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# A DESIGN CASE FOR UTILIZING THEORIES AS A HEURISTIC THINKING DEVICE TO CREATE EMPATHY IN [INTERIOR] DESIGN STUDIOS

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This design case introduces a design and development process of theories from environmental psychology, humanities, and social sciences as heuristic thinking devices to measure human-centered design solutions. The pedagogical review of the traditional studio design process revealed obstacles as students translated their research and program to the development of the design. They created the latter without applying their theoretical understanding of research conducted on the human-environment relationship. Given this challenge, the authors evolved a revised design method utilizing theories to afford an empathetic design response. Students in two interior design studios adopted this approach to develop hypotheses for the design problem, and later the theories informed guidelines for cultivating a more empathetic design response. Project analysis by authors, and reflection statements from the students, capture the value of theory as thinking devices to assist directly in their work by improving their position and power, prompting a more imaginative and generative ideation process. The role of this design case is to acknowledge the role of theory as a heuristic device in order to generate, develop, and support the advancement of interior design as a discipline through interaction, mediation, and discourse.

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## INTRODUCTION

*Problem Identification:* The interior design studio is a creative environment where students are presented with a design situation and then taught skills to address these challenges creatively and empathetically. However, design students often become mired in the details of the site and program, shifting all focus to functional solutions struggling to create a meaningful and experiential spatial narrative for the users of the space. The authors, who also teach the studios, looked at student work and found that the anticipated goals were not being met. An analysis of the design methodology and process utilized to solve the design projects in the studio and students' work indicates a schism between the pre-design phase (focused on research, analysis, and synthesis of information) and the design phase (focused on conceptual, schematic, and design development along with preparing construction documents). Students habitually developed the latter without applying the lessons learned during the pre-design phase.

*Evolution of Design Case:* Recognizing the complexity, the authors reviewed the existing pedagogical approach to the design studios they taught and developed a new framework that would allow students to critically think about the design problem and inculcates a new transformative and empathetic attitude toward the design solution. Heuristic reasoning refers to a problem-solving process in which any procedure, prior episode, or other device contributes to a reduction in the search for a satisfactory solution and focuses on testing more imaginative outcomes (Rowe, 1998). The theory may be a statement that suggests how facts lead to

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something concrete or a conceptual construct that connects understanding to practice (Richards, 1994). Theories are not intended to be prescriptive but projected to inform the design thought processes, activate questions, inform hypotheses, and assist in the development of thinking tools (Tilley, 2006). Engagement with the theory is therefore crucial, as it allows designers to reflect, articulate, and engage in discourse within their own and other disciplines with intellectual rigor. Susan Close (2007) reveals that there is a logical connection between theory and practice in interior design that involves content, context, and narrative. Pertinent issues such as space, place, globalization, gender identity, branding, migration, performativity, and privacy, significant areas of theoretical study are all transferable to the more revisionist study of interior design being constructed in the twenty-first century (Chalmers & Close, 2007). The theories allow probing to have a better understanding of the human-environmental relationship. In an absence of interaction with user groups, especially when most of the projects introduced in the interior design studio are fictional, can theories be used as heuristic tools to help students think more empathetically about space and the relationships of people within the spaces?

This design case reveals how theories from environmental psychology, humanities, and social sciences are used as heuristic reasoning tools, devices, and episodes to be a thread into the linear design studio operating system to generate an empathetic and meaningful spatial solution. This design case is not limited to Interior Design; it can be applied to other design disciplines to redesign a traditional pedagogical framework, especially if the current one is not revealing that students are designing with empathy over the course of the comprehensive design process.

## THE UNFORSEEN OBSTACLES WITH THE EXISTING DESIGN FRAMEWORK

Connell, T.J. (2010) defines design thinking as a process of weighing and refining the creative, practical, strategic, tactical, and pragmatic goals and objectives presented by a problem (Guerin & Martin, 2010). Design thinking is a mindset and creative confidence set forth that affords a method to act when faced with a challenge to design a more desirable future. In design education and studio culture, this way of thinking, acting, and innovating is critically required. The design process becomes a platform that allows design thinking to launch, generate and develop ideas. In a typical interior design studio, the design process is guided by a structured methodological approach. This methodological approach involves two phases for interior design projects: 1) the pre-design phase focuses on research, analysis, synthesis of information, and programming 2) the design phase focuses on conceptual, schematic, design development, and preparation of the construction documents. These two phases are illustrated in Figure 1 as nested within the linear steps.

The pre-design phase is the critical phase, which begins by identifying the design problem and gathering information about the site context, codes and regulations, human factors, spatial needs, diversity, and design precedents (Nussbaumer, 2009). The information is synthesized into a program document that is intended to improve the design outcome after thorough analysis (Pena & Parshall, 2001). Following that, the design process begins with the generation of a concept and the beginning of schematic design. Solutions are produced in this phase using conceptual sketches such as bubble and block diagrams. These serve as preliminary ideas, while the final drawings, details, renderings, and sections are a response to these ideas in the design development phase. The contract documentation phase, which includes construction drawings and specification drafting, follows (Nussbaumer, 2009).

Professional designers and students in design studios follow this design process, and there is typically a broad approach to this process that a novice student designer may not completely realize. This broad approach is referred to as the top-down hierarchical decomposition method by Rowe (1998). In the top-down approach, the attention is directed downwards to a broader subdivision of the initial problem and gradually moves into numerous detailed subproblems. The approach most students adopt while in design studios are to decompose the overall schema as given in the design program, derive concepts from this schema, develop overall schematics for the design, and then develop prototypes for individual spaces arriving at a formal and geometric articulation of the interior space (Swaranjali, Patel & Espersen-Peters, 2020). A study conducted by Angne (2012) observed that by following this linear methodological process, the students often become enmeshed in the details of the site and program, providing functional solutions to a 'problem', struggling to create a meaningful, empathetic, and experiential spatial narrative. In light of these challenges, it is necessary to discover broad and iterative modes of thinking, particularly when teaching design students to place less emphasis on thinking tools and tactics that lead to stereotyped planning prepositions.

The linear methodological process needed feedback loops, a cyclic framework for the design studio to open new perspectives for the design solutions through iterations.

## DESIGN CASE: RESOLVING CHALLENGES THROUGH NEW POSSIBILITIES [THE PROCESS]

### STEP 1: HEURISTIC REASONING AND HEURISTIC DEVICES TO AFFORD EMPATHY

A heuristic reasoning is any principle, procedure, or device that contributes to the reduction in the search for a satisfactory solution (Simon & Newell, 1971).

Heuristic reasoning is less potentially contemplative and more immediately associated with an action (Rowe, 1998). He further explains that this could be comparable or has a resemblance to aspects of Merleau-Ponty's concept of situations. Merleou-Ponty and Smith (2018) uses the situation to mean "involvement in circumstances" or "active concern with sets of natural, cultural, or human problems." Applying this to the design process may be seen as sequence of episodes or situations that are, in turn, coincidental with periods of heuristic reasoning through which problems are defined and solutions sought. During each episode, a particular heuristic device or set of devices can be in operation and control the reorganization of a problem space. These devices may be perceived as constraints in problem solving, but in the design process they can have framing and self-referential qualities that allow a more comprehensive judgment about the scope and thrust of the problem-solving situation to be suspended for a moment, permitting problem-solving activity to proceed.

Thus, educators can see students productively moving the problem into a new light, and for the reasoning process to have the effect of providing valuable additional information, and not just provide functional solutions to the new studio project introduced. The five classes, or categories, of heuristics can be identified as the use of: 1) anthropometric analogies, 2) literal analogies, 3) environmental relations, 4) typologies; and 5) formal languages, Rowe (1982). These classes are based on a speculative protocol analysis of architectural students' work. Each class is by no means exclusive of the characteristics of others, nor inclusive of the range of possible heuristics, rather, the classification is one of practical convenience for grouping.

The interior design discipline is in a unique position to make contributions to improve the human condition in interior environments. Interior design involves the creation of environments that support and sustain human beings to live to the highest of their capabilities (Guerin & Martin, 2010). The universally accepted definition of Interior Design in North America as put forth by the Council of Interior Design Qualification (CIDQ) states that a qualified Interior Designer has a moral and ethical responsibility to protect consumers and occupants through the design of code-compliant, accessible, and inclusive interior environments that address well-being, while considering the complex physical, mental, and emotional needs of people (CIDQ definition, 2021). While considering Rowe's (1982) five classes in relation to interior design problems, issues, and situations; questions arise if these devices would assist in understanding human behavior and create spaces that are humancentric and empathetic to human behavior.

Thus, the templates of classification from Rowe (1982) need to make room to imagine human-centered interior places. As observed, many interior design students follow the customary design process and space planning techniques that result in typical layouts as shown in Figure 1. In order to move away from adhering to typically prescribed methodology and open to empathetic engagement, the design students need a more authentic engagement with the users. Pallasmaa (2015) shares this phenomenological approach to separate the formal imagination, emphasizing formal and geometrical configurations, and the empathetic imagination,

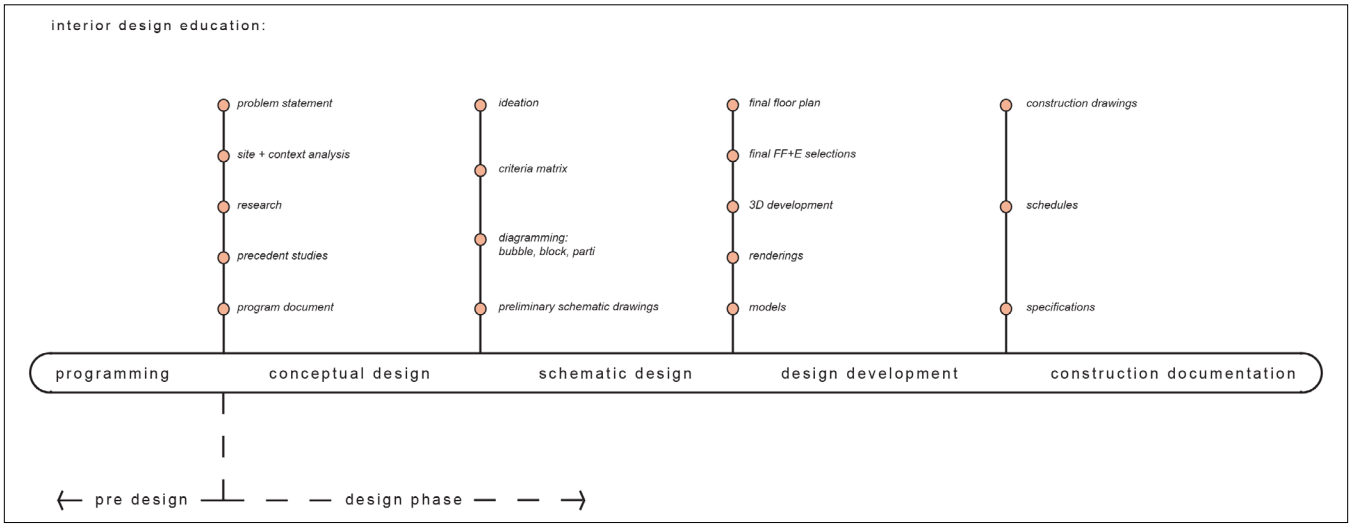


**FIGURE 1.** Interior Design Process in a Typical Studio.

which simulates the actual sensory, emotive, and mental encounters with the projected entity. Thus, this foresight affords empathy.

Empathy is defined as the ability to identify, understand, and feel other individuals' thoughts, feelings, and circumstances, and respond consequently to them (Gerdes et al., 2011; Howe 2013). Empathetically designed spaces could improve and enrich people's physical, emotional, and social interactions, hence adding value to the design responses (Tellez Bohorquez, 2017). This enables designers to understand other people's realities and perspectives and develop solutions informed and inspired by an empathetic response (Sanders & Dandavate 1999; Sanders, 2002; Brown, 2009; Kouprie & Visser, 2009; IDEO, 2010; Brown & Katz, 2011; IDEO, 2011). Empathy should be the core of design thinking and the essence of the design process. Empathy affords an understanding of whom you are designing for and all ideas and subsequent work stem from knowing this end-user (Zingoni, 2019). Empathetic design is characterized by proposing a balance between rationality and emotion (Postma et al., 2012), between the affective involvement of empathizing with others' experience and the cognitive process of analyzing it (Kouprie & Visser, 2009).

The body of knowledge focusing on empathetic design to understand and therefore improve user experience is extensive. Several researchers have focused on integrating empathy into the design process. Kouprie and Visser (2009) propose a four-phase model to practice empathetic design within the design process. Their model is based on the current literature in psychology, and it requires interaction with the user. Conversely, there is a gap in the literature for empathetic design when there is no direct contact or observation of the user.

The D-school at Stanford proposed two models involving empathetic design. The first model comprises six sequential stages including understand, observe, point of view, ideate, prototype, and test; and it considers various feedback loops within the process (Brown, 2009). This was closely related to the standard design process mentioned in Figure 1. The second model identified the modes designers are in including empathize, define, ideate, prototype, and test (IDEO, 2010). The results reveal the second model which enveloped designers empathetically gathered richer results because of the use of psychographics. Psychographics is defined as the study and classification of people according to their attitudes, aspirations, and other psychological criteria (Dictionary, 2020).

In the academic interior design studio setting, the students gather demographic data but often find it difficult to understand the attitudes, values, aspirations, emotional and psychological needs of their users due to an absence of interaction with them. The authors question if the five categories proposed by Rowe are the right tools for the interior design studio's pedagogical goals. How can these devices help the students understand human-environmental relationships? Further questioning what heuristic device can open and maintain a human-centered approach in the design process?

## STEP 2: THEORIES AS A DEVICE FOR HEURISTIC THINKING

As heuristic models are developed, the authors utilized theories from environmental psychology, social sciences, and humanities as heuristic devices in the design process to provide new perspectives on interior design issues. By creating spaces for discussion and debates about alternative ways of being and inspiring imaginations to flow freely. Design speculations can act as a catalyst for collectively redefining our relationship to reality (Dunne & Raby, 2013).

In layman's terms, the theory may be a statement offering suggestions as to how facts relate to meaningful or conceptual framework to link knowledge with practice (Richards, 1994). Furthermore, a body of theory represents an internally consistent system of knowledge that informs a discipline and/or profession (Birdsong & Lawlor, 2001). According to Hasell and Peatross, "the very complexity of interior environments argues for theory and methods that can explain interconnections between people and space" (1991, p. 49). Loustau (1988) clarifies the need for fitting theory into practice, particularly in the development of guidelines and organizing principles. In presenting the relevance of four existing human-environment relations theories (gestalt, semiotic, phenomenological, rational), the author states that "one theoretical approach may be more appropriate in a situation than another" (Loustau, 1988, p. 7). The common view shared by ecological (Brunswick, 1943), behavior setting (Barker, 1968), and spiritual (Stokols, 2000) theories of environmental psychology has been that the combination of person, setting, and cultural script forms a dynamic and interactive phenomenon that synthesizes the various possibilities of human participation and response (behavioral, perceptual, cognitive, affective) into a comprehensive whole.

There are many recognized theories or interrelated concepts that focus on spatial behavior. Among these Barker, Wright, and Gump's work on behavior setting theory in the context of ecological psychology (Barker,1968), Hall's (1992) theory of proxemics, Lynch's (1960) five components that structure city form, Newman's (1972) theory of defensive space. Kaplan's early work (Kaplan, 1988) on the cognitive map as a representational system (allowing humans to recognize, predict, evaluate, and act) might fit in here as well. Underlying a number of their spatial theories are a variety of spatial and place-related concepts (territoriality, personal space, personal distance, proxemics, privacy, crowing, place arrangement). A number of these concepts and their interrelationships

**FIGURE 2.** Theories Utilized in Design and Human Behavior Courses.

were laid out in Altman's 1981 book, The Environment and Social Behavior: Privacy, Personal Space, Territory, Crowding.

Engagement with theory is therefore crucial, as it allows designers to reflect, articulate and engage in discourse within their own and other disciplines with intellectual rigor. It is essential for designers to recognize the theory that they already have, although they may not recognize it in terms of concepts of form, perception, and creativity, can be an excellent launching point for the project. An understanding of these concept-based methodologies, along with critical thinking about the creative design process, is one part of the knowledgeable designer and informative educator (Angne & Patel, 2020). In interior design, there is a logical connection between theory and practice that includes content, context, and narrative Close (2007).

## STEP 3: EMBEDDING THEORIES AS HEURISTIC DEVICE INTO THE PROCESs

Council of Interior Design Accreditation (CIDA), establishes and periodically updates standards for interior design education. One of their 2020 standards emphasize all CIDA accredited programs must make sure that the students understand theories related to the impact of the built environment on human experience, behavior, and performance.

The interior design programs either offer courses or a unit in a course emphasizing theories on human-environmental relationships. The authors teach at different CIDA accredited programs and have developed and taught courses of Design and Human Behavior earlier in the curriculum. Figure 2 reflects on theories taught in those courses along with the application of these theories in various interior design typologies. The theories in yellow are preceding the COVID 19 pandemic, and those in white Alfaro and Patel (2020) identified as used during the COVID-19 pandemic.

The authors gathered work from third- and fourth-year interior design studios that they had taught following the introduction to design and human behavior courses. After an internal evaluation, careful review of the design project documentation and the outcomes, the authors realized that few students included theories as a tool to understand behavior and the relationship between people and their environments. Students that incorporated theories in their project documentation were limited to the pre-design phase and didn't implement it in the design phase. Theories are meant to inform thought processes and structure, to prompt questions, to inform ideas, and to aid in the creation of thinking tools rather than to be prescriptive (Tilley, 2006). However, the authors felt that this acquired knowledge was not applied to the interior design studio later. There was a schism

in what was learned and reflection on learned content within the context of the studio. The authors realized that they have encouraged, but not made a deliberate attempt to integrate the theories they have taught into the design process hence the students follow a typical design process, which they are used to ignoring the rich human behavior frameworks they have learned. This called for a revision to the traditional design framework to add the theories they have taught as tools to reflect on the relationship between behavior and environment and how to optimize it to provide an empathetic design solution. One challenge or risk with embedding the theories into the design process was how to train the students to this new way of thinking. The students have been exposed to a linear way of thinking- collecting the data and then dive into design. The authors modified the linear design process framework and introduced it at the start of the project so that students can grasp the new cyclic approach to design thinking.

In the book, *The Reflective Practitioner*, Schon (1983, 1987) suggests two levels of reflection: (1) reflection-on-action and (2) reflection-in-action. Reflection-on-action is the reflective process that is undertaken after the event, problem, or situation that initiated the process. He suggests reflection-in-action is a concept that allows for continual interpretation, investigation, and reflective conversation with oneself about the problem while employing the information gained to inform and guide new actions. It is not top-down as Rowe (1998) envisioned, but an active reflection to define the problem and then constant reflection within the framework established to solve the problem.

Theories represented in Figure 2 are used as one of the classes of heuristic reasoning devices and embedded in the interior design process utilized in the design studios. Figure 3 below depicts the integration of theory in the linear design process. This newly proposed cyclic approach/framework to the design studio aspired to open students to new prospects for the design solutions through a series of iterations and feedback loops.

## DESIGN IN ACTION: EXAMPLES OF STUDENT PROJECTS

Two interior design studios explored this new design thinking framework of embedding heuristic reasoning tools in the studio design process. The studios ran concurrently at two accredited Interior Design Programs where the authors taught. The theories from environmental psychology, social sciences, urban design, and humanities were introduced and explored by the students in the pre-design phase to frame the project. As the authors (instructors themselves) set out to reimagine an empathetic design studio, the students were intrigued. They had experienced a typical studio and understood the typical linear design process, but to embark on a heuristic theory voyage was appealing. The students constantly reflected-in-action as they were working on the design phase on the selected theory in the pre-design phase. These theories allowed for continual interpretation, investigation, and reflection on people's behavioral responses to their environment, and assisted students to speculate how people will use their spaces. Using theory as a heuristic device facilitated a conversation with oneself about the problem while employing the information gained to inform and guide them through their design process.

The authors collected projects from third year and fourth-year interior design studios which were taken at the two Interior Design Programs after the introduction to design and human behavior course offerings. The third-year student project was focused on workplace interiors at both programs and the fourth-year project at one program focused on healthcare typology while the other fourth year program was a self-directed thesis project varying between 10,000 sq. ft to 15,000 sq. ft. In most of these projects, the students had an opportunity to visit the site to understand the building and context but didn't have an opportunity to interact with their end-users, hence the role of theories and this framework was important to create a spatial experience sensitive to its users' needs. Both programs used theory as a development construct — the students demonstrate the ability to succinctly and logically develop a design utilizing theory that drove subsequent design decisions for the development of the project.

Utilizing design theory was also one of the grading criteria. The authors collected reflection statements from the students to learn how this new studio pedagogy facilitated their thinking process. The evaluation of over 200 projects indicated that 80% of them utilized theory as a developmental construct, however, some were more successful in developing design logics from the theory and manifesting them into space.

The analysis and synthesis of the four studio projects (two from the third year and two from the fourth year) showcase how students embraced these theories to build hypotheses for the design issue. These theories later informed guidelines to cultivate a more human-centered design response. Reflection statements from the students capture the value of theory to assist directly in their work by improving their position and power on the design projects. They acknowledge the role of theory is to cultivate, develop, and support the advancement of their project as a discipline through reflection, iteration, and generation. Followed by the student reflection, the instructors' (authors') analysis was presented on how the theory framed the project and then how it was continuously used as a thinking tool to speculate an empathetic design response.

Going beyond studio projects as case study, just observing the behavior of the students in the design studio, this design

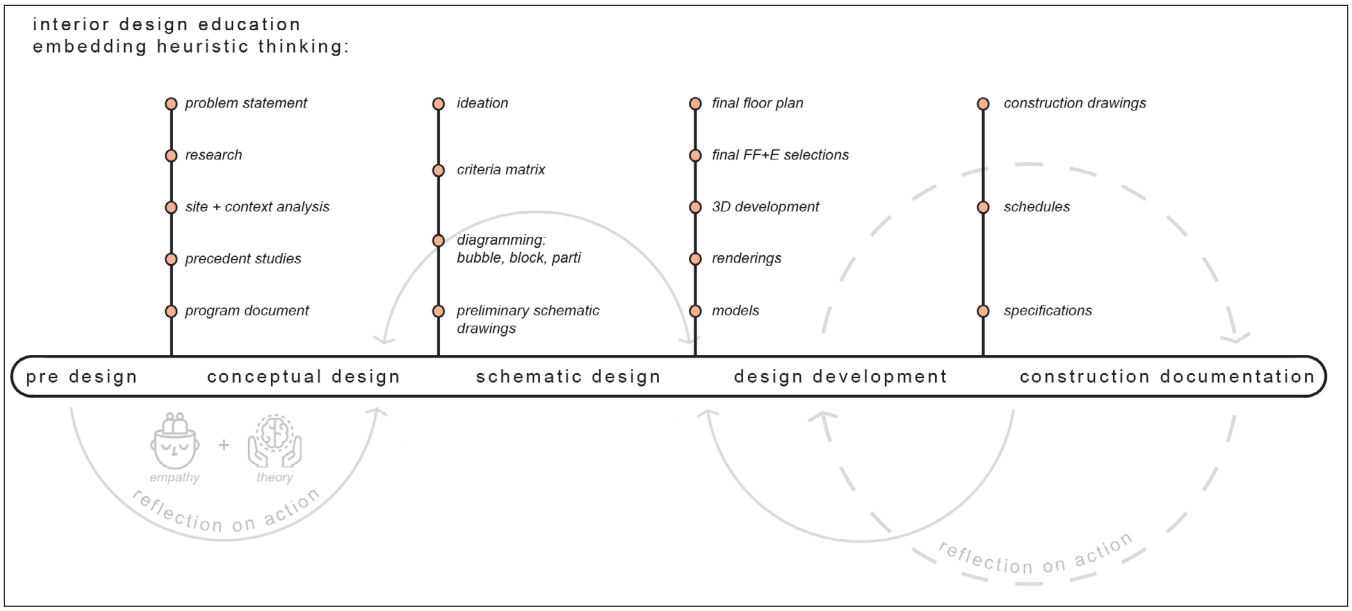


**FIGURE 3.** New Framework for Studio.

case, offered ways to allow the researchers/authors control over the participant.

They introduced an independent variable, design theories, and measured the behavior based on their design response and reflections. This allowed a cause and effect to be more readily established. The following reflections highlight how students successfully utilized theory as a device to think differently about the project parameters. The following studio project outcomes highlight how students successfully utilized theory as a device to think differently about the project parameters. The examples shared serve to explore theories as heuristic reasoning devices to encourage a more creative and generative ideation process by analyzing and documenting interior design studio projects as case studies. The authors selected two projects from the fourth year and two from the third year. The fourth-year projects focused on self-directed thesis and health care typologies, and the third-year project focused on workplace typology. These four projects were deemed the best in terms of selecting the appropriate theory, utilizing it as a tool to understand the design challenge, and effectively incorporating it into a design solution, according to the authors. Further, the students' reflection statements provided an overview of how they used theories as a thinking tool to develop empathy with their users and create a meaningful experience.

### Healthcare Project Utilizing Kevin Lynch's: The Images of the City:

Lynch (1960) introduced the theory of imageability which was initially intended for urban design and has since found relevance in other areas of design.

Lynch's theory explains how identifiable settings that provide a vivid and graspable image enable people to move about them with ease. According to Lynch (1960), the integration of elements that promote legibility such as paths, edges, districts, nodes, and landmarks leads to emotional satisfaction, provides a framework for communication and brings new depth to everyday experiences. Although people are flexible and can adapt to many circumstances, there are benefits to having such an ordered environment (Glass, 2018).

The students were challenged to design an in-patient mother-baby facility addressing programmatic requirements such as nurse's stations, low- and high-risk, pre and postpartum rooms, lobby, waiting lounges, doctor offices, and had to consider the patient, family, and caregiver flow into the space. Considering the high level of anxiety patients and families encounter in these environments, Figures 4 and 5 feature the way a student utilized Lynch's theory to organize the space and to make it legible and perceptible to the users. Defined circulation paths with discernible edges created boundaries between different areas or districts. The change in flooring markings within the circulation distinguished the nodes (lounge spaces) and pathways. Change in materiality massing defined the reception spaces as landmarks that became orienting places to other destinations. Understanding and leveraging what constitutes a common mental picture, like distinct landmarks as a directing factor, clear pathways leading to destinations, and interception of enriching nodes all aid in communication with a complex environment like this (Glass, 2018).

> *Student Reflection: "As I was handling such a large-scale project for the first time, this theory helped me with the organization of spaces. Breaking down the spaces into five elements and then playing with hierarchy within the*

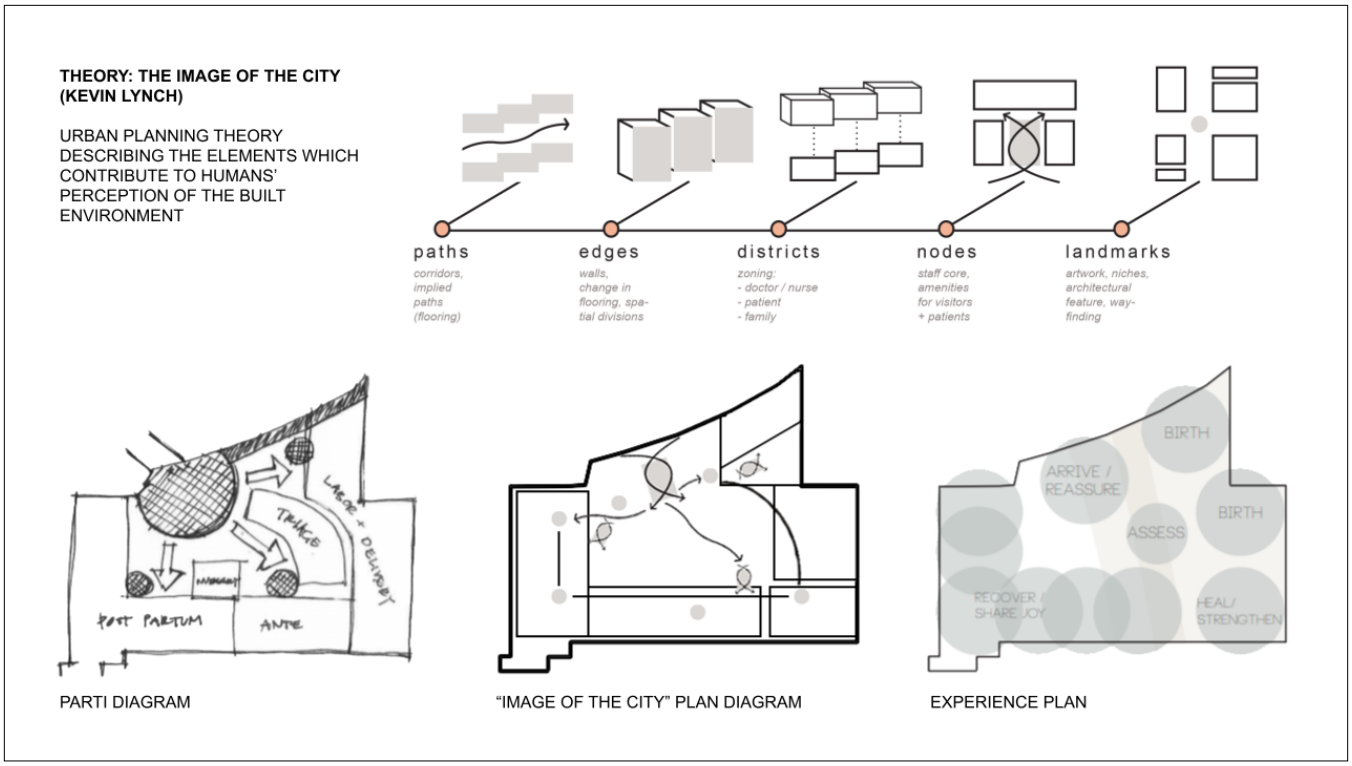


**FIGURE 4.** Kevin Lynch's Theory helped the student define the space types.

**FIGURE 5.** Final student design outcome evolved upon reflection of the theory.

*system, oriented the patients and their families to their destination especially when they are in a stressful state. The theory assists in creating a legible mental picture for space, so it can be intuitively used by the caregivers and patients and their family, and they do not feel overwhelmed in the space."*

Instructors Analysis of Student Design Process: The student gathered information in the pre-design phase about the patients, their emotional and mental state at the healthcare facility like this through readings. The main programmatic goal was to make this space easily accessible, perceptible, and legible for its users. The student reflected on this goal, which provided an impetus to investigate the theories presented. This student utilized Lynch's theory to frame the project and all through the design phase. This theory became an active tool to evolve the design from diagramming to space plan to the final three-dimensional development as shown in Figures 4 and 5. Reflecting on this theory the student was able to empathize with the users and evolve a design response that addressed the underlining programmatic criteria.

## INTERGENERATIONAL PROJECT UTILIZING PLACE ATTACHMENT THEORY

The place attachment theory stipulates that interactions and bonds with a specific place are the sources of feelings of commitment, responsibility, and management of the place (Relph, 2016; Tuan, 1977). Place attachment 1) is a positive emotional bond between individuals and groups and their environment (Altman & Low, 1992); 2) a state of psychological well-being resulting from accessibility to a place or a state of distress upon separation or remoteness from a place (Giuliani & Feldman, 1993); 3) an emotional investment with a place (Hummon, 1992); and 4) the extent to which an individual values and identifies with a particular environmental setting (Moore & Graefe, 1994). Hence, place attachment is a multifaceted notion that describes the bond that exists between individuals and their specific locations. (Altman & Low, 1992; Giuliani & Feldman, 1993). This attachment may serve to promote and encourage environmentally responsible behavior using appeals to individuals' self-identity and dependence (Junot, Paquet, & Fenouillet, 2018)

After reflecting on place attachment, the fourth-year interior design student developed an intergenerational program to better understand how various age groups react to place attachment. With sterile living environments and frumpy interiors, older adults often face increased isolation and decreased physical activity as they make the transition into senior communities. One way to combat this is through intergenerational programs. Intergenerational activities provide many benefits including but not limited to the learning of new skills, increased sense of purpose, alleviating fears children may have of elderly people, helping children understand and later accept the aging process, energizing older adults, reducing depression and isolation, filling a void for children who do not have available grandparents, keeping family stories and history alive, increasing cognitive

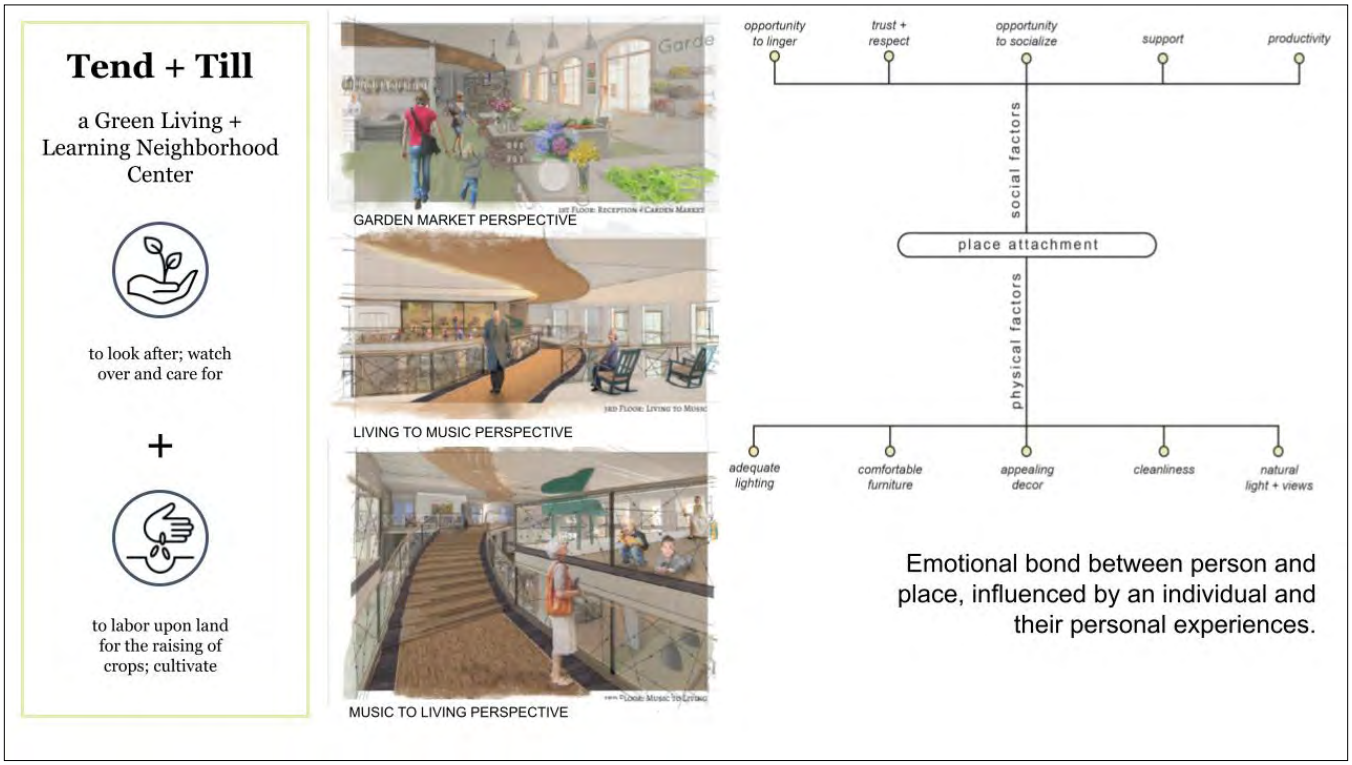


**FIGURE 6.** Final design outcome evolved upon reflection of the place attachment theory.

stimulation, and broadening social circles. When you put the issues of older adults and children side-by-side, it makes sense that gardening would be a great activity to bring both generations together and increase their physical and mental health and get attached to the place socially and physically.

> *Student Reflection: "The problems I attempted to solve with this project include fill a gap in senior living options, prevent isolation in the earlier stages of aging, provide an urban community with beautiful and productive green space, a nature-focused preschool program for those who want their children to have less screen time and more active play outdoors, providing healthy breakfast and afterschool snacks for elementary school children, providing healthy lunches for preschoolers, providing fun and educational activities for elementary children with working parents before and after-school. All these goals in the end add up to the improved quality of life through increased socialization, physical activity, and learning healthy lifestyle skills."*

Instructors' Analysis: This project exemplified how to establish a positive emotional bond between individuals, two age groups, and their environment. The title "Tend + Till" explains that the hard work of tending to something and tilling something is personal. The unique program items: garden, interior walking paths, sight-light, and areas for interactive communication drew both user groups to the place. The emotional investment with a place was established by the intergenerational blend and supported by overall programmatic elements. Space planning the interior afforded a closeness of both parties and their families which provided a positive environment. The emotion stemmed from pre-design research, observation of the student's own family. As the student leaned on her own personal experiences, she was able to create a greater personal impact for the users. The Place Attachment Theory used in this design established a positive bond between people and their place.

**Workplace Project Utilizing the Third Place Theory:**

Oldenburg (2001) identifies "third places" as the public places on neutral ground where people can gather and interact. In contrast to first places (home) and second places (work), third places allow people to put aside their concerns and simply enjoy the company and conversation around them. Third places "host the regular, voluntary, informal, and happily anticipated gatherings of individuals beyond the realms of home and work" Oldenburg (2001). Some of the examples of third place can be beer gardens, main streets, pubs, cafés, coffeehouses, post offices, which are the heart of a community's social vitality. These spaces promote social equity by leveling the status of guests and offering psychological support to individuals and communities.

The students were challenged to design a co-working space for young entrepreneurs. Coworking spaces are hubs for innovators and entrepreneurs where they increasingly find that great ideas flourish in the churn and activity of working alongside others (DeGuzman and Tang, 2011). The students researched human-environmental theories focusing on

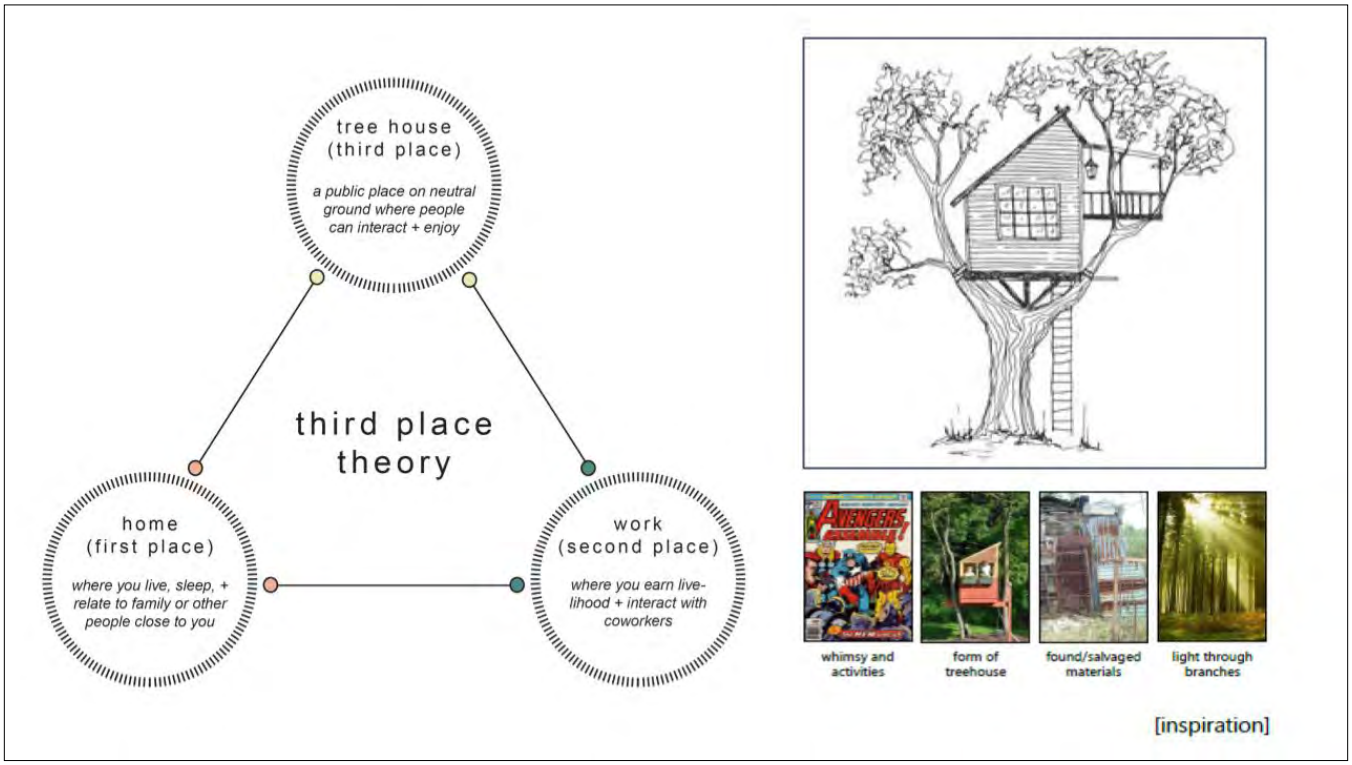


**FIGURE 7.** Third place theory and metaphor of tree house as a third place.

**FIGURE 8.** Final student design outcome evolved upon reflection of the third-place theory.

workplace affinity. This student researched about third places and the design strategies and elements that make a place a 'third place'. As she reflected on her user profile, she speculated making this second place 'work' as a 'third place' to create place attachment and enhance creativity within the space. After understanding the context, she mapped her users as a young male, between the age of 20 to 45, who are entrepreneurs in the technology sector. She started looking at the problem from the lens of third-place theory and questioned the common ground for creativity and innovation. After conducting an informal focus group conversation with young male entrepreneurs, she arrived at Tree house as a metaphor for third place. The elements of the tree house such as scale, light, and massing were manifested in the space. The custom wallcovering representing classic superhero comics which one usually brings to the tree house was used in hallways and huddle space to create nostalgia.

> *Student's Reflection: "This theory helped me rethink our places in the community, and I questioned — why can't we make our second places as the third place? If I make this co-working office the third place, it would offer psychological and emotional supportive elements which would create a strong sense of attachment and affinity to space. Thinking about the demographics, the tree house became an evident nostalgic metaphor to start conceptualizing and organizing the space two- and three-dimensionally."*

Instructors Analysis of Student's Design Process: According to Oldenburg (2017) the workplaces are the second place in the urban fabric, but the Third Place Theory presented the student with a new perspective to look at the workplace as a third place rather than the second place. The student gathered data that an employee spends 8 to 10 hours on an average at their workplace. Hence, reflecting on all the theories presented she chose the Third Place Theory because she wanted the entrepreneurs to form a sense of association with this place by offering emotional and psychological support to individuals and the entire workplace community. Therefore, the Third Place Theory became a reductive thinking device for this student to arrive at a concept and translate the qualities of a space to engage with their users' experience as shown in Figures 7 and 8.

### Workplace Project Utilizing the Affordance Theory

Affordance Theory as defined by J.J. Gibson states that the world is perceived not only in terms of object shapes and spatial relationships but also in terms of object possibilities for action (affordances) — perception drives action (Greeno, 1994). Affordances, or clues in the environment that indicate possibilities for action, are perceived in a direct, immediate way with no sensory processing. Some examples of this include buttons for pushing, knobs for turning, handles for pulling, and levers for sliding.

This workplace typology project focused on designing an office for an architecture firm. As the students were thinking of the users in the space, this particular student profiled her end users as focusers, sharers, collaborators, and socializers as shown in Figure 9. She further wrote the characteristics, outlook, and values of each of these users and their associated spatial needs. After reflecting on Gibson's Affordance Theory, the student wanted to create a perceivable environment for these users where they can easily find the spaces they prefer without any sensory processing. This strategy

**FIGURE 9.** Characteristics of users in space utilizing the theory of affordances for design development.

**FIGURE 10.** Final design outcome evolved upon reflection of the theory.

helped to understand and empathize with the user group and segregate the programmatic space into two sections: one for collaborators and socializers and the other section for focusers and sharers. The contrasting colors red (representing stimulation) and blue (designating focus spaces) further helped to distinguish between these affordances or zones.

> *Student Reflection: "This theory helped me to see the program differently. After reading and reflecting on Gibson's theory, I wanted to understand the users, their needs of privacy, collaboration, and interaction in the space. Hence, I started grouping the programmable spaces based on the gradient of privacy rather than just organizing the space into open and private offices. It also helped me understand and empathize with different personality types and how I can make a space which is very perceptible for them, something we take for granted."*

Instructors Analysis of Student's Design Process: This theory provided a new perspective for the student to look at users, understand their personality type and spatial needs in-depth. Upon reflection on this theory, the student clustered and organized the spaces as active and passive zones to meet the users' needs as reflected in Figures 9 and 10.

## REFLECTION, UNFORSEEN OBSTACLES, AND FUTURE DIRECTIVES

An analysis of the typical design processes and phases used by students to solve interior design projects in the studio indicated a schism between the pre-design phase and the design phase. The students habitually developed the latter without applying the lessons learned during the former. Thus, the authors revised the pedagogical approach in order to allow students to think about the design problem critically and inculcate a new transformative and empathetic attitude towards the design solution. This revised pedagogical approach embedded theories from environmental psychology and social sciences as heuristic reasoning devices to encourage a more creative, generative, and empathetic ideation process.

*Who Was Involved?*: This framework was incorporated for two years in the third year and fourth year level Interior Design Studios. Over two hundred projects and student reflections were collected to understand how successfully or unsuccessfully students utilized theories from environmental psychology, social sciences, and humanities to empathize with the users of the space and provide a human-centric design solution.

*Challenges and Resolution*: The authors questioned whether integrating this emotive driver in the design process could become the means of understanding behavior and the relationship between people and their environment thus producing more meaningful designs? They were hopeful that this mechanism would facilitate building empathy with the end-users, and the examples shown within this paper illustrate the empathy. The theories, tools used for reflection on the relationship between behavior and environment and how to optimize it, provided an empathetic design solution. The authors were concerned if this revised framework would in fact reinforce working through the negotiations of ideation, program, space planning, and three-dimensional development of the interior environment based on the time it took to train students in the new way of thinking. The examples provided reveal that the design process can coincide with the periods of heuristic reasoning devices like theories to afford a more thorough exploration of alternative possibilities for design solutions.

It was unknown beforehand to the authors if theory as a heuristic device would yield an empathetic solution. However, critical reflection by the authors of the projects collected over a period revealed that 80% of the student's utilized theory as a developmental construct, some being more successful in developing design logics from the theory and manifesting them into space. The theory as a heuristic device allowed probing, in order to have a better understanding of the human-environmental relationship.

The instructors wanted the students to productively move the problem into a new light. This new framework is intended to provide valuable additional information beyond just functional solutions to the studio project. The student reflection statements indicated that this process had framing and self-referential qualities that allowed a more comprehensive judgment about the scope permitted problem-solving activities to proceed. For various reasons, some students perceived utilizing theory as a thinking tool as a constraint in problem-solving. Some students struggled to find the appropriate theory to help them see the problem from a different perspective. The instructors had to probe them in the right direction, which required time hindering students' progress from one design phase to the next. As a result, some students selected the appropriate theory but found it hard to visualize it in the interior spaces. The instructors had to show the students case examples to help them see and imagine how these ideas may be used in space. Several students struggled to adapt to this new mode of thinking since they were so used to the linear design process. They eventually accepted the approach after numerous suggestions from the professors recognizing the value and change in their thinking process. In the end, the students reflected and saw value in the iterative approach. They understood the added depth to their designs, based on the integration of theory, helped to accomplish more appropriate human-centered design solutions.

The adoption of theories as heuristic reasoning devices as an explorative methodology in the studios brought together the goals of integrating empathy, collaboration, and storytelling. This open-ended, nonlinear approach challenged

students to identify, define, and empathize with the client user group and the given design challenge. The examples shared serve to explore theories as heuristic reasoning devices to encourage a more creative and generative ideation process by analyzing and documenting interior design studio projects as case studies. The theories helped researchers to gain insight into the human-environmental relationship. These theories, along with research and physical site analysis, serve as an emotive driver that becomes the means of working through the negotiations of ideation, program, space planning, and three-dimensional development of the built environment. The design process, coinciding with the periods of theoretical heuristic reasoning, aims to help the students proceed through a playful exploration of alternative possibilities for design solutions (Dunne & Raby, 2013). By exposing students to the development of empathy through a proposed alternate design process framework, this new framework was carried out in the design studios. As mentioned earlier, it could be applied to other design disciplines to redesign a traditional pedagogical framework, especially if the current one is not assisting students in designing with empathy. Environmental psychology, humanities, and social science theories are easily transferable and may be used as heuristic reasoning techniques to come up with a human-centered design solution.

Future exploration would like to use the new cohorts of students, students earlier in their academic program- in their second and third year to understand whether the new pedagogical method influences the remainder of their educational endeavors. Additionally, better assessment tools to evaluate the process and project work would benefit student feedback. Creativity is about seeing in different and unexpected ways and a willingness to seek the rare and unknown (Swaranjali, Patel & Espersen-Peters, 2020). Consequently, the framework used tackled the unfamiliarity generated by the design problem to resolve the perceived gap between research and empathetic design. This emerging pedagogy made a significant contribution to the discussion about how to train the next generation of interior designers.

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