Analyses tested to what degree there are associations between learning style, interest in historic preservation or connectedness to both nature and history and degree of compatibility in the student outcomes.

Upon completion of the project, students wrote a short essay explaining what guided their design decisions. These written responses on essay and on several open-ended questions included with the survey instruments were read using a content analysis. The content analyses explored student reflections on their design decisions and explanations of what they believe influenced their decisions, as well as whether or
not they saw any associations among learning, interest, or connectedness, or a high degree of compatibility in student outcomes.

Research Setting

The foundation of the interior design education is the design studio. In studio classes, interior design students practice developing solutions to design problems as well as expressing those solutions through architectural drawings, such as floor plans, sections, and perspectives. Content lecture classes on related topics, such as history, materials, and construction methods, support the interior design studio and presumably build students’ knowledge base, but studio is where students practice, explore and demonstrate their combined design skills. As discussed in Chapter 2, studios typically use a project-based or discovery-based learning process.

This study was conducted in the capstone senior 2011 design studio class at a public university in the southeast. The interior design program is CIDA accredited and is highly ranked by DesignIntelligence (College News, 2010). The studio class met three times a week for three hours each session throughout the spring semester for a total of 108 contact hours throughout the study, plus additional time for site visits. Students were expected to use studio facilities frequently. Studio facilities have key-coded entry and were open to students 24/7. The class worked in two studio rooms, one on the third and one on the fourth floor of the Architecture Building. Studios are connected by an exterior stairway. Each studio is equipped with a printer, plotter and computer stations with digital sketch tablets that allows instructors to show students new ideas by sketching directly on work in progress. Each student has dedicated work space with a desk and office chair. Students brought their laptops, drafting equipment and other
personal belongings to studio. Additional tables were available in each studio to allow smaller groups of students and/or instructors to work together.

Research Participants

Three types of participants contributed their time and resources to this study. All participants were aware of the nature of the study and signed an informed consent.

Students

All twenty-eight students in the senior spring 2011 interior design studio class agreed to participate in the study. Twenty-four students completed all assessments and are included in this research. In 2007, the year most participating students entered the university, the middle fifty percent of the entering freshman class had a High School GPA of 4.0 - 4.4, an SAT score range of 1210 – 1400, and an ACT score range of 26 – 31 (Office of Admissions, no date). Students were not compensated in any way for participating in this study.

Instructors

Two faculty members co-taught the participating studio class. The senior instructor is an Assistant Professor experienced both professionally and educationally in historic preservation projects. The instructor was a lecturer and a licensed interior designer with local professional experience. A master’s level student graduate teaching assistant working 10 hours a week helped with the class.

The instructors were recruited for this research after discussing it with fellow faculty members and the researcher. The studio project, project timeline, and requirements were the instructors’ prerogative. Instructors received no extra compensation or incentives for participating in this study.
Expert Evaluators

Eight evaluators examined the completed projects over the course of two days in April 2011. The researcher individually recruited evaluators and contacted each one either by phone or email. Evaluators were selected for their knowledge and experience in design, preservation, and/or teaching. Evaluators were not compensated for participating in this study. Evaluators reviewed student projects individually over a two-day period. Each evaluator spent two-three hours reviewing student projects. Evaluators came from a range of backgrounds, including professional and academic, interior design and architecture. The evaluation team of eight was composed of:

- A practicing university architect with experience working on the University of Florida’s historic campus;
- The assistant Vice-president of Facilities Planning and Construction at the University of Florida;
- A practicing architect with extensive preservation experience from Sarasota Florida;
- Two local, licensed interior designers;
- An emeritus University of Florida interior design professor of history, studio and historic preservation courses, who is also a licensed architect and building contractor;
- A University of Florida interior design faculty member with experience teaching preservation projects in studios;
- A University of Florida research historian with experience serving on the University of Florida Historic Campus District Preservation Board.

Data Collection

Participating students were administered their surveys during regularly scheduled class time. This research covered the twelve-week studio project. Either the two studio instructors or the graduate teaching assistant administered all instruments. The student
essay was passed out during class, and students returned it several days later. The researcher did not administer any assessments to the students.

The researcher interviewed the principal instructor approximately every two weeks during the course of this study. Most interviews were conducted over the phone. Interviews were primarily informal discussions about how the class was progressing in the instructor’s opinion. A formal set of questions was not prepared for phone interviews; the researcher sought to allow the studio instructor to guide the conservation and focus the discussion on matters the instructor thought were most relevant. Follow-up questions and discussions were shared between the researcher and instructor via email.

The researcher administered the Evaluator’s Questionnaires to each participating evaluator. After students completed their design project outcomes, they posted their projects as large digital printouts on the walls of their studio. Over the course of two days, the researcher met with each evaluator in the students’ studio and administered the questionnaires. The researcher stayed in the studio while the evaluators were working to answer questions.

Figure 3-1 illustrates when each instrument was administered in the four phases of the studio process: project introduction, pre-design phase activities, design phase, and project completion. Three instruments were administered to students during the introductory phase; one instrument was administered to students after the pre-design activities had been completed, but before the design phase began. Four self-evaluation assessments were administered to students after the project was complete. The
evaluators completed both project assessments while reviewing completed student work.

Research Instruments

Pre-Test of Student Interest

Before completing their rehabilitation designs, students completed a test to measure their interest in the overall project and historic preservation. The Pre-test of Student Interest (Appendix A) begins with an open-ended question to assess views about historic buildings. Several scaled questions on students’ interest and experience with historic preservation projects follow. This instrument was used to assess students’ beginning interest in completing their studio projects and compares their incoming interest with their later degree of compatibility and post-completion interest in the project at the end. Higher scores indicate greater interest in the project and historic preservation; lower scores indicate relatively lesser interest. Table 3-1 outlines the variables derived from this instrument and how each variable was operationalized from the instrument’s questions. All variables derived from this instrument were both independent and quantitative variables.

Figures 3-2 through 3-10 are included to help the reader understand the nature of each study variable. The first column in Figures 3-2 through 3-10 lists each variable name, allowing for easy references to the study questions following in Chapter 3. Proceeding columns list the variable’s type: is it derived from student or evaluator responses, and qualitative, derived from comments and open-ended responses, or quantitative, derived from gauged numerical responses. The “operationalized from” column lists which instrument(s) and questions were used to obtain the variable’s data
points. For quantitative variables, how each question was scaled and the ends of the measure are included in the furthest right columns.

**Connectedness to Nature Scale (CNS)**

Before beginning their design work, participating students responded to the Connectedness to Nature (CNS) scale, shown in Appendix B. The CNS was designed by Mayer and Frantz (2004) to test feelings of connectedness, or oneness, with the natural world. It has been used in multiple studies since its development (Frantz at al, 2005; Mayer & Frantz, 2009), and found to be a valid and reliable indicator of connectedness (Perrin & Benassi, 2009). Higher CNS scores may indicate a greater desire and degree of action on behalf of the natural world. The CNS was administered to test the feelings of connectedness to the natural world among interior design students. No studies to date were found by the researcher to specifically examine interior design students’ connectedness to nature. Connectedness of the natural environment may be significant because the ability to connect to the natural environment may be part of a general ability to connect to the natural and built environment, in addition to connecting with people. See Chapter 2 for additional information on this instrument and its previous applications. Table 3-2 outlines the variable that was derived from the CNS.

**Connectedness to Historic Buildings Scale (CHBS)**

The Connectedness to Historic Buildings Scale was developed from the CNS (Mayer & Frantz, 2004) and a version of the CNS modified to examine the relationships between farmers, their farms and their stewardship practices (Gosling & Williams, 2010). The Connectedness to Historic Buildings Scale was administered at the beginning and end of the design phase of the studio project. The pre-design phase
administration tested students’ initial sense of connectedness with the historic built environment. The post-design phase administration tested students’ end-of-project sense of connectedness with the historic built environment. Comparisons between above average CHBS scores from the pre- and post-design phase administration test whether or not and to what extent sustained sense of connectedness to the historic built environment may be related to the relative compatibility of students’ design outcomes. Table 3-3 outlines the two variables that were derived from the CHBS. See Appendix C for a copy of the instrument.

**Reflections on the Pre-Design Concept Survey**

The Reflections on your Pre-design Concept (RPCS) survey asked students to consider their pre-design concept. The RPCS was a combination of scaled and open-ended questions. It was administered after students completed their pre-design research and analysis activities, and before the design phase, when they began developing interior design solutions for their project buildings. At this stage in the design process, students developed a concept board, which outlined their learning thus far about the project site and building, as well as their overarching ideas to guide the design phase. The RPCS questions asked students to reflect on their ideas and learning process. The RPCS answers indicated the degree to which students reported participating in the studio learning processes and the degree to which they believed they were gaining from the experience. See Appendix D for a copy of the instrument. Three variables were derived wholly or in part from the RPCS. How each variable was operationalized is explained in Table 3-4.
**Student Opinion of Design Decision Influences Survey**

The Student Opinion of Design Decision Influences (SODDIS) was administered after students completed their design project solutions. The SODDIS combines both scaled and open-ended questions. Students reflected upon their entire studio process and explained which studio learning activities most helped them in their design work and influenced their ultimate design decisions. This self-report test indicated the studio learning activities with the greatest effect on students, and when compared with their compatibility scores, how compatibility and studio activities interacted. See Appendix E for a copy of the instrument. Table 3-5 outlines the variables derived from this instrument and how they were operationalized.

**Student Essay**

After completing the design project outcomes, students wrote an essay reflecting on their design process and design decisions. Students were encouraged to report in detail their motivations, decision making processes, successes, failures as well as ways to become more successful in the future. This open-ended examination asked students to express themselves, their ideas, likes and dislikes and motivations. See Appendix F for a copy of the instrument. Table 3-6 lists the variables derived from the student essay and how each was operationalized.

**Post-Tests of Student Interest**

After completing their designs, students took a Post Test of Student Interest, (Appendix G). The post-test gauged to what degree as well as how student interests changed over time, and allowed for comparisons with student compatibility scores. Like the Pre-test, the Post-test uses a combination of scaled and open-ended questions. High scores indicated greater interest in the project and historic preservation; low
scores indicated relatively less interest. Table 3-7 outlines the seven variables derived from this instrument and how each variable was operationalized from the instrument’s questions.

Evaluator’s Questionnaire

Compatibility of student outcomes was primarily assessed through the Evaluator’s Questionnaire (Appendix H for a copy of the instrument). This questionnaire was used to gauge the compatibility of student projects. Evaluators completed their questionnaires individually; however, some were working at the same time. Each area of possible compatibility reflects either a character defining feature or a social or architectural historical aspect of the historic buildings. The instrument is based on information in historic district guidelines (Hole, 2004; Tampa Architectural Review Commission, 2002; Tate & Dixon, 2007a).

Using a 9-point Likert type scaling had evaluators’ rank their judgment of each student project’s degree of compatibility in each area. An attitudinal scale was appropriate because it allowed multiple aspects of compatibility to be subdivided into discreet components and then be analyzed separately or in total (Kumar, 1996). Individual student compatibility scores were generated from a mean of all evaluators’ responses for each type of compatibility. Table 3-8 outlines the twelve types of compatibility scores that were correlated with student responses and explains how each type was operationalized from the Evaluator’s Questionnaire.

This process and assessment tool reflects real-world design evaluations. Like historic preservation board members, the evaluators are experts in the field and each possesses an individual understanding of compatibility. Evaluators were asked to use their own judgment throughout the assessment process. Since this is what happens in
practice, this study uses practice-methods to be a reliable corollary to real-world design and evaluation processes.

**Evaluator’s Summary Questionnaire**

The Evaluator’s Summary Questionnaire was administered once to each participating evaluator. After completing their reviews of student projects and Evaluator’s questionnaires, each evaluator completed this open-ended instrument. The summary questionnaire asked evaluators to list the strongest and weakest design solutions, and explain their choices. This instrument allowed evaluators to express themselves and explain their choices in greater detail. See Appendix I for a copy of the instrument. Table 3-9 outlines the two types of variables derived from the Evaluator’s Summary Questionnaire.

**Study Questions**

This study examines several interconnected variables to explore associations among aspects of learning, interest, connectedness and compatible designing. Chapter 2 provided in-depth discussion of these issues and how they may be interconnected. This section uses the variables outlined above to generate study questions. Please refer to the section above to explain how each variable was derived and operationalized and refer to Chapter 2 to explain the significance of variables. Study questions are organized by their primary independent variable.

- **RQ1 Pre-design phase interest in historic preservation.** Do students’ pre-design phase interest in historic preservation correlate to the relative compatibility of design outcomes?

- **RQ2 Pre-design interest in the assigned studio project.** How do students’ pre-design phase interest in the assigned studio project correlate to the relative compatibility of design outcomes?
RQ3 Student’s belief of possessing incoming knowledge of the studio project’s related subject matter. How does students’ belief about possessing incoming knowledge of the studio project’s related subject matter correlate to the relative compatibility of design outcomes?

RQ4 CNS score. How do students’ CNS score correlate to the relative compatibility of design outcomes?

RQ5 Pre-design CHBS score. How do students’ pre-design phase CHBS score correlate to the relative compatibility of design outcomes?

RQ6 Post-design CHBS score. How do students’ post-design CHBS score correlate to the relative compatibility of design outcomes?

RQ7 Open-ended pre-design activity that most influenced concept. In their open-ended responses, which pre-design phase activities did students say most influenced their concept?

RQ8 Influence of pre-design phase studio activities. How does the student’s ranking of pre-design phase activities, scored from most to least influential, impact the relative compatibility of design outcomes?

RQ9 Total influence of pre-design phase studio activities. How does crediting the eight pre-design phase activities with influencing design decisions impact the relative compatibility of design outcomes?

RQ10 Pre-design activity that most influenced design decisions. Which pre-design activities did students believe most influenced their design decisions?

RQ11 Open-ended pre-design phase activity that most influenced design decisions. In open-ended responses, which pre-design activities did students believe most influenced their design decisions?

RQ12 Final student interest in the assigned studio project. How does final student interest in the assigned studio project correlate to the relative compatibility of design outcomes?

RQ13 Student enjoyment of project. How does student enjoyment of the project correlate to the relative compatibility of design outcomes?

RQ14 Being pleased with design solution. How does being pleased with the design solution impact correlate to compatibility of design outcomes?

RQ15 Student understanding of compatibility. In what ways do students discuss compatibility in their open-ended responses?
• RQ16 STUDENT GENERATED THEMES. What issues did students generate and discuss in their open-ended responses?

• RQ17 EVALUATOR’S GENERATED THEMES: QUALITIES OF SUCCESSFUL PROJECTS. What qualities did evaluator’s cite as contributing to making a student project relatively more successful?

• RQ18 EVALUATOR’S GENERATED THEMES: QUALITIES OF UNSUCCESSFUL PROJECTS. What qualities did evaluator’s cite as contributing to making a student project relatively less successful?

Most study questions are correlated with the relative degree of compatibility of student outcomes, measured along the twelve dependent compatibility variables, shown in Table 3-8. Figure 3-2 illustrates which study questions and variables are correlated to each measure of relative degree of compatibility. Eleven of eighteen study questions examine the relationship between an independent variable and the relative compatibility of design outcomes. The seven study questions not included in Figure 3-2 are not correlated with relative degree of compatibility of student outcomes. These questions assess different data and relationships. All questions are further discussed in Chapter 4.

Analytic Techniques

Scaled numerical data from student and evaluator instruments was entered in Excel spreadsheets and checked for accuracy. Data were transferred to OpenOffice Calc 3.3 for calculations of means, rankings, standard deviations and correlations. Correlations were calculated comparing students’ data to evaluators’ compatibility scores. A two-tailed Pearson’s r correlation coefficient test was used to determine significant correlations between independent and dependent variables. Correlation tests are appropriate for this study because they indicate whether or not there is an association between two variables, and the level of significance. An α=0.05 or below was used to show significance. Results are discussed in Chapter 4.
Qualitative data from student essays and open-ended short answer responses from five of the survey tools were assessed by the researcher. The researcher read through student responses twice, and then developed a list of repeating themes in students’ discussions. During a third reading of the data, the researcher counted how many students referenced each theme and noted individuals who discussed the themes particularly well. During this reading, the researcher also confirmed that all major themes were being considered. This assessment method is recommended for small quantities of open-ended responses in educational research because it allows the researcher to build an in-depth understanding of collected data and then use flexible and data-derived categories to interpret data (Yin, 2008). Data were used to enrich understanding of studio processes and students’ concerns, issues, and beliefs.

Evaluators' qualitative data were assessed through multiple readings and are used in Chapter 4 and Chapter 5 to discuss study outcomes. Evaluators’ data expand on the scaled Evaluator’s Questionnaire by allowing open-ended comments on evaluators’ opinions of students’ work.

Validity and Reliability

This study examined a single interior design senior studio class. As a single case study, the findings and implications should not be generalized. However, findings may point the way for related future studies. The relative validity of this study is important for maintaining integrity and promoting findings as a source for future research. This study is valid to the degree that it measures the research concepts: student interest, learning, connectedness, and compatibility. Student interest was measured through multiple instruments, each containing both scaled and open-ended questions. Each variable’s validity improves by triangulating the data since the students have multiple times and
methods to express themselves. Student learning was also measured through multiple assessments of 1) instructor interviews, 2) class assignments, 3) student essays, and 4) two Likert-type surveys. Each of these measures improves the validity of the measured concept by expanding its data source. Connectedness was measured using a modified version of a previously used scale. The CNS was used in multiple studies over the past seven years (Frantz et al., 2005; Mayer & Frantz, 2004; 2009). Evaluators measured compatibility with a single instrument adapted by the researcher and based on an extensive survey of historic district design guidelines (National Alliance of Preservation Commissions, no date). By examining each variable through multiple instruments and at different times throughout the studio process, the study maintains its relative validity.

Inter-rater reliability was calculated at 94.8 percent using Cronbach’s alpha. This is an extremely high frequency of inter-rater reliability, testifying to the cohesion among the evaluators and strongly supporting this study’s relative reliability.

**Limitations of the Study**

There were several limitations inherent in this study. The study design limits the number of variables that were assessed. An interior design student can design a compatible project because of classroom instruction, past experiences, or a socially conductive working environment. Having multiple students create either successful or unsuccessful design solutions may be the result of instruction as well as many uncontrollable and unknown factors, such as cohort effects. The students participating in this research may produce more or less successful projects because of the processes being tested, or their project outcomes may be the result of other factors. This could weaken the conclusions being draw about associations between learning, interest, connectedness, and student project outcomes.
The study had twelve weeks in which students studied their project site and generated interior design project solutions. It is possible that students may have created more compatible designs with a smaller project or additional time to work; however, this study was constrained by the time frame of the class studio project. The principal instructor determined the project time frame and controlled how students progressed through pre-design research and the design phases of their projects.

The Likert-type scales used in the evaluator’s questionnaire can only measure relative compatibility, so responses indicate a general degree of relative compatibility for each student’s project outcomes. The limitations of the Likert scale used in the evaluator’s questionnaire are outweighed by the scale’s ease of use for the evaluators and ability to capture a range of opinions on evaluators’ attitudes.

Finally, as an in-depth examination of a single studio classroom, the results of this study should not be generalized. However, results provide new insights into the creation of relatively compatible designs among interior design senior students and some of the associations existing within the complex system surrounding design studio practice.

Summary

This case study is an in-depth analysis of how students in a senior interior design studio class created relatively compatible interiors for rehabilitation in two historic buildings. Levels of student interest, learning, and sense of connectedness were tested multiple times throughout the studio project process. Participating students used both Likert-type survey and open-ended questions to express their views. Student views are balanced by data from a team of outside evaluators from the allied design fields. Together, students, instructors, and evaluators provide a rich source of data to explore
the complex relationships among student interest, learning, connectedness, and design project outcomes.
Figure 3-1. Timeline of instrument administration and studio processes. Student and evaluators' instrument administration is shown in relationship to students' progress on their studio projects. The red arrow shows the phases of the studio project, from beginning to completion. Each connecting box illustrates which instruments were completed at each phase of the studio project. Students completed instruments in black boxes; evaluators completed instruments in the blue box.
Table 3-1. Pre-test of Student Interest variables. Four variables were derived from survey questions on the Pre-test of Student Interest.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-design interest in historic preservation</td>
<td>Student Quantitative</td>
<td>Mean of 1 and 3 on the Pre-test of Student Interest.</td>
<td>1-9</td>
<td>Not interested to Very interested</td>
</tr>
<tr>
<td>Pre-design interest in the assigned studio project</td>
<td>Student Quantitative</td>
<td>2 on the Pre-test of Student Interest</td>
<td>1-9</td>
<td>Not interested to Very excited</td>
</tr>
<tr>
<td>Student’s belief of possessing incoming knowledge of the studio project’s related subject matter</td>
<td>Student Quantitative</td>
<td>Mean of 4, 5 and 6 on the Pre-test of Student Interest</td>
<td>1-9</td>
<td>Not experienced to Very experienced; No knowledge to Very knowledgeable</td>
</tr>
</tbody>
</table>

Table 3-2. Connectedness to Nature (CNS) scale variables. One variable was derived from the CNS. This figure outlines the variable and how it was operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS score</td>
<td>Student Quantitative</td>
<td>Mean of 1-14 on the CNS</td>
<td>1-5</td>
<td>Strongly disagree to Strongly agree</td>
</tr>
</tbody>
</table>
Table 3-3. Connectedness to Historic Buildings (CHBS) scale variables. Two variables were derived from the CHBS. This figure outlines the variables and how they were operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Design CHBS score</td>
<td>Student</td>
<td>Mean of 1-14 on the pre-design phase administration of the CHBS</td>
<td>1-5</td>
<td>Strongly disagree to Strongly agree</td>
</tr>
<tr>
<td>Post-Design CHBS score</td>
<td>Student</td>
<td>Mean of 1-14 on the post-design phase administration of the CHBS</td>
<td></td>
<td>Strongly disagree to Strongly agree</td>
</tr>
</tbody>
</table>

Table 3-4. Reflections on your Pre-design Concept (RPCS) survey variables. Three variables were derived from the RPCS. This table outlines the variables and how they were operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended pre-design activity that most influenced concept</td>
<td>Student</td>
<td>Studio activities listed on the RPCS in response to question two</td>
</tr>
<tr>
<td>Student generated themes</td>
<td>Student</td>
<td>Written responses to open-ended questions one and two on the RPCS</td>
</tr>
<tr>
<td>Student understanding of compatibility</td>
<td>Student</td>
<td>Written responses to open ended questions on RPCS and other instruments</td>
</tr>
</tbody>
</table>
Table 3-5. Connectedness to Historic Buildings (CHBS) scale variables. Four variables were derived from the CHBS. This figure outlines the variables and how they were operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influence of Pre-Design phase studio activities</td>
<td>Student Quantitative</td>
<td>Individual scores for questions 1-8 on the SODDIS</td>
<td>1-9</td>
<td>No influence to Very influential</td>
</tr>
<tr>
<td>Total influence of Pre-Design phase studio activities</td>
<td>Student Quantitative</td>
<td>Mean of 1-8 on the SODDIS</td>
<td>1-9</td>
<td>No influence to Very influential</td>
</tr>
<tr>
<td>Pre-design activity that most influenced design decisions</td>
<td>Student Quantitative</td>
<td>Comparative rankings of individual scores for questions 1-8 on the SODDIS</td>
<td>1-9</td>
<td>No influence to Very influential</td>
</tr>
<tr>
<td>Open-ended pre-design phase activity that most influenced design decisions</td>
<td>Student Qualitative</td>
<td>Written responses on Student Essay, Post-tests of Student Interest and SODDIS</td>
<td>N/A</td>
<td>Word count</td>
</tr>
</tbody>
</table>
Table 3-6. Student Essay variables. Three types of variables were derived from the Student Essay. This table outlines the variables and how they were operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended pre-design phase activity that most influenced</td>
<td>Student</td>
<td>Written responses on</td>
</tr>
<tr>
<td>design decisions</td>
<td>Qualitative</td>
<td>Student Essay</td>
</tr>
<tr>
<td>Student generated themes</td>
<td>Student</td>
<td>Written responses on</td>
</tr>
<tr>
<td></td>
<td>Qualitative</td>
<td>Student Essay</td>
</tr>
<tr>
<td>Student understanding of compatibility</td>
<td>Student</td>
<td>Written responses to</td>
</tr>
<tr>
<td></td>
<td>Qualitative</td>
<td>open ended questions</td>
</tr>
</tbody>
</table>
Table 3-7. Post-test of Student Interest variables. Seven variables were derived from the Post-test of Student Interest. This figure outlines which survey questions were used to operationalize each variable.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-design interest in historic preservation</td>
<td>Student Quantitative</td>
<td>Mean of 3 and 4 on the Post-test of Student Interest</td>
<td>1-9</td>
<td>Not interested to Very interested; No to Yes</td>
</tr>
<tr>
<td>Final student interest in the assigned studio project</td>
<td>Student Quantitative</td>
<td>2 on the Post-test of Student Interest</td>
<td>1-9</td>
<td>Not interested to Very interested</td>
</tr>
<tr>
<td>Sustained student interest in the assigned project</td>
<td>Student Quantitative</td>
<td>A score between 7-9 on 2 of the Pre-design interest in the assigned studio project and 2 of the Post-design interest in the assigned studio project.</td>
<td>1-9</td>
<td>Not interested to Very interested</td>
</tr>
<tr>
<td>Student enjoyment of project</td>
<td>Student Quantitative</td>
<td>1 on the Post-test of Student Interest</td>
<td>1-9</td>
<td>No enjoyment to Enjoyed</td>
</tr>
<tr>
<td>Being pleased with design solution</td>
<td>Student Quantitative</td>
<td>5 on the Post-test of Student Interest</td>
<td>1-9</td>
<td>No to Yes, very much</td>
</tr>
<tr>
<td>Open-ended pre-design phase activity that most influenced design decisions</td>
<td>Student Qualitative</td>
<td>Written responses to open ended questions</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Student understanding of compatibility</td>
<td>Student Qualitative</td>
<td>Written responses to open ended questions</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Table 3-8. Evaluator’s Questionnaire variables. Twelve dependent, quantitative measures of relative degree of compatibility were derived from the Evaluator’s Questionnaire.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Code</th>
<th>Type</th>
<th>Operationalized from</th>
<th>Scale</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social context compatibility</td>
<td>CS</td>
<td>Expert</td>
<td>1 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>No references to Many references</td>
</tr>
<tr>
<td>Architectural historical context compatibility</td>
<td>CAH</td>
<td>Expert</td>
<td>2 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Masses and volumes of architectural context compatibility</td>
<td>CA1</td>
<td>Expert</td>
<td>3 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Surface forms, such as roofs and walls, of architectural context compatibility</td>
<td>CA2</td>
<td>Expert</td>
<td>4 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Windows and views of architectural context compatibility</td>
<td>CA3</td>
<td>Expert</td>
<td>5 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Entrances and interior circulation of architectural context compatibility</td>
<td>CA4</td>
<td>Expert</td>
<td>6 on the Evaluator’s Questionnaire</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
</tbody>
</table>
Table 3-8. Continued

<table>
<thead>
<tr>
<th>Category</th>
<th>CA</th>
<th>Expert</th>
<th>Questionnaire</th>
<th>Scale</th>
<th>Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion and scale of architectural context compatibility</td>
<td></td>
<td>Expert</td>
<td>7 on the</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Architectural ornamentation of architectural context compatibility</td>
<td></td>
<td>Expert</td>
<td>8 on the</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Materials of architectural context compatibility</td>
<td></td>
<td>Expert</td>
<td>9 on the</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Mean compatibility of architectural context</td>
<td></td>
<td>Expert</td>
<td>Mean of</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Holistic compatibility</td>
<td></td>
<td>Expert</td>
<td>10 on the</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
<tr>
<td>Mean compatibility</td>
<td></td>
<td>Expert</td>
<td>Mean of</td>
<td>1-9</td>
<td>Not compatible to Very compatible</td>
</tr>
</tbody>
</table>
Table 3-9. Variables operationalized from Student Essay. Two types of variables were derived from the Student Essay. This table outlines the variables and how they were operationalized.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Operationalized from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluator’s generated themes: qualities of successful</td>
<td>Expert</td>
<td>written responses to questions one and two on the Evaluator’s Questionnaire</td>
</tr>
<tr>
<td>projects</td>
<td>Qualitative</td>
<td></td>
</tr>
<tr>
<td>Evaluator’s generated themes: qualities of unsuccessful</td>
<td>Expert</td>
<td>written responses to questions three and four on the Evaluator’s Questionnaire</td>
</tr>
<tr>
<td>projects</td>
<td>Qualitative</td>
<td></td>
</tr>
</tbody>
</table>
Figure 3-2. Structure and relationship of study variables. Number of study questions and associated student derived quantitative variables are set against relative degree of compatibility variables, derived from experts’ quantitative responses. Some expert-generated variables are generated through averages; included variables are indicated with dashed line.
CHAPTER 4
FINDINGS

This study used eight original and one existing instrument to assess the relative compatibility of student design outcomes, gather data on multiple factors potentially correlated to relative compatibility and explore new themes of interest to students and evaluators. Chapter 4 presents the findings from the eighteen study questions outlined in Chapter 3. Quantitative analysis outcomes are discussed below; tables of findings are in Appendix J. Qualitative data are organized into recurrent themes and discussed below. Findings suggest which personal qualities, feelings and studio activities relate to interior design compatibility of proposed renovations to a historic structure. Overall, the findings indicate that compatibility is a design challenge important to many students and evaluators, warranting studio support and further study.

Study Questions

Pre-Design Phase Interest in Historic Preservation

RQ1 How does a student’s pre-design phase interest in historic preservation correlate with the relative compatibility of design outcomes?

This study found no significant correlations between pre-design phase interest in historic preservation and higher or lower relative compatibility of design outcomes. This finding was unexpected, the literature discussed in Chapter 2 suggested that those with a greater interest in something, in this case preservation, should be more sensitive to prevalent issues, such as creating relatively more compatible designs. This finding may be the result of students’ having the desire, but not the knowledge and experience, to create designs that experts find compatible. With practice and experience, these
interested students may develop the ability to create relatively more compatible designs.

See Table J-1 in Appendix J for calculations.

**Pre-Design Interest in the Assigned Studio Project**

RQ2 How does a student’s pre-design phase interest in the assigned studio project correlate with the relative compatibility of design outcomes?

This study found no significant correlations between pre-design phase interest in the assigned studio project and higher or lower relative compatibility of design outcomes. Interest in the studio project may support students in other ways; further exploratory studies are needed. See Table J-2 in Appendix J for calculations.

**Student’s Belief of Having Prior Knowledge of the Studio Project’s Related Subject Matter**

RQ3 How does a student’s belief of possessing incoming knowledge of the studio project’s related subject matter correlate with the relative compatibility of design outcomes?

This study found no significant correlations between student’s belief of possessing incoming knowledge of the studio project’s related subject matter and higher or lower relative compatibility of design outcomes. This finding was surprising. Previous literature suggests that students with knowledge of a subject area should be able to do more advanced work. Like the findings for RQ1, this finding may be the result of a difference between students’ self-assessments and their ability to apply knowledge through designs judged by experts. See Table J-3 in Appendix J for calculations.

**Connectedness to Nature Scale**

RQ4 How does a student’s CNS score correlate with the relative compatibility of design outcomes?
This study found no significant correlations between mean CNS score and higher or lower relative compatibility of design outcomes. Mean CNS scores were consistent with Frantz’s (2004) administrations on a larger selection of university students. See Table J-4 in Appendix J for calculations.

**Pre-design Connectedness to Historic Buildings Scale (CHNS)**

RQ5 How does a student’s pre-design CHBS score correlate with the relative compatibility of design outcomes?

This study found no significant correlations between pre-design CHBS score and higher or lower relative compatibility of design outcomes. See Table J-5 in Appendix J for calculations.

**Post-design CHBS**

RQ6 How does a student’s post-design CHBS score correlate with the relative compatibility of design outcomes?

This study found no significant correlations between post-design CHBS score and higher or lower relative compatibility of design outcomes. See Table J-6 in Appendix J for calculations.

This result was not supported by the literature discussed in Chapter 2, which suggested that sense of connectedness would be positively correlated with an increase in the relative compatibility of design outcomes. This study’s results may be the result of a flaw in the testing instrument. This was the first administration of the CHBS to a small sample size; redevelopment and multiple retesting may generate different results in future studies.

The lack of significant positive correlation with the CHBS may reflect the findings of Whitmarsh (2009). In his study of the climate change mitigating actions taken by
those who wanted to help the environment, Whitmarsh found that ignorance of recommended behaviors to limit waste and emissions led participants to make lifestyle choices that were increasing their negative impact on the environment. Similarly, the students participating in this research may have wanted to create relatively more compatible designs, but their lack of understanding of the impact of their design decisions and how to design compatibility may have led to the asymmetry of their intentions and evaluators’ assessment of their final design solution. Like the participants in Whitmarsh (2009), students with higher CHBS scores may create relatively more compatible designs once they have more experience and accurate knowledge about how to design compatibly in a rehabilitation project.

**Open-Ended Pre-design Activity that Most Influenced Concept**

RQ7 In their open-ended responses, which pre-design phase activities did students say most influenced their concept?

On their Reflections on Your Pre-design Concept Survey, completed after students submitted a set of three concept boards to their instructors and before students began work on their final design solutions, students listed the pre-design activities that most influenced their concept. At this point in their studio processes, fourteen students found the site visit and tour influential in their concept development, nine students found the morphological analysis influential, seven students found their independent research influential, and five students found the benchmarking research, in which students examined previous Frank Lloyd Wright buildings, influential. Results are shown in Table 4-1. 92 percent of respondents listed multiple significant influences. Students listed their site visit and tour, morphological analysis and research. All listed influences were counted equally.
Influence of Pre-design Phase Studio Activities

RQ8 How does the choice of pre-design phase activities that students ranked as most influential correlate with the relative compatibility of design outcomes?

Pre-design phase activity: Analysis of Frank Lloyd Wright’s original design concepts

Finding the studio activity, analysis of Frank Lloyd Wright’s original design concepts for the Florida Southern college campus, influential was positively correlated with two measures of compatibility. Architectural ornamentation of architectural context compatibility was significant at $\alpha = 0.05$. Materials of architectural context compatibility was significant at $\alpha = 0.02$. See Table J-7 in Appendix J for calculations.

In their open-ended responses, discussed later in Chapter 4, students shared how they used Frank Lloyd Wright’s design ideas and concepts to inform their own design ideas. It is significant that students connected on an abstract, theoretical level to the historic architect. This finding suggests that students’ design work can be supported through abstract learning about design concepts and theories.

Pre-design phase activity: Character defining features research

This study found no significant correlations with finding the character defining features research pre-design phase activity influential in the design decision-making process. This finding was particularly surprising. Historic preservation guidelines rely on sharing information about character defining features. This exploratory finding suggests that understanding the design concepts, rather than the physical parameters of a design, supports students more as they create compatible design outcomes. See Table J-8 in Appendix J for calculations.
Pre-design phase activity: Building user perceptions and behavior research

This study found no correlations with finding the building user perceptions and behavior research pre-design phase activity influential in the design decision-making process. See Table J-9 in Appendix J for calculations.

Pre-design phase activity: Code compliance and ADA research

This study found no significant correlations between finding code compliance and ADA research an influential pre-design phase activity and higher or lower relative compatibility of design outcomes. See Table J-10 in Appendix J for calculations.

Pre-design phase activity: LEED research

This study found no significant correlation between finding LEED research an influential pre-design phase activity and higher or lower relative compatibility of design outcomes. LEED research involved learning current LEED standards and exploring how they could be applied to the building. See Table J-11 in Appendix J for calculations.

Pre-design phase activity: Morphological analysis

This study found no significant correlation between finding the morphological analysis pre-design phase activity influential in the design decision making process and higher or lower relative compatibility of design outcomes. See Table J-12 in Appendix J for calculations.

Pre-design phase activity: Concept and branding development

This study found no significant correlation between finding the concept and branding development pre-design phase activity influential in the design decision making process and higher or lower relative compatibility of design outcomes. See Table J-13 in Appendix J for calculations.
Pre-design phase activity: Midpoint presentation

This study found no significant correlations between finding the midpoint presentation an influential pre-design phase activity and higher or lower relative compatibility of design outcomes. See Table J-14 in Appendix J for calculations.

The course instructors participating in this research designed and implemented the pre-design phase studio activities. Helping students develop greater relatively compatible projects was not the instructors’ only learning goal and pre-design phase activities covered a range of topics. Analysis of Frank Lloyd Wright’s original design concepts had a significant positive correlation with greater compatibility. Students found their pre-design phase activities influential, as shown in Table 4-2. Instructors seeking to improve the relative compatibility of their students’ rehabilitation projects should use research activities on analyzing the original design intention. Further studio studies should be conducted to develop new activities that could guide students toward a relatively greater compatible design solution.

Total Influence of Pre-design Phase Studio Activities

RQ9 How does a student’s crediting pre-design phase activities choice with influencing design decisions correlate with the relative compatibility of design outcomes?

This study found no significant correlations between crediting pre-design phase activities with influencing design decisions and higher or lower relative compatibility of design outcomes. See Table J-15 in Appendix J for calculations.

Pre-design Activity that Most Influenced Design Decisions

RQ10 Which pre-design activities did students believe most influenced their design decisions?
Students used the SODDIS’s scaled questions covering eight pre-design phase activities to rate on a scale of one to nine how influential each pre-design phase activity was in their design development process. Table 4-2 ranks the eight pre-design activities scaled on the SODDIS and gives total participants’ mean influence score out of a possible nine or ‘very influential.’ Concept and branding development (mean = 8) and analysis of Frank Lloyd Wright’s original design concepts (mean = 7.98) were rated most influential. Next, code compliance and ADA research (mean = 7.18) and morphological analysis (mean = 7.09) were ranked as highly influential. Character defining features research (mean = 6.91), building user perceptions and behavior research (mean = 7.09), and LEED research (mean = 6.5) were influential. The midpoint presentation at Florida Southern College (mean = 4.05) was ranked as less influential in the design decision-making process.

Open-Ended Pre-design Phase Activity that Most Influenced Design Decisions

RQ11 In their open-ended responses, which pre-design activities did students believe most influenced their design decisions?

The Student Essay, Post-test of Student Interest, and SODDIS were administered after students completed their design project solutions. Each of these instruments included open-ended questions, and students discussed the pre-design activities that most influenced their final design solutions in these three instruments. Table 4-3 outlines the pre-design phase activities that students found most influential; many students discussed multiple activities and all were counted equally. Findings from students’ open-ended responses vary slightly with scaled answers from the SODDIS. Analysis of Frank Lloyd Wright’s original design concepts received the highest rating: sixteen students found analysis of Frank Lloyd Wright’s original design concepts most
influential. Fourteen students found the morphological analysis influential. Nine students listed the character defining features analysis as influential. Eight found their design concept influential in their design decision making process. Between six and four students found the ADA and other code requirements, building program and new function, perception of users' needs, LEED criteria, and the site visits influential in their design decision-making.

Students scored answers on the SODDIS varied from the activities they discussed in their open-ended questions. Students acknowledge that many studio activities were influential in the design-decision making processes. As they developed their design concepts, students found their site visits and the building morphological analysis most influential. After completing their design project outcomes, students generally considered the Frank Lloyd Wright design concept analysis, morphological analysis, concept development and ADA and code compliance issues most influential in their design decision-making.

**Student Self-reported Assessments**

**Final student interest in the assigned studio project:** RQ12 How does final student interest in the assigned studio project correlate with the relative compatibility of design outcomes?

This study found no significant correlations between final student interest in the assigned studio project and higher or lower relative compatibility of design outcomes. See Table J-16 in Appendix J for calculations.

**Student enjoyment of project:** RQ13 How does student enjoyment of project correlate with the relative compatibility of design outcomes?
This study found no significant correlations between student enjoyment of project and higher or lower relative compatibility. See Table J-17 in Appendix J for calculations.

Student enjoyment of project is a complex variable. Student comments to the open-ended follow-up to question one on the Post-test of Student Interest suggested that 1) project selection and program parameters, 2) classroom experience, and 3) feeling of success with the final design outcome and presentation all contributed to enjoyment of project. Students completed the Post-test of Student Interest before receiving their grades.

**Being pleased with design solution:** RQ14 How does a student’s being pleased with their design solution correlate with the relative compatibility of design outcomes?

This study found that being pleased with design solution positively correlated with the relative compatibility of design outcomes along one compatibility measure. Surface forms of architectural context compatibility was significant at α = 0.05. See Table J-18 in Appendix J for calculations.

Being pleased or feeling successful with their design solution was important to students. It correlated positively with an increase in the relative compatibility of design outcomes. Some students provided explanations for why they felt pleased. These included feeling successful with the total design outcome, implementation of media and graphics on final presentations, use of their concept, and ability to make a difference for historic buildings and building users through their new design and its code compliance. In their written comments, students who were relatively more pleased with their design solution seemed engaged with the process and happy with their product. Helping students to engage in studio processes, and to develop design solutions that they are
pleased with may also help them create more compatible design outcomes. Students completed the Post-test of Student Interest before receiving their grades, so their feelings reflect their assessment of their project and are not influenced by their instructors’ assessment.

**Student understanding of compatibility:** RQ15 In what ways do students discuss compatibility in their open-ended responses?

In their answers on the Reflections on Your Pre-design Concept, Student Essay, Post-test of Student Interest and SODDIS, students discussed their design decision-making processes, their goals for their projects, and how they tried to implement those goals. Fifteen students addressed the concept of compatibility, although they did not use the word. Through their explanations, students reveal their understanding of the concept of compatibility and their personal struggles to design compatibility. The following quotes from student responses are discussed below to illustrate how participating students understood compatibility. (To ensure reader clarity, regardless of gender, all students are referred to with feminine pronouns where necessary in the following discussion.)

The student who explained that “[t]he historical integrity of these spaces is integral in the redesign process…the redesign process will link both old and new, but each architectural style will maintain its own identity” has a clear understanding of compatibility and wants to achieve it in her final design outcome. Another student described her thought process as she attempted to design compatibility, “[h]ow do I add anything to an original Frank Lloyd Wright design? Then also too, if I can change it, do I attempt to blend with the original, or stand apart from it? I decided to attempt to walk the
fine line between the two and had to decide upon rules of how to walk the line.” This student wanted to create a compatible design, but was unsure of how to do so and might have been unaware of how to best use precedents and guidelines to aid the design process. Her lack of clear awareness of how to design compatibility and what guidelines to use suggests a place for improvement: if students can develop a clearer understanding of what a compatible design is and how they are developed, designing compatibility can be facilitated.

A student described her project as fairly successful because “[i]t introduced designing while trying to maintain/reestablish original design intent of a historically significant building.” She had a developing concept of compatibility; she wanted to contribute something to the space while appreciating that the historic buildings should be part of her new design. Four student excerpts discuss maintaining Frank Lloyd Wright’s design concept and intentions. A student explained that the main thing she learned while completing her studio project was “[t]hat it’s not as important to maintain everything about the space, but more so to maintain the original design’s intent.” The focus on maintaining the architect’s concept may be helping students develop their rehabilitations, but without rigorous application to architectural features, evaluators may not see compatibility in the final design outcome.

Sensitivity was another concept that emerged in students’ nascent discussion of compatibility. The student who explained that “[i]n the design it was important to be sensitive to Frank Lloyd Wright’s original design while still incorporating a new, modern design” is trying to use sensitivity as a tool as she develops her new design and a goal
for her final design outcome. Another student said “[l]earning to be sensitive to existing
design” was the primary thing she learned while completing her project.

Some students seemed to understand compatible designing as modernization or
updating. The historic building contributes its history, design or structure; their design
brings it into the modern era. Students focused on different aspects of the historic
building to coordinate with their new designs. The student who said, “[m]y design
brought a lot of FLW design ideas into it, just giving them a more modern day feel” is
focusing on the design ideas and concepts of the original architect and pairing that with
her design. Another student, who wanted to “be able to preserve their original concept
while updating their features,” echoed emphasis on the buildings’ concept and added an
awareness of architectural building features as a medium for modernization. Other
students took a completely physical approach, trying to “use his details and structure to
create a new modern identity.” Student pre-design phase studio activities addressed
both physical and conceptual aspects of the project buildings and Frank Lloyd Wright’s
design process.

Sixty-three percent of students discussed their struggles and successes with
learning to design compatibility. No one used the exact word, but explanations
demonstrate some understanding of the concept. Based on student comments, the
relative compatibility of future student projects may be increased by focusing pre-design
phase studio activities on developing a clear understanding of the concept of
compatibility and how to apply it throughout the design process and to the final design
outcome. Examples of compatible design solutions and discussions of compatible
design processes, or how designer’s created a compatible design, may aid students as they attempt to work with historic buildings and create new designs.

**Student generated themes:** RQ16 What issues did students find significant and discuss in their open-ended responses?

Through their open-ended responses, students shared their concerns, opinions, and ideas about historic buildings, their projects, their design efforts, and their studio environment. These qualitative data provided insight into students’ views. Three repeating themes arose in students’ open-ended responses: a discussion of individual attempts to design compatibly, concerns about the level of creativity they could express in an adaptive reuse project, and concerns about the amount of technical knowledge needed to rehabilitate historic buildings. Table 4-4 summarizes themes students reflected on in their discussion. Students’ discussion of their efforts to work compatibly with their rehabilitation project building was discussed above, under Question 15.

From the data collected for this research, one significant trend emerged in students’ written responses on their Reflections on Your Pre-design Concept, Student Essay, Post-test of Student Interest and Student Opinion of Design Decision Influences Survey (SODDIS): creativity. No survey instrument asked students directly about creativity, yet 58 percent discussed creativity concerns. This independent, repeated discussion of creativity suggests that creative design processes and solutions were significant to students. In the Reflections on Your Pre-design Concept, four students, when asked to explain how pleased they were with their concept, justified their answers by explaining why their concept was creative. When completing the Post-test of Student Interest, only one student felt her design solution was creative.
In their written responses, students repeated that creativity in design concept, process and solution was important to them. Fourteen students discussed their struggles to be creative with their studio project. One student explained the weakness of her project, “I was afraid to do too much…next time I will have more initial creativity and pull back.” Another student “felt our creativity was a little limited but it ended up ok.”

Instructors should help students create projects they are pleased with. This study found that being pleased with the design solution correlated to greater relative compatibility. Helping students create projects they judge more than ‘ok’ may be important in order to increase the relative compatibility of student outcomes. Working creatively can be enjoyable (Nakamura & Csikszentmihalyi, 2009) when students feel they can engage their projects and their creativity, in a compatible solution.

Three students struggled to go beyond the framework established by iconic architect Frank Lloyd Wright. One student explained that “[i]t was hard to develop a design solution for a building that has such a strong design identity.” Another discussed Frank Lloyd Wright specifically: “FLW was the biggest influence in my design process and the decisions I made. FLW’s decisions were also the biggest hindrance to my project. I just felt so limited with the space.”

Students also felt limited by the project because it was a rehabilitation of a historic building. One student explained, “I did feel limited because it was a historic renovation.” Another struggled to work with the buildings, explaining that “[i]t is also very hard to come up with something original because we are so concerned with existing features. Not a lot of room for creativity.” In her Post-test of Student Interest, a student explains why she does not want to do many historic projects: “I do enjoy preserving that piece of
history but I’ve grown more drawn too updating and integrating a modern intervention rather than just preserving.” This student quote illustrates two points that future historic rehabilitation studio projects could address with greater clarity to improve students’ engagement with their projects. First, rehabilitations should be “integrating a modern intervention,” while “just preserving” should be primarily left to significant museums (NPS, The Secretary of the Interior’s Standards, no date). Secondly, compatible rehabilitation work should involve updating and integrating. If future students understood that they should be doing contemporary, even creative, designs, they may not lose interest in historic preservation work.

Studio instructors set the project program. Two students believed that the program limited their engagement with the project. They explain that “the program of this project was not very flexible so it was difficult to get excited about it” and it was “[s]ometimes hard to be motivated because at times I felt like all I could do is place furniture and the program was already pre-determined.” Giving these students greater flexibility might have helped them express their design ideas and engage their projects more fully. With greater engagement, they might be more creative, enjoy the design process, and ultimately develop relatively compatible designs.

Only one student stated that her design outcome was creative. In her Student Essay, she explains that “[p]roblem solving in an innovative fashion, while holding true to original concepts and flexibility, leads to dynamic and functional solutions.” Creativity was important to many of the students participating in this research. Creativity in future preservation studios may be increased by using the studio classroom to increase student understanding of compatibility and show students creative and contemporary
design solutions in historic rehabilitation design work. A dynamic studio environment and a flexible program may facilitate student engagement and ability to develop creative solutions. By working creatively, students may feel more engaged and pleased with their design processes and solutions (Nakamura & Csikszentmihalyi, 2009). Working creatively helps students enjoy the design process, potentially leading them to develop relatively more compatible design outcomes and to be willing to design for historic buildings again. Working on historic buildings with less significant designers may also help students feel more comfortable and able to engage the historic building and develop compatible designs.

**Evaluator’s Generated Themes: Qualities of Successful Projects**

RQ17 What qualities did evaluator’s cite as contributing to making a student project relatively more successful?

Through their open-ended responses on the Evaluator’s Summary Questionnaire, evaluator’s elaborated on their views of students’ projects. The Evaluator’s Summary Questionnaire asked each evaluator to note the strongest and weakest design project solutions and explain why those projects were selected. Evaluators, who came from architecture and interior design, and professional and academic backgrounds, were remarkably consistent in their selection of projects and explanations. Inter-rater reliability was 94.8%. Three projects evaluators found successful are shown in Appendix N, along with three moderately successful projects, and three unsuccessful projects. Chapter 5 discusses the nine projects shown in Appendix N. Three evaluators did not list specific projects, but all noted project qualities. Having students address the context of the original architecture was evaluators’ most significant criterion for a successful project. Secondly, evaluators responded positively to projects they assessed
as well presented, with detailed drawings showing specific materials, finishes and furnishings arranged within a clear presentation layout. Three evaluators, all architects, also cited a fuller development of three-dimensional space as their reason for finding some projects more successful. Figures 4-5 and 4-6 organize the common themes found in evaluator’s written analysis of students’ projects.

**Evaluator’s Generated Themes: Qualities of Less Successful Projects**

RQ18 What qualities did evaluator’s cite as contributing to making a student project relatively less successful?

In their open-ended responses to questions three and four of the Evaluator’s Summary Questionnaire, evaluator’s elaborated on what made some student projects less successful. As suggested by Table 4-5, the context of the original architecture remained a significant issue in evaluators’ discussions. Five evaluators noted that less successful projects ignored the context of the existing architecture. Following their thoughts on successful projects, another five evaluators also wrote that less successful projects looked incomplete and needed both design and presentation development. They could not distinguish finish type, texture and color. Three evaluators critiqued projects for unclear finishes- they could not tell what the intended finish was- and inappropriate furnishings. While they were completing their evaluations, four evaluators told the researcher that less successful computer-rendered perspective drawings were too monotonous, slick and smooth. In these types of drawings, they could not judge the appropriateness of materials. Preceding their written comments, three evaluators told the researcher less successful projects had inappropriate furnishing choices. Specifically, evaluators said that students selected residential grade products for a commercial space.
On the Evaluator's Summary Questionnaire, participating evaluators were fairly consistent in their explanations of why student projects were successful or unsuccessful; see Figures 4-5 and 4-6. Addressing the context of the architecture was the primary reason a project was successful; ignoring the architectural context was the primary reason a project was listed as unsuccessful. Since evaluators had just finished examining student projects for compatibility and completing the Evaluator's Questionnaires, this theme may be the result of both what evaluators wanted to see and what they had been asked to examine on each student project. Since most evaluators had historic preservation interest and experience, this theme also reflects their professional practice and interests.

The second most common reason evaluators gave for finding a project successful or unsuccessful was its presentation quality and apparent level of detail and completion. Evaluators judged projects with more detailed interiors and well-laid out presentation boards more favorability. Less successful projects were cited for lack of development. In their written comments, students discussed this issue. Four students complained that the project was too large for one person; two others wanted to go into greater detail in their designs, but said they ran out of time. During a telephone interview, the primary instructor suggested that the project was too large for the students and giving each student one building, instead of two, would have allowed them to create more detailed design solutions in the allotted time. Appropriate project scope can be corrected in future studio situations by giving students smaller projects and/or increasing the allotted time for design work.
Three evaluators, all architects, found some projects successful because of a fuller development of three-dimensional space, as shown in perspective drawings. The importance and difficulty of developing three-dimensional space is echoed in students’ written comments: on their Post-test of Student Interest, three students explained that the project was challenging or limiting because the buildings had low-ceilings. Studio activities that encourage students to fully engage their project spaces should be developed to address this issue. More time to develop a design, work on the project, and modeling, may help more students successfully use three-dimensional space in their final design outcomes.

Selecting appropriate finishes and furnishings is an important part of an interior designer’s work. Three evaluators, two interior designers and one architect, cited poor or unclear finishes and furnishings as why a project was relatively less successful. Another evaluator mentioned this issue to the researcher, but did not write it down. Based on oral and written evaluator’s comments, unclear finishes were primarily the result of poor rendering and a lack of sample materials on project presentations. Inappropriate furnishings could be addressed in future studio projects by allowing greater time for students to select furnishings and discuss proposed selections with their studio instructors.

Evaluators said they critiqued projects primarily for architectural compatibility. Evaluators used other criteria as well. They specifically mentioned: clear and successful use of media, full engagement of three-dimensional space, detailed design solutions, and selection and labeling of appropriate finishes and furnishings. The first issue, compatibility, is the primary concern of this study and suggestions for increasing the
relative compatibility of student design outcomes are discussed in Chapter 4 and Chapter 5. The other issues will continue to challenge interior design students and studio instructors. With practice and time for development, students should continue to improve and create clearer, more appropriate project solutions.

**Summary**

Compatibility is a design goal for working with historic structures. Compatibility allows the best of a building’s historic features to become a distinct part of a new design so that building users may experience the best of the past and the present. Assessing the relative compatibility of student project outcomes and correlating relative compatibility with multiple student-generated measures was the primary focus of this study. Quantitative results indicated that being pleased with the design solution and finding the analysis of Frank Lloyd Wright’s original design concepts influential to the decision-making process positively correlated with increased relative compatibility of student project outcomes. Qualitative analysis of both students and evaluators written responses provided information on their opinions, thought processes and what they find significant in design processes and products. Chapter 4 discussed significant results and themes, provided explanations for results, and suggested how results could be used to improve students’ studio experiences and increase the relative compatibility of student design outcomes in future historic preservation and rehabilitation projects.
Table 4-1. Pre-design activities that students found most helpful while developing their concept boards. This data came from students’ completed Reflections on Your Pre-design Concept Survey, which was completed shortly after students submitted a set of three concept boards and before they began design work.

<table>
<thead>
<tr>
<th>Students’ views: Pre-design activities that most influenced concept</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site visit and tour</td>
<td>58 percent</td>
</tr>
<tr>
<td>Morphological analysis</td>
<td>38 percent</td>
</tr>
<tr>
<td>Own research (examples given: reading about Frank Lloyd Wright, looking at images online)</td>
<td>29 percent</td>
</tr>
<tr>
<td>Benchmark research</td>
<td>20 percent</td>
</tr>
</tbody>
</table>
Table 4-2. Rankings the eight pre-design phase studio activities by students’ mean score of degree of design decision influence.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Pre-design activity</th>
<th>Participants’ Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Concept and branding development</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>Analysis of Frank Lloyd Wright’s original design concepts</td>
<td>7.98</td>
</tr>
<tr>
<td>3</td>
<td>Code compliance and ADA research</td>
<td>7.18</td>
</tr>
<tr>
<td>4</td>
<td>Morphological analysis</td>
<td>7.09</td>
</tr>
<tr>
<td>5</td>
<td>Character defining features research</td>
<td>6.91</td>
</tr>
<tr>
<td>6</td>
<td>Building user perceptions and behavior research</td>
<td>6.68</td>
</tr>
<tr>
<td>7</td>
<td>LEED research</td>
<td>6.5</td>
</tr>
<tr>
<td>8</td>
<td>Midpoint presentation</td>
<td>4.05</td>
</tr>
</tbody>
</table>
Table 4-3. Pre-design activities that students found most influential on their final design solutions.

<table>
<thead>
<tr>
<th>Students’ views: Pre-design activities that most influenced design solution</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysis of Frank Lloyd Wright's original design concepts</td>
<td>67percent</td>
</tr>
<tr>
<td></td>
<td>n=16</td>
</tr>
<tr>
<td>Morphological analysis</td>
<td>58percent</td>
</tr>
<tr>
<td></td>
<td>n=14</td>
</tr>
<tr>
<td>Character defining features analysis</td>
<td>37percent</td>
</tr>
<tr>
<td></td>
<td>n=9</td>
</tr>
<tr>
<td>Own design concept</td>
<td>33percent</td>
</tr>
<tr>
<td></td>
<td>n=8</td>
</tr>
<tr>
<td>ADA and other code requirements</td>
<td>25percent</td>
</tr>
<tr>
<td></td>
<td>n=6</td>
</tr>
<tr>
<td>Building program and new function</td>
<td>20percent</td>
</tr>
<tr>
<td></td>
<td>n=5</td>
</tr>
<tr>
<td>Perception of users’ needs</td>
<td>17percent</td>
</tr>
<tr>
<td></td>
<td>n=4</td>
</tr>
<tr>
<td>LEED criteria</td>
<td>17percent</td>
</tr>
<tr>
<td></td>
<td>n=4</td>
</tr>
<tr>
<td>Site visits</td>
<td>17percent</td>
</tr>
<tr>
<td></td>
<td>n=4</td>
</tr>
</tbody>
</table>

These data came from students’ completed Essays, Post-tests of Student Interest, and Student Opinion of Design Decision Influences Surveys. These three instruments were completed after students finished developing their interior design solutions.
Table 4-4. Major themes in students’ responses to open ended questions and how many students discussed each theme.

<table>
<thead>
<tr>
<th>Students’ themes:</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reported views from open-ended responses</td>
<td>n=24</td>
</tr>
<tr>
<td>Discussed their efforts to work compatibly* with the building</td>
<td>63 percent n=15</td>
</tr>
<tr>
<td>Concerned that the project did not allow them to be creative</td>
<td>58 percent n=14</td>
</tr>
<tr>
<td>Concerned that the amount of technical, systems, and codes knowledge specially required when working with historic buildings was too great</td>
<td>29 percent n=7</td>
</tr>
<tr>
<td>Believed they had a creative concept</td>
<td>17 percent n=4</td>
</tr>
<tr>
<td>Believed they had a creative solution</td>
<td>4 percent n=1</td>
</tr>
</tbody>
</table>

*No student used the word compatibility or compatible; however, in their explanations of their design efforts, they defined the concept.

Table 4-5. Evaluator’s themes explaining the qualities of more successful student project outcomes.

<table>
<thead>
<tr>
<th>Evaluators’ themes:</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>What makes a student’s project outcome more successful?</td>
<td>n=8</td>
</tr>
<tr>
<td>Addressing the context of the original architecture</td>
<td>100 percent n=8</td>
</tr>
<tr>
<td>Detailed presentation, with clear graphics, finishes, and furnishings</td>
<td>63 percent n=5</td>
</tr>
<tr>
<td>Fuller development of three-dimensional space</td>
<td>38 percent n=3</td>
</tr>
</tbody>
</table>
Table 4-6. Evaluator’s themes explaining the qualities of less successful student project outcomes.

<table>
<thead>
<tr>
<th>Evaluator’s themes:</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>What makes a student project relatively less successful</td>
<td>n=8</td>
</tr>
<tr>
<td>Ignoring the context of the original architecture</td>
<td>63 percent</td>
</tr>
<tr>
<td>Incomplete design with lack of development</td>
<td>63 percent</td>
</tr>
<tr>
<td>Unclear finishes and poor choice of furnishings</td>
<td>38 percent</td>
</tr>
</tbody>
</table>
CHAPTER 5
DISCUSSION AND CONCLUSIONS

This case study research followed the course of a single adaptive reuse senior studio project. This was an exploratory study, with a small sample size. This study used qualitative and quantitative methods to discover, explore and raise further questions regarding the nature of student learning and design. The qualitative findings from this study are particularly rich, allowing students to speak out in their own words. These data provide significant new insights into these students and raise new questions on how to support student designers.

Students prepared design rehabilitations for two historic building on the Florida Southern College campus, Buckner (1942-1946) and Ordway (1950-1952). Originally the Roux Library (Buckner) and Industrial Arts building (Ordway), students’ design task was to develop these campus buildings into new classroom spaces and a conference center, complete with hotel rooms in Ordway. As part of the largest single collection of Frank Lloyd Wright buildings, the Florida Southern campus rehabilitation project was both a unique opportunity and a worthy challenge for participating interior design students. The campus is on the National Register of Historic Places and is famous for its original Wright designs.

Students’ project work began with a series of visits to the campus and pre-design phase research exercises. Students worked in groups on these exercises and shared their findings with the class. As students worked individually toward concept development and design, engaging both the ideas and architectural expression of Buckner and Ordway became increasingly important. Additionally, the instructor
stressed the importance of updating the buildings and making them compliant with current ADAAG access and safety code guidelines.

Frank Lloyd Wright envisioned the Florida Southern campus unfolding under the sun. Geometric ray, wave and circular forms help the campus structures move and spread across the landscape. With its strong geometric design and concept, it is not surprising that students struggled to work with Wright’s designs and still express their own creativity, as discussed in Chapter 4. Nine example student projects, reproduced in Appendix N, are discussed below. Reproduced projects were selected from among those with evaluators’ comments. Evaluators found the first three successful, and the second three moderately successful. Evaluators found the final three projects very weak. Table N-1 shows the cohort’s compatibility means, and the class’s mean compatibility standard deviation and range. With a class mean of 6.12 out of a possible nine, class projects were generally more compatible than not. Individual compatibility means are listed with each student project presentation board in Appendix N.

**Example Student Projects**

The student projects shown in Figures N-7 through N-12 were all listed as successful projects by at least three evaluators. The student project shown in Figures N-7 and N-8 was applauded for the detailed and thoroughness of the design and compatibility toward the existing architecture. This project engages the three-dimensional spaces with elaborate ceiling geometric forms and cutaways forming skylights. These features help give the space a similar architectural presence to Wright’s original designs. This student used a combination of text and diagrams to explain her design thinking processes. Explanatory process media may have helped the
evaluators understand her design and appreciate its level of development. Three evaluators called this the best project.

Figures N-9 and N-10 illustrate a second successful student project. This presentation includes text and a few clear diagrams to explain the design intent. The six supporting perspective rendering illustrate the interior spaces. The grey flooring material is a little monotonous, but the perspectives show that the habitable space is rich in architectural details, materials and colors. Much like Wright’s own work, this students’ design has a clear architectural order and sense of control within interior spaces. This project had the highest mean compatibility in the class.

Figures N-11 and N-12 reproduce a third successful student project. This design has strong, clear architectural and materials’ features. For example, the wood on the walls and ceilings, and the floor pattern plan delineate different spatial experiences and create moving and still interior environments. The perspectives are well rendered; carpet textures, floor changes and lighting conditions are clear. The presentation supports the student’s design intent and helps successfully articulate her vision to the evaluators.

Figures N-13 through N-18 illustrate three projects the evaluators called out as moderately successful. The project in Figure N-13 has a clear architectural concept, a folding fan, which reflects some of Wright’s ideas about the campus unfolding under the sun. Wave and ripple forms in the walls and ceilings create the three-dimensional space. The design is clearly articulated and presented, combined with explanations, this probably helped the evaluators appreciate this design.
Figures N-15 and N-16 illustrate a project that scored slightly below the class average on compatibility; however, two evaluators’ listed it as a fairly successful project. Compared to previous projects, the three-dimensional qualities of the spaces seem less developed—note the flat ceiling in a perspective drawing in Figure N-15. However, the use of red and a diamond motif may help create a unified design.

The project in Figures N-17 and N-18 scored almost exactly at the class mean. This project exemplifies the typical, moderately successful solution. Some interiors have developed three–dimensional spaces with active ceiling and wall surfaces, while others are flat boxes. The floor plans are complete; however, some elements seem random and the design, especially the site plan, lacks the cohesion of more successful projects.

Figures N-19 through N-23 show three projects evaluators listed as especially weak design solutions. The project in Figure N-19 was the lowest scoring project in the study. This may largely be the result of the design’s incompleteness: floor plans are not rendered, no materials are shown, and only one perspective of a minor space is included. With so little available information, evaluators’ struggled to find merit in this project. Evaluator comments were particularly negative and focused on the incompleteness of the design and poor quality of the presentation.

The project shown in Figures N-20 and N-21 was judged a poorly thought-out design, with poor choices of finishes and colors. Like other less successful projects, this one lacks a cohesive design concept, clear articulation of the design goals, and interior architectural features and lighting to engage and activate interior spatial experiences. Too many surfaces are smooth and bare; the low-saturation color palette does not offer enough contrast.
Figures N-22 and N-23 was scored slightly above the class average on compatibility; however, three evaluators listed it as a weak project. The poor color choices, specifically the flat yellow and teal, dominate the design and obscure other design elements. As a moderate to less successful project, this one has some interior articulation- the suspended or recessed ceiling panels; however, these elements can not solely create a three-dimensional experience or maintain Wright’s strong architectural concepts.

The nine student projects discussed above and shown in Appendix N were selected for having both evaluators’ comments and a range of compatibility means, including the highest and lowest ranking projects. With a class mean of 6.12, projects were generally judged somewhat compatible. Included examples capture the diversity of design solutions.

Conclusions

Historic preservation is the care, maintenance and preservation of the built environment, particularly buildings over fifty years old. Historic preservation usually preserves tangible cultural heritage; by doing so it provides a living record of the actions and choices of people through time. With the exception of a few national cultural landmarks, preserved historic buildings are not frozen in time. Historic buildings are part of the built environment, and they continue to evolve with their communities. Historic buildings today are often a narrative of changing aesthetic preferences, building technologies and uses. Today, the Secretary of the Interiors’ Standards for Historic Rehabilitations recommend that designers working on the next transformation of a historic structure use compatibility as the overarching design goal.
Compatibility is designing to combine the best of the past and the present. In a compatible design, noteworthy historic features are preserved and historic elements are distinct from the new design. Together, both the historic and new design elements are synthesized to create one appropriate and pleasurable interior experience. Designing a compatible interior can be challenging. Designers must discover the significant historic elements, transform the building into a fully functional space for new clients and develop a creative, successful contemporary interior design solution that supports the historic context and the building's functions. This study focused on exploring ways to help student designers develop compatible project solutions within a studio setting facilitating active discovery-based learning. Experts in preservation, architecture and design evaluated students' design solutions, expressing their applied knowledge. Associations between compatible design solutions and students' self-report concerning the stages in the design process were identified in Chapter 4. Findings outlined there are discussed below. The first section discusses findings related to compatibility and designing for historic structures. The following subsections discuss findings regarding studio learning and sense of connectedness (CNS).

**Compatibility and Historic Preservation**

Students discussed their understanding of compatibility in their written responses. No student used the word compatibility, but 63 percent of students discussed issues related to compatibility, including sensitivity and their personal techniques to design within the historic context. Many wanted to create compatible interiors, but struggled with details of implementation. Meneely (2010, 26) found that relatively fewer interior design students prefer to use critical, analytical or logical thought processes more than intuitive thought processes. Turning an emotional sense of connection to the historic
built environment and a nascent understanding of compatibility into a compatible design may have required more analytical thinking than students were comfortable with. Alternative studies with different types of structures or project guidelines should be conducted to assess students’ abilities to design compatibly. Further studies, including both student and practicing designers, should be conducted to assess interior designers’ level of knowledge about historic preservation practice— including understanding of the concept of compatibility— and how increasing understanding may clarify practice processes and affect design outcomes. For example, interior design students could shadow professionals as they work on a historic preservation project, including meetings with clients and the local historic preservation district review board. Pre- and post-shadowing tests and interviews could examine exactly what students learned through a targeted practice experience and how or where they learned it.

**Application to Historic Preservation Teaching and Practice**

Creating a compatible design solution in studio may be an ideal class projects for instructors who want their students to practice both creative and analytical design thinking. Historic preservation projects are challenging because students must address design and preservation issues within a compromised structure. Interior design instructors may improve their teaching practice through guided pre-design phase studio activities. Participating students in this study completed many pre-design phase research activities as part of their studio work. Early in the design process, students found their site visits the most influential activity. After they finished their design solutions, students cited their analysis of Frank Lloyd Wright’s original design concepts, morphological analysis and concept and branding development studio activities as the most influential. Indeed, most activities were ranked as influential to some degree.
Students who found their analysis of Wright’s original design concepts most influential also had higher relative compatibility scores from evaluators. The other seven pre-design phase research activities did not correlate to higher or lower relative compatibility scores. These findings suggest a potential area for design instructors to intervene. By emphasizing how compatibility plays a role in every aspect of design as well as the users’ experiences, instructors may help all of their students learn to integrate compatibility into their research and design processes.

Students’ lack of understanding and knowledge regarding compatibility suggests that current CIDA standards, which require awareness of history and historical aesthetics, may be inadequate to prepare students for studio application and professional practice. Current students are preparing for a lifetime of practice with historic structures (Futurevisions, 2004). The students participating in this study lacked awareness of fundamental historic preservation practice concepts. This was reflected in their vague understanding of compatibility, confusion about how to work compatibly during a rehabilitation project with a historic structure and frequent frustration with the design process. To prepare students for professional practice in historic buildings, CIDA needs to encourage 1) awareness of the tenets of historic preservation, including the different types of preservation, and 2) understanding, demonstrated through practice, of how to work with a historic structure. Each student participating in this study had previously completed a year of history lecture courses. This experience did not fully prepare students for working with historic buildings. As discussed in Chapter 2, students need active studio learning to prepare them for design practice. Students participating in this study demonstrated their knowledge of design for historic preservation by practicing
on a real-world based rehabilitation project. Students’ open-ended responses documented their struggles and suggest that they felt unprepared to practice compatible designing within a historic building.

This study’s findings may also assist those writing and interpreting historic preservation literatures. While conducting the literature review for this study, this researcher did not find a definition of compatibility in any historic district guidelines. Guidelines either omitted examples of compatible construction or used simple drawings illustrating a single design detail. When working with designers (and the lay public), rather than fellow preservationists, historic preservation literature could provide clearer definitions of key terms and more complete examples of compatible designs. With companion explanations and suggestions, such literature may demonstrate how designers can work compatibly on a historic rehabilitation.

The evaluators who participated in this study reflected the knowledge and expertise found in historic preservation boards, which approve design work within historic districts. Historic preservation boards are charged with assessing the relative compatibility of proposed new designs. Feedback from the evaluators participating in this study demonstrated that compatibility was the most important quality evaluators gauged in students’ projects; however, evaluators also assessed projects based on their architectural design and graphic merit. Designers and students trying to have projects approved should maintain their design communication skills; creative production in presentation is necessary to gain approval.

**Compatibility and Creativity**

Expressing their own creativity was a significant theme for students. 58 percent of students discussed the challenge of developing a creative solution. Most felt hampered
by the qualities of the historic building or the new program for the building. Before
beginning to develop their designs, four students believed they had a creative concept,
yet only one student believed that her completed project solution was creative.
Students’ concern over their inability to be creative in the project suggests several areas
for further examination. What do students think creativity is? Student comments suggest
an understating of creativity that is more focused on novelty than appropriateness.
Portillo (1996) found that interior design students were surprised to learn that creativity
includes dramatic bursts of insight and a disciplined revision process. Because this
studio project involved many technical issues such as making the new building
functional and code compliant while maintaining the significance of Frank Lloyd Wright’s
design, students may not have realized how they could work creatively while addressing
more technical or analytical design issues. Increasing students’ understanding of
creativity, including exposure to the creative process (not just product), may help
students understand how they can be creative in a historic rehabilitation project (Portillo,
1996).

Increasing awareness of historic preservation concepts and guidelines may also
help students feel able to be creative. Students’ discussion of compatibility suggested
that they believed historic rehabilitation projects were restrictive and focused on
restoration. However, the Secretary of the Interiors’ Standards for Historic Preservation
allow for great flexibility in design rehabilitation work (U.S. Department of the Interior,
NPS, no date). If participating students had possessed greater awareness of historic
preservation concepts, they may have restrained themselves less and been confident
that they had room for creative expression.
More study is needed to understand how creativity and historic preservation projects align in process and outcome, and how to help students design creatively within a historic structure. Understanding compatibility and seeing examples of successful compatible designs may help students imagine where their ideas and creativity can be integrated into a historic building project. Future study, class content and literature should be developed to demonstrate where and how historic preservation designs and designers can be creative.

Future research should also examine how developing student understanding of both compatibility and creative practice may support an increase in the relative compatibility of student design outcomes. Students may be more satisfied that they have expressed their own creativity if they understand that 1) compatible rehabilitation designing is not restoration (U.S. Department of the Interior, NPS, no date), 2) the creative process includes analytical thinking, redesign and hard work (Portillo, 1996), and 3) creative design solutions are novel and appropriate (Hennessey & Amabile, 1988). Developing educational materials showing compatible design products and discussing the creative process of creating a compatible design solution may help students understand both what they are trying to achieve and how they will achieve it.

**Summary**

This study is significant because it adds to the body of knowledge on design processes and compatibility outcomes in interior design education. This study expands our understanding of what personal, process and outcome factors correlate to relatively more or less compatible project outcome evaluations. Preservationists at the local, state and national level develop and update guidelines and review processes to help designers develop compatible design outcomes for historic buildings. This study can aid
preservationists and interior design educators by providing preliminary data on what qualities and experiences correlate with relatively more compatible design solutions. In Chapter 2, the researcher used preservation literature to develop a preliminary framework suggesting which qualities, attributes and knowledge may be needed by a student interior designer for the production of relatively more compatible design outcome. Figure 2-1 illustrates how the literature review informed these concepts. Figure 5-1 is based upon the broader Figure 2-1; however, it lists specific findings from this study that correlated with relatively more compatible design outcomes. Evaluators’ criteria, listed in the box on the far right, were discussed above. The content of the other leading boxes will be discussed below.

Figure 5-2 supplements Figure 5-1. Figure 5-2 illustrates which qualities were correlated with relatively less compatible design outcomes. These qualities are significant. Students who struggled with their design process, appeared to ignore the architectural context, and presented their design solution poorly were assessed as having relatively less compatible solutions. By improving students’ practice processes, knowledge and design abilities, they may create better and more compatible design solutions.

**Recommendations:**

- **Awareness** – have students gain familiarity with the project site and historic architect’s design concepts.
- **Understand/Understanding** – increase student understanding of creativity, compatibility and recommended historic preservation practice.
- **Apply/Ability/Able** – let students apply their developing skills by working with a somewhat flexible program and less significant architect.
Studio Learning

This study was conducted within an active, studio-learning environment. Students completed a complex, real-world problem requiring a multifaceted solution. Each student’s learning experience was unique, including individual research and project development. Students completed surveys and open-ended questionnaires throughout the pre-design process. Figure 5-3 illustrates the specific studio activities and student feelings that positively correlated with a relatively higher compatible design evaluation. The pre-design phase research activity of analyzing the original architect’s design concepts correlated with relatively higher compatible design evaluations. Additionally, students who were pleased with their solutions created projects that were scored higher for compatibility. Students completed their self-assessments before receiving their grades. It is significant to note that students and evaluators concurred in their assessments of student projects; pleased students had design solutions that evaluators found compatible. These findings, and those illustrated in Figure 5-4, which show the pre-design phase studio assignments and feelings that correlated with relatively less compatible design outcomes, are significant for interior design educators trying to develop a studio that supports students as they create compatible design solutions.

Applications for Studio Instructors

This study found that prior knowledge and interest do not correlate to relatively higher compatibility of design outcome, but that being pleased with the design solution, i.e. finding your own solution successful, was correlated with higher relative compatibility scores. This finding should be encouraging for instructors and practitioners. Senior students, soon-to-be entry-level design employees, evaluate their
work similarly to seasoned professionals. Interior design students’ abilities may not be fully developed, but in this study, their judgment reflects that of advanced practitioners. These findings are also significant because they underscore that what students brought to the studio was less important than the product they created there.

As shown in Figure 5-3 and 5-4 and discussed in Chapter 4, students found the instructor generated pre-design phase research activities influential. Which specific activities students found most influential were correlated with higher or lower scores on relative compatibility. Analyzing the original architect’s design concepts was correlated with greater compatibility. Why some activities were correlated with greater compatibility, while others had no positive or negative correlations is difficult to explain. In particular, character defining features research is a standard preservation practice; its lack of association with relatively higher compatible outcomes is extremely surprising. Since historic district guidelines and the Secretary of the Interiors’ Standards focus on character defining features, this finding should be further investigated. It may be an anomaly of this study, but more inquiry is needed. Further studies should first examine whether this finding is related to experience; for example, do experienced practitioners use character defining features in their design work, and if so, how compatible are their outcomes? Practice, both professional and practice based, may help students create projects judged relatively more compatible in the future. The students participating in this study were learning to design a historic rehabilitation; this was their first try. After this and future experiences, they should be better able to tackle the challenges of such a project- including issues of compatibility. Student comments from their open-ended responses indicate that this was a challenging design project. Their compatibility
discussions, found in Chapter 4, illustrate their struggles. No students mentioned their lecture-based history classes on any data collection instruments. When students used research and analysis, it was their recent, targeted research done within the studio context. That students did not knowingly connect their history and studio learning suggests, with the literature discussed in Chapter 2 that students do need an applied, active-learning studio practice experience to help prepare them for working with historic buildings. Further studies could examine and compare the outcomes of students completing multiple historic preservation projects versus those completing just one. Additional studies could compare the work of more or less experienced designers. Such studies could ascertain whether or not and to what extent practice on historic preservation projects improves design outcomes, and how design work processes change overtime.

Summary

This study was conducted in one classroom with twenty-four participating students. Future studies should work with several programs, more students and a wider variety of project buildings and sites.

This study presented some promising results. First, it found that what students bring to the classroom, such as prior knowledge and incoming interest and sense of connectedness to the historic built environment, was less related to the compatibility of their final design solutions than the experiences they had in studio while working on their projects. Interior design educators can use this finding to justify focusing on studio experiences and processes, over which educators have some control. The strong correlations between several of the studio experiences and compatibility scores suggests that educators should continue working to develop projects and a studio
environment that supports key learning experiences as students create compatible interior design solutions. Future research should be conducted to examine which studio practices, policies and project programs facilitate the consistent development of compatible interior design solutions.

Studio activities assessed in this study that were correlated with a decrease in the relative compatibility of student outcomes are listed in Figure 5-4. These activities should be redeveloped to help the students who found these activities influential create relatively more compatible design solutions. Students should learn to use their research to positively integrate compatibility into all aspects of their designs. For example, integrating new ADA accessibility guidelines could be presented as an aesthetic, compatibility challenge, not just a code challenge.

**Recommendations:**

- **Awareness** – help students use their awareness of the quality of their own work to gauge and push themselves.
- **Understand/Understanding** – increase student understanding of and level of comfort with technical issues before they begin a rehabilitation project.
- **Apply/Ability/Able** – have students apply their developing skills through repeated practice.

**Sense of Connectedness**

This study found no correlations between any type of sense of connectedness and evaluators’ compatibility scores. Pre- or post- design phase sense of emotional connection to the historic built environment did not correlate with more compatible design outcomes, suggesting that students may be struggling to use their feelings to make analytical design decisions or they may not understand how and why they should design compatibly. Further study and testing is needed to understand this situation. For
example, interviews and desk critiques throughout the design process, in addition to students’ deliberately generated responses, could be used to expand understanding of sense of connection to the historic built environment and how that emotion may or may not be applied. Interviews with practicing designers specializing in historic preservation projects could be conducted to establish a benchmark of whether a sense of connectedness to the historic built environment exists and how it is used in practice. The literature discussed in Chapter 2 to provide a basis for the possibility of sense of connectedness to the historic built environment was primarily based on research with historic building owners, users and neighbors. Like these groups, designers have a stake in their projects, but their different relationship may be affecting what emotions they develop toward a project site and how those emotions are utilized in design practice.

The lack of correlation between greater sense of connectedness to the historic built environment and greater relative compatibility of student design outcomes was surprising. This finding may be a factor of the small sample size, twenty-four students. This suggests that the CHBS may need to be redeveloped and retested and/or students who feel connected to the historic built environment may not know how to compatibly design for the historic built environment. Additional practice with historic buildings and greater understanding of compatibility and historic preservation may increase both students’ sense of connection to the historic built environment and their ability to design compatibly in that environment. Further study is needed to explore how interior design students with an emotional sense of connectedness to the historic built environment use, or do not use, their emotions to make design decisions.
Conclusions

In conclusion, creating compatible interior design solutions within existing historically significant structures is a relative goal that interior design students, educators, and practitioners can continue to improve upon. As reaffirmed by the expert evaluators participating in this study, responding to the context of the existing architecture is an important design goal for any interior design project. Compatibility is how interior designers respond to context within a historic building. Like sustainability or universal design, compatibility may need to become an overarching goal that is integrated into the design process and integral to every design decision. This may help student-designers learn to see how compatibility can serve people by creating a holistic interior design solution that combines the best of the past and the present.

This study provided evidence that students’ studio processes and experiences were correlated to the relative compatibility of their design outcomes. It also concluded that students are interested in creating compatible design solutions, but they need help understanding the compatible design process and product. This study expanded the body of literature by exploring those factors that were related to developing a compatible design outcome. Previous preservation practice has focused on providing knowledge and information to support the development of compatible design solutions. This study contributed by examining how interest, emotions and design process experiences relate to the relative compatibility of interior design solutions. This study found that creating a relatively more compatible interior design solution, as scored by experts, was related to a variety of process factors, many of which could be enhanced by design educators to help create a studio environment that supports the design of compatible interiors. This research and future studies can be used to target education.
and preservation efforts to assist designers as they create compatible designs for historic buildings.
Figure 5-1. Framework based upon Figure 2-1 illustrating how student designers may create relatively more compatible design outcomes.

- **Compatible design outcome**
  - Student designer: Using the original concepts and design intentions
  - Student designer: Being pleased with own design solution

- **Relativity less compatible design outcome**
  - Student designer failing to:
    - Fully address compatibility in a functional solution
    - Express own creativity

- **Student designer**
  - Addressing the context of the original architecture
  - Presenting detailed and clear graphics, finishes, and furnishings
  - Designing with a fuller development of three-dimensional space

- **Student designer**
  - Ignoring the context of the original architecture
  - Presenting an incomplete design lacking development
  - Selecting unclear/inappropriate finishes and furnishings

Figure 5-2. Framework based upon Figure 2-1 illustrating traits that correlated to lower relative compatibility of design outcomes based on this study’s findings about their knowledge, working processes and feelings.
Figure 5-3. Framework based on Figure 2-3 illustrating how the study’s findings on compatibility and learning theory combined to support relatively more compatible design outcomes.
Figure 5-4. Framework based on Figure 2-3 illustrating how the study’s findings on compatibility and learning theory combined to negatively correlate with relatively more compatible design outcomes.

- Student designer failing to:
  - Fully address compatibility in a functional solution
  - Express own creativity

- Relatively less compatible design outcome

- Student designer:
  - Ignoring the context of the original architecture
  - Presenting an incomplete design lacking development
  - Selecting unclear/inappropriate finishes and furnishings

- Studio Projects
  - Not learning through research and practice by:
    - Failing to apply knowledge derived from research and analysis exercises to creating a compatible design solution

- Studio Project
- Real world problem
APPENDIX A
PRE-TEST OF STUDENT INTEREST

Student Code Number:

Please rank your views or experience level for the following questions. You will not be graded on this assignment.

Your Views__________________________________________________________

How excited are you to be doing an interior design project set within a historic building?

1 2 3 4 5 6 7 8 9
Not interested Very excited

What is your overall level of interest in this specific project?

1 2 3 4 5 6 7 8 9
Not interested Very excited

What is your overall level of interest in historic buildings?

1 2 3 4 5 6 7 8 9
Not interested Very interested

Do you have any experience with historic buildings?

1 2 3 4 5 6 7 8 9
Not experienced Lots of experience

Do you have any prior knowledge of this project site?

1 2 3 4 5 6 7 8 9
No knowledge Lots of knowledge

Do you have any prior knowledge of Wright’s work and philosophy?

1 2 3 4 5 6 7 8 9
No knowledge Lots of knowledge
Student Code Number:

Please answer each question based on the way you generally feel. You will not be graded on this assignment.

1. I often feel a sense of oneness with the natural world around me.
   1 2 3 4 5
   Strongly disagree    Strongly agree

2. I think of the natural world as a community to which I belong.
   1 2 3 4 5
   Strongly disagree    Strongly agree

3. I recognize and appreciate the intelligence of other living organisms.
   1 2 3 4 5
   Strongly disagree    Strongly agree

4. I often feel disconnected from nature.
   1 2 3 4 5
   Strongly disagree    Strongly agree

5. When I think of my life, I imagine myself to be part of a larger cyclical process of living.
   1 2 3 4 5
   Strongly disagree    Strongly agree

6. I often feel a kinship with plants and animals.
   1 2 3 4 5
   Strongly disagree    Strongly agree

7. I feel as though I belong to the earth as equally as it belongs to me.
   1 2 3 4 5
   Strongly disagree    Strongly agree

8. I have a deep understanding of how my actions affect the natural world.
   1 2 3 4 5
   Strongly disagree    Strongly agree

9. I often feel part of the web of life.
   1 2 3 4 5
   Strongly disagree    Strongly agree

10. I feel that all inhabitants of Earth, human, and nonhuman, share a common ‘life force.’
    1 2 3 4 5
    Strongly disagree    Strongly agree

11. Like a tree can be part of a forest, I feel embedded within the broader natural world.
    1 2 3 4 5
    Strongly disagree    Strongly agree

12. When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature.
    1 2 3 4 5
    Strongly disagree    Strongly agree
13. I often feel like I am only a small part of the natural world around me, and that I am no more important than the grass on the ground or the birds in the trees.

1 2 3 4 5
Strongly disagree Strongly agree

14. My personal welfare is independent of the welfare of the natural world.

1 2 3 4 5
Strongly disagree Strongly agree
### APPENDIX C

**STUDENT MODIFIED CNS FOR THE HISTORIC BUILT ENVIRONMENT: CONNECTEDNESS TO HISTORIC BUILDINGS SCALE**

Student Code Number:

Please answer each question based on the way you generally feel. You will not be graded on this assignment.

Think of older or historic buildings, especially one that might have been built before 1960, in your environment. Please describe this building.

Please answer each question below based on the way you generally feel.

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating Options</th>
<th>1 (Strongly disagree)</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 (Strongly agree)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I often feel a sense of oneness with the older and historic buildings around me.</td>
<td></td>
<td></td>
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<td>2. I think of the historic built environment as a community to which I belong.</td>
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<tr>
<td>3. I recognize and appreciate the design features of older and historic buildings.</td>
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<tr>
<td>4. I often feel disconnected from older and historic buildings.</td>
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<tr>
<td>5. When I think of my interior designs, I imagine myself to be part of a larger cyclical process of designing and redesigning.</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>6. I often feel a kinship with older and historic buildings.</td>
<td></td>
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<tr>
<td>7. I feel as though new buildings belong equally with older and historic buildings.</td>
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<tr>
<td>8. I have a deep understanding of how my interior designs may affect older and historic buildings.</td>
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</tbody>
</table>

170
9. I often feel part of multiple generations of older and historic buildings.
   1  2  3  4  5
   Strongly disagree  Strongly agree
10. I feel that all buildings, older, historic, and new, together create a richer built
    environment.
   1  2  3  4  5
   Strongly disagree  Strongly agree
11. Like a chair can be part of a dining room set, I feel that my designs can be
    embedded within the broader built environment, including older and historic buildings.
   1  2  3  4  5
   Strongly disagree  Strongly agree
12. When I think of my future interior designs, place on Earth, I consider my designs to
    be naturally more important than older designs.
   1  2  3  4  5
   Strongly disagree  Strongly agree
13. I often feel like my interior designs will be only a small part of the built environment
    around me, and that they will be no more important than anyone else’s designs from the
    past or future.
   1  2  3  4  5
   Strongly disagree  Strongly agree
14. Even if I am designing an interior for an older or historic building, my future interior
    designs will be independent of the older or historic buildings.
   1  2  3  4  5
   Strongly disagree  Strongly agree
APPENDIX D
REFLECTIONS ON YOUR PRE-DESIGN CONCEPT

Student Code Number:

Please rank your views for the following questions and explain your answers. You will not be graded on this assignment. Feel free to use both sides of this page! Thanks

How pleased are you with your design concept?

1  2  3  4  5  6  7  8  9
Not at all pleased  Somewhat  Very pleased

Explain Why?

Reflecting on the 3 boards you submitted, what most influenced your concept?

Consider:
Benchmark research
Site visit and tour
Physical documentation (code analysis, LEED evaluation, character-defining features identification, etc.)
Building user observations and comments
Morphological analysis
Your own research (elaborate)
APPENDIX E  
STUDENT OPINION OF DESIGN DECISION INFLUENCES

Student Code Number:

Please rank your views on how much each activity influenced your design decisions. You will not be graded on this assignment. Feel free to leave comments on the back! Thanks

Your analysis of Frank Lloyd Wright’s original design concepts

<table>
<thead>
<tr>
<th>1</th>
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<tbody>
<tr>
<td>No influence</td>
<td>Somewhat</td>
<td>Very influential</td>
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Your or your classmates’ research on the Character Defining Features

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Your or your classmates’ research on building user perceptions and behavior

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Your or your classmates’ research on code compliance and ADA assessment

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Your or your classmates’ research on LEED evaluations and recommendations

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Your morphological analysis of the buildings

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Developing your design concept and branding approach

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The midpoint presentation at Florida Southern College

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</table>
No influence  |  Somewhat  |  Very influential
Review your answers to the questions above and select the three most influential activities

1 | 2 | 3

Briefly explain why these influenced your design most:
APPENDIX F
STUDENT ESSAY INSTRUCTIONS

Review your design decisions and processes throughout this project. What issues, ideas, or factors guided your design decision-making and influenced your final design? What ideas guided you and helped you make design decisions or generate new ideas? What questions do you have now? Write a 750-word essay explaining what factors or issues influenced or guided your design processes and decisions.
Student Code Number:

Please rank your views for the following questions. You will not be graded on this assignment.

Your Views_______________________________

How much did you enjoy this studio project?

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<tr>
<td>No enjoyment</td>
<td>Enjoyed</td>
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Why?

What is your overall level of interest in this specific project?

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<tbody>
<tr>
<td>Not interested</td>
<td>Very interested</td>
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Why?

What is your overall level of interest in historic buildings?

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<tr>
<td>Not interested</td>
<td>Very interested</td>
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</table>

Why?
Would you like to work with a historic building again?

1 2 3 4 5 6 7 8 9
No, never
Why?

Yes, very much so

Were you pleased with your design solution?

1 2 3 4 5 6 7 8 9
No
Why?

Yes, very much so

6) What were the strengths of your project?

7) What were the weaknesses of your project? What would you have liked to revisit?

8) What will you take away from this project? What is the main thing you have learned?
APPENDIX H
EVALUATOR’S QUESTIONNAIRE

Student Code Number:

Evaluator’s Name:

Please rank this student’s project on a scale of 1-9 based on the compatibility between the existing historic building and the student’s new designs for the building. For example, if a student kept a historical feature and/or continued it in their new design, they would receive a 10 in compatibility for that area. If a student completely removes a feature and makes no reference to in their designs, they would receive a 1 for compatibility. If a feature is not present in the historic building, please select Not Applicable or N/A.

Social Context_________________________________________________

Social context refers to the activities and people that have surrounded the building throughout its existence. Students can reference the social context of a building in many ways, including displaying historic photographs or newspaper clippings, the content of art, signage, or other indicators of the area’s history

1 How much does the student’s design reference the social context of the building?

   1   2   3   4   5   6   7   8   9   N/A
   No references Many references

Historical Context______________________________________________

Historical context refers to the architectural history of the building, such as the historical style (Gothic revival, Greek revival, International Modern) it was originally designed and built in. Students can work with the historical context of the building by keeping historic elements, including ornaments and colors, and referencing the historic aspects of the building in their new design.

2 How much is the student’s design compatible with the historical context of the building?

   1   2   3   4   5   6   7   8   9   N/A
   Not compatible Very compatible

Continued on next page
Architectural Context

Architectural context refers to the physical building, such as the roof, windows, entrance, or materials. Students can work compatibly with the architectural context of a building by continuing or referring to existing architectural features, or they can ignore, obscure or remove existing architectural features to create designs that are not compatible. Please answer the following questions on compatibility by comparing student’s photographs of the existing building and their new designs.

3 How compatible are the masses and volumes of the existing building with those in the new design?

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<tr>
<td>Not compatible</td>
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4 How compatible are the surface forms, such as roofs and walls, of the existing building with those in the new design?

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5 How compatible are the windows and views of the existing building with those in the new design?

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6 How compatible are the entrances and interior circulation of the existing building with those in the new design?

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7 How compatible is the proportion and scale of the existing building with the new design?

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<td>Not compatible</td>
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8 How compatible is the architectural ornamentation of the existing building with those in the new design?

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<tr>
<td>Not compatible</td>
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</table>
9 How compatible are the materials of the existing building with those in the new design?

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<tr>
<td>Not compatible</td>
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Holistic Compatibility

10 Examining the student’s design as a whole, what is your overall opinion of the level of compatibility between the existing building and the new design?

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<th>1</th>
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<td>Not compatible</td>
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APPENDIX I
EVALUATOR’S SUMMARY QUESTIONNAIRE

Evaluator’s Name:

1. Which design solutions were the strongest?

2. Why?

3. Which design solutions were the weakest?

4. Why?
APPENDIX J
RESULTS OF TWO-TAILED PEARSON’S R CORRELATION COEFFICIENT TESTS

Table J-1. Pearson’s r correlation coefficient’s for pre-design phase interest in historic preservation, RQ1

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.89</td>
<td>1.58</td>
<td>CS</td>
<td>0.04</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>0.08</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CA1</td>
<td>0</td>
<td>22</td>
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<td></td>
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<td>0.22</td>
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<td>CM</td>
<td>0.14</td>
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Explanation of Table J-1:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)
For CA1, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA1 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA2 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA3 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA4 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA5 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, $r > \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CA6 and pre-design phase interest in historic preservation. A Pearson’s $r$ level of significance for two-tailed test was used.
CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and pre-design phase interest in historic preservation. A Pearson’s r level of significance for two-tailed test was used.
Table J-2. Pearson’s r correlation coefficient’s for pre-design interest in the assigned studio project, RQ2

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.57</td>
<td>1.83</td>
<td>CS</td>
<td>0.08</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>0.06</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.02</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>0.17</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA3</td>
<td>0.22</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>0.17</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>0.05</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>0.19</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>0.24</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>0.16</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>0.15</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>0.16</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-2:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)
For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)
For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)
For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)
For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)
For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)
For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.
CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and pre-design interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

Table J-3. Pearson’s r correlation coefficient’s for belief of possessing incoming knowledge of the studio project’s related subject matter, RQ3

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.01</td>
<td>1.17</td>
<td>CS</td>
<td>-0.01</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>-0.14</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.29</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>-0.13</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA3</td>
<td>-0.11</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>-0.22</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>-0.14</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>0.02</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>0.06</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>-0.16</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-3:

CS (Social context compatibility)
For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.
project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and belief of possessing incoming knowledge of the studio project’s related subject matter. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)
For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CAM and belief of possessing incoming knowledge of the studio
project’s related subject matter. A Pearson’s r level of significance for two-tailed test
was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CH and belief of possessing incoming knowledge of the studio
project’s related subject matter. A Pearson’s r level of significance for two-tailed test
was used.

CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CM and belief of possessing incoming knowledge of the studio
project’s related subject matter. A Pearson’s r level of significance for two-tailed test
was used.

Table J-4. Pearson’s r correlation coefficient’s for CNS score, RQ4

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.6</td>
<td>0.60</td>
<td>CS</td>
<td>0</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>-0.13</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>0.28</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CA2</td>
<td>0.23</td>
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<td>CA3</td>
<td>0.26</td>
<td>22</td>
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<td></td>
<td></td>
<td>CA4</td>
<td>0.21</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>0.26</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>0.25</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>0.33</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>0.28</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>0.19</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>0.21</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>
Explanation of Table J-4:

CS (Social context compatibility)

For CS, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CS and CNS score. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAH and CNS score. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CA1 and CNS score. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA2 and CNS score. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA3 and CNS score. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)
For CA4, $r$ value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA4 and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, $r$ value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA5 and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, $r$ value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA6 and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, $r$ value $< \alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CA7 and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, $r$ value $< \alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CAM and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, $r$ value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CH and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.
CM (Mean compatibility)

For CM, $r$ value $> \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CM and CNS score. A Pearson’s $r$ level of significance for two-tailed test was used.

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.59</td>
<td>0.43</td>
<td>CS</td>
<td>-0.07</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>-0.09</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.24</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>-0.08</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA3</td>
<td>-0.1</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>-0.12</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>-0.25</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>-0.19</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>-0.18</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>-0.18</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>-0.17</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>-0.16</td>
<td>22</td>
</tr>
</tbody>
</table>

Explanation of Table J-5:

CS (Social context compatibility)

For CS, $r$ value $> \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CS and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, $r$ value $> \alpha = 0.20$, therefore we accept $Ho$; i.e. there is no significant correlation between CAH and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)
For CA1, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA1 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

For CA2, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA2 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

For CA3, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA3 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

For CA4, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA4 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

For CA5, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA5 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

For CA6, $r$ value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA6 and pre-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.
CA7 (Materials of architectural context compatibility)
For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and pre-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)
For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and pre-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)
For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and pre-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)
For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and pre-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.
### Table J-6. Pearson’s r correlation coefficient’s for post-design CHBS score, RQ6

<table>
<thead>
<tr>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>-0.27</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CAH</td>
<td>-0.21</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA1</td>
<td>-0.06</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA2</td>
<td>-0.08</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA3</td>
<td>-0.05</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA4</td>
<td>-0.15</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA5</td>
<td>-0.14</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA6</td>
<td>-0.22</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA7</td>
<td>-0.15</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CAM</td>
<td>-0.13</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CH</td>
<td>-0.17</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CM</td>
<td>-0.16</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-6:

CS (Social context compatibility)

For CS, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CS and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)
For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and post-design CHBS score A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and post-design CHBS score. A Pearson’s r level of significance for two-tailed test was used.
CAM (Mean compatibility of architectural context)

For CAM, $r$ value $> \alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CAM and post-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, $r$ value $> \alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CH and post-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, $r$ value $> \alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CM and post-design CHBS score. A Pearson’s $r$ level of significance for two-tailed test was used.

Table J-7. Pearson’s $r$ correlation coefficient’s for influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts, RQ8

<table>
<thead>
<tr>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>7.95</td>
<td>1.13</td>
<td></td>
</tr>
<tr>
<td>CS</td>
<td>0.22</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CAH</td>
<td>0.21</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA1</td>
<td>0.24</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA2</td>
<td>0.27</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA3</td>
<td>0.13</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA4</td>
<td>0.06</td>
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<tr>
<td>CA7</td>
<td>0.47</td>
<td>22</td>
<td>0.02</td>
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<tr>
<td>CAM</td>
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<td>22</td>
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<tr>
<td>CH</td>
<td>0.27</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CM</td>
<td>0.29</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-7:

CS (Social context compatibility)
For CS, r value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CS and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value $< \alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CA2 and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities- analysis of
Frank Lloyd Wright’s original design concepts. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value < α = 0.05, therefore we reject Ho; i.e. there is a significant positive correlation between CA6 and influence of pre-design phase studio activities-analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value < α = 0.02, therefore we reject Ho; i.e. there is a significant positive correlation between CA7 and influence of pre-design phase studio activities-analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)
For CAM, $r$ value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CAM and influence of pre-design phase studio activities-analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, $r$ value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CH and influence of pre-design phase studio activities-analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, $r$ value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CM and influence of pre-design phase studio activities-analysis of Frank Lloyd Wright’s original design concepts. A Pearson’s $r$ level of significance for two-tailed test was used.

Table J-8. Pearson’s $r$ correlation coefficient’s for influence of pre-design phase studio activities- character defining features research, RQ8

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>$r$</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
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<tbody>
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<td>6.91</td>
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<td>CAH</td>
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<td></td>
<td></td>
<td>CA1</td>
<td>-0.21</td>
<td>22</td>
<td>0</td>
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<td>CA4</td>
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<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>-0.23</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>-0.25</td>
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</tr>
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<td></td>
<td>CH</td>
<td>-0.28</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CM</td>
<td>-0.27</td>
<td>22</td>
<td>0</td>
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</tbody>
</table>
Explanation of Table J-8:

CS (Social context compatibility)

For CS, r value < α = -0.10, therefore we reject Ho; i.e. there is a significant negative correlation between CS and influence of pre-design phase studio activities-character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities-character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities-character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and influence of pre-design phase studio activities-character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)
For CA3, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities- character defining features research. A Pearson’s $r$ level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- character defining features research. A Pearson’s $r$ level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- character defining features research. A Pearson’s $r$ level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities- character defining features research. A Pearson’s $r$ level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- character defining features research. A Pearson’s $r$ level of significance for two-tailed test was used.
defining features research. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)
For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities - character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)
For CH, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CH and influence of pre-design phase studio activities - character defining features research. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)
For CM, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CM and influence of pre-design phase studio activities - character defining features research. A Pearson’s r level of significance for two-tailed test was used.
Table J-9. Pearson’s r correlation coefficient’s for influence of pre-design phase studio activities- building user perceptions and behavior research, RQ8

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
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<td>6.68</td>
<td>2.03</td>
<td>CS</td>
<td>-0.39</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>-0.3</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.28</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>-0.27</td>
<td>22</td>
<td>0</td>
</tr>
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<td>CA3</td>
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<td>0</td>
</tr>
<tr>
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<td>CA4</td>
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<td>0</td>
</tr>
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<td></td>
<td>CA5</td>
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<td>22</td>
<td>0</td>
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<td>CA6</td>
<td>-0.15</td>
<td>22</td>
<td>0</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>-0.29</td>
<td>22</td>
<td>0</td>
</tr>
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</table>

Explanation of Table J-9:

CS (Social context compatibility)

For CS, $r$ value $< \alpha = -0.10$, therefore we reject Ho; i.e. there is a significant negative correlation between CS and influence of pre-design phase studio activities- building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, $r$ value $> \alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities- building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, $r$ value $< \alpha = -0.20$, therefore we reject Ho; i.e. there is a significant negative correlation between CA1 and influence of pre-design phase studio activities-
building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CA2 and influence of pre-design phase studio activities-building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities-building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CA4 and influence of pre-design phase studio activities-building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities-building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)
For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities- building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities- building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CH and influence of pre-design phase studio activities-building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CM and influence of pre-design phase studio activities-
building user perceptions and behavior research. A Pearson’s r level of significance for two-tailed test was used.

Table J-10. Pearson’s r correlation coefficient’s for influence of pre-design phase studio activities- code compliance and ADA research, RQ8

<table>
<thead>
<tr>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CAH</td>
<td>-0.06</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA1</td>
<td>0.15</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA2</td>
<td>0.07</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA3</td>
<td>0.06</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA4</td>
<td>-0.04</td>
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</tr>
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<td>CA5</td>
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</tr>
<tr>
<td>CM</td>
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<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-10:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)
For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson's r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- code
compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)
For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and influence of pre-design phase studio activities- code compliance and ADA research. A Pearson’s r level of significance for two-tailed test was used.

Table J-11. Pearson’s r correlation coefficient’s for influence of pre-design phase studio activities- LEED research, RQ8

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5</td>
<td>2.1</td>
<td>CS</td>
<td>0.01</td>
<td>22</td>
<td>0</td>
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<tr>
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<td>0.16</td>
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<td>CA3</td>
<td>0.13</td>
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<td></td>
<td></td>
<td>CA4</td>
<td>0.06</td>
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<td>CA5</td>
<td>0.17</td>
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</tr>
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<td></td>
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<td>CAM</td>
<td>0.17</td>
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<tr>
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<td>CH</td>
<td>0.11</td>
<td>22</td>
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</tr>
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<td></td>
<td></td>
<td>CM</td>
<td>0.12</td>
<td>22</td>
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</tr>
</tbody>
</table>

Explanation of Table J-11:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)
For CA1, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA2 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, \( r < \alpha = 0.20 \), therefore we reject Ho; i.e. there is a significant positive correlation between CA6 and influence of pre-design phase studio activities- LEED research. A Pearson’s \( r \) level of significance for two-tailed test was used.
CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and influence of pre-design phase studio activities- LEED research. A Pearson’s r level of significance for two-tailed test was used.
Table J-12. Pearson’s r correlation coefficient’s for influence of pre-design phase studio activities-morphological analysis, RQ8

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
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<td>7.09</td>
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<td>0.08</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CAH</td>
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<td>22</td>
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<tr>
<td></td>
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<td>CA1</td>
<td>0.12</td>
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<td>0.29</td>
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<td>CA4</td>
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<td>CA5</td>
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<td></td>
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<td>CA6</td>
<td>0.2</td>
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<tr>
<td></td>
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<td>CA7</td>
<td>0.23</td>
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<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>0.23</td>
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<td></td>
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<td>CH</td>
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<tr>
<td></td>
<td></td>
<td>CM</td>
<td>0.23</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-12:

CS (Social context compatibility)

For CS, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CS and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CAH and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)
For CA2, r value < α = 0.10, therefore we reject Ho; i.e. there is a significant positive correlation between CA2 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value < α = 0.20, therefore we reject Ho; i.e. there is a significant positive correlation between CA3 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.
CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value < α = 0.20, therefore we reject Ho; i.e. there is a significant positive correlation between CH and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and influence of pre-design phase studio activities-morphological analysis. A Pearson’s r level of significance for two-tailed test was used.

Table J-13. Pearson’s r correlation coefficient’s for influence of pre-design phase studio activities- concept and branding development, RQ8

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
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<td>CS</td>
<td>-0.26</td>
<td>22</td>
<td>0</td>
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<td>22</td>
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<td></td>
<td></td>
<td>CA1</td>
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<td></td>
<td></td>
<td>CA3</td>
<td>-0.04</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>-0.14</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>-0.08</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>-0.04</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>-0.15</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>CH</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-13:

CS (Social context compatibility)
For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value < α = -0.20, therefore we reject Ho; i.e. there is a significant negative correlation between CAH and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA2 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA3 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.
CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- concept and branding development. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities- concept
and branding development. A Pearson’s $r$ level of significance for two-tailed test was used.

**CH (Holistic compatibility)**

For CH, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CH and influence of pre-design phase studio activities- concept and branding development. A Pearson’s $r$ level of significance for two-tailed test was used.

**CM (Mean compatibility)**

For CM, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CM and influence of pre-design phase studio activities- concept and branding development. A Pearson’s $r$ level of significance for two-tailed test was used.

**Table J-14. Pearson’s $r$ correlation coefficient’s for influence of pre-design phase studio activities- midpoint presentation, RQ8**

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>$r$</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
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<td>0.05</td>
<td>22</td>
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<td></td>
<td></td>
<td>CAH</td>
<td>0.08</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CA1</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>0.06</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CA3</td>
<td>0.12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>0.06</td>
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<td>CA5</td>
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<td>CA6</td>
<td>-0.06</td>
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</tr>
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<td></td>
<td></td>
<td>CAM</td>
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<td>0</td>
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<td></td>
<td></td>
<td>CH</td>
<td>-0.03</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CM</td>
<td>0.05</td>
<td>22</td>
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</tr>
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</table>

**Explanation of Table J-14:**

CS (Social context compatibility)
For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CS and influence of pre-design phase studio activities- midpoint
presentation. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CAH and influence of pre-design phase studio activities- code
compliance and ADA research. A Pearson’s r level of significance for two-tailed test was
used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CA1 and influence of pre-design phase studio activities- midpoint
presentation. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CA2 and influence of pre-design phase studio activities- midpoint
presentation. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant
correlation between CA3 and influence of pre-design phase studio activities- midpoint
presentation. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)
For CA4, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA4 and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA5 and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA7 and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAM and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CH and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.
CM (Mean compatibility)

For CM, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CM and influence of pre-design phase studio activities- midpoint presentation. A Pearson’s r level of significance for two-tailed test was used.

Table J-15. Pearson’s r correlation coefficient’s for total influence of pre-design phase studio activities, RQ9

<table>
<thead>
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<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
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<td>6.80</td>
<td>1.03</td>
<td>CS</td>
<td>-0.17</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>-0.12</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.03</td>
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<td>CA2</td>
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<td></td>
<td>CA5</td>
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<td></td>
<td>CAM</td>
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<td>CH</td>
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<td>CM</td>
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</tbody>
</table>

Explanation of Table J-15:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and total influence of pre-design phase studio activities. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and total influence of pre-design phase studio activities. A Pearson’s r level of significance for two-tailed test was used.
CA1 (Masses and volumes of architectural context compatibility)

For CA1, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA1 and total influence of pre-design phase studio activities. A Pearson’s $r$ level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA2 and total influence of pre-design phase studio activities. A Pearson’s $r$ level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA3 and total influence of pre-design phase studio activities. A Pearson’s $r$ level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA4 and total influence of pre-design phase studio activities. A Pearson’s $r$ level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA5 and total influence of pre-design phase studio activities. A Pearson’s $r$ level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)
For CA6, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA6 and total influence of pre-design phase studio activities. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA7 and total influence of pre-design phase studio activities. A Pearson’s \( r \) level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CAM and total influence of pre-design phase studio activities. A Pearson’s \( r \) level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CH and total influence of pre-design phase studio activities. A Pearson’s \( r \) level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CM and total influence of pre-design phase studio activities. A Pearson’s \( r \) level of significance for two-tailed test was used.
Table J-16. Pearson’s r correlation coefficient’s for final student interest in the assigned studio project, RQ12

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.70</td>
<td>1.61</td>
<td>CS</td>
<td>0.05</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAH</td>
<td>0.08</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA1</td>
<td>-0.04</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>0.07</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA3</td>
<td>0.14</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA4</td>
<td>0.1</td>
<td>22</td>
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<tr>
<td></td>
<td></td>
<td>CA5</td>
<td>0.1</td>
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<td></td>
<td></td>
<td>CA6</td>
<td>-0.21</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>0</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>0.02</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CH</td>
<td>0</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>0.04</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-16:

CS (Social context compatibility)

For CS, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CS and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CAH and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)
For CA2, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA2 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA3 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA4 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA5 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA6 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)

For CA7, r value > \( \alpha = 0.20 \), therefore we accept \( H_0 \); i.e. there is no significant correlation between CA7 and final student interest in the assigned studio project. A Pearson’s r level of significance for two-tailed test was used.
CAM (Mean compatibility of architectural context)

For CAM, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CAM and final student interest in the assigned studio project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CH and final student interest in the assigned studio project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, \( r > \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CM and final student interest in the assigned studio project. A Pearson’s \( r \) level of significance for two-tailed test was used.

### Table J-17. Pearson’s \( r \) correlation coefficient's for enjoyment of project, RQ13

<table>
<thead>
<tr>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>0.27</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CAH</td>
<td>0.19</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA1</td>
<td>0.16</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA2</td>
<td>0.36</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA3</td>
<td>0.34</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA4</td>
<td>0.36</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA5</td>
<td>0.2</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA6</td>
<td>0.02</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CA7</td>
<td>0.14</td>
<td>22</td>
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</tr>
<tr>
<td>CAM</td>
<td>0.24</td>
<td>22</td>
<td>0</td>
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<tr>
<td>CH</td>
<td>0.3</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>CM</td>
<td>0.28</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-17:

CS (Social context compatibility)
For CS, r value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CS and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAH and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)

For CA1, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CA1 and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value < $\alpha = 0.10$, therefore we reject Ho; i.e. there is a significant positive correlation between CA2 and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value < $\alpha = 0.10$, therefore we reject Ho; i.e. there is a significant positive correlation between CA3 and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value < $\alpha = 0.10$, therefore we reject Ho; i.e. there is a significant positive correlation between CA4 and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.
CA5 (Proportion and scale of architectural context compatibility)
For CA5, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA5 and enjoyment of project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)
For CA6, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA6 and enjoyment of project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CA7 (Materials of architectural context compatibility)
For CA7, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CA7 and enjoyment of project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)
For CAM, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CAM and enjoyment of project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CH (Holistic compatibility)
For CH, \( r \) value > \( \alpha = 0.20 \), therefore we accept Ho; i.e. there is no significant correlation between CH and enjoyment of project. A Pearson’s \( r \) level of significance for two-tailed test was used.

CM (Mean compatibility)
For CM, r value < $\alpha = 0.20$, therefore we reject Ho; i.e. there is a significant positive correlation between CM and enjoyment of project. A Pearson’s r level of significance for two-tailed test was used.

Table J-18. Pearson’s r correlation coefficient’s for being pleased with design solution, RQ14

<table>
<thead>
<tr>
<th>Mean</th>
<th>Standard deviation</th>
<th>Measure of compatibility</th>
<th>r</th>
<th>df</th>
<th>Level of significance for 2-tailed test</th>
</tr>
</thead>
<tbody>
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<td>6.57</td>
<td>1.78</td>
<td>CS</td>
<td>0.05</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CAH</td>
<td>-0.01</td>
<td>22</td>
<td>0</td>
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<td></td>
<td></td>
<td>CA1</td>
<td>0.23</td>
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<td>0</td>
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<tr>
<td></td>
<td></td>
<td>CA2</td>
<td>0.43</td>
<td>22</td>
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<td></td>
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<td>CA3</td>
<td>0.39</td>
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<td>CA4</td>
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<td>CA5</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>CA6</td>
<td>0.13</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CA7</td>
<td>0.17</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAM</td>
<td>0.29</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>0.23</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CM</td>
<td>0.25</td>
<td>22</td>
<td>0</td>
</tr>
</tbody>
</table>

Explanation of Table J-18:

CS (Social context compatibility)

For CS, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CS and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CAH (Architectural historical context compatibility)

For CAH, r value > $\alpha = 0.20$, therefore we accept Ho; i.e. there is no significant correlation between CAH and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA1 (Masses and volumes of architectural context compatibility)
For CA1, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA1 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA2 (Surface forms, such as roofs and walls, of architectural context compatibility)

For CA2, r value < α = 0.05, therefore we reject Ho; i.e. there is a significant positive correlation between CA2 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA3 (Windows and views of architectural context compatibility)

For CA3, r value < α = 0.10, therefore we reject Ho; i.e. there is a significant positive correlation between CA3 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA4 (Entrances and interior circulation of architectural context compatibility)

For CA4, r value < α = 0.20, therefore we reject Ho; i.e. there is a significant positive correlation between CA4 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA5 (Proportion and scale of architectural context compatibility)

For CA5, r value < α = 0.20, therefore we reject Ho; i.e. there is a significant positive correlation between CA5 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.

CA6 (Architectural ornamentation of architectural context compatibility)

For CA6, r value > α = 0.20, therefore we accept Ho; i.e. there is no significant correlation between CA6 and being pleased with design solution. A Pearson’s r level of significance for two-tailed test was used.
CA7 (Materials of architectural context compatibility)

For CA7, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CA7 and being pleased with design solution. A Pearson’s $r$ level of significance for two-tailed test was used.

CAM (Mean compatibility of architectural context)

For CAM, $r$ value < $\alpha = 0.20$, therefore we reject $H_0$; i.e. there is a significant positive correlation between CAM and being pleased with design solution. A Pearson’s $r$ level of significance for two-tailed test was used.

CH (Holistic compatibility)

For CH, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CH and being pleased with design solution. A Pearson’s $r$ level of significance for two-tailed test was used.

CM (Mean compatibility)

For CM, $r$ value > $\alpha = 0.20$, therefore we accept $H_0$; i.e. there is no significant correlation between CM and being pleased with design solution. A Pearson’s $r$ level of significance for two-tailed test was used.
APPENDIX K
INFORMED CONSENT FOR STUDENTS

Protocol Title: REFLECTING THE BEST OF THE PAST AND THE PRESENT: EXPLORING STUDENT LEARNING IN A DESIGN STUDIO FOCUSED ON DEVELOPING INTERIOR DESIGN COMPATIBILITY ON A HISTORIC CAMPUS

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:
The purpose of this study is to evaluate the effectiveness of interior design classroom practices.

What you will be asked to do in the study:
You will complete a studio project for a historic building. Before beginning design work, you will complete three questionnaires (see attachments). After you have completed your project, you will write a short essay explaining your learning processes throughout the studio project and answer two questionnaires about which aspects of the project helped you learn and which did not. Your instructor will check that you completed your essay and questionnaire, but will not use the information to determine your grade. Other faculty members in your department and allied design professionals will examine and evaluate your class’s completed studio projects as a group and evaluate them. Your instructor will not use their evaluations to determine your grade.

If you chose not to participate, you will still complete the same work as your classmates; however, it will not be submitted to the researcher. You will complete your work when your classmates do, and they will not know that you are not participating in this research. Participating or nor participating will not affect your grade or classroom experience.

You do not have to answer any question you do not want to answer.

Time required: About 3 hours to write your essay and 2 hours to complete the questionnaires.

Risks and Benefits: You may help determine the effectiveness of interior design teaching practices. We do not anticipate that you will benefit directly by participating in this experiment.

Compensation: None

Confidentiality: Your identity will be kept confidential to the extent provided by law. Your information will be assigned a code number by your instructor. Only your instructor will know your number. No list linking your name and number will be maintained. Your name will not be used in any report.

Voluntary participation: Your participation in this study is completely voluntary.

There is no penalty for not participating.

Right to withdraw from the study: You have the right to withdraw from the study at anytime without consequence.

IRB02 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; phone (352)392-0433.

Agreement: I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.
Protocol Title: REFLECTING THE BEST OF THE PAST AND THE PRESENT: EXPLORING STUDENT LEARNING IN A DESIGN STUDIO FOCUSED ON DEVELOPING INTERIOR DESIGN COMPATIBILITY ON A HISTORIC CAMPUS

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:
The purpose of this study is to evaluate the effectiveness of interior design classroom practices.

What you will be asked to do in the study:
You will be asked to examine an interior design studio class's completed interior design projects and complete questionnaires about your opinion of the projects. Use your impression of the average quality of the work to complete your assessment. You do not have to answer any question you do not want to answer.

Time required:
15 minutes per project evaluated. If you evaluate all projects, it will take up to 7.5 hours to complete your questionnaires, which can be spread out over multiple sessions at your convenience.

Risks and Benefits:
You may help determine the effectiveness of interior design teaching practices. We do not anticipate that you will benefit directly by participating in this experiment.

Compensation:
None

Confidentiality:
Your identity will be kept confidential to the extent provided by law. Your name will not be used in any report.

Voluntary participation:
Your participation in this study is completely voluntary. There is no penalty for not participating.

Right to withdraw from the study:
You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study:
Redacted

Whom to contact about your rights as a research participant in the study:
IRB02 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; phone 392-0433.

Agreement:
I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.
APPENDIX M
INFORMED CONSENT FOR INSTRUCTORS

Protocol Title: REFLECTING THE BEST OF THE PAST AND THE PRESENT: EXPLORING STUDENT LEARNING IN A DESIGN STUDIO FOCUSED ON DEVELOPING INTERIOR DESIGN COMPATIBILITY ON A HISTORIC CAMPUS

Please read this consent document carefully before you decide to participate in this study.

Purpose of the research study:
The purpose of this study is to evaluate the effectiveness of interior design classroom practices.

What you will be asked to do in the study:
Your students will complete a studio project for a historic building. At the end of the term, you will arrange for at least five reviewers, composed of other faculty members from your department and/or allied design professionals to view the students’ work and complete a questionnaire. You will also have your students’ complete questionnaires and an essay on their learning processes. You will not use students' essays, questionnaires, or feedback from allied designers or other faculty to determine your students' grades. You will submit all research study material to the researcher at the end of the spring 2011 Term. Bimonthly, the researcher will telephone you to discuss your opinion of how your class is progressing.

You do not have to answer any question you do not want to answer.

Time required:
Approximately one class session at the beginning of your class project to administer surveys (2 hours maximum) and one class session at the end of the semester to administer surveys and collect student’s essays (2 hours maximum). Bimonthly telephone calls, 2 hours a month. The duration of the class project will be determined by you.

Risks and Benefits:
You may help determine the effectiveness of interior design teaching practices. We do not anticipate that you will benefit directly by participating in this experiment.

Compensation: None
Confidentiality: Your identity will be kept confidential to the extent provided by law. Your name will not be used in any report.
Voluntary participation: Your participation in this study is completely voluntary.

There is no penalty for not participating.
Right to withdraw from the study: You have the right to withdraw from the study at anytime without consequence.

Whom to contact if you have questions about the study: Redacted
Whom to contact about your rights as a research participant in the study: IRB02 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; phone 392-0433.

Agreement:
I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description.
APPENDIX N
IMAGES AND SELECTED PROJECTS

Figure N-1. Hallway in Anderson Hall, University of Florida. Hallway shows how a significant interior space and the original wood framing were preserved and integrated into a design with new light fixtures. (Photo by graduate student Jessica Goldsmith, 2011)

Figure N-2. Entrance in Anderson Hall. Historic elements are preserved, updated with new safety and accessibility features, and integrated into the current design. (Photo by graduate student Jessica Goldsmith, 2011)
Figure N-3. Original pink marble staircase in the HUB, University of Florida campus. (Photo by graduate student Jessica Goldsmith, 2011)

Figure N-4. New doorway with brushed metal framing in the HUB, University of Florida campus. Railings inspire framing for doors and windows surrounding the original pink marble staircase, shown in Figure N-3. (Photo by graduate student Jessica Goldsmith, 2011)
Figure N-5. Student computer service area in the HUB, University of Florida campus. A half-circle applied ceiling pattern and brushed metal tubing refer to historic architectural features, while being products of their own time. (Photo by graduate student Jessica Goldsmith, 2011)

Figure N-6. Student service area in the HUB, University of Florida campus. A half-circle cutout ceiling pattern, radiating carpet pattern and brushed metal tubing reference historic architectural features, yet are products of their own time. (Photo by graduate student Jessica Goldsmith, 2011)
<table>
<thead>
<tr>
<th>Mean compatibility</th>
<th>Scale</th>
<th>Standard deviation</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td>6.12</td>
<td>1-9</td>
<td>0.87</td>
<td>4.58-8</td>
</tr>
</tbody>
</table>
Figure N-7. First example of a relatively more successful student project. Mean compatibility= 7.6. (Student work shown with permission of student and department head, 2011)
Figure N-8. Details from Figure N-7. (Student work shown with permission of student and department head, 2011)
Figure N-9. Second example of a relatively more successful student project. Mean compatibility= 8.0. (Student work shown with permission of student and department head, 2011)
Figure N-10. Details from Figure N-9. (Student work shown with permission of student and department head, 2011)
Figure N-11. Third example of a relatively more successful student project. Mean compatibility= 6.62. (Student work shown with permission of student and department head, 2011)
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BIOGRAPHICAL SKETCH

Jessica Goldsmith entered the University of Florida in 2001. During her undergraduate interior design studies, she began the four plus one program to continue her studies. Jessica graduated with high honors, receiving a Bachelor of Design, Interiors in 2006. While completing her master's degree on function and symbolism of Collegiate Gothic ornamentation, she conducted original historical archives research and participated in recovery efforts in Bay St. Louis after Hurricane Katrina. She received her Ph.D. from the University of Florida in the spring of 2012. She is currently pursuing an academic career in interior design.