THE "UH CO.LAB": AN INNOVATIVE LEARNING SPACE AT THE UNIVERSITY OF HAWAIʻI AT MĀNOA BASED ON THE CO-DESIGN METHODOLOGY AND PRACTICE

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ABSTRACT

The nature of the client, architect, and contractor relationship has changed considerably within contemporary architectural practice. Today, clients place more trust in professionals who specialize in non-architectural areas, such as construction costs, rather than architects who specialize in design. While a client might hire both types of parties, this disproportionate placement of trust on one particular party could adversely affect relationship between the client and the architect as well as between the client and other essential specialists. These correlations between client, architect, and other professional key players, in professional practice, are not consistently reflected in architectural education. The relationship in professional practice can be improved by starting at the roots—exposing students to design-communication strategies, thereby preparing them to engage with clients on different levels. Inspired by recent academic curricula in business and design, this dissertation investigates the modern architectural education environment, its alignment with professional practice, and the related impact on learning spaces and curricula. By anticipating new architectural curricula that derive from the profession, current design processes and methods, when combined with client-driven communication concepts from business curricula, will expose students to a variety of architect-client interactions and relationships, will help develop stronger design-communication interaction, and will demand the occurrence of new educational spaces for these interactions. This doctoral project poses the following questions. *How can students gain knowledge and confidence when communicating the value of design through client interaction within an academic environment?* And, stemming from that, *how can the learning spaces facilitate the integration of professional design and communication strategies?*

Evidence shows that a curriculum that brings interactions regarding client relations into the classroom reveal opportunities for re-envisioned design spaces that accommodate and adapt to new collaborative working models and that foster growth and collective creativity. Past research on business and design curricula, existing design strategies, and communication strategies led to the development of an integrated educational model known as co-design, which has been redefined to inform the design of a new collaborative educational space. This led to the creation of a new type of programmatic educational space, which brings co-design methods into the educational environment and directly supports student engagement with clients.

INTRODUCTION

Communication allows for the sharing of ideas, the development of social interactions, and the passing of history to the next generation through oral transmission, illustration, and handwritten documents. With the advancement of technology, humans have developed the capability to share information through various media almost instantly. Though communication strategies differ depending on the specific context, the underlying importance of effective communication remains the same, and success in any field is largely dependent on productiveness of that communication.

David Nicol and Simon Pilling state the following, in their book *Changing Architectural Education: Towards a New Professionalism*.

> Architecture in practice is a participative process involving communication with many stakeholders in design: clients, users, other architects, engineers, specialist consultants, construction managers, statutory authorities and so on. However the schools, through both their formal structures and their more informal socialization processes, may not be fully preparing students in the skills needed for participative practice.[1]

The initial intent of this doctoral project was improve the communication skills of recent architecture graduate students so that they may enter professional practice with the confidence and knowledge needed to engage with clients and the general public. However, throughout the invigorating process of creating this dissertation, it became apparent that the end goals of this project would be most beneficial for all recent graduates rather than just architecture students, although architecture remains the prominent focus of the research design development of this doctoral project as it serves as the primary inspiration.

Design communication requires the use of many skill sets, particularly when the audience is unaffiliated with the field of architectural design. Communicating design ideas to clients is one of the consistent challenges faced by those within the architecture industry. In agreement with this point, Nicol and Pilling state, "Communication is not just about effective description: equally important is listening to clients and negotiating and facilitating the processes of building design."[2]

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[1] David Nicol and Simon Pilling, *Changing Architectural Education: Towards a New Professionalism* (New York: Spon Press, 2000), 6.
[2] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 2.

Thus, the challenge of learning how to communicate these ideas serves as the primary motivation for this doctoral project. Mastering the art of communicating design ideas typically requires many years of professional experience. However, this dissertation argues that the current architecture curricula could be improved by incorporating concepts of client relations or communication—skills that are imperative for success in professional architectural practice.

Recent graduates of architecture schools throughout the U.S. often state that they struggle to make the transition between their architectural education and engaging with clients in professional practice. One such graduate spoke specifically of this experience as follows.[3]

> I began working in an architecture firm when I was in my fourth year of a seven-year program. Almost immediately after I began working, I was interacting with clients, presenting to them and hearing their ideas. In school, however, there was no client interaction. All clients for projects were completely fictional, and, for all intents and purposes, we as designers dictated the needs and desires of the "client." Occasionally, the professor would give client-like feedback and make requests, but their motives are incomparable to a real client. Real clients care about time and money. Money is no object in the hypothetical studio world.[4]

The survey responder above has experienced what many recent architecture graduates experienced - the quick transition from education to professional practice in the architecture field without knowledge and confidence to engage with clients, users, or other key professional stakeholders. The goal of this doctoral project is to improve architecture students' leadership potential through improved communication skills fostered by an educational experience that more closely reflects professional needs and spaces designed to support two major areas of study, both architecture and business curriculum and practice. By using the term space, this dissertation proposes to define it as a continuous area or expanse that is free and available and within which architects and designers work with clients who hire them. The primary objective of this dissertation is to research the creation of an experiential learning space driven by a conceptual academic program for students, a curriculum supported and utilized by faculty, and the participation of community members.

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[3] Name of survey responder is withheld by mutual agreement.
[4] Survey response from student, January 19, 2016.

To further investigate these proposed concepts, two primary questions arise. *How can students gain knowledge and confidence communicating design value through client interaction in an academic environment?* And, *how can the learning spaces facilitate this integration of professional design and communication strategies?*

Qualitative descriptive research methodologies will provide the framework for the research for this dissertation. First, a basic understanding of architectural space and how people learn in contemporary society will give meaning to analyses of current co-working spatial studies in Honolulu, Hawai'i. Since the inspiration for this doctoral project comes from an educational background in, both, architecture and business, a study regarding curriculum and practice in the both fields is conducted to understand the creation of a new blend of an educational curriculum known as co-design. Before co-design is introduced, the changing role of the architect must be examined to reveal how architects adapt to societal changes, maintain architectural relevancy, and build design value. Co-design is then thoroughly discussed through investigating the different ways co-design has been and is being used today. Co-design is, then, redefined by integrating concepts of negotiation and mediation as communication strategies to enhance the working relationship with clients and others. Case studies collect data on how universities implement similar programs and create different types of school cultures. These case studies focus both on the programs themselves and how corresponding the architecture departments respond to the needs of the respective programs. Further analysis is conducted within the different user groups regarding how these user groups choose to use the space and what defines each user's individual success. All accumulated design research is used to inform the creation of a new collaborative educational program – the UH (University of Hawai'i) co.Lab.

The contribution of this dissertation to the body of existing knowledge within the fields of architecture, business, and education will be the proposal of design elements that respond to key points within the descriptive research topics and that are applied into a specific project site striving for similar goals as the ones within this doctoral project. The project site is a specific location of where the UH co.Lab program will be designed for. It is located in Honolulu, Hawai'i on the University of Hawai'i at Mānoa campus, more specifically, at Building 37.

In May of 2014, inspired by the Hasso Plattner Institute of Design at Stanford University (d.school) the University of Hawai'i (UH) president, David Lassner, outlined the need for an alternative learning space, subsequently revealing the name of this new facility, the UH

Innovation Lab (iLab), at its grand opening in January 2015. Although, as of early 2016, the UH iLab is still in its early stages of development, the technology and current learning tools available within the iLab building allow both students and faculty to experience enhanced learning and teaching techniques. The iLab is, therefore, the selected site for this project because of its potential as a hub for enhancing design communication and working relationships for students, faculty, and community members, reflecting contemporary industry needs.

1.0 LEARNING THROUGH SPACES

This chapter will be divided into three sections: concepts of space, analysis on how people learn today, and existing co-working spaces in Honolulu, Hawai'i. The purpose of this chapter is to introduce the connections between co-working spaces and how these spaces could be utilized as a response contemporary ways of learning.

The concept of space is a complex one due to the many ways it can be perceived, experienced, and remembered by individuals within varying contexts. This section seeks to create a basis for the final design of spaces supported by the co-design method. The contents of this chapter intend to relate to the final programmatic design but are not meant to delve into what exactly defines a given space. The basic concepts discussed in this chapter will draw connections between the intent of the final programmatic design and the conducted design research.

1.01 SPACES

According to Francis D. K. Ching, in *Architecture: Form, Space, and Order*, the qualities of space are listed as follows: form; color, texture, pattern, sound; proportion, scale; definition; degree of enclosure, view or outlook, and light.[5] However, spaces are perceived through more than just the aforementioned qualities; they are also perceived through properties of enclosure, which, according to Ching, are as follows: shape; surface, edges; dimensions; configuration; and openings.[6]

Space can be further broken down into specific instances of usage; however, what remains most relevant and human-centric about the concept of space is how it is defined by the activities and experiences that occur within a given area. According to Burçin Kürtüncü et al., in their article "Decoding Spatial Knowledge and Spatial Experience," "[S]patial knowledge stemming from spatial experience acts as a network interwoven between interrelated concepts such as body, scale, proportion, experience, perception, atmosphere, senses, time, memory, context, light, structure, materials, architectonics, spatial articulation and syntax, etc."[7] However, only a selection

[5] Francis D. K. Ching, *Architecture: Form, Space, and Order* (New Jersey: John Wiley & Sons, Inc., 2007), 170.
[6] Ching, *Architecture: Form, Space, and Order*, 170.
[7] Burçin Kürtüncü, Sait Ali Köknar, and Pelin Dursun, "Decoding Spatial Knowledge and Spatial Experience," (in proceedings of Design Train Congress, Amsterdam, The Netherlands, 05-07 June, 2008).

of the elements listed in their article will be discussed for application in the final architectural program design for the purpose of this doctoral project.

Form or Massing

The idea of form includes many of the terms mentioned in the first paragraph of this section and describes the external appearance of figures. Ching sums up the idea of form as such. "In art and design, we often use the term ['form'] to denote the formal structure of a work—the manner of arranging and coordinating the elements and parts of a composition so as the produce a coherent image."[8] Ching lists some of the elements and parts as shape, size, color, and texture, yet the combined form would also have relational properties that speak to sequence and composition such as position, orientation, and visual inertia.[9]

Light

One way that space can be experienced and defined is through configurations of light. As light travels through a space, it reveals shadows, shade, textures, and open and enclosed spaces. The creative use of light can either liven up or calm a space through the size and location of openings or with natural or artificial lighting installations. Figure 1 and Figure 2, for instance, are of the Art Building at University of Hawai'i at Mānoa. The Art Building hallways are dark and only lit by natural lighting with some artificial warm light from fixtures. However, when a users move toward the natural daylight, they become aware that they are either being led to the central courtyard or toward the outside of the building based on the patterns of light that are present.

[8] Ching, *Architecture: Form, Space, and Order*, 34.
[9] Ibid., 34.

Figure 1: View from Art Building hallway
Source: Author

Figure 2: View from hallway to courtyard in Art Building
Source: Author

View or Outlook

Designing the view or outlook from a room can define both the space within and the space beyond. Creating views can provide direct focus or the orientation of an object. As Ching states, "Views should not be limited to the outdoors or adjacent spaces. Interior design elements can also provide subjects for visual attention."[10] Establishing a view from both inside and outside provides a surrounding context for the user, which helps provide awareness of space. Within a space, views can, then, be constructed for one to maintain awareness of activities and movement. Generally, views are created to share visual contact and information or are purposely blocked to hide that information.

Proportions

Proportions define shapes by giving an aspect ratio of width to length as well as determining the characteristics of rooms. According to Chris Grimley and Mimi Love, in their book, *Color, Space, and Style*, "[P]roportions are considered when making design decisions about a series of related elements."[11] For example, proportions can be useful for pointing out the spaces in between window frames or window sizes in comparison to human scale. According to Grimley

[10] Ching, *Architecture: Form, Space, and Order*, 181.
[11] Chris Grimley and Mimi Love, *Color, Space, and Style* (Massachusetts: Rockport Publishers, Inc., 2007), 78.

and Love, a room's relative proportion usually determines the intended use of the space.[12] A space can, then, be identified as a path or as a place. Narrow spaces are usually designated as a pathway, while square-like spaces are designated as places. "Square rooms are the most geometrically stable,"[13] though they tend to be the most difficult to furnish in a creative manner because they demand a symmetrical furnished setup, whereas rectangular spaces allow more freedom to configure various arrangement of spaces. According to Grimley and Love, the assembly of a "… tall and long room is ideal for both work and entertaining."[14] Pixar, a company well known for its playful animation movies, is headquartered in Emeryville, California. Pixar's Headquarters lies within a rectangular building, which allows for the creation of smaller, segmented spaces without disrupting the large spacious lobby (figs. 3 and 4).

Figure 3: Smaller segmented spaces at Pixar Headquarters
Source: Office Snapshots[15]

[12] Grimley and Love, *Color, Space, and Style*, 78.
[13] Ibid.
[14] Ibid., 79.
[15] "Pixar Headquarters and the Legacy of Steve Jobs - Office Snapshots," digital image, accessed March 22, 2016, http://officesnapshots.com/wp-content/uploads/2012/07/Img00073.jpeg.

Figure 4: Large lobby space at Pixar Headquarters
Source: Office Snapshots[16]

Social Product

Spaces can be broken down into a list of physical elements; however, spaces are transformed by social influence. A space comes alive when users occupy it. As philosopher Henri Lefebvre states in *The Production of Space*, "[S]pace is a social product."[17] Lefebvre also states, "A social transformation, to be truly revolutionary in character, must manifest a creative capacity in its effects on daily life, on language and on space."[18] Spaces are only as meaningful as their users deem them to be. Spaces set the stage for lives, activities, relationships, and memories to take place at any given time and in any given context.

As such, architectural and space planning, together, help people build social relationships. These relationships then create situations for learning from one another. Then, the act of learning is a social behavior that transforms a space into a learning space. Thus, architectural design can improve and heighten the experience of learning by exhibiting an understanding about how individuals learn and respond in contemporary society.

[16] "Pixar Headquarters and the Legacy of Steve Jobs - Office Snapshots," digital image, accessed March 22, 2016, http://officesnapshots.com/wp-content/uploads/2012/07/Pixar_2.jpeg.
[17] Henri Lefebvre, *The Production of Space*, trans. Donald Nicholson-Smith (Oxford: Blackwell, 1991), 26.
[18] Lefebvre, *The Production of Space*, 54.

1.02 HOW DO WE LEARN TODAY?

With an understanding about what could comprise a space, it is crucial to then understand what defines learning in order to design an effective learning space. There are many spaces where learning can take place. Individuals can learn in both formal and informal settings. An informal setting is relative to impromptu type of learning spaces. Examples would be teaching or learning in the middle of the courtyard, rather than in a traditional classroom with a static setup of tables and chairs. Formal setting is relative to professional settings, like a classroom or a meeting room. The space in which learning occurs can affect the way a person acquires knowledge, as well as the kind of knowledge he or she gains. A challenge lies within formally designing a space for informal learning.

In addition, there are many ways in which one can learn. According to P. Robert-Jan Simons's article "New Learning: Three Ways to Learn in a New Balance," ways of learning can be categorized into three groups: guided learning, experiential learning, and action learning.[19] Simon relates the three different ways of learning to going on an adventure: traveling, trekking, and exploring.[20]

He relates guided learning to *traveling*. It can be described as acquiring knowledge from the leader who has already journeyed the path; the learner is then regarded as the follower. It is sharing prior knowledge with someone who has not yet experienced the journey. This type of learning that Simons has related to traveling is the relative to traditional learning.

Simon relates experiential learning to the idea of a group of people undergoing an unplanned *trekking* journey. Within the group, circumstances may arise, and some members may leave the group while others stick together. The group may run into unpredictable weather conditions that could affect their route, but they improvise plans to move forward. Within the group, there is no hierarchy; anyone can be a leader. The group members learn through experiences created with one another, usually motivated by their enjoyment and passion. With experiential learning, Simon states, "[C]ircumstances, personal motivation, other people, innovations, discoveries, experiments and so on determine what and how one learns."[21]

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[19] Robert-Jan Simons, Jos Van der Linden, and Tom Duffy, "New Learning: Three Ways to Learn in a New Balance," in *New Learning*, (Heidelberg: Springer Netherlands, 2000), 3, accessed January 1, 2016, doi:10.1007/0-306-47614-2_1.
[20] Simons, "New Learning: Three Ways to Learn in a New Balance," 3.
[21] Ibid., 4.

Lastly, *action learning*[22] is related to *exploring*. Exploring forces the traveler to find refuge. Unlike in trekking, he or she is not driven by enjoyment but firmly believes the travel is a necessary action to take. Reflection plays a large role in action learning as it is self-organized and self-motivated. The learner determines the goals of his or her own journey.

While all three ways of learning can be applied to an academic or a professional setting, the amount and type of acquired knowledge depends on the context, conditions, and experiential spaces.

Learning how other people learn will influence the experiences of collaborative learning spaces. The three ways of learning described by Simon can serve as design drivers for different types of spaces and can foster different types of interpersonal relationships. This dissertation chooses to focus on the co-working type of environment to understand how to integrate learning within a given space.

1.03 CO-WORKING SPACES IN HONOLULU, HAWAIʻI

To understand what the current community in Honolulu has to offer in terms of co-working spaces, three existing co-working establishments were selected for spatial studies: BoxJelly, Kakaʻako Agora and The Coop. BoxJelly is a privately owned co-working space that operates through users paying a monthly fee. Kakaʻako Agora is a park, or indoor pavilion, created for the local Honolulu community. The Coop is a co-working space specifically created for fashion designers that provides them with necessary equipment and tools to create fashion pieces.

According to the official website, BoxJelly defines itself as, "[m]ore than just an office or business center, BoxJelly thrives from the interactions that its members have with one another and the space. The emphasis on community helps to foster a collaborative environment, from which innovation is bred."[23] BoxJelly first opened in August 2011 and occupies a section of Fishcake, a creative furniture store based in Honolulu. BoxJelly has four types of users: users who have their own designated workstations at all times, users who occupy the open workstations on a first-come, first-served basis, users who rent an event space or conference rooms and tenants.

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[22] R. W. Revans, "What is Action Learning," *Journal of Management Development* 1 (1982), accessed February 20, 2016, doi:10.1108/eb051529.
[23] "Hawaii's First Co-working Space," accessed January 5, 2016, http://www.theboxjelly.com/about-us/.

Many people pay membership fees to co-work at BoxJelly, including graphic designers, programmers, web designers, architects, marketers, writers, and more.

BoxJelly's architectural elements speak to its architectural program and purpose. The entry to BoxJelly starts with a few "intro spaces." *Intro spaces* are comprised of the large open-space lobby, a lounge, and an open workspace (fig. 5). Visual connection is maintained between intro spaces, which adds to the "work-mode" mentality. Everything in the open workstation is mobile, except the premium workstations that are reserved for designated users. BoxJelly has the capability of holding many events that accommodate large numbers of people by rearranging the intro spaces' furniture. Traveling further into BoxJelly, the spaces transform into private rooms that are reserved for tenants, meetings, and private events. Although these rooms are more private than the intro spaces, they still maintain minimal levels of visual connection. For instance, the tenant space uses textured glass for the doors and walls allowing some visual connectivity between tenant and other users passing by. There is a section within BoxJelly knows as the "Hot Box." The Hot Box serves as a transitional space between Fishcake and BoxJelly. It provides the co-working purpose of BoxJelly with the creative-casual furnishings of Fishcake. BoxJelly has been operational and thriving since 2011 and, given the standard high cost of living and running a business in Hawai'i, BoxJelly is considered to be a successful Honolulu business. Users are actively working in every type of space, though the establishment is rarely fully occupied. BoxJelly has a playful and semi-industrial material palette, which could contribute to why many find this co-working space attractive.

All the above observations conducted have allowed conclusions to be made. BoxJelly has a balanced amount of various levels of privacy and visual connectivity between different user groups. This provides the needs of different user groups. Some users want more privacy, while others enjoy an open workspace atmosphere. The users that want more privacy most likely want to work at BoxJelly because they also have the option of working in an open space area if they need a change in atmosphere. The transition from intro spaces to more private spaces supports the user into understanding and remembering that the deeper they move into BoxJelly, the more secluded the spaces become.

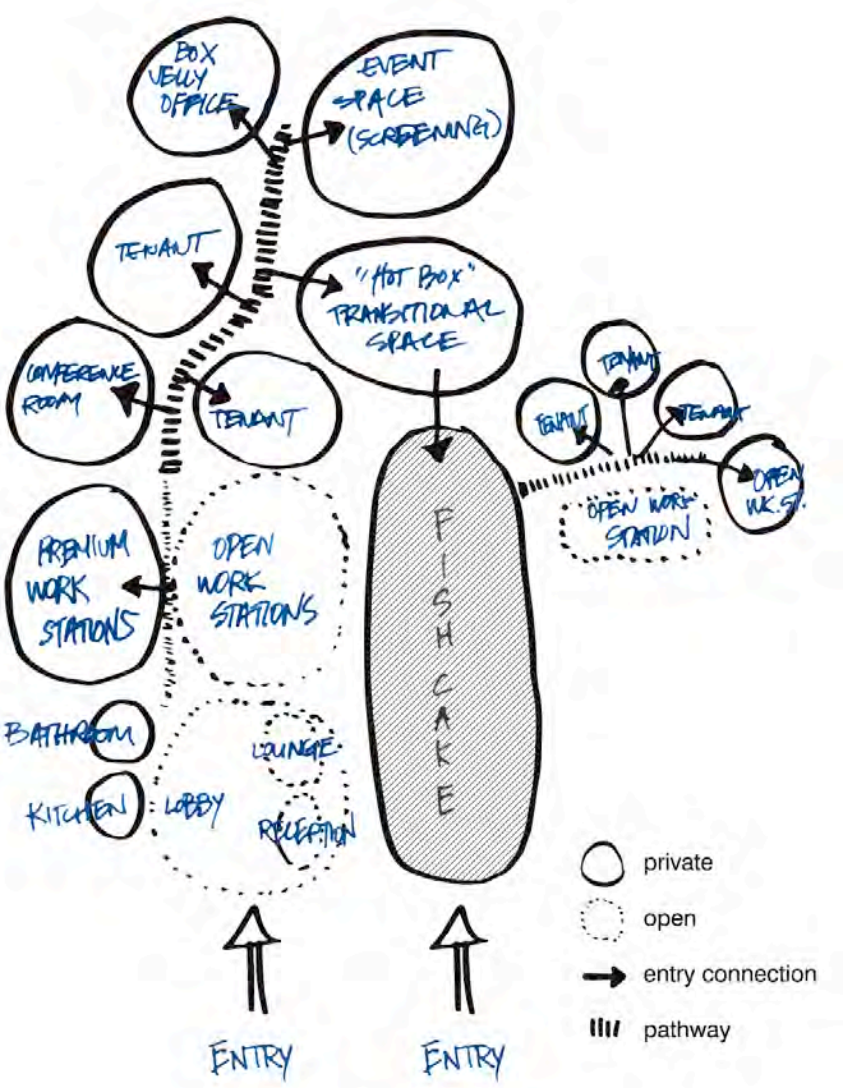

Figure 5: Spatial study - BoxJelly

Source: Author

Kaka'ako Agora, or Agora, is a popular venue sponsored by Interisland Terminal, a Honolulu-based non-profit arts collaborative. Kaka'ako Agora was transformed into an indoor park from a 3,225-square-feet warehouse with an additional 687 square-feet mezzanine. According to Khon2, a Fox-affiliated television station based in Honolulu, Kaka'ako Agora first opened their doors in June 2014 and was once open to the public from 9:00 a.m. to 5:00 p.m.

Monday through Friday and 10:00 a.m. to 4:00 p.m. on Saturdays.[24] However, due to unidentified reasons they are only open for scheduled reservations.

Kaka'ako Agora has a simple open floor plan with a second floor mezzanine constructed out of wood. Since the Agora is transformed from a warehouse, the space is rectilinear—long in one direction and short in the other—with a high ceiling (fig. 6). There is not one specific program that the Agora supports; however, this flexibility offers the freedom of transformative use of space. Different types of events take place at the Agora—anything from private to public events including workshops, artist initiatives, and even church gatherings.

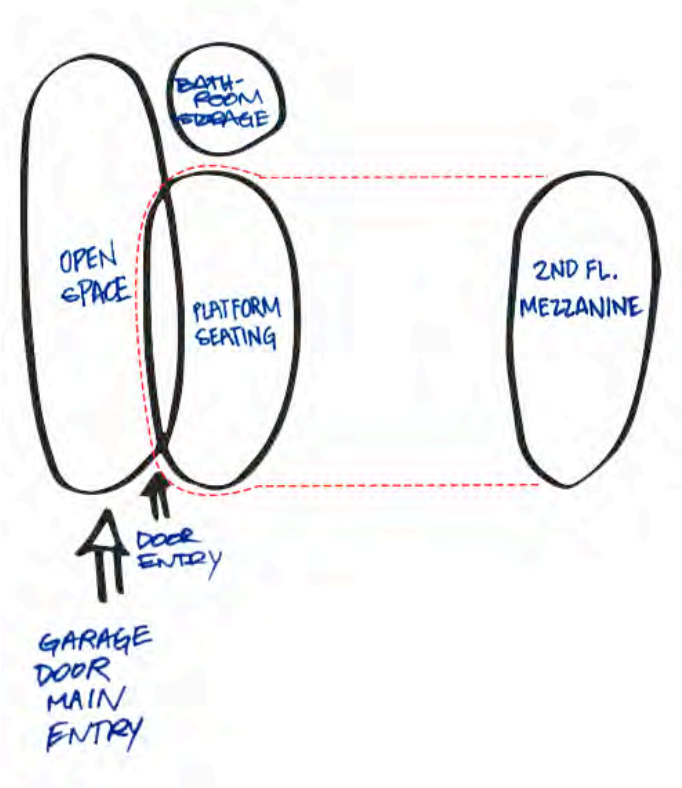

Figure 6: Spatial study – Kaka'ako Agora
Source: Author

Hawai'i Fashion Incubator, also known as HIFI, runs The Coop—a co-working space for fashion designers. Their motto, according to their website, is "We are Hawaii's premiere hub

[24] "Innovative Indoor Park and Pavilion Opens in Kaka'ako," *Khon2*, June 8, 2014, accessed January 26, 2016, http://khon2.com/2014/06/08/innovative-indoor-park-and-pavilion-opens-in-kakaako/.

and co-working space for all things HI Fashion."[25] The Coop first opened their doors in March of 2012, offering open studios with the necessary equipment for any fashion designer. In 2016, they also offer classes and workshops that focus on studying, creating, and promoting fashion. Occasionally, The Coop offers a curated showroom space to feature a rotating selection of Hawai'i-based designer fashion pieces to promote exposure for local talents.[26] Previously, The Coop included a retail area for local designers to sell their creations, too. Since 2012, the use of the space has transformed based on the operational manager's observations regarding what was successful and was not successful. Since then, it continues to be occasionally modified to remain relevant to user needs.

The footprint of The Coop is relatively small compared to BoxJelly or Kaka'ako Agora, The Coop has the smallest area coverage. The overall co-working space has an expressively creative vibe to it with mannequins in every corner and large parts of the floor area plastered in fashion magazine spreads. Approximately two-thirds of the entire space is dedicated to The Coop itself, while the other one-third is rented to tenants (fig. 7). Most of The Coop's equipment is mobile and flexible which helps when the space is used for other events such as fashion showcases or private parties. *The Office* is used by Toby Portner, the current (2016) Partner and Co-founder of Hawai'i Fashion Incubator, and is located next to the *Open Workspace.* The Open Workspace is where a large working table with tools such as scissors, fabrics, and other materials are available for use. This is also where the equipment, such as sewing machines, are located. *The Kitchen* isn't technically a kitchen, but the users of the space call it "the kitchen," because it is where the coffee maker, microwave, and other appliances are located. *The Storage* is accessed through the tenant space, but is not for specifically the tenant. At the time of observation (February 2016), the Storage was being used by another fashion designer as a place to store her fashion pieces. A fashion designer (tenant) uses the large tenant space in the center with her sewing machine set up against the wall, while her fashion mannequins surround her workspace. *The Open Meeting Space* is the most open space since it has one table, and foldable chairs. There are no permanent or heavy furniture in this space making it the most flexible space for all users. The tenant space in

[25] "The Coop | Coworkspace for Fashion Industry," accessed January 26, 2016, http://www.hawaiifashion.org/coop/.
[26] "The Coop | Coworkspace for Fashion Industry," accessed January 26, 2016, http://www.hawaiifashion.org/coop/.

the upper right hand corner is for a salon. This is the one use of space that seems the most out of place in relation to the rest of the program, and perhaps it exists to assist in providing revenue for The Coop.

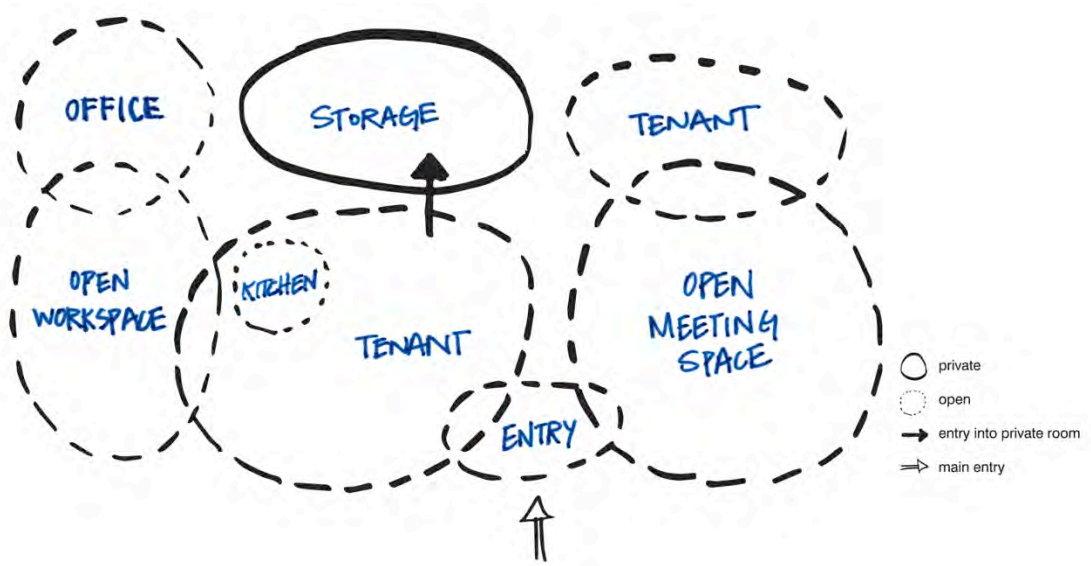

Figure 7: Spatial study – The Coop
Source: Author

Each of the three co-working establishments has their strengths and weaknesses. Based on observations, BoxJelly's success stems from providing different levels of privacy for their different user groups while providing a casual, industrial-like co-working open space atmosphere. In this context, success is based on the frequency of people utilizing the space. While Kaka'ako Agora is attractive with its indoor pavilion space, it is less than ideal as a co-working space because it lacks an architectural program for the space. According to the American Institute of Architects' excerpt from *The Architect's Handbook of Professional Practice* (13th edition), "Architectural programming is the thorough and systematic evaluation of the interrelated values, goals, facts, and needs of a client's organization, facility users, and the surrounding community. A well-conceived program leads to high-quality design."[27] Based on observations, Kaka'ako Agora is not successful in providing a space that users would occupy frequently; instead, the venue is

[27] Robert G. Hershberger, "Programming," *The American Institute of Architects* (2000), accessed March 26, 2016, http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab089267.pdf.

currently mostly used for private and public events. The Coop is a co-working establishment created for a specific group (i.e., fashion designers). The Coop successfully brings in fashion designers to utilize the space by providing equipment and a variety of spaces to support the creation of fashion pieces. Of all three venues, BoxJelly is the one space that is designed to truly support the co-working method for diverse range of users. From these observations, it is evident that a space designed for a specific program and to support various user groups performed better in the long run than an open space with a generic program, as well as successful in terms of people fully utilizing the space. Evidence from these studies show that different levels of privacy attract different user groups, and this results in attracting more various types users into designated spaces, especially those that seek more than one type of space to work in.

2.0 EXPERIENCE AND ANALYSIS: ARCHITECTURE PRACTICE AND EDUCATION

The purpose of this chapter is to discuss architectural curriculum, practice, and the pedagogy of client relations. Furthermore, it explores students' academic exposure to real life client relations. Thus, this chapter serves as validation for the need to address the problem upon which this dissertation focuses—that of the disproportionate placement of trust between client, architect, and other professional key players, within professional practice, is not consistently reflected in architectural education.

Architectural education is fairly new, only establishing a solid foundation within the United States as of the late 1900s. As Arthur Clason Weatherhead states in his dissertation, *The History of Collegiate Education in Architecture in the United States,* "[C]ollegiate education in the field of architecture is of relatively late origin."[28] He continues, "[I]t is only within recent years that architectural education may be considered mature in respect to its national organization, basic principles, and procedures."[29] On a side note, although Weatherhead uses the phrase "within recent years," his dissertation was published in 1941. This means that Weatherhead's belief in the collegiate education in the field of architecture was only considered mature approximately 75 years ago. Nicol and Pilling state in *Changing Architectural Education: Towards a New Professionalism* that, in the past decade, studies have documented drastic changes in society that are influencing architecture and other related construction professions.[30] These changes include a need "for greater client sensitivity and responsiveness to user needs in construction and for more effective cross-disciplinary teamwork amongst industry professionals" demanding for architects that are more versatile, adaptable, and flexible.[31] This correlates with clients wanting to be more involved with the design decisions, as Nicol and Pilling state, "[C]lients are more demanding and knowledgeable than in the past, and many clients, both one-off and regular, wish to be more involved in making design decisions."[32] This comparably rapid evolution forces architecture curricula to be continuously restructured to remain relevant because of our rapidly

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[28] Arthur Weatherhead, "The History of Collegiate Education in Architecture in the United States" (PhD diss., Columbia University, 1941), 2.
[29] Ibid.
[30] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 1.
[31] Ibid.
[32] Ibid., 2.

changing society. But how relevant is today's architecture curricula compared to the current needs of architectural practice? Are architecture schools keeping up with the changes in society and providing the necessary knowledge and skills to prepare recent graduates for professional practice?

It is generally understood that the success of an architectural firm relies heavily on client satisfaction and positive client relationships. Without a client's trust, a designer would not have the freedom to design or, perhaps, a project at all. Loyal, returning clients are vital for a firm's success. This fact, then, raises the question: *How does an architect gain and maintain a client's respect and trust through positive working relationships?* There are many ways to answer this question, though this dissertation focuses on the notions of inclusion, ownership, and collaboration with clients and users of the program as will be discussed later in this dissertation. These notions noted above incorporates the philosophy of co-design, which will also be defined more thoroughly later in this dissertation. In general terms, co-design means designing in collaboration with clients who may not possess a design background.

Personal Experiences in Architecture School

Throughout my experiences in architectural education and design, within the college forum and not the professional sphere, there were few opportunities to proactively integrate clients' wishes and feedback into my design projects. For instance, while designing a large-scale studio with Amy Anderson, an associate professor at the University of Hawai'i at Mānoa, School of Architecture, in spring semester of 2014, I had the chance to design and work in conjunction with the Howard Hughes Corporation, one of the primary developers investing in the current Kaka'ako development in Honolulu. The project entailed creating a master plan that included designing a high-rise condominium. In this particular instance, Howard Hughes Corporation was both developer and client and was not a direct user of the project. Direct users would be individuals that live in this condominium, or within the scope of the master plan.

Because my architectural education program did not strongly emphasis client-relations within the curriculum, we had a traditional architect-client relationship with the Howard Hughes Corporation, one almost exclusively based on discussions of issues and priorities. The initial meeting with the client consisted of a presentation regarding what the client had in the design process up to that point. My classmates and I were allowed to ask questions; however, being unfamiliar with the client-interview design process, I did not feel that we asked enough questions

and received adequate answers to fully inform us of the company's design goals. Later interaction, focusing on mid-term presentations of design options, consisted of discussing what they liked, what they did not like, and how we could potentially move forward. The interaction was not designed for active participation, though it did offer an excellent perspective on what can be expected working with a developer and how a generally traditional client-architect interaction occurs.

Other courses in my program also included interaction with clients and external consultants such as engineers. However, these "clients" and external consultants merely acted as consultants regarding the design process. Conversely, a number of classes did involve collaborative teamwork among classmates. In collaborative projects with classmates, the value of teamwork and importance of delegating tasks was crucial to completing a project. Working with a team placed perspective on the nature of being motivated, or unmotivated, by those who surround you. Collaborative projects tend to create a sense of empowerment for all members if the team because they are working with a neutralized hierarchy. However, my own limited exposure to collaborative design techniques and client integration in the design process created a lack of knowledge regarding how client-focused design communication works within the current pedagogy within academia.

My experience was not singular in this regard. According to a variety of architecture programs at University of Hawai'i at Mānoa, Harvard Graduate School of Design, and MIT Architecture websites (accessed February 2015), architecture curricula do not generally emphasize client relations or communication. Nor do the programs at these schools offer courses focusing on professional architectural practice as a business. My own experience and personal assessment of the curricula within these three top-level architecture schools leads toward a belief that architectural education programs can improve by incorporating experiential learning highlighting the importance of client relationships through interactive real-world communication, as it is reflected in professional practice.

2.01 INSIGHT FROM PRACTICING ARCHITECTS

To further understand how practicing architects' view the profession and recent architecture graduate students' transitions into the field, three architects were interviewed. The two topics discussed were as follows: 1) their recollection of their own experiences as architecture

students and their level of exposure to clients at that time, and 2) insight regarding how they feel about the current power distribution of design decisions as made by architects and by clients comparing past, when they first entered the professional field, to present, where they are highly skilled experienced architects. Diagrams were created by the interviewees to visually show how they felt about the distribution of power over design decisions between architect, client, contractor and construction manager/client representative.

When asked about the primary focus of their respective architecture program, all three interviewees recollected different topics. Ma Ry Kim, who was a student in the architecture program at USC, expressed that her architectural education focused on design and the process of design.

> I went to USC, and USC had professors that were practicing architects as professors. So there wasn't a single professor that wasn't a practicing architect. Despite that, they focused a lot on design and the design process.[33]

Lester Ng attended the University of Hawai'i at Mānoa, School of Architecture for his architectural education. He expressed that his school's primary focus was acquiring knowledge that was going to help students pass the licensure exam, not client importance. He described that the only type of client interaction he recalled was when he, along with his peers, was invited to serve as a juror for his final design critique.

> The closest thing was when a professor invited their guest, and they acted as our client, for example, like in crit. Or people who bounced ideas around but not in an elongated relationship.[34]

Meanwhile, Troy Miyasato, who attended the University of Hawai'i at Mānoa, School of Architecture, expressed that his experience very much involved client relations, with studio professors bringing clients for students to interview for the programming part of the design.[35] Beyond that, client relations followed the traditional patterns.

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[33] Ma Ry Kim (Principal and Design Director, Group 70 International), in discussion with the author, July 2015.
[34] Lester Ng (Principal and Director for Design & Sustainability, Architects Hawaii Ltd.), in discussion with the author, July 2015.
[35] I experienced the same type of exposure to potential client interactions.

> In actuality, client emphasis [relations] was emphasized through all design studios and all professional practice classes. They would always try to bring the client; in the programming process we would have to develop the program of needs to interview the client.[36]

However, Miyasato also mentioned how it was possible for a student to get through five full years without actual experience of interacting with a client, if that the student lacked passion for that part of architectural design.

> Obviously, not all students love that part of the design process . . .
>
> I think you can make your way through five years of the program without being in that role.[37]

These statements demonstrate that systematic and consistent exposure to how to participate in client engagement was not emphasized during many architecture programs in the past and might have maintained the same in today's architecture programs as the one in which I was enrolled at the University of Hawai'i. Even if students are not interested in client interaction, as Troy Miyasato mentions, the choice should be given to all students and the importance of improving such communication skills should be stressed.

When Miyasato, Ng, and Kim were asked about how they felt about the power distribution regarding making design decisions, the interviewees had different outlooks about how the power distribution has shifted and the reasons for that shift. They were asked to sketch a diagram showing how they felt power over design decisions was being distributed between architect, client, contractor and construction manager/client representative (figs. 8, 9, and 10). Kim elaborated on how she feels the role of the architect lost its leverage when the architect's duties began to disperse into other profession. Somehow, along the way, the architect's influence decreased.

> Traditionally, the architect and client were sort of equal; the contractor had some say than the construction manager. So it would definitely be like one-third, two-thirds. Now, I would say, I can see the trend where the construction manager is having more power and it is taking away from the architect and the contractor. It's

[36] Troy Miyasato (Principal, Ferraro Choi), in discussion with the author, July 2015.
[37] Ibid.

shifting from architect to project construction manager. I think that's very relative—how you procure a project, how you buy a project. How do you buy a building? Who gets paid what? Architect gets paid less, and construction manager gets paid more. Traditionally, 25 years ago, there wasn't a cost estimator, project manager, whatever these millions other things. The architect did everything. Now that the traditional role has been broken down, job descriptions that take power away from the architect, the architect needs to diversify and do other things to survive. It's a different world now.[38]

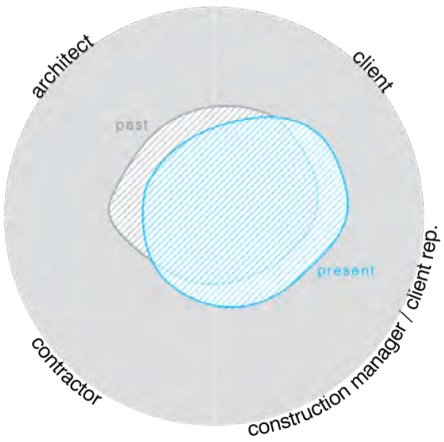

Figure 8: Ma Ry Kim's diagram on power distribution
Source: Author

In contrast, Miyasato stated that he does not feel like there was a large shift in power; however, he observed a significant change in the client's desire to be more involved in the design process.

> It didn't shift that much, maybe a little bit of a shift. By far, it is the sophistication of the client, the availability of information in this day and age, availability of design option is just . . . their desire to be more involved.[39]

[38] Ma Ry Kim (Principal and Design Director, Group 70 International), in discussion with the author, July 2015.
[39] Troy Miyasato (Principal, Ferraro Choi), in discussion with the author, July 2015.

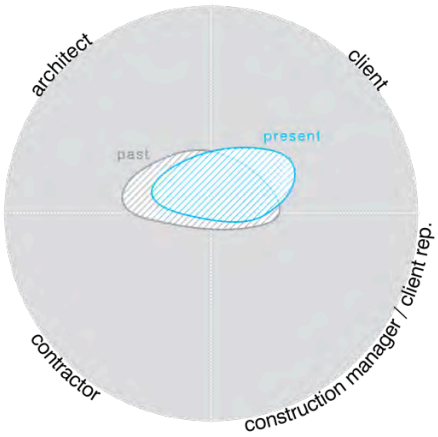

Figure 9: Troy Miyasato's diagram on power distribution

Source: Author

Lester Ng made comments about how cost increasingly influences design decisions. His answer is largely based around his experiences in Hawai'i versus in China.

> Yeah, costs. Mainly costs. That's the most important thing, especially in the private sector. I'm not sure about other places like when I worked in Asia, Hong Kong and China, or maybe I wasn't in a position to notice it. But working here, working the last ten years in this office position, I am, I am aware of Hawai'i construction costs and, man, costs are so expensive that when a local contractor comes here, they spend so much money already on land, acquiring the lands, materials. It's very little windows of opportunity to do design work. You can start seeing doing design build mainly the owner going into a contract with the contractor then hiring an architect to help them put it together. Then it is driven by what was already agreed on between the owner and contractor. They usually set a price, and, then, you have to design toward that. Traditionally, like when I was in school, basically the client comes to an architect, and they have a project, and you work out everything. And, then, they go out to bid. Then the contractor arrives. But it happens very rapidly, and I think, in the last five years, it has shifted toward design build. A lot of government work as well is design build.[40]

[40] Lester Ng (Principal and Director for Design and sustainability, Architects Hawaii Ltd.), in discussion with the author, July 2015.

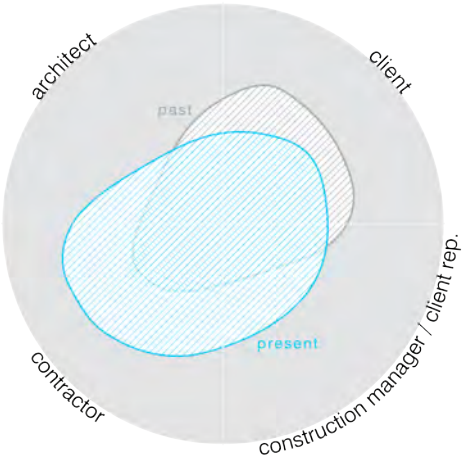

Figure 10: Lester Ng's diagram on power distribution
Source: Author

It should be noted that when Miyasato became aware of this doctoral project topic, he strongly discouraged student engagement with clients, claiming that no recent graduate in any field is fit to professionally engage with a client because he or she simply has not gained enough knowledge to handle client demands as follows.

> I would say that no graduate is put in a position that immediately interfaces with the clients. No matter what level they come up, they are not ready to professional engage the client as a lead person. This is not a failure of the architecture programs they come from. I believe that, before they are put before a client representing our firm, we have to make sure that they are representative of our firm and philosophy and they have the technical skills above all to represent our firm well. And a graduate of a program whether doctorate or masters, they are interns for a reason, they are not licensed architects, and they don't know enough to answer and give the client confidence that the person they are speaking to has the answers. It is not a failure. That is why you have the work period after graduation to build that experience. That's why I was interested in your thesis because I don't think that was ever the intent for licensure, that you come out of the program into architecture in business and professional all its facets of the profession. Would any business put a recent graduate in front of a client in a leadership role? I don't think that would be practical

> or wise. They might have great personalities and be energetic, but just pure knowledge is just not there yet.[41]

Though Miyasato's point is valid, it does not address how to improve the transition from an educational setting to a professional setting. This dissertation argues that students should engage with the client in the design process in some way or another to gain leadership and communication skills. More specifically, students should be exposed to this type of experience in an educational environment where they can still receive the guidance and support of their instructors. Students who seek to build their communication and leadership skills should be offered the opportunity to do so. This type of opportunity and exposure to client interaction would only benefit the growth of students, rather than not providing this opportunity at all. Some may argue that students are exposed to this type of experience during the internship part of their education; however, that gives further credence to the concept that immersing a student in professional setting rather than a student learning in an educational setting is important for that student's future in the field. The question exists as the following. *What if the student is exposed to proactive client engagement while still in an educational setting?*

These interviews offer insight into how practicing professionals view their architectural education experiences and how professional practice is viewed from an architect's perspective today. Each interviewee's diagram shows only slightly shifted power distributions when compared to one another. Each of their answers regarding the shift of power regarding design decisions involved different explanations, based on their backgrounds, experiences, and the type of architectural firm at which they currently work. Overall, when the architect portion is isolated, it is clear that some power shift has occurred; furthermore, all three agreed that architecture students are not well-equipped and prepared for client engagement. However, this dissertation seeks to find solutions for ways of improving architecture curriculum to better prepare students for client communication as they transition into professional practice.

[41] Troy Miyasato (Principal, Ferraro Choi), in discussion with the author, July 2015.

Analysis of Association of Collegiate Schools of Architecture (ACSA)

The purpose of the analysis and investigation within this doctoral project is essentially to understand what architecture researchers are currently studying and where client relations stand within the context of their research. This investigation covers five Association of Collegiate Schools of Architecture conferences that took place annually from 2012 to 2014. It seems evident that there has been minimal research-based emphasis on concepts of client relations, co-design, or collaboration. The tables and charts that follow were created to provide a visual representation of the categorized distribution of research articles. These are accumulated academic research articles selected by the ACSA. It is important to note that each conference has a dedicated theme, so it makes sense that there are more articles focused on relevant themes that correspond with the title of the conference. The themes are listed below. Many of these themes tended to overlap with one another (e.g., technology and environment or urban and housing). In these overlapping theme cases, a judgment call was made to place the research article into the more dominant category.

Here is the list of categories:

1. Co-design, Collaboration, Client Relations, Negotiation
2. Education, Pedagogy, Research
3. Drawings, Collage, Creative Means
4. Case Study, Specific Study
5. Public Interest, Globalizations, Housing
6. Culture, History, Theory
7. Technology
8. Environmental, Ecology, Landscape
9. Urban, City
10. Material, Structure, Installation, Design-Build

In addition, the following tables are assembled in a color-coded manner, and the different colors represent each of the five ACSA conferences. The faded colors in the same horizontal bar are articles of the same topic but were published in different ACSA conference proceedings.

In the 100th ACSA Annual Meeting, "Digital Aptitudes," there was a strong emphasis on two categories. The integration of *Technology*, as well as *Material, Structure, Installation, Design-Build*. *Co-design, Collaboration, Client Relations, and Negotiation* contributed a total of three articles out of 91, which, as compared to other conferences, three articles was greater than the

norm. Two of the three articles focus on interdisciplinary collaborations, while one concentrated on global collective ideas. The article, "Reaching for Sustainability Using Technology and Teamwork: Teaching Integrated Project Delivery in Multi-Disciplinary Studios" focuses on the collaboration in having team members for the project's entirety to allow students to build team value and to understand the opportunities and overcoming barriers in teamwork. In the article, "In Support of Pre-Professional Relations: Guidelines for Effective Education Collaborations Between Architecture and Engineering," architecture and engineering students experience the value of collaboration. They also express enthusiasm toward learning from one another, as this is one of the main benefits of collaboration. The last article, "Activating Agency: Assessing Impacts of Global Collaborative Practices," focuses on collaboration on an aggregation of ideas by different professionals, experts, universities, and community enthusiasts. Although these three articles discuss the importance of collaboration, they still do not address the importance of the client-based interaction and communication. Figure 11 shows the article distribution for 100th ACSA Annual Meeting Proceedings, "Digital Aptitudes," compared alongside with the four conference proceedings that followed.

Figure 11: 100th ACSA Annual Conference proceedings, "Digital Aptitudes" (2012)

Source: Author

(See Appendix A for the corresponding reference table.)

The articles in the 101st ACSA Annual Meeting, titled "New Constellations, New Ecologies," placed strong emphasis on two categories: Urban, City, and Environmental, Ecology, Landscape. Co-design, Collaboration, Client Relations, Negotiation with a total of three articles each with unique focuses. "Mess-Mate Co-Designers" discusses animal architecture and how animal architecture is constructed to respond to the surrounding environment and how it needs to be fused with human architecture. "No More Waiting for Superman: Teaching Guerilla Urbanism and Reflexive Practice" is similar in focus to this dissertation in its purpose of addressing concepts that architectural education lacks. The article's focus is in allowing students to engage in community planning by being proactive and engaging with the community. "Negotiated Territory" details a discussion about how every aspect of architecture, ranging from form to structural details, is a type of negotiation. Though these three articles focus on topics relevant to various parts of this doctoral project, not one of these three articles specifically focuses on client-based relationships. "No More Waiting for Superman: Teaching Guerilla Urbanism and Reflexive Practice" is the most applicable as it involved collaboration in community input; however, client input was not mentioned. Figure 12 shows article distribution for 101st ACSA Annual Meeting Proceedings, titled "New Constellations, New Ecologies" alongside the other four conference proceedings.

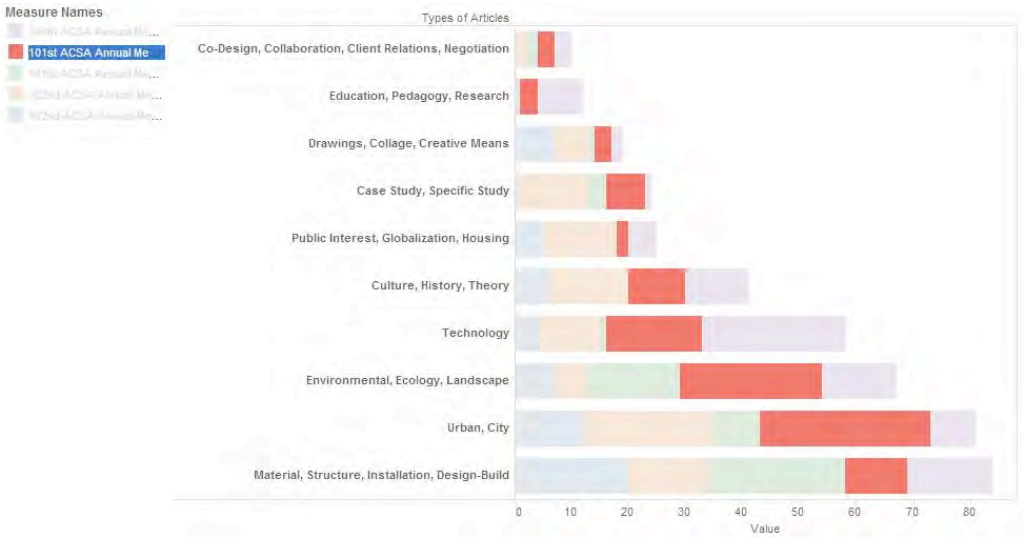

Figure 12: 101st ACSA Annual Conference proceedings, "New Constellations, New Ecologies" (2013)
Source: Author
(See Appendix A for the corresponding reference table.)

The 101st ACSA Annual Meeting Project Proceedings placed a strong emphasis on two categories: *Material, Structure, Installation, Design-Build* and *Environmental, Ecology, Landscape*. *Co-design, Collaboration, Client Relations, Negotiation* with a minimal two articles: "Collaborative Crafting: Arena Screen Wall" and "Collaborative Craft: An Interdisciplinary Ceramics and Architecture Studio." These two articles focus on interdisciplinary collaboration. "Collaborative Crafting: Arena Screen Wall" is one of the many articles that overlapped with another category because it also fit with the design-build category. The article focuses on the collaboration and mutual appreciation of craftsmanship for architecture students and fabricators in the construction of the arena wall on the University of Virginia campus. "Collaborative Craft: An Interdisciplinary Ceramics and Architecture Studio" focuses on the collaboration between ceramic students and architecture students as they experiment to create water-shedding surfaces. Once again, although both articles are categorized as Co-design, Collaboration, Client Relations, Negotiation, neither of them focuses on client-based interaction. Figure 13 displays article distribution of the 101st ACSA Annual Meeting Project Proceedings by category alongside with the other four conference proceedings.

Figure 13: 101st ACSA Annual Conference proceedings, "New Constellations, New Ecologies" (2013)
Source: Author
(See Appendix A for the corresponding reference table.)

In the 102nd ACSA Annual Meeting Proceedings, titled "Globalizing Architecture/Flows and Disruptions," there is a strong emphasis on one category: Urban, City. The presence of articles categorized as Co-design, Collaboration, Client Relations, Negotiation remained minimal with a total of two articles: "Remaking Locations, Based on Fictions, Questions, and Swaps" and "Spatial Stories in Northern Manhattan." Both articles focus on collaboration with the community. "Remaking Locations, Based on Fictions, Questions, and Swaps" examines collaboration through technology, specifically through text messaging. The community collects a large amount of text messages then uses the information gathered to involve the community in the building process. Together, the designers and the contributing committee members build resilience by designing together towards a common goal. This article also fits into the Technology and Urban, City category, but since collaboration is the main focus of this research, it was placed in Co-design, Collaboration, Client Relations, Negotiation. "Spatial Stories in Northern Manhattan" focuses on the collaboration between architects and community through the spatial mapping of thoughts and narratives of Northern Manhattan. This article also fits into the Urban, City category. Once again, although there are two articles categorized in Co-design, Collaboration, Client Relations, Negotiation, none of them focused on the client-based interaction. Figure 14 displays article distribution of the 102nd ACSA Annual Meeting Proceedings, titled "Globalizing Architecture/Flows and Disruptions" by category alongside with the other four conference proceedings.

Figure 14: 102nd ACSA Annual Conference proceedings, "Globalizing Architecture/Flows and Disruptions" (2014)
Source: Author
(See Appendix A for the corresponding reference table.)

In the 102nd ACSA Annual Meeting Project Proceedings, titled "Globalizing Architecture Flows and Disruptions," there is a strong emphasis on two categories: *Material, Structure, Installation, Design-Build* and *Urban, City*. While no articles in this conference focused on *Co-design, Collaboration, Client Relations, Negotiation*, the area is still analyzed because this conference is the most recent one available in the ACSA conference archive and, thus, identifies the focus of current research. Figure 15 displays article distribution of the 102nd ACSA Annual Meeting Project Proceedings, titled "Globalizing Architecture/Flows and Disruptions" by category alongside the other four conference proceedings.

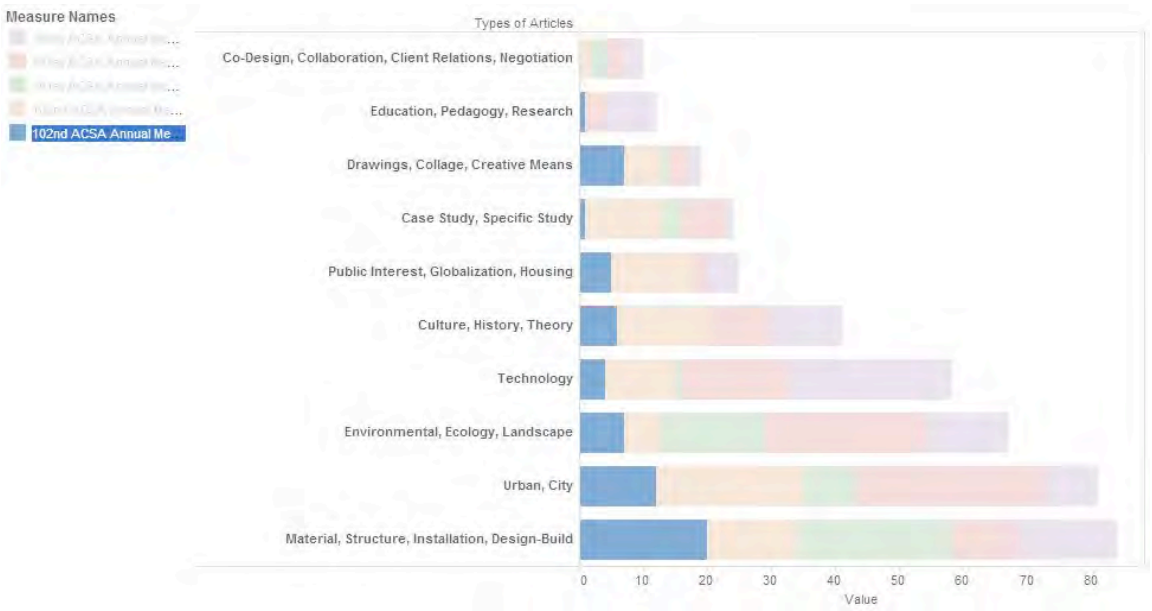

Figure 15: 102nd ACSA Annual Conference proceedings, "Globalizing Architecture/Flows and Disruptions "(2014)
Source: Author
(See Appendix A for the corresponding reference table.)

Figure 16 shows the entire distribution of compiled research articles in the five most recent ACSA Conferences, from 2012 to 2014, in 10 different research categories. The main research topics of the Association of Collegiate Schools of Architecture within the last five conferences is visually displayed in order from most to least common.

1. Material, Structure, Installation, Design-Build
2. Urban, City
3. Environmental, Ecology, Landscape
4. Technology
5. Culture, History, Theory
6. Public Interest, Globalizations. Housing
7. Case Study, Specific Study
8. Drawings, Collage, Creative Means
9. Education, Pedagogy, Research
10. Co-design, Collaboration, Client Relations, Negotiation

By analyzing the preceding list, and figures 16 and 17 that follow, results prove that articles focusing on *Co-design, Collaboration, Client Relations, Negotiation* are presented least in all of the categories. This area only accounts for 10 articles out of a collective total of 421 articles from the five conferences and accounts for only 2% of all research-based articles published in the

past three years of ACSA conference proceedings (fig. 17). This data proves that client-based interaction is not a primary research focus on an architectural academic research-level standpoint. This calls to attention the importance of introducing and integrating client-based interaction and co-design methods into architecture curricula.

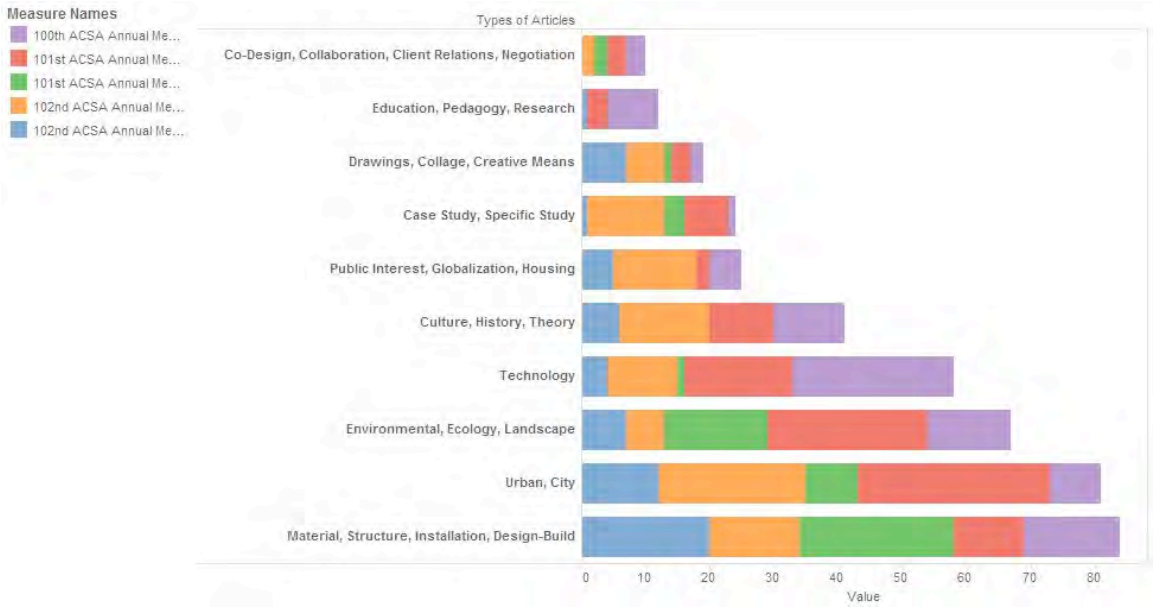

Figure 16: 100th to 102nd ACSA Annual Conference proceedings (2012-2014)

Source: Author

(See Appendix A for the corresponding reference table.)

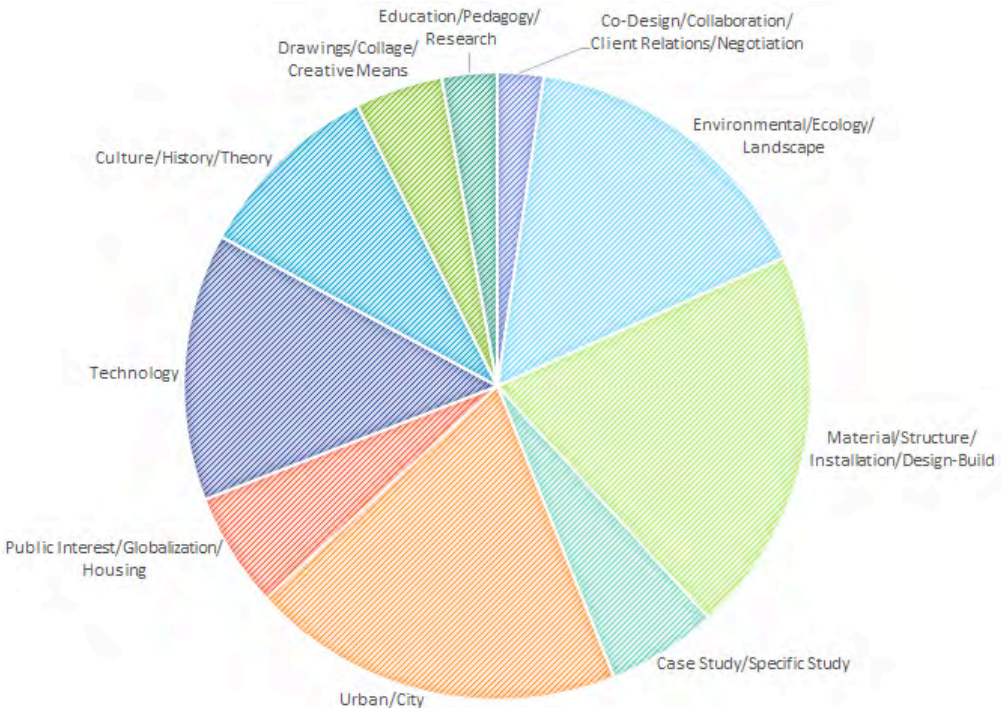

Figure 17: Chart of all articles from the last five ACSA Annual Conference proceedings
Source: Author
(See Appendix A for the corresponding reference table.)

With all facts and observations at hand, it is safe to assume that there is a considerable gap between architectural education and practice that reflects an uneven emphasis on client importance, relations, and communication. Student exposure to possible communication and engagement strategies with clients is needed for a smoother transition from architectural education to architecture practice. If this need is efficiently addressed, students may gain more confidence in communicating with clients before actually graduating and entering the workforce through design engagement.

3.0 EXPERIENCE AND ANALYSIS: BUSINESS PRACTICE AND EDUCATION

Business department collegiate-level education documentation existed as early as 1635 in Plymouth, Massachusetts. The demand for business education evolved rapidly, and, by 1880, according to Richard N. Rosett, an economist and university administrator, in his paper entitled "Business Education in the United States," there were "162 commercial and business colleges in the United States, enrolling 27,000 students."[42] In 1881, the first collegiate school of business was created at the University of Pennsylvania, and changes have been made to their original curricula.[43] Since the changes kept occurring, the evolution, progression, and expansion of business education have been well documented.

Based on personal experience in business school, at the University of Hawai'i at Mānoa in the Shidler College of Business, I am aware of the importance of business practices that incorporate an awareness of positive relationships with potential clients. The general curriculum emphasizes that the success of a business relies heavily on building a healthy relationship with the client through personal involvement and efficient communication. Many required business courses involve creating a new product, service, or business plan. Therefore, each course curriculum often requires an understanding of the wants and needs of clients and end-users, whether these attributes are realized or not yet realized. End-users can be defined as the users who use the end product or service. The business curriculum is heavily focused on understanding and developing human wants and needs.

As an example of how business curriculum focuses on client importance, in business marketing there is a concept called the seven P's of the marketing mix that can be applied to any company or brand. The seven P's of the marketing mix are as follows: the Product and Service, the Price, the Promotion, the Place, the Packaging, the Positioning, and the People. For the following section, "The People" will be the primary focus, as it is relative to client relations and client importance. The People consist of clients, customers, or consumers. In Brian Tracy's book titled, *Brian Tracy Success Library: Marketing*, he explains how customers do not buy products

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[42] Richard N. Rosett, "Business Education in the United States," (selected paper no. 59, University of Chicago Graduate School of Business, 1982), 1, https://www.chicagobooth.edu/~/media/02DC5B04961049B89187464885876053.pdf.
[43] Ibid.

from companies, but, instead, "they buy products from the people in those companies that sell them to them."[44] This type of thinking correlates with the notion that the success of a business is heavily weighted on the positive relationships between client and company. The "client," in Tracy's case, is the user or consumer. Positive relationships should also be developed between client and designer. This concept is only one of many taught within business curriculum at Shidler that exposes students to the idea that the client and the company or designer should be on the same level of appreciation, respect, understanding, and agreement regarding a product or service.

More now than ever, companies highly value customer feedback. This desire for information from clients or customers could be due to the correlation between advancement of technology influencing the consistently evolving wants and needs of human beings. In agreement, Neal M. Ashkanasy, Professor of Management in the UQ Business School at the University of Queensland, in a book review of C. K. Prahalad and Venkat Ramaswamy's *The Future of Competition: Co-Creating Unique Value with Customers,* he states, "A new breed of customers is evolving, one who now has access to heretofore unprecedented knowledge, information, and resources."[45] Companies that choose to include customers in the process of designing a new product or service can gain insight regarding otherwise unforeseen customer wants and needs.

However, companies need to be specific about what kind of feedback they want when requesting it from their customers. Specific feedback will help the company innovate toward the next best product or service. Anthony Ulwick, founder and Chief Executive Officer an innovation consulting firm based in San Francisco, and influential contributing author to Harvard Business Review, noted that in his article, "Turn Customer Input into Innovation," "[C]ustomers should not be trusted to come up with solutions; they aren't expert or informed enough for that part of the innovation process."[46] This idea of how customer's input or feedback is utilized is an important concept to keep in mind when including clients or customers in the design process. They will potentially provide observations that the designers have not seen before and even

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[44] Brian Tracy, *Brian Tracy Success Library: Marketing* (New York: AMACOM Books, 2014), accessed January 7, 2016, ProQuest ebrary, 46.
[45] Neal M. Ashkanasy. review of *The Future of Competition: Co-Creating Unique Value with Customers*, by C. K. Prahalad and Venkat Ramaswamy, *The Academy of Management Executive* 18, no. 2 (2004): 155, http://www.jstor.org/stable/4166079.
[46] Anthony W. Ulwick, "Turn Customer Input into Innovation," *Harvard Business Review*, January 2002, accessed Janurary 20, 2015, https://hbr.org/2002/01/turn-customer-input-into-innovation.

uncover unrealized requests and desires. Designers are necessary during the design process because of their ability to innovate. Yet, they are also important for their communication skills to assist clients in realizing the client's priorities. Provided that this dissertation will explore a method that will integrate architecture and business concepts, the final product will propose an architectural program design that will provide a context for the merge of architecture and business curriculum.

4.0 THE MERGE: ARCHITECTURE AND BUSINESS CONCEPTS THROUGH SPACES

The purpose of this chapter is to investigate various spaces within both departments – architecture and business because of the integration of architecture and business curriculum. The physical spaces within each department that have been chosen to be investigated will give insight to how these physical spaces support the curriculum and their users (students and faculty).

4.01 ARCHITECTURE SCHOOL SPACES

Dana Cuff, an American architecture theorist and professor, states, in her book entitled *Architecture: The Story of Practice*, "The studio is the heart of architectural education, since one third to one half of the required educational program takes place in the design studio or laboratory (see McCommons et al., 1982), and it is in the studio that we find the purest vision of an architectural problem."[47] The architecture school workspace, or design studio, is something that has commonly been regarded as its own identifiable culture. In "Decoding Spatial Knowledge and Spatial Experience," Burçin Kürtüncü observes that the "studio is an environment to learn how to learn."[48] The design studio, in my experience, is the one place I find clarity within my own design thinking process. Many of my hours are spent in studio trying to solve problems through design. The studio atmosphere, along with being surrounded by classmates that are experiencing similar challenges, provides us with the opportunity to work and learn together toward our own design project challenges.

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[47] Dana Cuff, *Architecture: The Story of Practice* (Massachusetts: MIT Press, 1992), 63.
[48] Kürtüncü, Köknar, and Dursun, "Decoding Spatial Knowledge and Spatial Experience," 3.

The architecture student's workspace or studio represents a context in which design problems are presented and solutions are created. It is student-dominated space, and each student typically has consistent and continual access. Although studio projects may not always be group projects, ideas are often exchanged between students. This dynamic exchange of experiential learning enhances student projects. Nicole and Pilling agree by stating, "The design studio offers the potential to provide a multifaceted and enriching learning experience. One inherent educational strength in studio teaching is the implicit commitment to 'experiential learning' or 'learning by doing."[49] The architecture studio environment heightens and inspires creativity. The freedom to draw, sketch, trace, pin, and build in their studio space allows students to express and communicate their design ideas. To Burçin Kürtüncü, et al, "[S]tudio is an environment where students are trained and equipped with skills such as thinking with concepts, expressing ideas verbally and visually, enhancing critical thinking, developing a critical stance, explicating thoughts, listening, working with others, experiencing space, managing time, creating intuitive knowledge about designing and building."[50] This type of learning space in architecture schools is crucial in the development of the final design for this doctoral project—spaces that thrive on the creative vibes of the group to create innovative solutions.

4.02 BUSINESS SCHOOL SPACES

Through observations made of business schools, especially the Shidler College of Business at University of Hawai'i at Mānoa, impromptu meeting spaces are a staple on campus. Impromptu meeting spaces occur in between the individual buildings within the courtyard and also either side of the entrances of each classroom. The purpose of these spaces is to provide places for students to study, socialize, and relax between classes. No matter the reason, these impromptu meeting spaces offer places for the gathering of students. In most business school curriculum throughout the U.S., many of the assignments within individual instructors' curricula, especially final and midterm projects, require teamwork. Many team meetings are held in these impromptu spaces. Thus, this type of space becomes influential in the final architectural program design for it provides an informal, semi-private space for people to meet. Architecture schools

[49] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 5.
[50] Ibid., 3.

often have courtyards with spaces that could be considered impromptu meeting spaces, but what sets these courtyard spaces apart from meeting spaces within many business schools is the nature of having these spaces as the main place to gather.

4.03 THE MERGE

Architecture and business curriculum both teach concepts that could mutually benefit each discipline. Architecture curriculum provides insight on the dynamic design process, while business curriculum provides insight on building client relationships. Architecture schools offers creative spaces or studios where creativity is encouraged, while business school offers spaces for impromptu meetings where an informal exchanging of information and social gatherings occur. The benefits of an architectural studio have been previously discussed; however, Dana Cuff also discusses the disadvantage of the isolated environment of a studio that is comprised of only architecture students. As such, architecture students in studio would likely only know how to communicate with other architects.[51] This dissertation proposes the immersion of multidisciplinary students into a studio atmosphere to support their own learning regarding how to communicate to other students, faculty, and community members from diverse backgrounds. These curriculum concepts and proposal of spatial elements inspire the final program design of this dissertation.

In essence, the solution to the idea of merging both architecture and business disciplines lies in the concept of co-design. Co-design revolves around designing with participants who are not necessarily considered "designers." The focus of this dissertation is to create a literal co-design workspace for the University of Hawai'i at Mānoa. However, before becoming immersed in the design process, three topics must be addressed: first, the changing role of the architect as it relates to the concept of co-designing with clients; second, the history and concept of co-design and its application; and, third, useful communication strategies and styles for engaging with clients.

[51] Cuff, *Architecture: The Story of Practice*, 262.

5.0 CHANGING ROLE OF THE ARCHITECT

> "The traditional role of the architect has been, and will continue to be, that of creative problem solver."[52]

To fully comprehend the responsibilities that an architect has throughout the design process, one must look back in history. According to Ronald Kahn's, lawyer based in California, article titled, *The Changing Role of the Architect*, an architect's traditional role once was the "master builder," meaning that the architect was fully liable and responsible for every detail from conceptual design to the last stage of construction.[53] In more recent times, the duties of the traditional "master builder" have dispersed into different professions because of the high level of liability for the architect.[54] Some of these professions are now known as engineers, contractors, landscape architects, interior designers, and more. This disbursement has led to the unbalanced relationship between the client, the architect, and other professional key players. Ma Ry Kim, a current (2016) practicing architect at Group 70 International, spoke in agreement.

> Traditionally, 25 years ago, there wasn't a cost estimator, project manager, whatever these millions other things. The architect did everything. Now that the traditional role has been broken down—job descriptions that take power away from the architect. The architect needs to diversify and do other things to survive. It's a different world now.[55]

The architect's professionalism in the client's point of view isn't the only point of view that is tainted. Based on observational reports that supported the contents of their book, *Changing Architecture Education: Towards a New Professionalism*, Nicol and Pilling states that, "[T]here has also been increasing scrutiny of the architectural profession by the general public and building users." "Not only must architects develop interpersonal skills in the relationship to clients and other professionals, but they must also become better at listening and responding to, and communicating with, building users and the public."[56]

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[52] David Straus and Michael Doyle, "The Architect as Facilitator: A New Role," *Journal of Architectural Education* 31, no. 4 (1978): 13, doi:10.1080/10464883.1978.10758144.
[53] Ronald Kahn, " The Changing Role of the Architect," *23 St Louis ULJ* 23 (1979): 216.
[54] Kahn, " The Changing Role of the Architect," 217.
[55] Ma Ry Kim (Principal and Design Director, Group 70 International), in discussion with the author, July 2015.
[56] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 3.

One reason for the client's misplaced value in the architect is related to the client being more knowledgeable about the building process, most likely because of availability of information and resources due to technology. Nicole and Pilling add the following. "It is clear from the nature of these reports that clients are increasingly knowledgeable and demanding in their dealings with the construction industry and architects."[57] They further state that "[c]lients are no longer content to rely on the architect as primary adviser."[58] This statement describing the architect and client relationship could be understood by clients having more trust in other professional key players than in the architect.

The current responsibilities between owner and architect are defined in standard contracts written by the American Institute of Architects (AIA). In the owner and architect contract, the responsibilities of each party differ from one another. The responsibilities are defined in figure 18.

Responsibilities of Owner	**Responsibilities of Architect**
• Develop scope of work • Provide objectives • Provide schedule • Provide budget • Provide site surveying • Employ contractor	• Review owner's scope of work • Review owner's budget • Review owners schedule • Develop a design • Prepare construction documents • Provide any additional consulting services • Filing approval of governmental authorities • Acts as owner's representative

Figure 18: Responsibilities of owner and architect

Source: AIA Document B105[59]

According to American Institute of Architects (AIA) Document B105 (2007), *Standard Form Agreement between Owner and Architect for a Residential or Small Commercial Project*, the architect's responsibilities start after receiving all the approvals necessary documents from the

[57] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 2.
[58] Ibid.
[59] "B105: Owner and Architect Agreement for Residential/Small Commercial Project - The American Institute of Architects," The American Institute of Architects, accessed January 20, 2015, http://www.aia.org/contractdocs/AIAB088237.

owner. The list of responsibilities is clearly defined. The architect is responsible for the design production and the outcome of the project, while the owner is not stated as a participatory part of the design process. This does not, however, reflect how the client is becoming more interested in the involvement of design decisions. This AIA Document B105 serves as a basic guideline, yet the distribution of duties between owner and architect can change under the agreements made between the two parties. It also demonstrates the traditional client-architect relationship and how the traditional owner's level of interaction with architects consists of approval or disapproval stages in the overall design process.

Architects as Facilitators

Although the original responsibilities of a "master builder" have been dispersed into different professions, the current nature of an architect's responsibilities requires having knowledge in diverse fields as Nicol and Pilling state in their publication *Changing Architectural Education: Towards a New Professionalism*:

> [A]s a result of changes in society, technological advances and the rapid growth in information, those entering a profession are likely to update their knowledge and skills many times over a lifetime. All this is calling on architects to become more skilled in the human dimensions of professional practice and more adaptable, flexible and versatile over the span of their professional careers.[60]

These words bring the following question. *How do architects fit within the concept of co-design?*

During a co-design session, architects can act as facilitators. Sanders and Stappers[61], Soini[62], Iversen et al.[63], and Straus and Doyle[64] all believe that designers will become facilitators in the future. Generally, this belief is true in today's world as architects are, indeed, acting as facilitators. It is reasonable for architects to act as facilitators in a co-design session for such an

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[60] Nicole and Pilling, *Changing Architectural Education: Towards a New Professionalism*, 1.
[61] Elizabeth Sanders and Pieter Stappers, "Co-creation and the New Landscapes of Design," *CoDesign* 4, no. 1 (2008): 11, accessed January 28, 2015, doi:10.1080/15710880701875068.
[62] Katja Soini, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops" (in proceedings of Connecting-A Conference on the Multivocality of Design History & Design Studies, Helinsky – Tallin, August 23-25, 2006), accessed March 10, 2015, http://www2.uiah.fi/~kvirtane/julkaisut/KS_Industrial_Designers_as_Facilitators_Connecting.pdf.
[63] Ole Sejer Iversen, Kim Halskov and Tuck W. Leong, "Values-led participatory design," *CoDesign* 8, no. 2-3 (2012): 93, accessed February 1, 2015, doi:10.1080/15710882.2012.672575.
[64] Straus and Doyle, "The Architect as Facilitator: A New Role," 13.

approach is an efficient use of company time and money. However, professional facilitators are typically hired when the design project is controversial, high profile, or sensitive to the community. Facilitation skills are valuable because, according to Charles Martin and Donald Hackett in their book *Facilitation Skills for Team Leaders*, facilitators are "responsible for structuring teams, groups or tasks forces, and their activities so as to allow for their success in attaining organizational goals and objectives."[65] In other words, facilitators help shape and sculpt the results for the client; they inspire different kinds of people to participate, they assist clients with communicating more effectively, and they possess the management skills to produce meaningful outcomes. These skills are useful for negotiating with clients.

Facilitation varies within different professional fields. The word "facilitation" means to make processes easier and more efficient. Facilitation applied to the design process means leading the sessions to produce useful and meaningful results. The act of facilitation varies from discovering users' wants and needs, to managing the general direction of the co-design session acting as the interpreter between users and designers. Katja Soini, development manager at Vahanen Group based in Finland, states in her article entitled, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops," that a "facilitator enables others to collaborate, be creative, and innovate."[66] The work of a facilitator requires ideation, visualization, social, communication, and research skills. The work of facilitation overlaps duties of an architect as they both involve mastering ideation and visualization.

[65] Charles Martin and Donald Hackett, *Facilitation Skills for Team Leaders* (Menlo Park, CA: Course Technology/ Cengage Learning, 1993), 6.
[66] Soini, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops," 1.

6.0 CO-DESIGN: DESIGNING WITH PEOPLE

6.01 DEFINING CO-DESIGN

According to *The Columbia Guide to Standard American English*, by Kenneth George Wilson, "co" as a prefix means "together, joint" or "equally, mutually."[67] Whereas, "design" means "the creation of a plan or convention for the construction of an object or a system."[68] For this dissertation, co-design will be defined as **the** "process of designers designing with non-designers."[69] Co-design is a method to empower collective creativity. It is about being active and involved in the design process of products or services that add value to peoples' lives. Co-design is about serving society with one's creative self. It is a public service to the community and expresses how architecture should be an act of service to the community with participation from its members.

The term co-design is mistakenly used with other similar "co-" terms such as co-creation. Elizabeth Sanders and Pieter Stappers, an expert in pre-design research and a design professor at Faculty of Industrial Design Engineering, Delft University of Technology, authors of the article, "Co-creation and the New Landscapes of Design," explain that "co-creation refers to any type of act of collective creativity and co-design is collective creativity that is applied across the whole span of a design process."[70] In that sense, co-design is a derivative of co-creation. Sanders and Stappers agree when they broadly refer to co-design as "[T]he creativity of designers and people not trained in design working together in the design development process."[71] The relation between co-creation and co-design and how it applies to this research is simple: co-design is used as one strategy to co-create with clients. In agreement, Sanders and Stappers state, "co-designing is a specific instance of co-creation."[72] Another term worthy of defining for the purpose of this doctoral project is "collaboration." Collaboration is to be used as a more generalized term than co-design and is used when designers work with a mix of professionals, not necessarily only during the design process like co-design. Collaboration would include the mix of professionals along

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[67] Kenneth Wilson, *The Columbia Guide to Standard American English* (New York: Columbia University Press, 1993), 99.
[68] "Cambridge Dictionaries Online," accessed March 8, 2016, http://dictionary.cambridge.org/dictionary/english/design.
[69] Sanders and Stappers, "Co-creation and the New Landscapes of Design," 2.
[70] Ibid.
[71] Ibid.
[72] Ibid.

with clients and users. For example, a team comprised of architects, engineers, contractors, and the owner worked in collaboration through a co-design session. With key terms are defined, it is crucial to know how co-design came to be as influential in the business and design field as it is today.

6.02 HISTORY OF CO-DESIGN

The idea and methodology of co-design originates from business or marketing, not from the design practice. Sanders and Stappers state that C. K. Prahalad and Venkat Ramaswamy are the first to bring the idea of co-creation into the business field with their book *The Future of Competition: Co-Creating Unique Value with Customers*.[73]

> The meaning of value and the process of value creation are rapidly shifting from a product- and firm-centric view to personalized consumer experiences. Informed, networked, empowered and active consumers are increasingly co-creating value with the firm.[74]

In the business field, the application of co-design is used as a marketing tool. Marketing strategies that include customers' input, feedback, and contributions pave the way for real customers to be a part of the design process, ultimately utilizing co-design strategies. It is a valuable strategy that should not be merely used to educate the customer on the product or service but also to solve problems and create new perspectives to improve ways of living. For example, a case study on the merge of two fashion brands, Trendsales.fi (Finland-based) and Kaos (Danish-based), was conducted by the European Commission in their article "Business Innovation Observatory: Design for Innovation."[75] Trendsales.fi and Kaos incorporated the co-design and co-creation methods by using crowdsourcing as a tool for customers to co-create the latest fashion trends. Crowdsourcing is the process of obtaining information from a large group of people, and it is typically implemented through the online community. An ideation contest was put on by

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[73] Sanders and Stappers, "Co-creation and the New Landscapes of Design," 4.
[74] C. K. Prahalad and Venkat Ramaswamy, "Co-creation Experiences: The Next Practice in Value Creation," *Journal of Interactive Marketing* 18, no. 3 (2004): 5, accessed March 10, 2015, doi:10.1002/dir.20015.
[75] Kristina Dervojeda, Diederik Verzijl, Fabian Nagtegaal, Mark Lengton, Elco Rouwmaat, Erica Monfardini, and Laurent Frideres, "Design for Innovation: Co-creation design as a new way of value creation," *European Union* (2014), accessed March 10, 2015, http://ec.europa.eu/growth/industry/innovation/business-innovation-observatory/files/case-studies/14-dfi-co-creation-design-as-a-way-of-value-creation_en.pdf, 1.

Trendsales.fi to provide incentives for both the company and the co-creator, also known as the designer, to participate in this process.[76] Ideation can be defined as the creation of ideas. The purpose of the contest was to find the next aspiring young and talented fashion designer to co-design a jacket collection for next season. The winner of the contest would get his or her name attached to the next season fashion collection, providing them with global exposure along with the opportunity to co-design the collection with the company's fashion designer. Within three weeks, crowdsourcing enabled 54 designers to participate and attracted 2,390 customers to vote on the designs. This increased the amount of exposure for the companies.[77] In this business case study, co-design was used as a marketing incentive for designers to co-create with a big fashion brand name.

Initially, marketing had complete control over products and services and, in a sense, traditional marketing controlled users' desires. Yet, a shift in customer value has occurred. Now, customers also find value in their experiences with a product or service, not just the product or service itself. However, experiences could be improved if the customer is included within the design process. The basis of traditional marketing has changed from functional characteristics to experiential characteristics. For instance, functional characteristics meaning people used to seek for products that provided usability and basic working functions. Now, people seek for experiential characteristics, meaning they value the experience that comes with receiving a product. This can be observed when a person buys an iPhone. The iPhone is known for their luxurious packaging because it creates a new experience for the customer as they unveil each part of the iPhone. As Bernd Schmitt, a professor of international business at Columbia University in New York, states in his article, "Experiential Marketing," "Traditional marketing has been developed in response to the industrial age, not the information, branding and communications revolution we are facing today."[78] User experience has been highlighted as a contrast to traditional marketing and has redefined the marketing industry. "Experiences provide sensory, emotional, cognitive, behavioral, and relational values that replace functional values."[79] Co-design is and can

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[76] Dervojeda et al., "Design for Innovation: Co-creation Design as a New Way of Value Creation," 6.
[77] Ibid., 7.
[78] Bernd Schmitt, "Experiential Marketing," *Journal of Marketing Management* 15, no. 1-3 (January 1999): 55, accessed March 5, 2015, doi: 10.1362/026725799784870496.
[79] Schmitt, "Experiential Marketing," 57.

be used to create user experiences. The user would be the end-user of the product or service, the person to actually physically use it.

The concept of co-design is far from being new in the architecture field. In fact, there are two types of co-design strategies that are being used in architectural practice today: design charrettes and participatory design. The concept of a design charrette originates from the École des Beaux Arts in Paris, France during the 19th century, when art and architecture students had to meet intense deadlines.[80] These deadlines could have been anywhere from a day to a three-day charrette, where it was likely that the students did not sleep much during that period. The "charrette" was a cart that the proctors used to collect the final drawings that students were frantically finishing as they passed by.[81] The typical "design charrette" scenario was students participated in a timed design session, and by the end of it, a proctor would come by with a "charrette" to collect all the drawings to be critiqued.

Today, the concept of design charrettes has somewhat changed, though it is still used to think of design ideas in a short time frame. Design charrettes are now more commonly used in the initial stages of architectural design process so designers can interact with users and stakeholders within a project. It is also used privately within architecture design firms as a method to bring all designers at the firm together to create design concepts. Rob Roggema, a landscape architect based in the Netherlands and expert in creating design charrettes, in his book *Design Charrette: Ways to Envision Sustainable Futures*, defines design charrettes as the act of "engaging people in a planning process. It is a creative, intensive and an embracing way to discuss, draw and build images of a future that is desired by *all* participants."[82] The levels of user participation differ depending on contexts and situations; therefore, the level of participation is differs every time. The different levels of participation, better known as the "Ladder of Participation,"[83] are later discussed in this chapter. Whether it is practiced only between designers or designers with non-designers, design charrettes are crucial during the initial stages of a design, as it plays as an influential communication strategy.

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[80] "The NCI Charrette System," accessed January 23, 2016, http://www.charretteinstitute.org/charrette.html.
[81] "The NCI Charrette System."
[82] Rob Roggema, *The Design Charrette: Ways to Envision Sustainable Futures* (New York: Springer, 2013), 11.
[83] Sherry Arnstein, "A Ladder of Citizen Participation," *Journal of the American Institute of Planners* 35, no. 4 (1969): 216, doi:10.1080/01944366908977225.

Participatory design (PD), as an additional co-design related concept, existed and has been in practice since the 1970s. Its application and principles have evolved over time and been adapted by many industries. According to Jesper Simonsen, Professor of Design Studies at Roskilde University, and Toni Robertson's, Professor of Interaction Design at the University of Technology, Sydney, book titled *Routledge International Handbook of Participatory Design*, "PD is about engaging users in the design of new information technology. Much of the research within Participatory Design has been concerned with developing and improving methods, techniques and tools supporting *how* Participatory Design can be done in practice."[84] Participatory design has been used to integrate active end-user input to create more cohesive and well-rounded decisions. Because of its decade-long history, PD is the most common strategy used for co-design between designers and users today. PD is used in software design, architecture, landscape architecture, product design, urban design, graphic design, the field of medicine and more.

Michael Muller, internationally recognized expert in participatory design, and Sarah Kuhn, Professor of Interaction Design at University of Massachusetts Lowell, authors of an article entitled "Participatory Design," state "PD first took root in Europe, especially in the Scandinavian workplace democracy movement."[85] In addition, Clay Spunzzi's article titled "The Methodology of Participatory Design," says that PD derived from political changes in the workplace and was "motivated by a Marxist commitment to democratically empowering workers and fostering democracy in the workplace."[86] Workers fell into unemployment because there was a large disconnect between use of technology and the worker's ability to use it. This highly impacted Scandinavia workers. As a solution, participatory design was co-created between software developers and end-product users, also known as the workers. The purpose was to understand, design, and redevelop new technologies ultimately "allowing workers to retain control over their work."[87] This integrative solution of designing along with the workforce has proven to be successful in creating products and solutions that work well for the people of the workforce. This PD approach of designing with end-users is still practiced today.

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[84] Tone Bratteteig et al., *Routledge International Handbook of Participatory Design* (New York: Routledge, 2013), 118.
[85] Michael Muller and Sarah Kuhn, "Participatory Design," *Communications of the ACM* 36, no. 6 (1993): 26, accessed February 1, 2015, doi:10.1145/153571.255960.
[86] Clay Spinuzzi, "The Methodology of Participatory Design," *Technical Communication* 52, no. 2 (2005): 164.
[87] Ibid.

Traditionally, "participatory design is done by, for, and with people who are using some kind of digital technologies"[88] as Joan Greenbaum, professor emerita at City University of New York, and Daria Loi, UX Innovation Manager at Intel Corporation, state in their article "Participation, the Camel and the Elephant of Design: an Introduction." Today, PD strategies and principles are applied to many types of disciplines that do not necessarily involve digital technologies such as, urban design, landscape architecture, product design, architecture, planning, and so on. However, some researchers do not classify PD work as PD but, instead, classify it as collaborative work. Since the 1970s, the principles of PD have been adapted, transformed, and evolved into other collaborative strategies such as transformative design, service design, interaction design, user-centered design, and even co-design.

It is important to note that, although co-design fundamentals and principles are used in the architecture industry, the process is not typically documented within academia or on a public platform. Sometimes the process is documented under other related co-design terms, such as participatory design or collaborative community design. The term "co-design" has not been regarded as standard terminology, possibly because the difference between the two terms has not yet been identified as significant within the design field.

Most design strategies that include the user within the design process have many overlapping principles. Co-design and participatory design are no exception to this overlap. However, the difference between co-design and participatory design would be their historical roots. As stated previously, participatory design derived from a political, technological problem that occurred in Scandinavia, whereas co-design was first noted in the business field as a way for companies to include end-users in different stages of creating a new product or service. Some people see co-design as a simple process that can be taught to people to use for their own purposes and can adapt for the involvement of key professional stakeholders. While participatory design majorly focuses on involving important stakeholders as key players of the process. David Casali, a user experience director and startup advisor, agrees, as stated in his blog post entitled "Co-design and participatory design: a solid process primer." "Co-design leans more on teaching

[88] Joan Greenbaum and Daria Loi, "Participation, the camel and the elephant of design: an introduction," *CoDesign* 8, no. 2-3 (2012): 81, accessed January 28, 2015, doi:10.1080/15710882.2012.690232.

the skills to the recipients of the process, while Participatory Design stress more the involvement factor, but in the end they are both part of a design that is centered on the users involved in it."[89]

Although concepts of co-design are typically used in the architecture industry, this dissertation addresses that architectural education's integration of this these communication skills of engagement with clients, stakeholders, and users can be improved. Integrating concepts of co-design and design communication can improve students' confidence and knowledge in preparation for professional practice. This dissertation proposes to design an educational environment to integrate students to engage with clients and users by providing a space for co-design to occur and also exposing students to the pedagogy of co-design.

6.03 WHY CO-DESIGN?

The general notion of co-design is a fairly common approach to design, even though took a long while before co-design was fully accepted in the professional practice of many different industries, especially design.[90] Sanders and Stappers detail one of the main reasons. "Co-designing threatens the existing power structures by requiring that control be relinquished and be given to potential customers, consumers or end-users."[91] The question, then follows. What is the purpose of designers if users themselves are able to identify the problems, solutions, and needs? This issue was previously answered in another section discussing how designers will become facilitators of the future.

Under the assumption that situational circumstances will only get more complicated, John Thackara, a writer, speaker and design producer, states that there is a need to find new ways to solve the complex problems of today and the future.[92] Soini claims that there are two reasons collaboration between designers, clients, and users is becoming increasingly important: "[C]hange in design problems and change in work culture."[93] Muller and Kuhn agree stating that businesses

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[89] Davide Casali, "Co-Design and Participatory Design: A Solid Process Primer," *Intense Minimalism* (blog), November 28, 2013, http://intenseminimalism.com/2013/co-design-and-participatory-design-a-solid-process-primer/.
[90] Sanders and Stappers, "Co-Creation and the New Landscapes of Design," 5.
[91] Ibid.
[92] John Thackara, *In the Bubble: Designing for a Complex World* (Massachusetts: MIT Press, 2005), 8.
[93] Soini, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops," 2.

strategically turn to collaboration for a competitive advantage because of rapid technology advancement.[94]

Co-design is a way to holistically understand these evolving problems and to creativity solve them, with users and experts on the relevant topic. Creativity is at its best when it involves collaboration of different minds and not solely one designer's mind because, "if designers stay in one organization," says Thackara, design results are monotonous and restricted."[95] Designers must design with users because users can give valuable insight to things that typically would not be apparent.

6.04 WORKSHOP MENTALITY

A successful co-design method would have to be complimented with a solid workshop mentality. Workshops are valuable because they allow for a leveled platform with an open-minded and welcoming atmosphere. The workshop mentality offers all participants a chance to put all their ideas on the table without harsh judgment. Shared decision-making power is a concept that needs to be accepted in order for a co-design session to succeed. Elizabeth Sanders, a visionary in pre-design research, wrote in her article entitled "From User-Centered to Participatory Design Approaches," "the new rules are the rules of networks, not hierarchies."[96] A common misperception assumed by clients or participants of the workshop is that the workshop themselves are expected to produce answers to questions or problems. However, not all workshops are designed to provide answers. As an example, Sioni's project IKE workshop "did not develop any solutions, technical details or concepts, but opened new perspectives."[97] IKE is the given name for the study that focused on defining the needs for a residential-oriented renovation project. New perspectives are valuable depending on how clients or designers chose to use this information. In other words, workshops are sometimes designed as a way to open minds and think freely.

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[94] Muller and Kuhn, "Participatory Design," 26.
[95] Soini, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops," 5.
[96] Elizabeth Sanders, "From User-centered to Participatory Design Approaches," in *Design and the social sciences: Making connections*, ed. Jorge Frascara (United Kingdom: CRC Press Inc., 2002), 2.
[97] Soini, "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops," 4.

Co-design methods must meet a list of workshop guidelines to increase the likeliness of being successful. Some of these guidelines are based on the principles of participatory design.

- Know your role

  The point of having a co-design with clients is to be able to wear a different hat, or no hat at all. Before proceeding with the session, there must be a brief, but simple explanation of what type of mindset everyone needs to have. Although everyone has their profession and expertise, it is important to not put down ideas other participants. Knowing your role in any co-design session will act as a guide toward reaching the goal of the session.

- "Equalizing power relations"[98] from Greenbaum and Loi

  By leveling the playing field, all participants should feel welcome to share their ideas and thoughts without feeling judged. This would be implemented by predisposing rules of engagement by the facilitator such as: reminding participates that everyone is entitled to share their ideas and opinions, reminding of the main purpose of a co-design session. Other rules involve empowering those who are not normally forthcoming; no talking over others, no saying no to ideas, and so on.

- Mutual learning and respect

  Opportunities to learn from one another are present during the exchange of thoughts, discussion, and knowledge. As users share their experiences and knowledge that pertain to the co-design session, stakeholders and designers progressively become aware of design blind spots. As designers and stakeholders share their knowledge pertaining to the co-design session, users become more aware of the external processes of implementing a project.

- Transparency

  The company, or architectural firm, must present themselves with no hidden incentives and must hold a certain level of transparency so participants do not feel like they are being taken advantage of. Showing a high level of transparency will increase the willingness of clients to participate.

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[98] Greenbaum and Loi, "Participation, the camel and the elephant of design: an introduction," 1.

6.05 NEGOTIATION

By integrating the co-design guidelines, the co-design atmosphere will be designed for success. By incorporating negotiation and mediation strategies into the co-design session, it will strengthen the way architects communicate design decisions to their clients. Nicol and Pilling state, "Communication is not just about effective description: equally important is listening to clients and negotiating and facilitating the processes of building design."[99] Under the assumption that a series of co-design sessions will be conducted, not just one, at various stages of the design process, the lead designer can utilize negotiation strategies to validate and strengthen their design decisions based on previous co-design sessions. Results from previous co-design sessions will assist in further defining the purpose and outcomes of the following co-design sessions as well as developing design aspects in the next stages of the design process.

Although negotiation and mediation seem like they often complement each other, they are two distinct concepts. According to Peter Carnevale and Dean Pruitt, in their article "Negotiation and Mediation," negotiation and mediation are defined as follows. "Negotiation involves discussion between the parties with the goal of reaching an agreement," while "[M]ediation is a variation on negotiation in which one or more outsiders assist the parties in their discussion."[100]

Workshops create mutual benefits while co-designing takes the relationship with clients to another level, ultimately to develop trust and some sense of co-ownership over the design process. Thus, co-design sessions can be used as negotiation and mediation strategies to change a traditional business relationship. These open opportunities for a mutual level of understanding during design decisions might affect a number of factors such as apparent priorities such as cost and time.

The structure of negotiation is proactively crafted to influence key players, stakeholders, and others included in the process. Negotiation is a game of strategy, and there is no definitive pathway to success because key elements exist that can change and shift at any moment. Michael Watkins, Professor of Leadership and Organizational Change at IMD based in Switzerland, in his article "Teaching Students to Shape the Game: Negotiation Architecture and the Design of

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[99] Nicol and Pilling, *Changing Architecture Education: Towards a New Professionalism*, 5.
[100] Peter Carnevale and Dean Pruitt, "Negotiation and Mediation," *Annual Review of Psychology* 43, no. 1 (1992): 532, doi:10.1146/annurev.ps.43.020192.002531.

Manageably Dynamic Simulation" states, "Negotiation architectures are socially constructed phenomena,"[101] adding to the uncertain outcome. However, by mastering negotiation and mediation, participants are able to shape, lead, and maneuver their way to a hopeful win-win situation.

In negotiation, there are two important factors to have in possession—power and leverage, as Ava Abramowitz, formerly the deputy general counsel of The American Institute of Architects, asserts in her book titled, *Architect's Essentials of Contract Negotiation*. She also states that power is formal, while leverage is informal.[102] Power comes with authority, whereas leverage comes from any kind of advantage to influence the opposing party. Both power and leverage have to be earned. According to Abramowitz, architects have power and leverage that is defined by design scarcity (owners need architects for their skills to complete the project goals).[103] Since a client's trust and value is being placed in other key players (e.g., engineer, contractor, or construction manager), architects can utilize co-design in combination with negotiation as a strategy to gain "power and leverage," while exposing the client to more value-driven design decisions. Just as co-designing skills are not taught in architecture schools, neither are negotiating and mediating skills.

According to Abramowitz, there are three ways to negotiate: hard, soft, and principled that will be examines in this dissertation.[104] The Harvard Negotiation Project developed "principled negotiation" in the late 1970s, and Abramowitz states that principled negotiation is a way to act on merits. [105] An example of acting on merits is when a party of participants encounters a problem. The way to approach the solution is by prioritizing interests and not prioritizing decisions based on a person's hierarchal rank. Such an approach pushes the parties to agree on solutions that solve the direct problem instead of focusing on themselves, their personality differences, or their respective positions in the organization. Architects are actually trained to make decisions on merits, as problem solvers by nature, and they are trained through school and

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[101] Michael D. Watkins, "Teaching Students to Shape the Game: Negotiation Architecture and the Design of Manageably Dynamic Simulation, *Negotiation Journal* 23, no. 3 (2007), 334. doi:10.1111/j.1571-9979.2007.00146.x.
[102] Ava Abramowitz, *Architect's Essentials of Contract Negotiation* (New York: John Wiley & Sons, Inc., 2002), 92.
[103] Ibid.
[104] Ibid., 94.
[105] Ibid., 98.

years of experience in professional practice to make priority decisions.[106] This principled negotiation is highly related to the natural work and thought patterns of an architect.

6.06 MEDIATION

Negotiation is the term for the formal approach of two parties coming to an agreement on decisions. Mediation compliments negotiation as another way of approaching discussions with a third party involved. To understand the useful scope of mediation strategies, Sherry Arnstein's article "Ladder of Citizen Participation" identifies the different levels of citizen contribution through participation activities ranging from the lowest to the highest level of citizen contribution influencing decision power. Sherry Arnstein was a health policy specialist who served 10 years as executive director of the American Association of Colleges of Osteopathic Medicine. The *Ladder of Citizen Participation* is mostly applied in the urban planning industry to involve community members. Yet, understanding the eight typologies of the *Ladder of Citizen Participation* as they assist in identifying the ideal level of participation for co-designing with clients.

In Arnstein's article, she defines citizen participation. "[C]itizen participation is a categorical term for citizen power."[107] Arnstein refers to the general population as "have-not citizens" because they do not necessarily have any power in political or societal decisions. The *Ladder of Citizen Participation* in the context in which it was written relates to the status and power of government and state officials versus the common people such as members of the community. Although it was written in this political or societal context, the general concept of the *Ladder of Citizen Participation* is similar to the design process and the relationship between client, architect, and other key professional stakeholders. The *have-not citizens* come in all ages, ethnicities, races, genders, and religions. Citizen participation is a strategy that enables *have-not citizens* to "[i]nduce significant social reform which enables them to share in the benefits of the affluent society."[108]

Figure 19 displays the "typology of eight levels of participation,"[109] which is then further categorized into three groups under nonparticipation, tokenism, and citizen power. "Nonparticipation" includes a) manipulation and b) therapy. "Tokenism" also includes c)

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[106] Ava Abramowitz, *Architect's Essentials of Contract Negotiation*, 111.
[107] Arnstein, "A Ladder of Citizen Participation," 216.
[108] Ibid.
[109] Ibid., 217.

informing, d) consultation, and e) placation. Lastly, "Citizen Power" includes f) partnership, g) delegated power, and h) citizen control. "Citizen power" is the highest form of citizen participation and is only achieved at the highest level of the *Ladder of Citizen Participation*, as seen in figure 19.

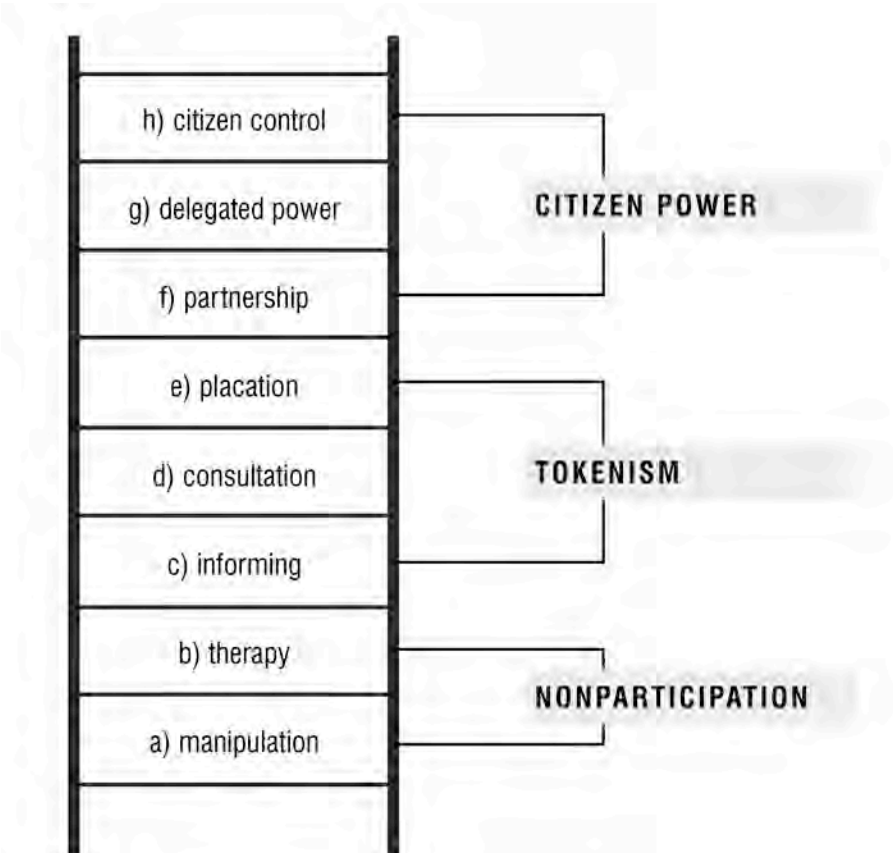

Figure 19: "Eight Rungs on the Ladder of Citizen Participation"
Source: Sherry Arnstein[110]
Illustrator: Author

The objective of "nonparticipation" is to inform the community instead of encouraging them to contribute. Nonparticipation has two rungs: a) manipulation and b) therapy. An example of *manipulation* is creating a committee advisory board whose purpose is to educate the community and public on decisions already made without the contributions of the citizens. *Manipulation* does not ask for feedback, and citizens are silenced. Citizens who hold a title in

[110] Arnstein, "A Ladder of Citizen Participation," 217.

these committee advisory boards are usually "social elites" and their job is to "sign off" on proposals by getting most of their committee members to agree with proposals. This is the highest form of participation within *manipulation*. The socially elite citizens are happy to spread the word that they have participated in the decision-making, but there is no real participation occurring. The other form of nonparticipation is *therapy*, which Arnstein describes as "both dishonest and arrogant."[111] *Therapy* is a strategy that is used on citizens when officials want to cure "them of their 'pathology' rather than changing the racism and victimization that create their 'pathologies.'"[112] In other words, instead of treating the issue at hand, officials send the victimized citizen to group therapy to "correct" their thoughts and feelings.

"Tokenism" is comprised of three rungs: c) informing, d) consultation and e) placation. The objective of *tokenism* is to give citizens the chance to express their opinions, suggestions, and concerns. The downside is that, although citizens are heard, the final decisions are still made by the officials. It is hypothetically a one-way road with citizens on the side shouting their concerns, while the officials make the final decisions. *Informing* is when officials provide information to citizens on various topics such as regulations, policies, rights, responsibilities, and options. At times, *informing* can be as simple as putting up posters or announcements on the radio, TV, or other types of media. The process up to this point has been a "sham since it offers no assurance that citizen concerns and ideas will be taken into account."[113]

The idea of *consultation* is no exception. Examples of consultation include "attitude surveys, neighborhood meetings, and public hearings."[114] There are many existing cases in which *have-not citizens* who participated in consultation methods still felt like their voices weren't heard and nothing was changed. The approach to *consultation* is similar to informing.

Lastly, *placation* allows for some citizen influence, although the characteristics of tokenism are still apparent.[115] *Placation* occurs when a chosen representative of the citizens becomes an equal member of some form of a committee board. This action provides some hope since a regular citizen is holding some power in the decision-making. However, for the possibility of being outnumbered in votes could hinder any change from occurring at all.

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[111] Arstein, A Ladder of Citizen Participation, 218.
[112] Ibid.
[113] Ibid., 219.
[114] Ibid.
[115] Ibid., 220.

"Citizen Power" is comprised of the last three rungs: f) partnership, g) delegated power and 8) citizen control. Power in the *partnership* is distributed through negotiations between citizens and power-holders.[116] *Partnership* consists of not only participating in the decision-making but also in the planning and structuring of committees and boards. This power distribution allows true citizen power. Yet, the most difficult part is the actual negotiation process of distributed power. In some instances, the success of a negotiation was only made possible when a citizen became outraged about the alleged participation.

Delegated power occurs when the citizen possesses dominant power over decisions through negotiations with public officials for certain programs or projects. Arnstein uses an example of the residents of the Hill neighborhood in New Haven. The community residents created a corporation and delegated power over the entire Model Cities plan. Arnstein states, "The city, which received a $117,000 planning grant from HUD, has subcontracted $110,000 of it to the neighborhood corporation to hire its own planning staff and consultants."[117] Delegated power steers power-making decisions toward citizens, but only if negotiated effectively.

Lastly, *citizen control* is when people demand a degree of power, which guarantees that participants or residents can govern a program or an institution; meaning that they are completely in charge of policy, managerial decisions, and negotiate conditions under which 'outsiders' may change them."[118] Even though they have *citizen control*, they still must seek the approval of city council under the demands of standard procedure. The most positive aspect is that there are no intermediaries between the citizens exercising *citizen control* and the funds for their projects.

Thus, Sherry Arstein's *Ladder of Citizen Participation* serves as a basis for understanding the various levels of citizen participation in any given situation. For the purpose of this dissertation, Arstein's *Ladder of Citizen Participation* is applied in the context of client participation rather than citizen participation. In this sense, the client already possesses a high level of *citizen control* because they are typically the primary funders for the project. Yet, the fact that the client typically has power over the funds, it is not to be confused with the level of client participation during the design process. Stemming from that, this creates the following question. *Is client participation at the same level as client control of funding?* Generally, it is not (figs. 20 and

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[116] Arstein, "A Ladder of Citizen Participation," 220.
[117] Ibid., 222.
[118] Ibid., 223.

21). In order to reach the same level, co-design will play an influential part in reaching a mutual level of client participation and client funding.

When architects and clients are applied to Arstein's concept of the "Ladder of Citizen Participation," it becomes a "Ladder of *Client* Participation," as it will be referred to for the remainder of this dissertation. The level of *client control* is split into two categories: funding and participation (fig. 20). Most clients have control of funding, but they are not necessarily meeting the same level of participation in the design process. Their stance in participation, traditionally, would relate to two of *tokenism* rungs: d) consultation or e) placation. However, in firms that perform design charrettes, client participation could reach as high as *Citizen Power* rung: f) partnership. It is at this level in which would be the most ideal for co-design to be influential in terms of client participation. This way, architects do not only act as consultants but are seen as partners through the eyes of the client. This would give a chance for, at least, a balance of client value and trust between all key players of design decisions. Client participation in co-design should ideally occur at f) partnership. However, in various situational contexts, it would be acceptable for any level of co-design to occur from d) consultation (traditional) to f) partnership.

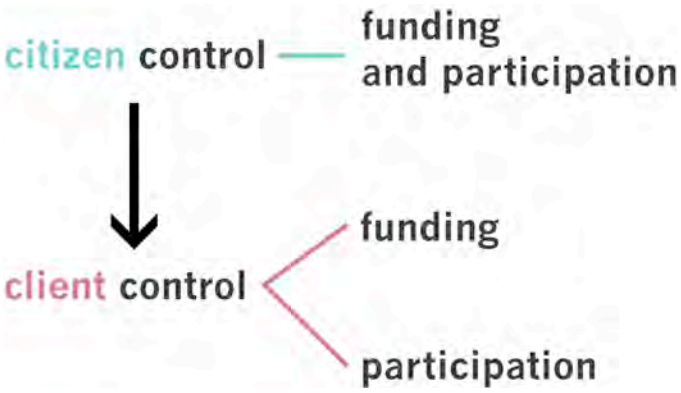

Figure 20: Citizen control when translated into client control
Source: Author

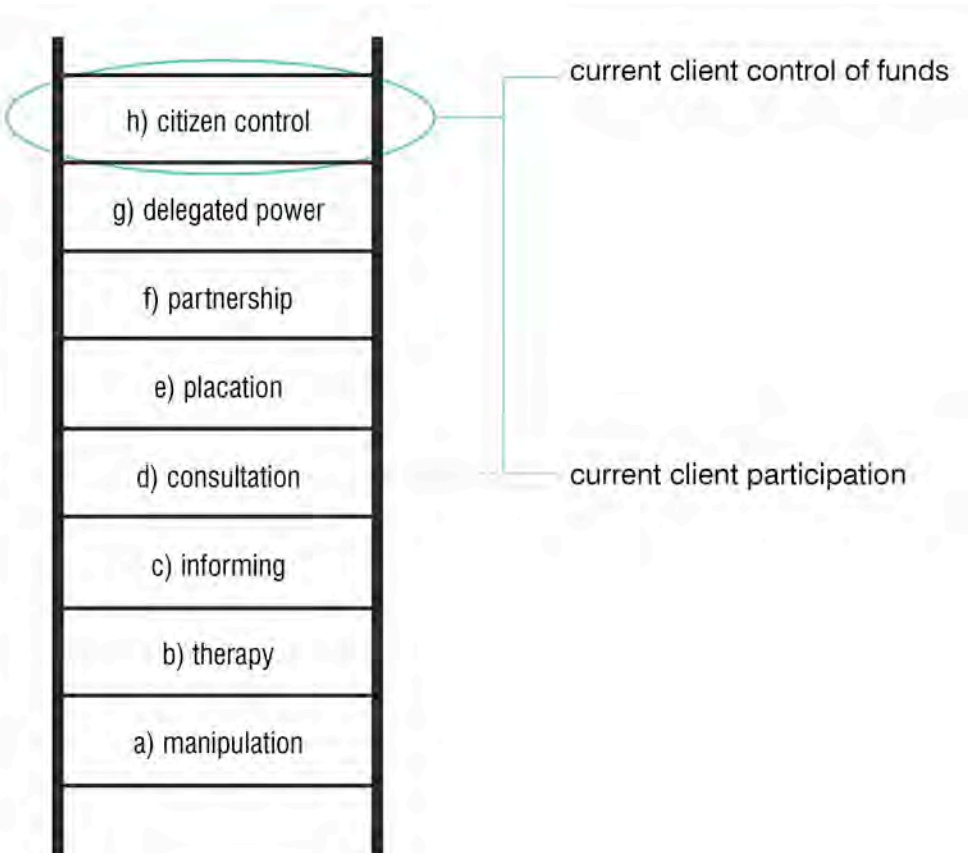

Figure 21: *Ladder of Participation* breakdown citizen control

Source: Sherry Arnstein[119]

Illustrator: Author

[119] Arnstein, A Ladder of Citizen Participation, 216.

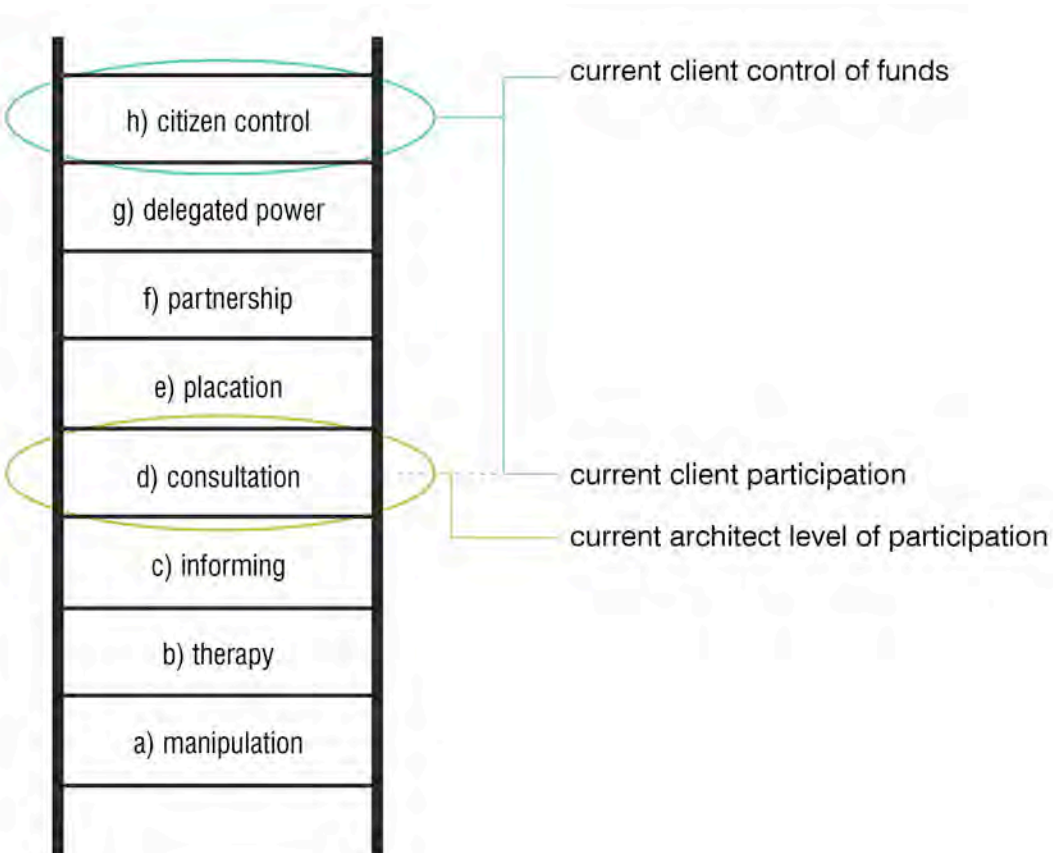

Figure 22: *Ladder of Participation* relevance to client control and participation compared to architect's level of participation

Source: Sherry Arnstein[120]

Illustrator: Author

[120] Arnstein, A Ladder of Citizen Participation, 216.

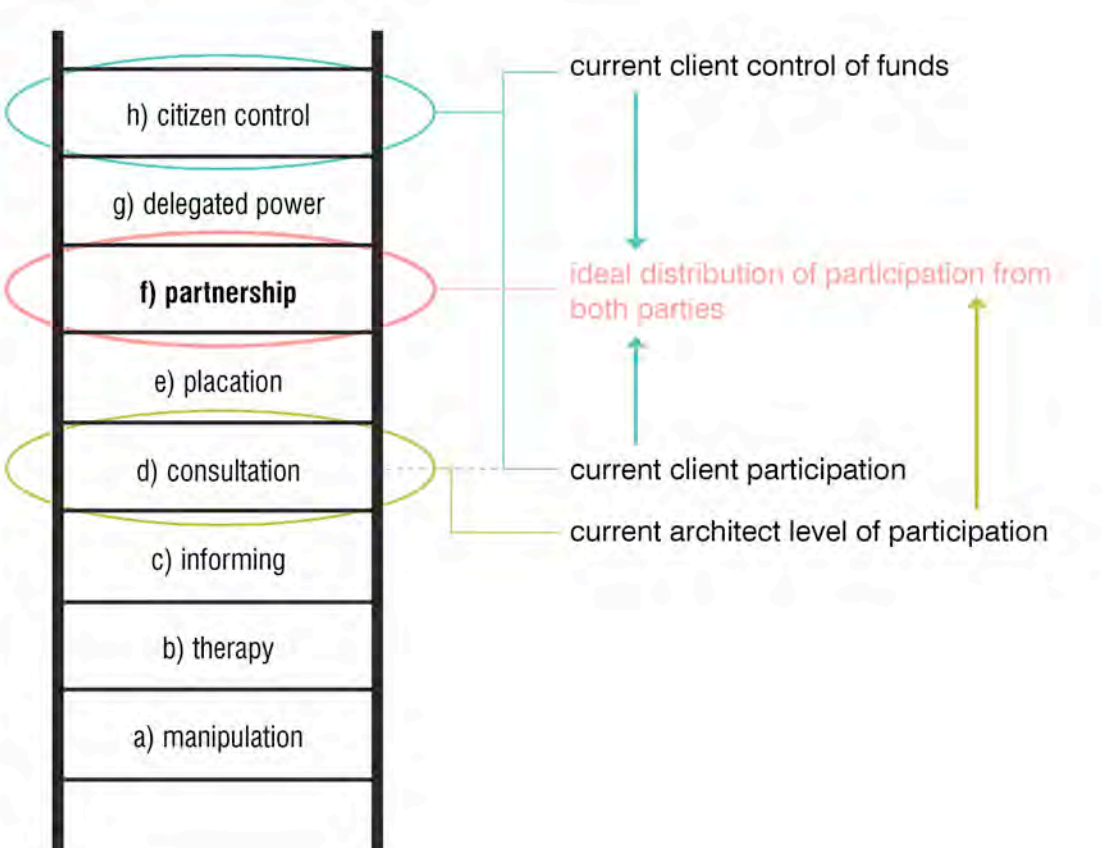

Figure 23: Ideal distribution of participation from all parties

Source: Sherry Arnstein[121]

Illustrator: Author

[121] Arnstein, A Ladder of Citizen Participation, 216.

7.0 CASE STUDIES

Two case studies have been chosen to investigate how each university, Stanford University and Harvard University, implemented programs similar to the nature of the co-design method. The case studies are the Hasso Plattner Institute of Design, or the d.school, and the Harvard Innovation Lab, or the Harvard i-lab. The findings from this investigation will act as guidelines toward the final architectural program design.

7.01 CASE STUDY ONE: HASSO PLATTNER INSTITUTE OF DESIGN, OR THE D.SCHOOL

PROJECT NAME	Hasso Plattner Institute of Design, or the d.school
LOCATION	Stanford University, Building 550 416 Escondido Mall
CONSTRUCTION COMPLETED	2010
PROJECT COST	35 million
SIZE	35,000 square feet
ARCHITECT(S)	Cody Anderson Wasney Architects
CLIENT/DEVELOPER	Stanford University: 1. Department of Project Management 2. School of Engineering 3. University Architect / Planning Office
CONSULTANTS/ARCHITECTS	Tenant Improvement Architect: MK Think Landscape Architect: SWA Group

Introduction

The d.school, formally known as the Hasso Plattner Institute of Design, is a unique design school that thrives on multidisciplinary approach for students and faculty to achieve success. In this context, success can be measured by the public's awareness of the program, increasing enrollment at the school, student feedback, and student/faculty project results. The d.school has been chosen as a case study with the intention to investigate a variety of factors in the sculpting of the final design for this doctoral project. The topics under investigation are as follows.

- Spatial relationships
- Spatial adjacencies
- Curriculum and architectural program integration

Define

The d.school is one that focuses on using human-centered design to create solutions for "the world's greatest problems." In the most basic terms, the world's greatest problems would include projects such as ending world hunger, providing clean water for global communities, and providing education for all. Stanford's School of Engineering founded the d.school in 2005 as a collaborative network of students and faculty from diverse backgrounds. Through diversity and holistic approaches to learning, the d.school has consistently been able to hold true to their objective: to prepare the next generation of innovators to tackle global challenges and problems. According to the 2012 d.school fact sheet, the d.school serves over 650 students per year, and the demand for more classes only continues to grow.[122] This number may include the students who are not officially enrolled in d.school courses but who come to use the space.

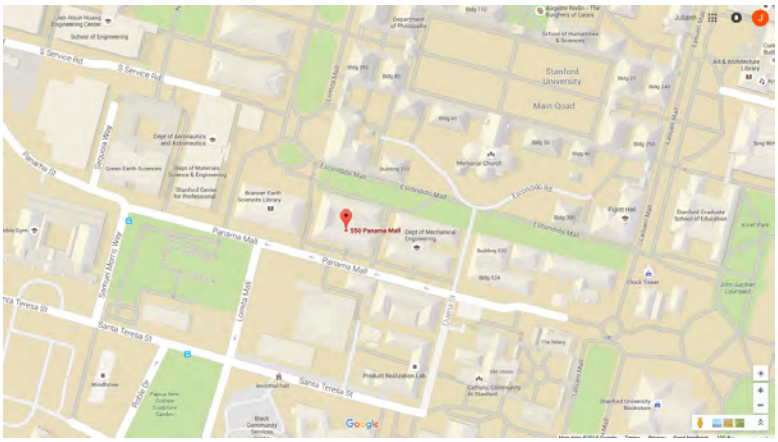

Figure 24: Graphic view map location of d.school
Source: Google Map[123]

[122] "dschool fact sheet 2012," Stanford University, accessed January 20, 2015, http://dschool.stanford.edu/wp-content/uploads/2010/09/dschool-fact-sheet-2012.pdf.
[123] "The d.school Map," Google Maps, accessed March 18, 2015, https://www.google.com/maps/place/The+d.school/@37.426272,-122.1719223,15z/data=!4m2!3m1!1s0x0:0x541dd6dcd3d6c0d3?sa=X&ved=0ahUKEwjKycToysvLAhUJ52MKHYH3AzoQ_BIIazAN.

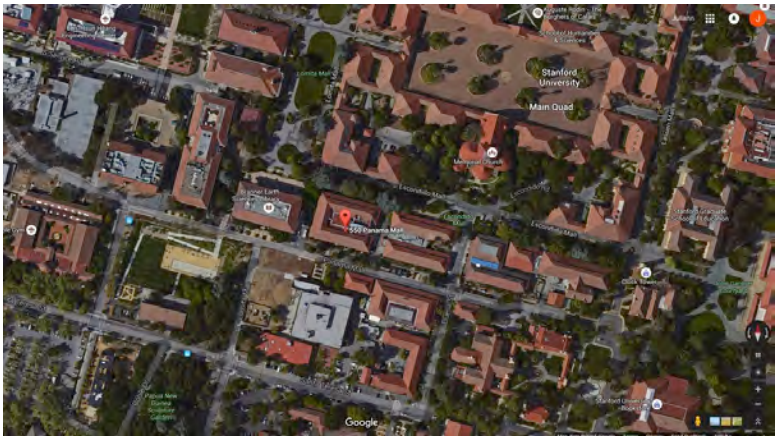

Figure 25: Aerial view map location of d.school

Source: Google Maps [124]

Figure 26: Street view of the southwest corner of the d.school

Source: Google Maps[125]

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[124] "The d.school Map," Google Maps, accessed March 18, 2015, https://www.google.com/maps/place/The+d.school/@37.426272,-122.1719223,15z/data=!4m2!3m1!1s0x0:0x541dd6dcd3d6c0d3?sa=X&ved=0ahUKEwjKycToysvLAhUJ52MKHYH3AzoQ_BIIazAN.

[125] "The d.school Map," Google Maps, accessed March 10, 2015, https://www.google.com/maps/@37.4260924,-122.1724504,3a,75y,59.01h,74.39t/data=!3m6!1e1!3m4!1sMfLrDdTUZRbqdnxlo9BaBg!2e0!7i13312!8i6656!6m1!1e1.

Figure 27: Street view of the south facade of the d.school
Source: Google Maps[126]

d.school Founder David Kelley & IDEO

David Kelley is the president of IDEO—a company most famous for its contribution to designing Apple products with Steve Jobs, among other accomplishments. David Kelley and IDEO play a significant part in the development of the d.school because IDEO's institutional culture is implemented as a part of the d.school culture. David Kelley founded the d.school with a vision of bringing multidisciplinary students together to create and collaborate. This vision was then made possible with the 35 million dollars donation from his colleague, Hasso Plattner—a German billionaire and co-founder of the major software company SAP AG.

Program

The d.school makes it clear that their primary goal is to solve the world's greatest problems through the collaboration of students, faculty, and professionals in a multidisciplinary setting. With the school's creation, they were seeking a "new kind of education that fosters creative confidence and pushes" the boundaries of traditional education. Since 2012, the d.school offers around 30 courses and workshops each year focusing on topics such as: "Design Thinking Bootcamp, From Play to Innovation, Design for Sustainable Abundance, Improv + Design, No Teacher Left Behind, Personal and Interpersonal Dynamics, and Customer-Focused Innovation,

[126] "The d.school Map," Google Maps, accessed March 10, 2015, https://www.google.com/maps/@37.4260924,-122.1724504,3a,75y,59.01h,74.39t/data=!3m6!1e1!3m4!1sMfLrDdTUZRbqdnxlo9BaBg!2e0!7i13312!8i6656!6m1!1e1.

a joint executive education program with the Graduate School of Business at Stanford."[127] This list has only grown since 2012 and the list of the current 2015 classes can be seen in figures 52 and 53.

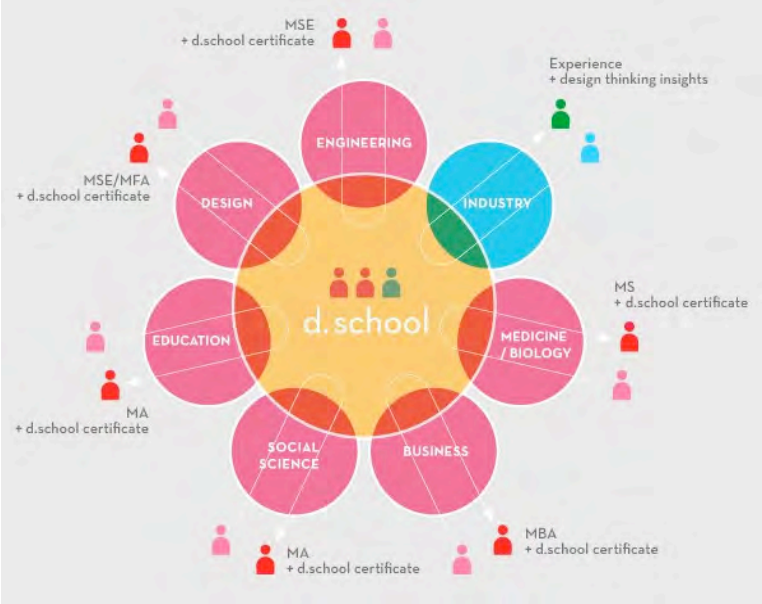

Figure 28: D.school's multidisciplinary educational program concept
Source: Stanford University[128]

In addition to their commitment to solving the world's greatest problems, the d.school also supports students in their own ambitions. Kathryn Roethel, a freelance journalist and alumni of the Stanford Graduate Program in Journalism, states in her 2007 article, "Stanford's Design School Promotes Creativity," "[S]tudents in the Design for Extreme Affordability class created Embrace, a sleeping bag that helps raise the body temperature of low-birth-weight infants"[129] at a cost that developing countries can afford. In 2010, two students created the iPhone app called Pulse News Reader for a two-and-a-half month assignment. Even before the course ended, it had become the top app purchased through iPhone. Pulse News Reader draws together news stories

[127] "d.school fact sheet 2012."
[128] "Our Point of View," Stanford University Institute of Design, accessed February 24, 2016, http://dschool.stanford.edu/our-point-of-view/.
[129] Kathryn Roethel, "Stanford's design school promotes creativity," *SF GATE*, November 26, 2010, accessed January 20, 2015, http://www.sfgate.com/education/article/Stanford-s-design-school-promotes-creativity-3244664.php.

from a variety of news media sources into one easy-to-use interface without losing data or source information.

The d.school's curriculum is grounded in one concept: "design thinking," which they define as "drawing on methods from engineering and design, and combines them with ideas from the arts, tools from the social sciences, and insights from the business world."[130] The curriculum is based on the integration of all types of disciplines with this methodology. It differs from traditional design approaches because it focuses on adding value through human-centric approaches. Design thinking thrives on discovering human values and needs, but it does not involve just thinking about a given topic. It also involves becoming active "doers."

In light of its popularity, the d.school does not offer any type of degree or certification; instead it is a supplemental, extra-curricular experience that, to some, may be worth more than a degree. It has proven successful in the fact that there is demand for impactful and meaningful programs whether or not they offer a degree. This proves that students are seeking an impactful education outside of the options in provided by the typical design curriculum. The d.school provides the alternative experience that students are seeking.

Partnerships developed between the d.school and large companies play a significant part in the d.school's success and growth. These partnerships provide job opportunities for students of the d.school. The following stand as some of the participating companies, as advertised on the d.school website.[131]

- Visa
- Teach For America
- JetBlue
- White Mountain Apache Tribe
- Gates Foundation
- Mozilla Foundation
- PepsiCo
- Palo Alto Medical Foundation
- The Girl Scouts
- Procter&Gamble
- General Electric
- NewSchools Venture Fund
- The City of Mountain View and Palo Alto

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[130] "Stanford Executive Education: Executive Leadership Development: Analysis to Action," accessed on February 24, 2016, http://www.gsb.stanford.edu/exed/eld/.
[131] "Our Point of View."

- Project[RED]
- Electronic Arts
- Stanford Trauma Center
- Motorola
- Google
- WNYC public radio

School Culture

During a video interview entitled "d.school Founder Taps into Humankind's Innate Creativity,"[132] David Kelley discussed how the d.school was made to be student grounded—belonging to the students. One of the strongest visions that David Kelley had for the d.school was for it to be a "student's canvas." He wanted students to express themselves creatively without worrying about getting the walls or floors dirty. This commitment is the reason most of the walls in the d.school are dry-erase boards. In another video, "Stanford d.school - case study,"[133] the speakers state how it was important for the space to be equally available to faculty and students. Among the speakers was d.school's creative director, Scott Doorley, who spoke about how students are in control of their own learning because the d.school encourages them to create. Educational researcher, Elise Valoe, agreed with Scott Doorley, in the same video stating, "[S]tudents are discovering new concepts and creating their own knowledge instead of memorizing facts."[134]

Mobility and flexibility were architectural concepts that drove the design within this educational space. It is a space that empowers and encourages students to take control of their own curriculum. At the d.school, they believe that their open floor plan gives students more mobility within the space thus increasing their chances of engaging in leadership roles. Media outlets and connections to electronic devices, such as cell phones, tablets, and laptops, also play a substantial role in sharing and communicating ideas quickly. According to d.school director George Kembel, "Creativity follows context."[135]

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[132] "d.school Founder Taps into Humankind's Innate Creativity," YouTube video, 57:37, posted by "John S. Knight Journalism Fellowships at Stanford," July 18, 2013, https://youtu.be/ag1PfUUXk_k.
[133] "Stanford d.school – case study," YouTube video, 3:32, posted by "Steelcase," December 6, 2010, https://youtu.be/NSjezj7_6mc.
[134] Ibid.
[135] Linda Tischler, "The Idea Lab: A Look at Stanford's d.school," *Fast Company*, June 2010, accessed January 10, 2016. http://www.fastcompany.com/1637759/idea-lab-look-stanfords-dschool.

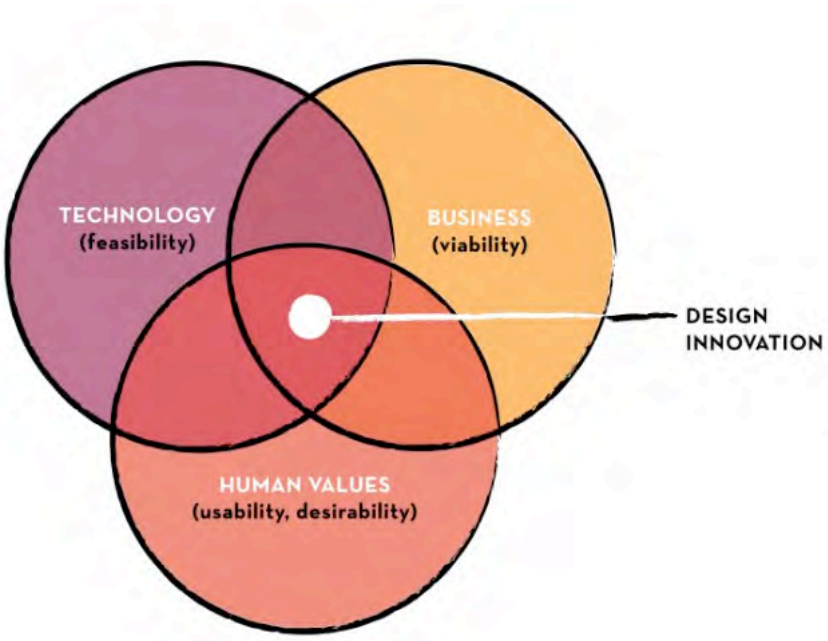

Figure 29: D.school's design innovation concept
Source: Stanford University[136]

Background: Site Selection

The d.school is located side by side with its founding school, Stanford's Department of Mechanical Engineering, and the two buildings share spaces on the southeast corner of the d.school. A portion of the d.school is designated for the Design Group for Mechanical Engineering—a separate space from the d.school. Since the Department of Mechanical Engineering is the d.school's founding school, it is not completely surprising that parts of their department are connected to the newly renovated d.school.

Background: Historical

Before receiving their funding, the d.school was based out of a trailer on the outskirts of the Stanford University campus. Now, the school is operating out of a 35,000-square-feet building located on Stanford's campus in Building 550, formally known as the Peterson Laboratory. According to Alan Guo of *The Stanford Daily*, in an article titled "Peterson Lab Undergoes Renovation," "The Peterson Lab was previously home to several material science

[136] "Our Point of View."

laboratories, the Center for Integrated Facility of Engineering (CIFE) and the Global Climate and Energy Program (GCEP)."[137] Building 550 was first constructed in 1907 as a horse stable and received renovations with respect to its historical bones. "Historical bones" meaning the main structural elements that are helping the building stand up on its own. Architecturally and functionally, Building 550 did not fit the d.school's program requirements, so alterations were necessary. However, an effort was made to conserve as many of the historical elements as possible to preserve Stanford University's historical memory while promoting sustainability.

Space Enhancement: Renovations

Renovations, completed in 2004, were implemented to better fit the d.school's program needs. To restate, the d.school embraces the concept of being every student's canvas. The goal is for students to feel like they can draw, sketch, paint, and, simply, create anything they want. The most significant renovations to the building included a new atrium and the demolition of interior walls. As shown in the figures 30 and 31, more than half of the walls on the first floor and approximately half on the second floor were demolished to create open spaces. These open floor plans allow for creativity and maximum configurability for workspace.

Originally, the atrium space extended out to the adjacent road between Building 550 (Peterson Laboratory) and Building 540 (Department of Mechanical Engineering), as shown in figure 32. After the renovations were complete, the atrium is shaped like an opening near the center of the second floor that allows users to circulate around the entire second floor, as shown in figure 33.

[137] Alan Guo, "Peterson Lab Undergoes Renovation," *The Stanford Daily*, May 29, 2008, 5.

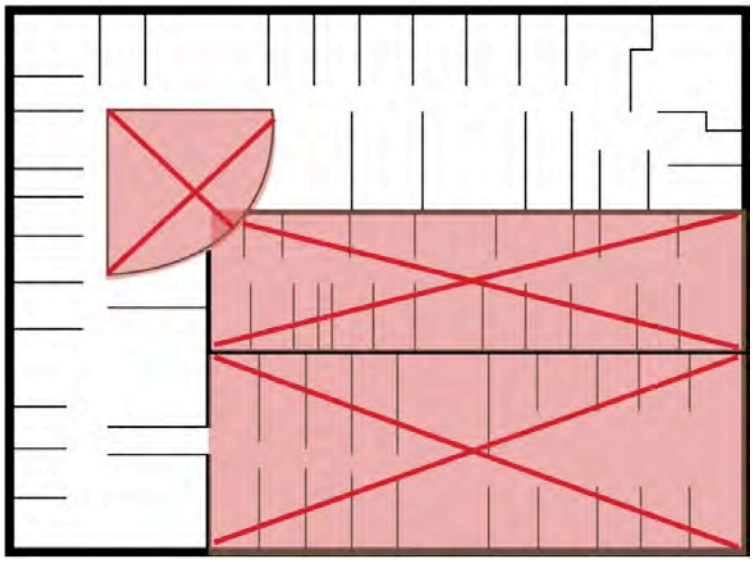

Figure 30: Demo plan: first floor of Peterson Laboratory

Source: Stanford University[138]

Illustrator: Author

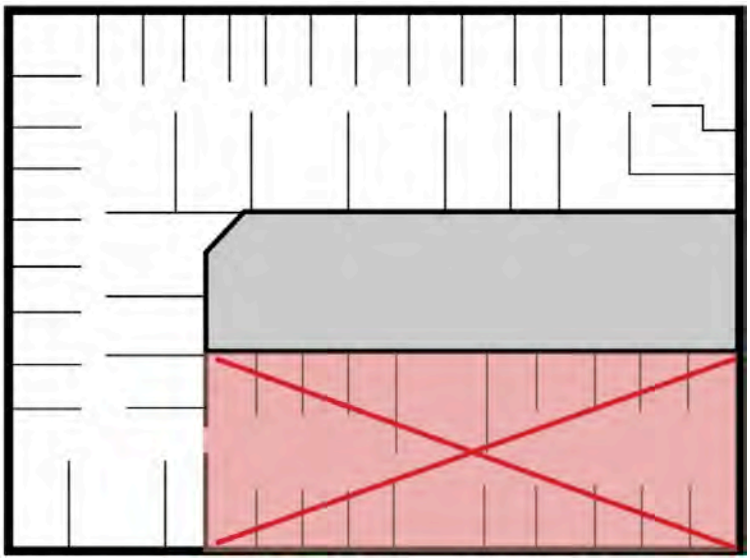

Figure 31: Demo plan: second floor of Peterson Laboratory

Source: Stanford University[139]

Illustrator: Author

[138] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation", 2010, provided by Stanford University, blueprint.
[139] Ibid.

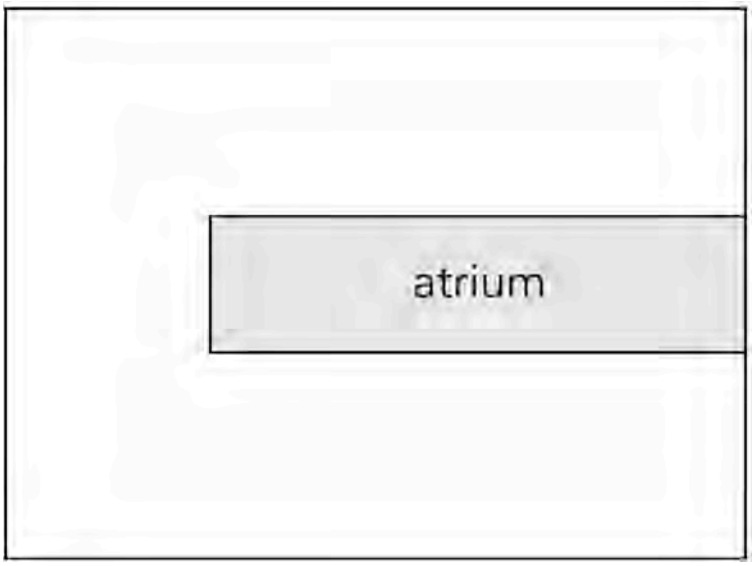

Figure 32: Building 550: Diagram of Peterson Laboratory's atrium space before the d.school renovation

Source: Stanford University [140]

Illustrator: Author

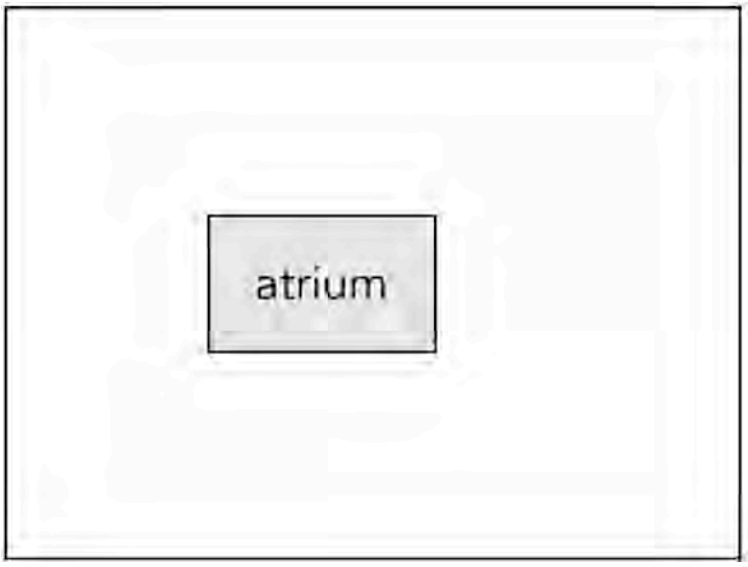

Figure 33: Building 550: Diagram of d.school's atrium space

Source: Stanford University [141]

Illustrator: Author

[140] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation," 2010, provided by Stanford University, blueprint.
[141] Ibid.

Architectural Analysis: Floor Plans

The purpose of this floor plan study is to understand spatial relationships, adjacencies, and assigned square footage for each category of use. By analyzing these concepts, a foundation can be formed for the final design. Note that these floor plans are according to the official floor plan drawings obtained from Stanford University, which were redrawn by the author of this dissertation. It is important to consider that the use of space may have been altered to accommodate new programs, student needs, or faculty projects. In fact, the d.school desired for the majority of open space to be designated for future intentions of adapting new program initiatives or projects. To simplify the analysis of spatial use distribution, areas within the d.school have been organized into six different categories. The names and descriptions of the six categories are as follows.

1. d.school student use

   These spaces are private and only used by students enrolled in d.school courses. According to the Stanford d.school website, neither the public nor University affiliates can reserve these spaces. So it is safe to assume that these are completely dedicated to d.school students. These spaces include both student studios and teaching studios. Student studios are open workspaces designated for students enrolled at the d.school, while teaching studios are for faculty to teach their classes.

2. University shared and public

   These spaces are a combination of public "always open" areas and areas for reservation only by affiliates of Stanford. These spaces include conference rooms, shared studios, a break room, booths, and interaction spaces.

3. Faculty use

   These spaces include offices, shared group offices, and shared meeting spaces that are not open to the public.

4. Circulation and restrooms

   These spaces include hallways, staircases, restrooms, and janitor closets.

5. Electrical and mechanical

   These spaces include elevator machine rooms, electrical closets, service, and data centers.

6. Administrative and lobby

   These spaces include lobby areas and administrative offices.

First Floor Plan

On the first floor of the d.school, only a small percentage of space is dedicated to the d.school students (fig. 34). The larger distribution of area is dedicated to the university shared and public and faculty offices. The fact that 7,529 square feet (equal to 34%) is dedicated to the public, demonstrates the d.school's design priority to create a welcoming atmosphere not only for Stanford University students and faculty but also for the general public. The second largest distribution is designed for faculty with 5,508 square feet (25%) of the first floor area. From greatest to least area, the last three categories are circulation and restrooms with 5,375 square feet (24%), administrative and lobby with 1,912 square feet (9%), and electrical and mechanical with 794 square feet (4%).

Entrances to the d.school are located in four different areas (fig. 36). Two of the entrances are the primary ones located on the east and south facades of the d.school, while the main entrance is located on the east facade situated side-by-side with Stanford's Department of Mechanical Engineering. The main entrance opens into a university shared and public "always open" space. The entry on the south facade faces Panama Mall, which is the main road for vehicular movement along the sides of the d.school. The south facade entry opens up into the Welcome Lobby, the main lobby. The last two entrances are both located on the north facade near Escondido Mall. One north facade entry, which is oriented to the west, opens up into a lobby that is primarily used for "always open" spaces, while the other north facade entry, oriented to the east, opens up into the faculty open office. Faculty open office is identified by office spaces that do not have doors. All entries lead either directly into the main central university shared and public open space, or they open into a similar open space, which leads into the main central university shared and public space. By analyzing the floor plan and entrances, it is clear that the main destination for users is the central university shared and public space in figure 35.

Name of Spaces	Area (sq ft)	Percentage
d.school students	1,097	5%
university shared + public	7,529	34%
faculty	5,508	25%
administrative + lobby	1,912	9%
circulation + restrooms	5,375	24%
electrical + mechanical	794	4%
Total	22,215	100%

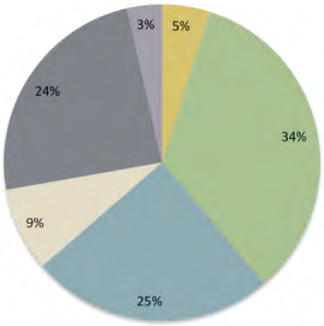

Figure 34: Calculations of total square feet of first floor plan of the d.school & pie chart of percentages

Source: Author

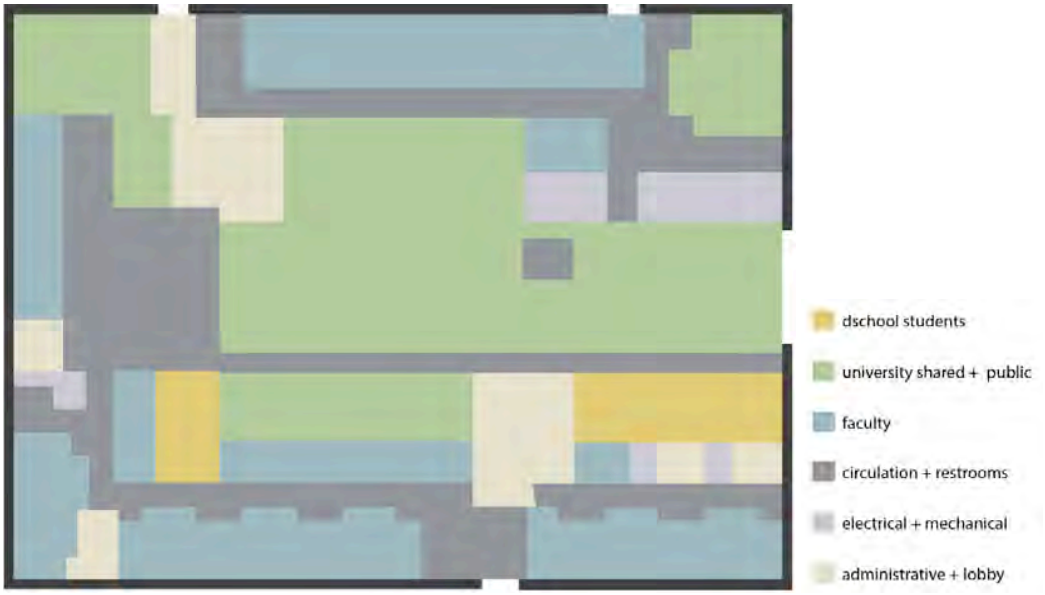

Figure 35: First floor plan of the d.school

Source: Stanford University[142]

Illustrator: Author

[142] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation," 2010, provided by Stanford University, blueprint.

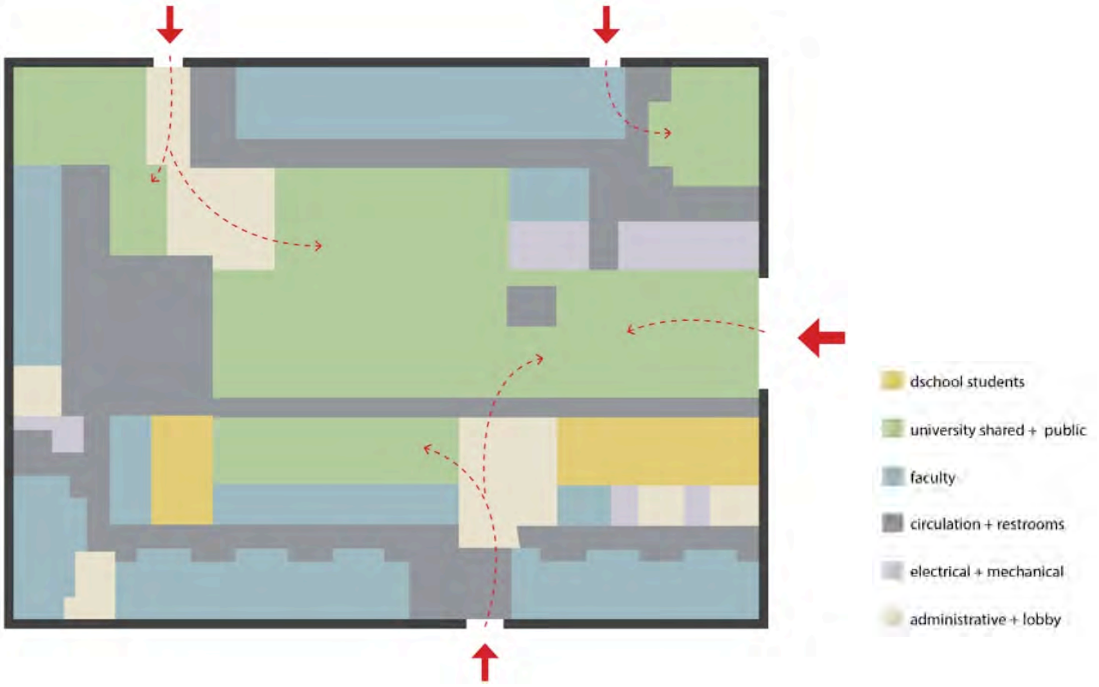

Figure 36: First floor: Diagram of entrances leading to university shared and public spaces

Source: Stanford University[143]

Illustrator: Author

The designated d.school student spaces only make up 5% of the first floor plan area, or 1,097 square feet. One particular d.school student space is accessible through the adjacent university shared and public space and the main entrance. The other main d.school student space is surrounded by faculty offices and the shared break room (under the university shared and public category) located in the southwest region of the building. This point is the farthest one from any entrance. As such, the first floor of the d.school is dedicated to sharing the facilities with the university and public, while the second floor is dedicated to d.school students.

The faculty spaces are situated on the outer border of the building, ultimately surrounding the d.school student spaces and the university shared and public spaces. This construction allows a degree of privacy for the faculty from the possible inflow of university and public members. On the other hand, the space is not completely private because, after every two units of faculty offices, there is a moment of open shared space (fig. 37). This architectural design

[143] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation," 2010, provided by Stanford University, blueprint.

supports the sense of collaboration. Faculty spaces are primarily located only on the first floor, perhaps because of the intention to create dynamic interactions and relationships between student and faculty (fig. 38). The aforementioned video "Stanford d.school - case study"[144] confirms the school's intention to mix students and faculty staff in its statements about the importance of creating equality. This creation is architecturally and spatially successful.

Figure 37: First floor: Diagram of faculty shared spaces

Source: Stanford University[145]

Illustrator: Author

[144] "Stanford d.school – case study," *YouTube* video.

[145] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation", 2010, provided by Stanford University, blueprint.

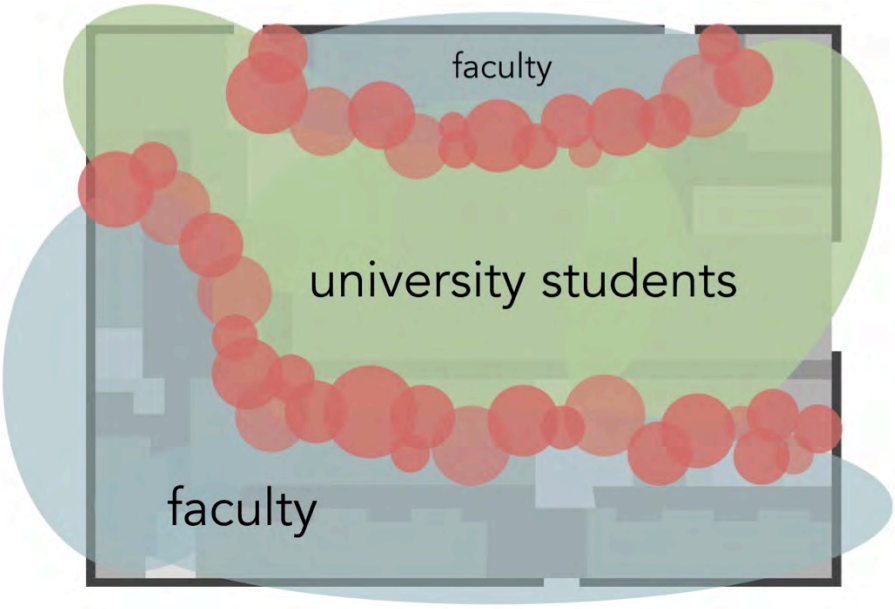

Figure 38: First floor: Diagram of the relationship dynamics of faculty and university shared and public spaces
Source: Stanford University [146]
Illustrator: Author

Second Floor Plan

The d.school's second floor is primarily dedicated to two categories: 1) d.school students and 2) university shared and public. The second floor area distribution is nearly evenly split even between two: d.school students, having 42% of the floor, and university shared and public having 41% (fig. 39). The southern half of the building is for the d.school students, while the northern half is for university shared and public. This layout is similar to the first floor layout. The last 17% of the floor area is comprised of circulation and restrooms and electrical and mechanical. It is important to note that the open atrium area has been subtracted from the total floor area.

The d.school's second floor has a condensed list of categorized spaces (fig. 39). There are no faculty and administrative and lobby spaces. There are four ways to get to the second floor—three staircases and one elevator that lead into university shared and public spaces and one staircase that leads into a d.school student space.

[146] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation," 2010, provided by Stanford University, blueprint.

Name of Spaces	Area (sq ft)	Percentage
d.school students	8,537	42%
university shared + public	8,532	41%
faculty	-	-
administrative + lobby	-	-
circulation + restrooms	3,369	16%
electrical + mechanical	132	1%
Total	20,570	100%

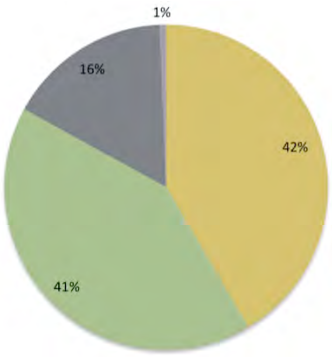

Figure 39: Calculations of total square feet of second floor plan of the d.school & pie chart of percentages

Source: Author

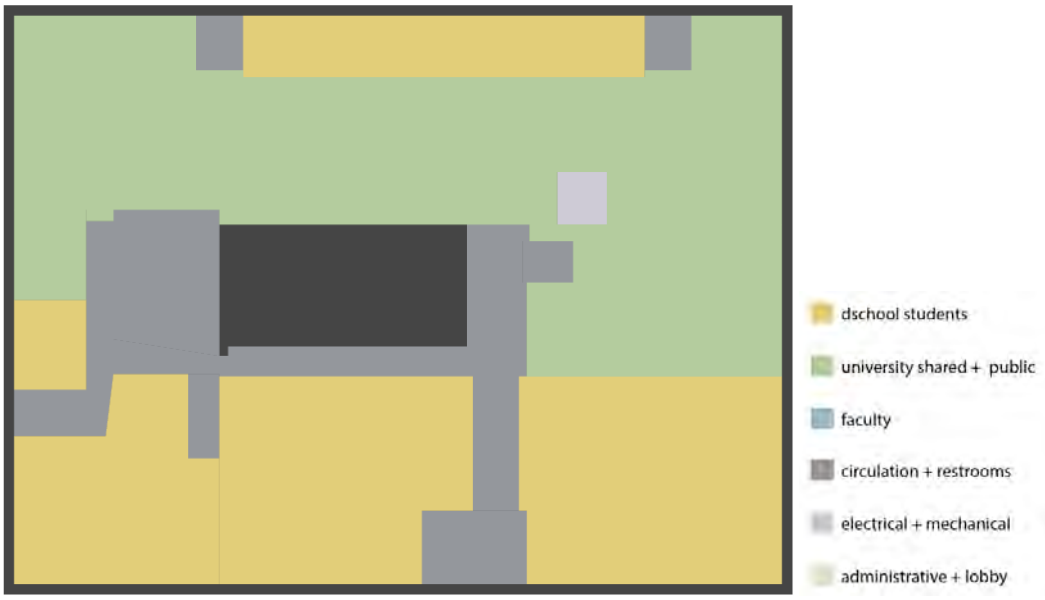

Figure 40: Second floor plan of the d.school

Source: Stanford University[147]

Illustrator: Author

[147] Cody Anderson Wasney Architects, Inc., "Peterson Building Renovation," 2010, provided by Stanford University, blueprint.

Space Uses

All of the different spaces in the d.school are characterized by mostly open configuration and also branded catchy names that relate to its intended use (figs. 41 and 42). Almost all the furniture at the d.school is mobile and lightweight for easy configuration. A description of these spaces illustrates a better understanding of how the d.school successfully developed program for each space. Only a selection of the rooms at the d.school is discussed further in the following section.

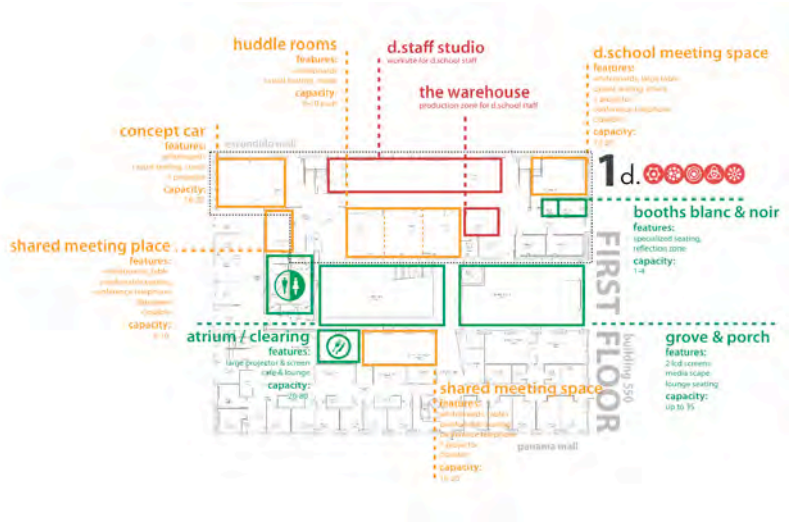

Figure 41: First floor: Rooms available for reservation

Source: Stanford University[148]

[148] "Reservations and Resets," last modified January 12, 2014, https://dschool.stanford.edu/groups/dhandbook/wiki/a592b/images/a526a.png#1224x792.

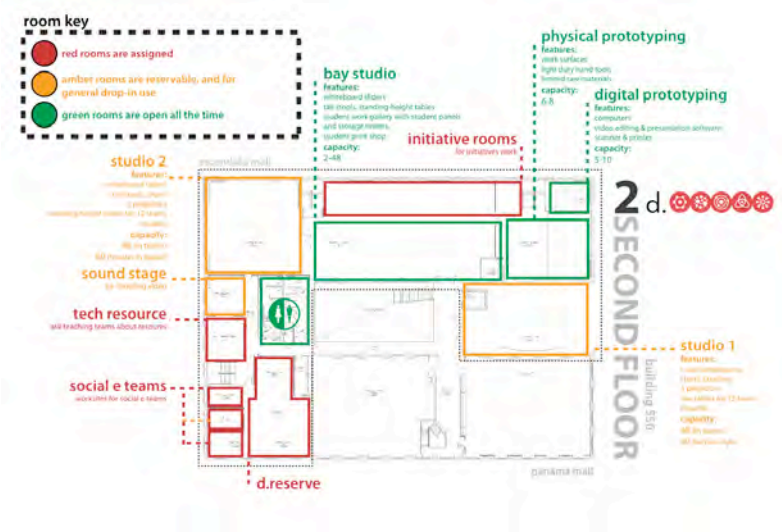

Figure 42: Second floor: Rooms available for reservation

Source: Stanford University[149]

One of the primary *intro spaces* to the d.school is the Concept Car, it is "where new ideas for the school will be constantly prototyped."[150] The purpose is to create a bold statement for visitors entering the building. George Kembel, co-founder of d.school, described the Concept Car as, "This is not the end point, and it's the starting point."[151] The Concept Car is usually arranged in an experimental configuration to be used by multiple small groups (2-4 people in each) or one large group (8-16 people) and is wisely located next to the school's reception desk (figs. 43 and 44). This is wise because immediately entering the d.school, the Concept Car's brainstorm-type appeal is prominent. This space supports dynamic, up-front teaching styles. It is equipped with bleacher blocks, tables, whiteboard sliders, Z-rack whiteboards and a projector.

[149] "Reservations and Resets," last modified January 12, 2014, https://dschool.stanford.edu/groups/dhandbook/wiki/a592b/images/ff002.png#1224x792.
[150] Tischler, "The Idea Lab: A Look at Stanford's d.school."
[151] Ibid.

Figure 43: Concept car

Source: Stanford University[152]

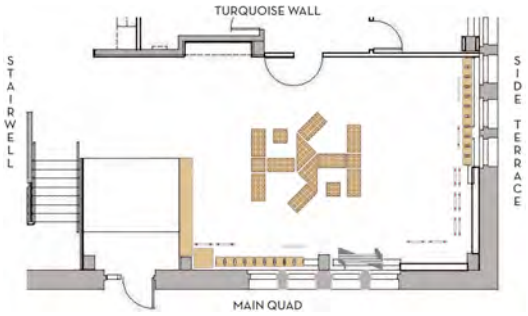

Figure 44: Concept car – reset floor plan

Source: Stanford University[153]

Huddle Rooms are immersed, studio-style workspaces for students (fig. 45). They are located next to the d.staff workspace to promote an intimate working relationship between faculty and students. These rooms convey an impromptu atmosphere that is emphasized with *ambiguous furniture.*[154] Ambiguous furniture can be described as furniture designed in a way that does not allow the users to "get comfortable" but to keep energies up, ideas flowing, and bodies moving. There is a photo wall of all the students that have come and worked at the d.school. This creates

[152] "Concept car – Reset," accessed January 20, 2015, https://dschool.stanford.edu/sandbox/groups/dhandbook/wiki/1f6ab/attachments/80040/reset_concept_car_winter2011.pdf?sessionID=9f8d4937a15600d2832a0b895a3fc531d7a73e14.
[153] "Concept car – Reset."
[154] Katherine Bell, "Designing Spaces for Creative Collaboration," accessed January 20, 2015, https://hbr.org/2012/01/designing-spaces-for-creative/.

a feeling of friendliness and promotes the d.school's diversity. Huddle Rooms are available to reserve for University affiliates, therefore, not always open for public use.

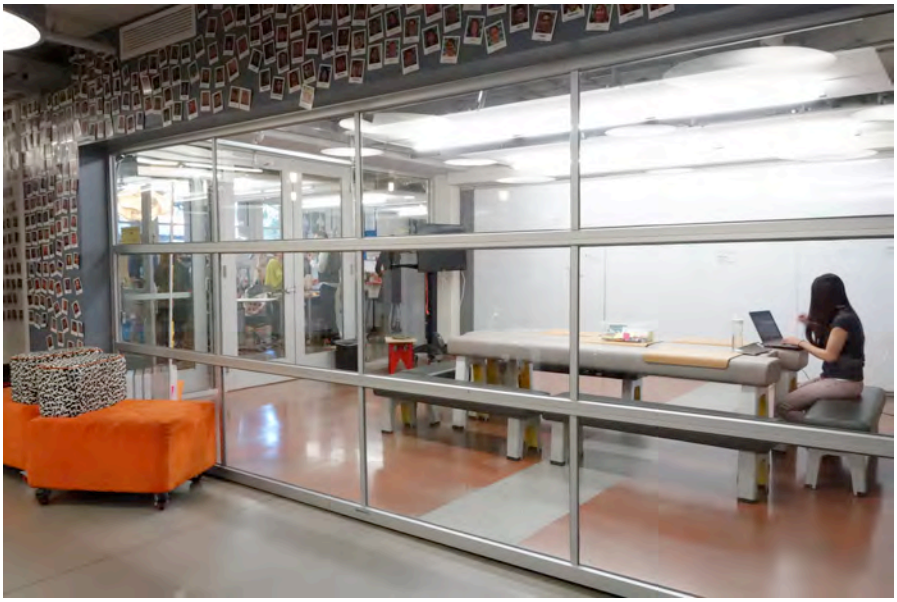

Figure 45: Huddle Rooms
Source: Author

The Atrium is located near the center of the building. It is characterized by a double height ceiling (fig. 46). The main entrance into the atrium is the largest entrance into the building, the d.school's "signature" glass garage door. Although d.school's signature glass door is actually directly connected to The Grove (mentioned below), The Atrium is alongside it. The atrium space has an ample amount of natural light from the placement of the atrium skylight, and it has diverse purposes. Sometimes it is used for presentations or student project fairs, and other times it is used for dance parties, as a bowling alley, and for art exhibits. The possibilities are endless in The Atrium. It is equipped with a computer podium, tables of all sizes, stools, chairs, a projector, and a viewing screen, among other educationally important items.

Figure 46: The Atrium
Source: Author

The Grove is connected to The Atrium but has a lower ceiling height (figs. 47 and 48). The Atrium and The Grove are similar in their intended uses as they are both always open for use for the university or the public. The Grove is especially welcoming to teams by providing media technology with easy connectivity capabilities, and walls of whiteboards to add to the collaboration process. Located at the signature glass garage door, The Grove directly leads the user into The Atrium. It is equipped with various types of chairs such as tall office chairs, high "swoop" stools, stacking chairs, mesh chairs, and orange foam "cube stools."

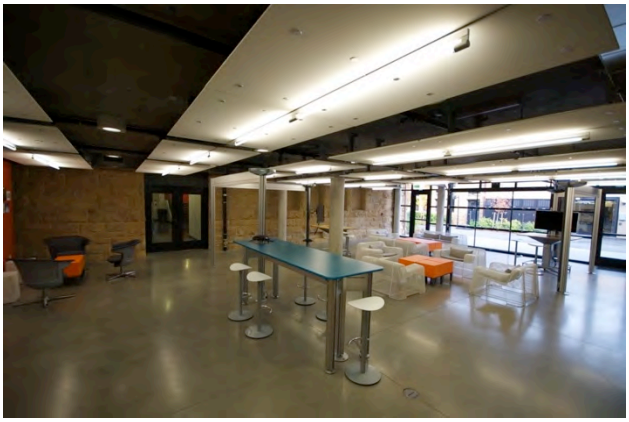

Figure 47: The Grove with colorful furniture

Source: Stanford University [155]

Figure 48: The Grove during site visit

Source: Author

Studio 1 and Studio 2 are both independent teaching areas that are available for reservation by University affiliates (figs. 49 and 50). It is an open space that is easily reconfigurable. Studio 1 has an emphasis on projection or theatre use while Studio 2 emphasizes on "prototyping." Studio 2's floor plan encourages standing, movement, and a lively sitting posture through its choice of mobile furniture and equipment.

[155] "The Grove – Reset," accessed March 23, 2016, https://dschool.stanford.edu/sandbox/groups/dhandbook/wiki/1f6ab/attachments/d9a65/reset_grove_winter2011.pdf?sessionID=9f8d4937a15600d2832a0b895a3fc531d7a73e14.

Figure 49: Studio 1

Source: Author

Figure 50: Studio 2

Source: Author

In the Bay Studio, students do not have designated permanent work areas, but all students can use this area to do whatever work they need to. They take photos to document their work and are responsible for cleaning the area when they are done (fig. 51). This rule applies to all the rooms available to reserve and use, not just the Bay Studio. Also inside the Bay Studio, lies the Student Work Gallery that provides storage for prototypes and allows student work to be displayed. The Bay Studio is located next to the Initiative Rooms and the Prototyping Suites. The Initiative Rooms are for special d.school programming, such as K-12 education, Executive Education and Teaching Team Suites. Initiative Rooms are permanent programming spaces to support d.school initiatives or projects.

Figure 51: Bay studio
Source: Author

The Prototyping Suite includes both digital and physical rooms. It utilizes a light construction ambiance to encourage a flow of ideas and communication. The digital and physical rooms are located next to one another for logistical purposes. Students are able to move from one

room to another while working on the same model or idea. Most would think that d.school would have fancy fabrication tools in its prototyping suite; however, Stanford University has these fabrication tools within other departments. The d.school is about students building their 50th prototype, their 5-minute prototype, or their two-hour prototype but not their final prototype. Prototypes can be defined as a preliminary model of a product, service, or idea. Digital tools and physical tools are readily accessible support a smooth workflow for rapid prototyping. The tools that are available in the Prototyping Suite include hammers, saws, and other light-duty tools.

Student Area Distribution Study

With approximately 35,000 square feet at their disposal, students are free to use the d.school spaces as they please. According to a d.school tour guide, the d.school serves approximately 650 students yearly. Official and non-official students are consistently coming and going. If the total of 35,000 square feet were divided between the 650 students served yearly, each student would have approximately 53 square feet in which to work. With no data on how many students are currently enrolled in d.school, there is no definite way to tell how many square feet could be given per d.school student on a semester or annual basis. However, 53 square feet of studio space could be considered the minimal amount of space. At University of Hawai'i at Mānoa, I have experienced the school providing at least approximately 100 square feet per student with additional square footage to compensate for community spaces in between. However, not all students in the d.school need a permanent studio space. Therefore, in the context of the d.school, 53 square feet per student is reasonable. The calculation of 53 square feet per student can be used in the estimations for the final design.

To provide another measurement scale for the square feet per student, the number of students in one semester were analyzed and compared to the previous analysis. The highlighted courses are the ones that did not specifically say how many students they were accepting into the course. The 2016 winter quarter (Stanford University is on a quarter-system calendar) enrollment was used to calculate the average square feet per student. For this example, the winter quarter of 2016 is used. During this quarter there was an approximate total of 363 students in the d.school courses (fig. 52) and approximately 323 students in the d.school pop-up courses (fig. 53). This makes an approximate total of 686 students during the 2016 winter quarter. The approximate square footage per student would be calculated by 35,000 square feet divided by 636 students,

totaling to 51 square feet per student. This total of 51 square feet per student is relatively close to the initial estimate based on the d.school yearly attendance of 650 students. By averaging the initial estimate of 53 square feet per student, and the last estimate of 51 square feet per student, the average estimated square footage per student is 52 square feet. The average of 52 square feet per student will serve as the basis for ideal teaching space as proposed within this dissertation.

d.school Courses, Winter 2016, 16 Courses, approx. 363 Students

No. of Students	Course Name
44	Building Innovative Brands
12	Bursting the 'Impossible' Bubble: The Art of Creative Engagement
28	d.leadership
24	d.media
40	Design for Extreme Affordability
24	Design for Healthy Behavior Change
-	Design Garage
40	Design Thinking Studio: Experiences in Innovation and Design
18	Designing for Safety in Labor and Delivery
18	FEED Lab: Food System Design & Innovation
20	From Maps to Meaning
25	Innovations in Education
24	Movie Design
-	Rethinking Purpose
16	The Designer in Society
30	Launchpad: Taught Spring 2016, Mandatory office hours Winter
363	TOTAL STUDENTS

Figure 52: Table of d.school courses during Winter 2016

d.school Pop-up Courses, Winter 2016, 16 Courses, approx. 323 Students

No. of Students	Course Name
24	Awkward Space Makeshop: On Campus
24	Building Your Negotiation Skills with Applied Improv
20	Change that has a Chance
20	Crash Solving a Non-Profit's Crisis
36	Conditioning for Creative Teams (12 teams, 3 per)
15	Dating, Diet & Sleep: Design at the Disconnect
12	Designing Human Scale Cities
18	Early Education Systems
16	Improv & Design: Mindsets for Collaboration
24	Project Joy: Designing delight into the workplace
12	Redesigning Stanford Emergency Department's Patient Experience
24	Research as Design: Redesign Your Research Process
18	Rethinking Purpose Prequel : Solve for Happy
16	Testing at Scale: The sports fan experience
20	The Curiosity Advantage: Developing curiosity to ignite creativity
24	Why Should I Wear This? Prototyping Human-Centered Value Propositions for Wearables
323	TOTAL STUDENTS

Figure 53: Table of d.school Pop-up courses during Winter 2016

Visual diagrams of space distribution allocation at the d.school were created to reflect the percentages of all six categories (d.school students, university shared and public, faculty, circulation and restrooms, electrical and mechanical, and administrative and lobby). The first diagram is divided by floor (fig. 54), while the second diagram (fig. 55) shows the combined percentages of first and second floor areas compared to the center gray circle. The center gray circle is considered 100% square feet of the building. These analysis diagrams are created to help visualize in another form how the uses are distributed at the d.school.

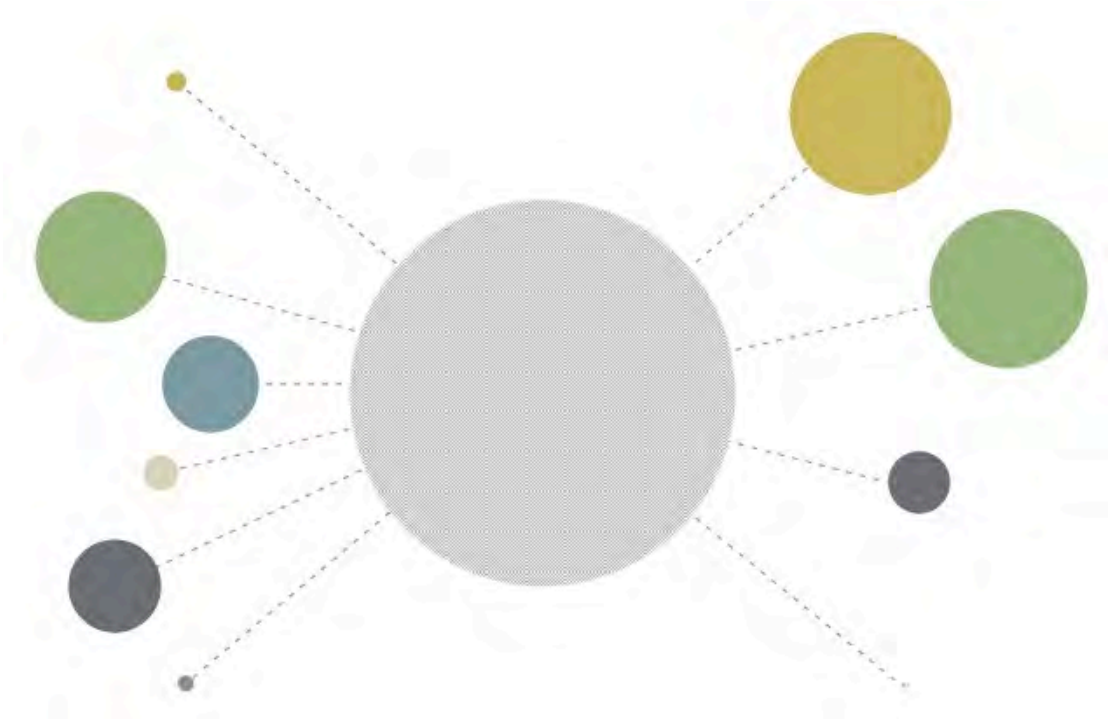

Figure 54: Area proportions of the d.school divided by floor; *Left* is first floor; *Right* is second floor
Source: Author

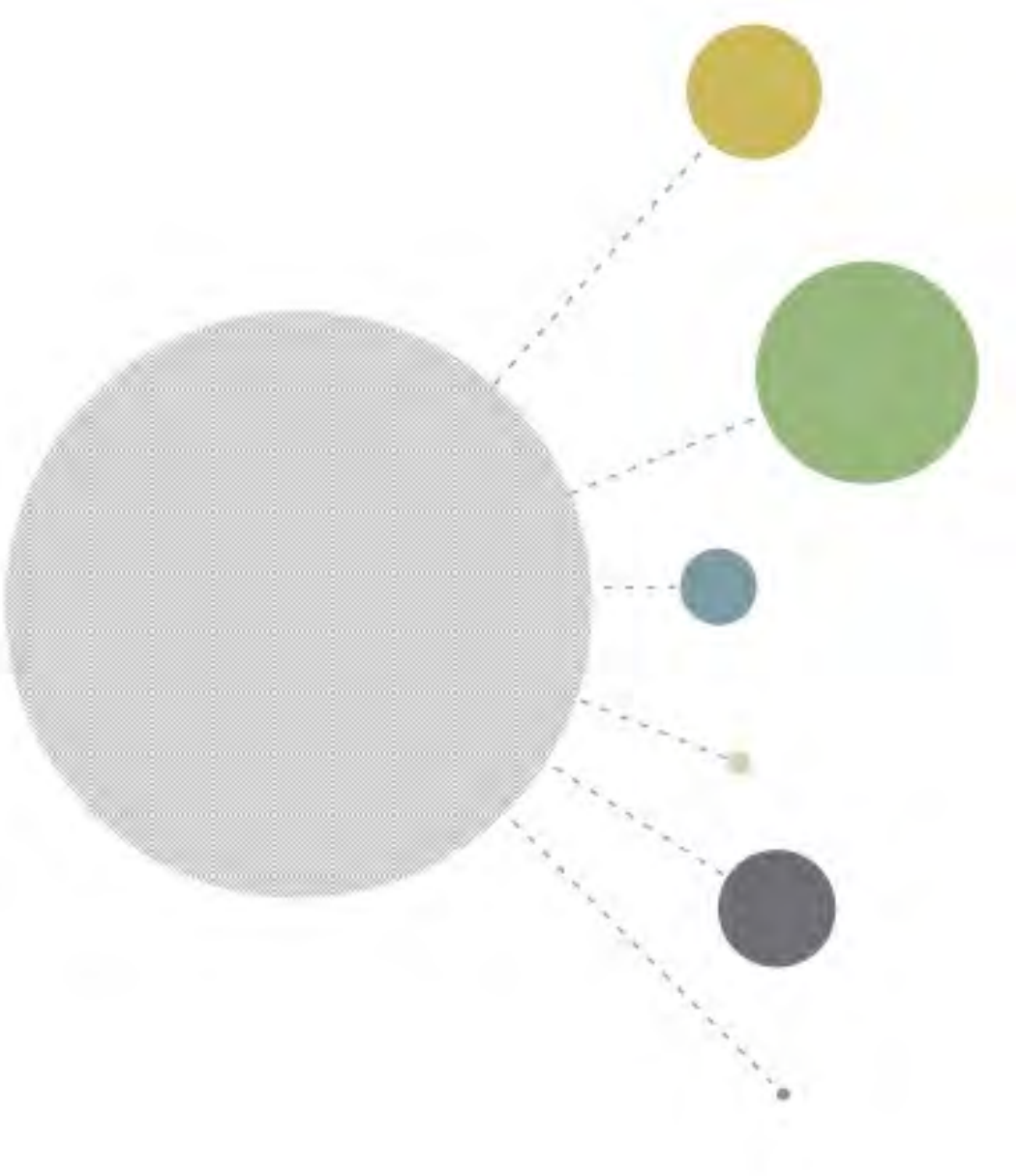

Figure 55: Area proportions of the entire d.school with combined floor areas
Source: Author

Case Study Conclusion: d.school

Through the case study analysis of the d.school, many elements were discovered that contribute to the d.school's "success." In this context, "success" is judged by how the d.school's vision transitioned from vision to a completed architectural spaces. It is also based on the general community positive perception of the d.school. Success is made possible by having a clear idea of what the d.school stands for, defining what their purpose is and why the d.school exists, and then creating that belief within students. Without the support of the students, the d.school would be merely another building on the Stanford University campus. The general public perceives the d.school as a unique learning space that thrives on creativity and design thinking. Society, especially the education system, is realizing that traditional schools and teaching methods might not always match how students are transitioning into their careers.

Marketing and branding plays a large part in the d.school's public acceptance and high media buzz. It is not the fact that the d.school managed to be mentioned in many architecture, business, and education magazine in 2015, but the follow through of the d.school brand within their brochures, their website, and their names of spaces (e.g. Huddle Rooms, The Grove, Concept Car). The branding is consistent. All of the d.school's spaces have creative names that identify each space with its respective use and users. For example, the Prototype Suite is made up of both physical tools and digital tools; Huddle Rooms are for intimate group gatherings; and the Concept Car is an area that allows users to "drive" new ideas. Creating a branded name that is connected to particular space gives that space an identity to which users can connect.

The d.school has made it clear that they are about bringing together students of different backgrounds to create real solutions to the world's problems. The school culture revolves around the concept of "design thinking"—the process of iteration: to empathize, define, ideate, prototype, test, repeat. This process usually involves more than one individual; it involves a team with diverse minds to make sure make sure nothing is missed. Design thinking involves collaboration methods. The d.school translated the culture of design thinking into architectural elements by providing open spaces that are easily reconfigured for any purpose or user(s). Design thinking involves the cyclical motion of ideas through active brainstorming, and the d.school is well equipped in both concept and construction to support that goal.

The following is a list of attributes that will be taken into consideration for the final architectural programming design as presented in this dissertation.

- 52 square feet of work space per student
- Faculty workspace being located next to students to promote relationship
- All entrances leading to the most common public area First floor dominated by shared spaces, second floor dominated by student spaces
- The space defined as students' canvas
- d.school open for all: public, university affiliates, and students
- Branded names for spaces
- Does not offer degrees, motivational advantage: whoever is at the d.school, wants to be at the d.school

7.02 CASE STUDY TWO: HARVARD INNOVATION LAB

PROJECT NAME	The Harvard Innovation Lab also known as the Harvard i-lab
LOCATION	Batten Hall at Harvard University 125 Western Ave, Allston, MA 02163
CONSTRUCTION COMPLETED	November 2011
PROJECT COST	$20 million
SIZE	75,600 square feet
ARCHITECT(S)	Shepley Bulfinch
CLIENT/DEVELOPER	Harvard Business School
CONSULTANTS/ARCHITECTS	Project Manager: CSL Consulting Contractor: Shawmut Design and Construction

Introduction

The purpose of the Harvard Innovation Lab (Harvard i-lab) case study is to gather information on the connection between the Harvard i-lab's program initiatives and the architectural elements that support it. The i-lab is chosen for a case study because its program has similar goals and objectives to both the UH iLab and the d.school—to create a social hub that sparks entrepreneurship for the university and the community. First, there must be an understanding of what the Harvard i-lab is and what purpose they wish regarding serving the university and the community. Second, an analysis of the spatial layouts, adjacencies, and relationships will be conducted to understand design priorities and decisions.

Define

The Harvard Innovation Lab's slogan on their official website states that their overall program objective is "fostering innovation and entrepreneurship across Harvard"[156] through "cross-disciplinary research and innovation focused learning and development of community."[157] The Harvard i-lab sees itself as the center for entrepreneurship at the University, for faculty

[156] "About the i-lab – The Harvard Innovation Lab," Harvard College, accessed January 10, 2016, https://i-lab.harvard.edu/explore/about/.
[157] Ibid.

members and for undergraduate and graduate students. "We are an extension of the classroom,"[158] says Gordon Jones, the i-lab's managing director. Harvard i-lab is positioned as a place that excels in startups, and does not fall short of that excellence.

The program launched in fall of 2011, and opened for classes at the start of the 2011-2012 academic year. A pedagogical approach was developed by Harvard faculty as an operating model to address the hierarchal learning stages that a student may experience while enrolled in Harvard i-lab. These hierarchal learning stages serves as the structure of their academic program, which is divided into four stages: Foundational Learning, Expert Resourcing, Experiential Learning, and Venture Incubation.

The idea is that all students are welcome to enroll at the first stage; however, to get to the next stages, the student must be engaged in a project that he or she would like to pursue in the stages that follow. In the advanced stages, there are experience-based activities, such as competitions that include "week-long trips to vibrant startup ecosystems including Silicon Valley, New York City, and Boston, weekend hackathons, scrambles, coding boot camps and startup career fairs."[159] In addition, as a student gets closer to the final stage, the Venture Incubation, teams are allowed to have personal workspaces, access to mentors, workshops, and more. This hierarchal learning approach and program structure for enrolled students does not exist at the d.school. The structured learning approach provides a platform for students to create their own project, while following a program structure at the Harvard i-lab. This way, each student still has full control over his or her own learning process, while receiving some structure as to how to accelerate his or her respective project.

Curriculum-wise, Harvard i-lab offers what they call "cross-university" courses. There is no direct definition regarding how these courses are derived, but it is safe to assume that they are courses designed for the cross-disciplinary education that the Harvard i-lab offers. Here are some of the courses' titles according to their official website: Design Thinking, Innovation in Project

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[158] D.C. Denison, "Off to torrid start, Harvard i-lab marks its first year," *The Boston Globe*, November 12, 2012, https://www.bostonglobe.com/business/2012/11/12/off-torrid-start-harvard-innovation-lab-marks-first-anniversary/G0oimnOz5CAtctQ8e13vUJ/story.html.

[159] "Our Approach – The Harvard Innovation Lab," accessed January 11, 2016, https://i-lab.harvard.edu/explore/about/our-approach/.

Delivery, Healthcare Innovation and Commercialization, and Social Entrepreneurship/Social Enterprises 101: How to Go from Start-Up to End Up.[160]

The Harvard i-lab's program support personnel are adamant about its identity as an institute that gives back to the community by they allowing the community to use the space. Since 2011, Harvard i-lab offers four rooms to be reserved by the public, while the other eighteen are available by reservation only to degree-seeking or Harvard students.[161] The group rooms vary by size, generally seating 3-15 people at a time, and are available every day from 7 a.m. to 9 p.m. Although four rooms seems like an incremental amount of space to offer the community, a large part of the first floor plan is dedicated to open spaces that can be used by anyone. The open spaces in the Harvard i-lab are elaborated later in this section.

One of the strongest elements of the building's construction is the bright red "Hi" on the primary entrance that faces the main road. The design of Harvard i-lab logo consists of "Hi" in a red square written in white san serif letters. The "H" stands for Harvard, while the "i" stands for innovation. The entirety of the logo was inspired by the idea of innovation (fig. 56). According to Shepley Bulfinch's brochure, the primary architect of the Harvard i-lab, states that the logo serves as a welcoming notion through displaying, "open and honest tone, conveying a sense of discovery and a broad invitation to the passersby."[162] The color red is used on the frame façade of the main entry at the Harvard Innovation Lab, which supports branding consistency, as seen in figure 57.

Figure 56: Harvard Innovation Lab logo

Source: Harvard University[163]

[160] "Cross-University Courses," accessed January 12, 2016, https://i-lab.harvard.edu/explore/courses/.
[161] "Reserve a Harvard i-lab Conference Room," accessed January 12, 2016, https://i-lab.harvard.edu/meet/reserve-a-room/.
[162] Shepley Bulfinch, *Harvard Innovation Lab*, brochure, 2011, accessed January 11, 2016, 6, http://www.shepleybulfinch.com/pdf/sb_i-lab_brochure.pdf.
[163] "Harvard Innovation Lab Logo," accessed March 18, 2016, https://yt3.ggpht.com/-9SPiNJ7tggM/AAAAAAAAAAI/AAAAAAAAAAA/6IQqBohqQ-A/s900-c-k-no/photo.jpg.

Figure 57: Street view of Harvard i-lab
Source: Google Maps[164]

Background

Before Harvard i-lab became the stomping grounds for enthusiastic cross-disciplinary Harvard students, the building was originally constructed as studios for the local TV station, WGBH-TV. WGBH-TV was a public media powerhouse that "serves New England, the nation, and the world with educational content."[165] The renovation project focused on modernizing the building systems in order to reach specific program and environmental goals. It was in the i-lab project's best interest to minimize the need for new building materials and to promote sustainability by reusing existing building material as much as possible. According to *Harvard Magazine*, the Harvard Business School (HBS) funded the Harvard i-lab through donations, with the intention of sharing the facility with the entire university.[166] The Harvard i-

[164] "Harvard Innovation Lab," Google Maps, accessed March 18, 2015, https://www.google.com/maps/@42.3637052,-71.1240897,3a,75y,0.78h,86t/data=!3m6!1e1!3m4!1s-6PaX5kOmZ0nzQORxL43Lg!2e0!7i13312!8i6656!6m1!1e1.
[165] "WGBH – About Us," accessed January 11, 2016, http://www.wgbh.org/about/.
[166] "Introducing the i-Lab," *Harvard Magazine Inc.,* 2012, accessed March 10, 2015, http://harvardmagazine.com/2012/01/introducing-the-i-lab#article-images.

lab was given support from the city redevelopment committee, and the spokeswoman on behalf of the mayor stated at the time that, "today he had encouraged the university on this project as a way to give something of direct-use to the neighborhood."[167] The involvement of the city representative's thoughts imply that the Harvard i-lab has taken into consideration the public and community members as a part of their end-user group.

The Harvard i-lab is located next to the building housing their primary funders, the HBS, on the corner of Western Avenue and Batten Way. According to Harvard University's campus map, the Harvard i-lab is located on the southern outskirts of the Harvard University campus, as seen in figure 58. Placement on the outskirts of campus makes the building more visible to the public rather than to the university members.

Figure 58: Location of Harvard Innovation Lab (geotagged) on the Harvard University campus map
Source: Harvard University[168]

[167] Matt Rocheleau, "City approves $20M Harvard Innovation Lab project in Allston," last modified March 11, 2011, accessed January 12, 2016, http://www.boston.com/yourtown/news/allston_brighton/2011/03/city_approves_20m_harvard_inno.html.
[168] "Harvard Innovation Lab," Google Maps, accessed March 18, 2015, https://www.google.com/maps/place/Harvard+Innovation+Lab/@42.3645542,-71.1239526,17z/data=!4m2!3m1!1s0x89e377602b41553f:0xfdc59254062cc57a.

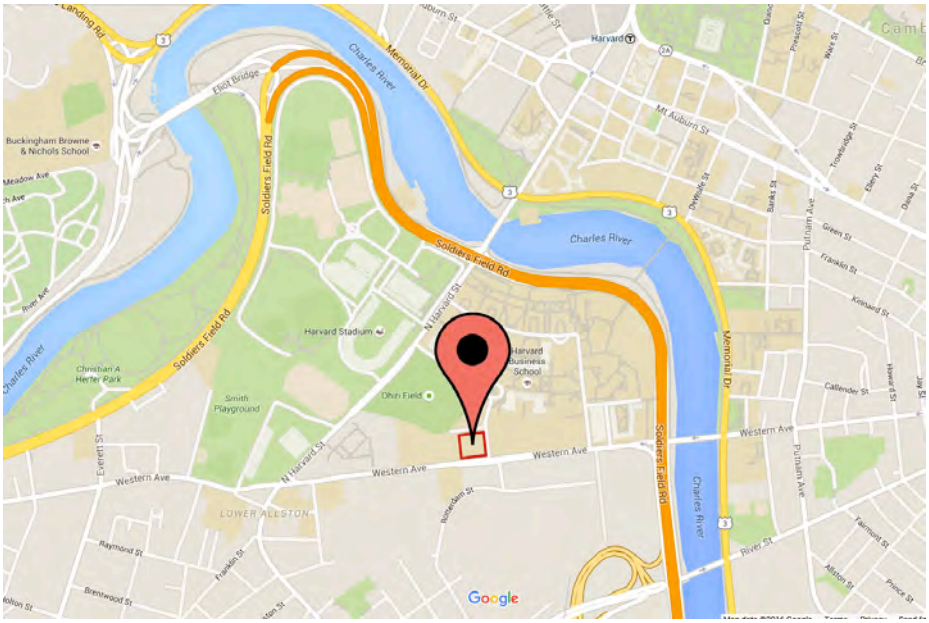

Figure 59: Location of Harvard Innovation Lab (geotagged)

Source: Google Maps[169]

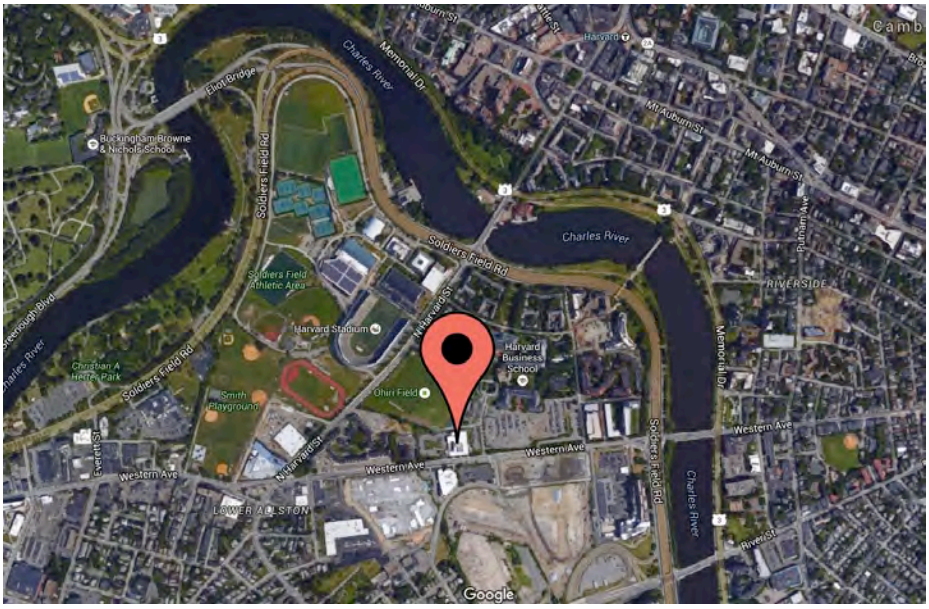

Figure 60: Google Earth view of Harvard Innovation Lab (geotagged)

Source: Google Map[170]

[169] "Harvard Innovation Lab," Google Maps, accessed March 18, 2015, https://www.google.com/maps/place/Harvard+Innovation+Lab/@42.3645542,-71.1239526,639m/data=!3m1!1e3!4m2!3m1!1s0x89e377602b41553f:0xfdc59254062cc57a!6m1!1e1.

Architectural Analysis

An architectural analysis of the Harvard Innovation Lab is necessary to understand the spatial and social relations between user groups and floor plans. Understanding these relationships will further build the foundation of the final architectural program design within this dissertation and will make apparent what concepts should be transitioned into the final design project. The floor plans will be analyzed by categorizing the use of spaces. The categories are as follows:

1. Designated Harvard Workspaces

   These spaces are primarily for Harvard students only and are available through reservations on Harvard's website.

   In the second and third floor analysis, the category of HBS classrooms are combined under this category for spatial allocation and categorization purposes. It is referred to as HBS classrooms and workspaces.
2. Community Workspaces

   Any member of the community is able to reserve these spaces for their own use.
3. Open Workspaces

   These spaces are for everyone—university students, faculty, and community members. These spaces are open ones with configurable furniture.
4. Service/Circulation/Misc.

   These spaces include hallways, elevators, staircases, restrooms, janitor closets, and other unspecified spaces.

First Floor: Harvard Innovation Lab

The first floor of the Harvard i-lab possesses the most diverse in types of spaces (fig. 61). More than half of the interior walls are situated to the northwest and southeast, so open working zones are situated between modular meeting rooms. The first floor is dedicated almost exclusively to the community and university members as the majority of the square footage is dedicated to open workspaces. There are two main entrances into the building. Both of the entrances lead into a large, common lobby. The community workspaces are available for reservation and are located

[170] "Harvard Innovation Lab," Google Maps, accessed March 18, 2015, https://www.google.com/maps/place/Harvard+Innovation+Lab/@42.3645542,-71.1239526,639m/data=!3m1!1e3!4m2!3m1!1s0x89e377602b41553f:0xfdc59254062cc57a!6m1!1e1.

near the two main entrances, which allows for easy public access. Designated Harvard Workspaces also surround the Community Workspaces. There is a café located near the entrance and connected to the lobby. This use of space for a small business offers a service and invites the public as well as university members to enjoy and utilize the i-lab.

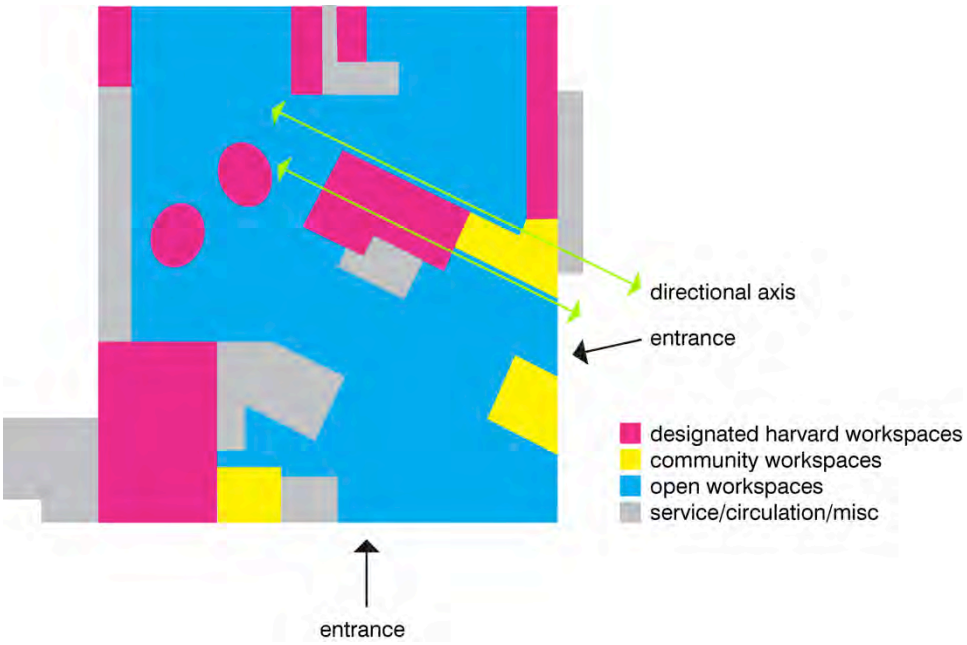

Figure 61: First floor plan of Harvard i-lab

Source: Harvard University [171]

Illustrator: Author

Second and Third Floor: Harvard Innovation Lab

Interestingly, the second and third floors of the Harvard i-lab are very similar to one another in their positioning and use of space (figs. 62 and 63). According to Garry Emmon, in his article in the *Harvard Business School Alumni Bulletin* entitled, "Welcome to the Future," both floors are reserved for HBS use. Open HBS workspace is located in the center of the HBS classrooms and workspaces area, which is situated on the outer perimeter. These HBS classrooms and workspaces are modular classrooms that are referred to as the "hives."[172] Within these hives

[171] Shepley Bulfinch Richardson & Abbott, Inc., "Harvard Innovation Lab," September 26, 2011, provided by Harvard University, blueprint.

[172] Garry Emmons, "Welcome to the Future," December 1, 2011, accessed January 12, 2016, https://www.alumni.hbs.edu/stories/Pages/story-bulletin.aspx?num=1032.

are smaller assemblies of groups that support team building; similar to how actual beehives work. "Hives" is an ideal word to describe this spatial layout in relation to its practical uses and typical furniture arrangement.

Given the fact that the second and third floors of the Harvard Innovation Lab are dedicated to the HBS, it is safe to assume that the entire program is driven by HBS. The Harvard i-lab's first priority was not to design a space for the community or as a space to attract students of diverse backgrounds as Harvard makes it seem like in Matt Rocheleau's article, "City approves $20M Harvard Innovation Lab project in Allston."[173] The Harvard i-lab was built on the sole purpose of expanding HBS and the idea of having a collaborative lab accessible to the community and other Harvard students was supplementary. The idea of Harvard i-lab opening up to the public as an after thought could also provide reason to why the first floor is made up of, primarily, an open floor plan that is not designed to support a specific program.

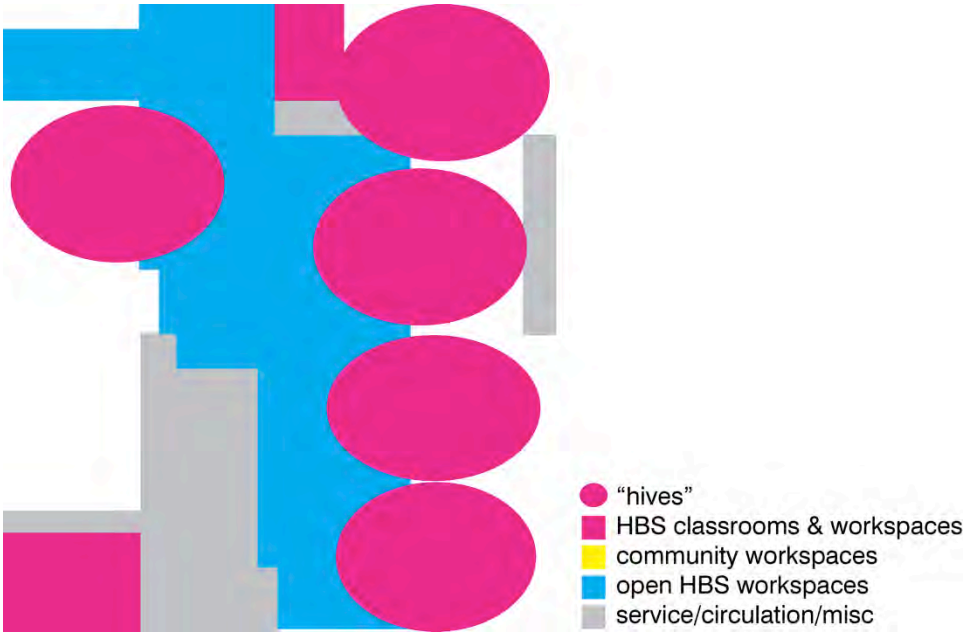

Figure 62: Second floor plan of Harvard i-lab

Source: Harvard University [174]

Illustrator: Author

[173] Rocheleau, "City approves $20M Harvard Innovation Lab project in Allston."
[174] Shepley Bulfinch Richardson & Abbott, Inc., "Harvard Innovation Lab."

Figure 63: Diagram third floor plan of Harvard i-lab

Source: Harvard University [175]

Illustrator: Author

In summary, the strengths of the Harvard Innovation Lab that will be considered in the development of the final architectural program design are as follows: 1) the consistency of the Harvard Innovation Lab logo (red "Hi"), 2) the analogy of beehives as team workspaces and their successful translation into the interior architecture, and 3) having the first floor dedicated to the public and the other floors dedicated to students.

The Harvard Innovation Lab has established a strong presence both in the community and within the university. Even without the vibrant "Hi" sign on the main facade, the other striking architectural elements give the i-lab a strong presence. For example, the signature red of the logo is used to frame the primary entrance and is also the color of the interior walls, which are visible from the main road. The red color is also used subtly on exterior elements of the building. The bold red color is another indicator of the strong branding of the Harvard i-lab. Branding is strong when it has an identifiable design that is consistent, clever, and positively relatable. The logo is bold with its color choices and lettering. "Hi" is easy to remember and is relatable to the

[175] Shepley Bulfinch Richardson & Abbott, Inc., "Harvard Innovation Lab."

basic english language. Then, the consistent use of the signature red through the building design serves as a memory recall for users.

"Beehives" is a clever analogy to use to describe the importance of teamwork and team building. Giving a catchy, clever, clear name to these designated spaces is considered a branding strategy. Users can easily remember that busy worker bees and the structure of their hives inspired the spatial composition of these rooms. If this type of marketing strategy were applied to other architectural designs, users would understand and remember the design intention and purpose.

Lastly, similar to the previous case study on the d.school, the first floor is dedicated to the community and the university. Majority of the first floor is Open Workspace and is the most public accessible space especially since the public is only allowed to inhabit the first floor. The first floor also possesses mixed-user groups. The mix of diverse user groups, especially students, allows community members to be immersed in the Harvard i-lab creative working spaces. Applying all three of these points into this dissertation's final architectural program design will be beneficial.

8.0 INTRODUCTION TO DESIGN

Inspired by Stanford's d.school, in May 2014 the University of Hawai'i President David Lassner outlined the need for an alternative learning space to foster entrepreneurship, subsequently naming this new facility the UH iLab at its grand opening in January 2015. Although, as of 2016, still in the early stages of implementation, the technology and current equipment available within the UH iLab building allow both students and faculty to enhance learning and teaching.

The initial intent of this dissertation was to target architectural students and their education; however, through this entire investigation, it has become apparent that the application of the design would be a greater contribution if the new collaborative educational space were designed for all students. This decision is supported by two reasons: 1) students today are seeking further education that is not traditionally available within their declared major, and 2) the mission statement of the current UH iLab is targeting all students and interested members of the community. In some ways, this design and purpose of the UH iLab is a gift to the community and the university.

The UH iLab displays potential growth and futuristic opportunities based on the current wants and needs of students, faculty, and the community. The UH iLab is selected as the project site, located at Building 37 on University of Hawai'i at Mānoa campus, for it has the potential opportunity to offer re-envisioned design spaces that foster creativity, as well as accommodate the redefined co-design method that will inform the design of a new collaborative educational space.

8.01 BACKGROUND ON UH ILAB

Since it opened its doors, the UH iLab has been used by faculty and students for various reasons. Entrepreneur events to teaching courses has taken place at the UH iLab, and can be considered successful in the short amount of time it took to launch. It took approximately a year. This comes to show that a space such as the iLab is useful for many different reasons, whether if its for education or event purposes. Users from both university and public are traveling onto campus to attend functions at the UH iLab.

Currently, the UH iLab is highly reconfigurable with all mobile furniture and is equipped with rapid prototyping machines such as 3-D printers and laser cutters. It has three large screen TV monitors that can conveniently connect to a laptop. The UH iLab is equipped with tools such

as mobile dry-erase whiteboards, and Wacom pen displays. Wacom are Japanese manufactured graphic tablets. The exterior has not been renovated, but the interior was renovated. A team of diverse students and faculty influenced the overall design of the renovated UH iLab. Photographs of the interior are displayed in figures 64-66.

Despite its success of being utilized by students and faculty members, the UH iLab does not possess a specific program or method that supports the architecture. Thus, the results of this doctoral project will be useful to inform the future expansion and growth of the UH iLab. A floor plan diagram is created and shown in figure 67 to provide observations regarding what is considered public, semi-private, and private within the iLab. It is clear that approximately 75% of the UH iLab is designed for the public, and private spaces are determined by interior walls. There are no semi-private spaces.

Figure 64: UH iLab interior view of the circular arrangement of chairs
Source: Author

Figure 65: UH iLab interior view to the right from the main entrance

Source: Author

Figure 66: UH iLab interior view from entering the main entrance

Source: Author

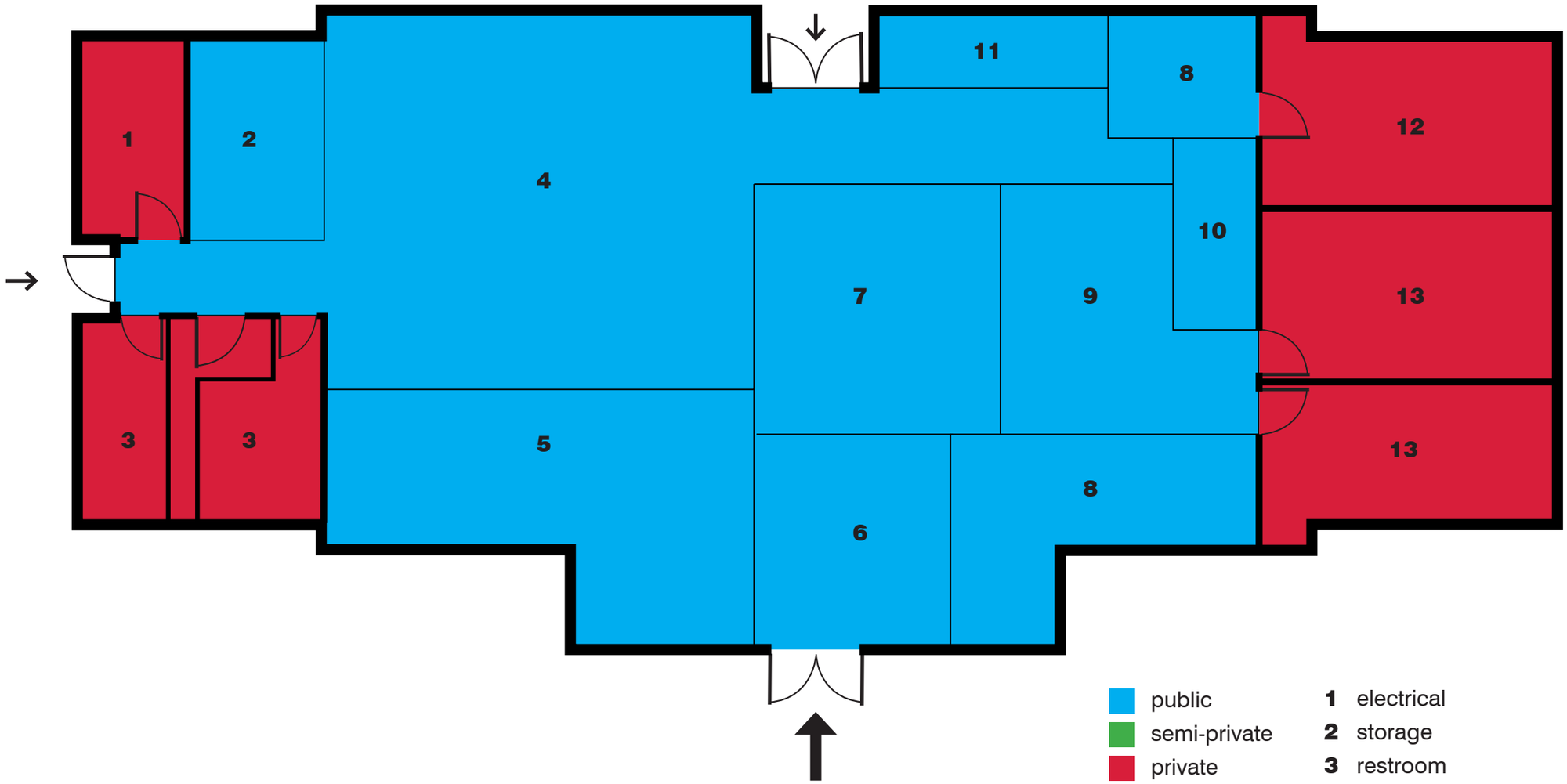

Figure 67: UH iLab floor plan with spaces defined by typical furniture layout

Source: University of Hawai‘i at Mānoa[176]

Illustrator: Author

[176] CR, “Interior Improvements Building No. 37,” April 2015, provided by University of Hawai‘i at Mānoa Facilities Management Office, blueprint.

Due to extracted analyses from the chosen case studies and research findings, it would be a more holistic design to recreate the UH iLab with a new identity and program to support the architectural design and the co-design method. Some believe the term "innovation" is overused due to the trend of universities creating spaces like this such as Harvard Innovation Lab (Harvard i-lab), MIT Innovation Initiative, and so on. For the purpose of this doctoral project, the UH iLab's new design will be referred to as the UH co.Lab (fig. 68) for which the method used to drive the design (co-design) occurs also in its name. An academic program must be conceptually designed to support architectural design. The next section is a conceptual form of the UH co.Lab's academic program that encompasses its founders visions and goals.

Figure 68: Logo design for the new UH co.Lab
Source: Author

8.02 ACADEMIC PROGRAM DESIGN

UH co.Lab **Define**

The UH co.Lab is a place that offers a different type of education for the students at the University and a co-working space in an educational atmosphere for the community. The UH co.Lab's program concept revolves around business strategies that intertwine with the architectural design process to prepare the next generation of leaders to create solutions for the greater good.

This program unifies design perspectives and processes, entrepreneurship, communication strategies, and leadership so as to create a holistic academic framework for all university students. The UH co.Lab culture focuses on a humanistic approach to design and implementation, supported by the co-design method.

Students not only learn how to create innovative products, services, and solutions but also how to actively engage with people through designing "with" rather than "for" them. In turn, students gain experiential knowledge, confidence, and leadership by the time they are ready to enter professional practice.

UH co.Lab **Vision**

Our vision at the UH co.Lab is to be the most integrative and active think tank to nurture the next generation of innovative design leaders, university students, and community members through diversity and collaboration.

Programming **Academic**

The UH co.Lab is not a traditional school, department, or program. It is built on collaboration and creativity. It, too, does not offer a formal degree, though it does offer exposure and experience that may not be offered elsewhere within the UH system.

Faculty members, professionals, and students co-design create the curriculum framework for the UH co.Lab. Ultimately, the UH co.Lab is a student-run program supported by faculty and integrated with the larger community. With most other departments, the curriculum is set, but occasionally altered due to external demands. However, at the UH co.Lab, the students initiate the demand of specific topics while faculty and community members enable their needs.

The courses are offered to all university students, at any level and for any major, though placement depends on availability of space and availability. Some examples of courses that would be offered in this space include but are not limited to the following.

Courses

Negotiating by Design

Description: In this course, students will explore different cases of negotiation, including cases that were won and lost. Students will explore the different types and styles of negotiation and learn ways to apply them in a design type of setting. This class provides an overview of design negotiation studies in which students will create their own methodology.

Connecting: Mediation + Participation

Description: This course focuses on the importance and significance of communicating and designing with the community. This course teaches ways to communicate verbally and physically with different types of people. Students will grasp the basic concepts of mediation and participatory design to include participants into their work.

Design Communication

Description: Students will learn different ways designers have communicated through visual means. Students will choose an artist, brand, or person that has displayed a level of expertise in design communication and will conduct a thorough analysis on how they are able to achieve their success. The use of multiple programs will be highly encouraged during this course, allowing students to gain exposure to a vast selection of programs and apply their theoretical knowledge using real software.

Branding Concepts

Description: Students will gain insight on effective branding techniques, both past and present. Students will understand the underlying psychological aspects of branding and to how it bonds products with the users.

Design Thinking

Description: During this course, students will gain knowledge on how to develop creative problem solving skills, concepts of innovation, and human-centered thinking. The goal of this course is to assist students in developing their own style of design attitude and problem-solving process.

Startup 101

Description: In this course, students will gain experiential knowledge on recognizing business opportunities, how to conduct market research, create business models and plans, budgeting, team building, and much more. Students will be briefly introduced to the concept of "design thinking." By the end of this course, students will have ideas for a start-up, in which they have to present to the program.

Programming **Architectural**

The UH co.Lab falls under building type: educational to colleges to the more specific category of universities. This project only covers universities, taking into account the fact that architecture or design school building types are generally different from other educational building types. The types of spaces that will be included at UH co.Lab are classrooms, adjustable open spaces, lounge, café, student gallery, studios, tech-connect/visualization center, project initiative hubs, co-design lab and makerspace [space for creating 3D models, usually equipped with laser cutters, CNC machines, wood shop tools, and 3D printers]. The types of spaces that are open to the community members during operational hours are: lounge, café, student gallery, and impromptu studios. Other spaces like the project initiative hubs, meeting room, and the community can use co-design lab only by approval request from the administrative managerial staff.

<u>Public Spaces</u>

Front Desk and Administrative Area

This space will consist of space for a couple administrative personnel, along with the program manager. It will serve as the main point of contact for people who are looking for information or who want to make room reservations.

Student Gallery (walk through)

The Student Gallery is used as an attraction to users entering the space. It is a freestanding cube-like display walk-through gallery. The display will change every month or so of current or previous projects.

Lounge

The Lounge Hall is seamlessly integrated with the Café, Front Desk and Administration Area, and the Student Gallery. It also can be perceived as the main lobby. It also is connected with the Impromptu Studios. The Lounge Hall is a place where students, faculty, and members of the community can have impromptu and informal meetings while observing students at the UH co.Lab. The Lounge Hall will be open to the public and stay open at all hours.

Café

The Café can be accessed from the Lounge Hall or from the exterior of the art building. This is where building users can get baked good and coffee to stay nourished while they work. This Café also serves as a "kitchen" for the UH co.Lab.

Student + University

Classrooms

The classrooms are for courses offered by the UH co.Lab. However, others can reserve the classrooms if is not being used by for a UH co.Lab course. These classrooms are not traditional classrooms, though they are not studios either; they combine aspects of both. They have desks and chairs that can be rearranged as needed, as well as dry-erase whiteboards for use.

Active Studios

Active Studios are designated for students enrolled in UH co.Lab classes and projects. They are open spaces and highly configurable to the student's use. The studio spaces will be assigned by group, with each student able to gain access to his or her studio space at any time of day, though after normal school hours, the Active Studios could only be accessed securely. The program emphasizes the importance of having students indulged in studio culture in order bring out creativity.

Impromptu Studios

Impromptu Studios are meant for students who need a space to spark their creativity flow. These studios allow students to build their own work set-up. Impromptu Studio is the main "student canvas" where students should feel like they are able to draw, sketch, and build anything. This space should be reset after use so that other students can also use it. Some spaces can be reserved for a longer period of 24 hours but must be approved by administration. These spaces are equipped with a monitor and screen to easily share information. Unlike the Active Studios, Impromptu Studios are not accessible 24 hours a day, 7 days a week.

Faculty Studios

Faculty Studios are situated next to the Active Studios that maintain visual connection with the students, creating an interesting work dynamic between the two types of user groups. The spatial relationship should increase the work atmosphere. The physical makeup of the Faculty Studio is similar to Real Studios and Impromptu Studios.

Project Initiative Hubs

The Project Initiative Hubs provide private spaces for groups of students or faculty to use specifically for special interest projects that the UH co.Lab supports. If the project involves a level of confidentiality, then it is likely that the team running the project will need a Project Initiative Hub.

Co-design Lab

The Co-design Lab is the most important and significant space in the building. It is created to bring people of different backgrounds and status' together to co-design on mutual ground. It is a place to inspire collaboration, and inspire creativity from designers and non-designers. To explore the importance of the space, the ceiling is raised to visually connect from interior and exterior.

Casual Meeting Spaces

Casual Meeting Spaces exist in the Lounge Hall and throughout the interior and exterior of the building. These spaces will encourage the kind of informal, spontaneous meetings that usually occur in business schools.

Support

Visualization Lab

The Visualization Lab is also known as the Visualization Lab. It is a space where users recap the co-designing session. The Visualization Lab acts as another layer of a filtering within the co-design method. It is equipped with advanced technology to assist in visualizing progress that has been made in the Co-design Lab, sound enhancers, and comfortable seating.

Tech-Connect

Tech-Connect shares the space with Visualization Lab and is equipped with computers, both Mac and PC, and both loaded with the latest design programs. It is important to keep these computers up-to-date with the latest programs so that students can feel free to explore and learn.

Makerspace

Makerspace is a lightweight workshop space for fast building including 3D printers, laser cutters, and CNC machines. This space and the equipment exist to support students who wish to build prototypes and models to communicate their ideas more effectively.

Programming **Times of Use**

The UH co.Lab will be used regularly for program-specific classes throughout Monday – Friday. Classes will be held during usual normal hours for class, 8:00AM – 4PM. Some classes could be held at night depending on the nature of the class and the instructor. Access to Real Studios will be available to participating students and faculty with access at any time. Community events may be held on weekends or weeknights depending on available space.

Programming **Spaces**

The following two tables are how the spaces are divided within the program. These spaces are ideal for the UH co.Lab for it caters to the co-design method of interaction. The total square footage of the UH co.Lab is 16,540 square feet, not including circulation pathways.

First Floor - Room Schedule	
Name	*Area SF*
Active Studios	2,915
Front Desk/Admin	200
Café	371
Co-design Lab	3,588
Co-working Spaces x2	701
Faculty Studios	1,021
Impromptu Studios	1,433
Lounge	196
Makerspace	541
Mechanical Room	65
Meeting Spaces	62
Student Gallery	313
W.C.	335
Total	**11,741**

Figure 69: First floor – Room schedule

Second Floor - Room Schedule	
Name	*Area SF*
Classrooms x3	1,988
Impromptu Meeting Spaces	465
Mechanical Room	65
Outdoor Balcony	457
Project Initiative Hub 1	299
Project Initiative Hub 2	289
Project Initiative Hub 3	247
Visualization Lab + Tech-Connect	854
W.C.	135
Total	**4,799**

Figure 70: Second floor – Room schedule

8.03 SITE DEVELOPMENT & ANALYSIS

Site: Selection

The existing area for the chosen project-building site is displayed in figure 71. It currently houses the UH iLab, at Building 37, comprising an approximate square footage of 3,800 net area. An expansion would be needed to accommodate the academic program and users. There are two expansion options displayed in figures 72 and 73. Option 1 gives the UH co.Lab an additional estimated amount of 18,800 square feet, while Option 2 gives the UH co.Lab an additional estimated amount of 23,100 square feet. Option 2 is the most optimal for the UH co.Lab due to Option 1's abrupt nature of expansion. The perimeter of Option 1 would block the view of the Art Building and not necessarily add anything significant to the design. On the other hand, Option 2 keeps true to its original nature of being in between Kuykendall Hall and the Art building. Being a prominent and almost obvious building is not a priority in the design of the UH co.Lab; instead a narrow and long nature of Option 2 suites the program design.

Figure 71: Existing project site – The UH iLab

Source: Author

Figure 72: Project site with Option 1 proposed expansion

Source: Author

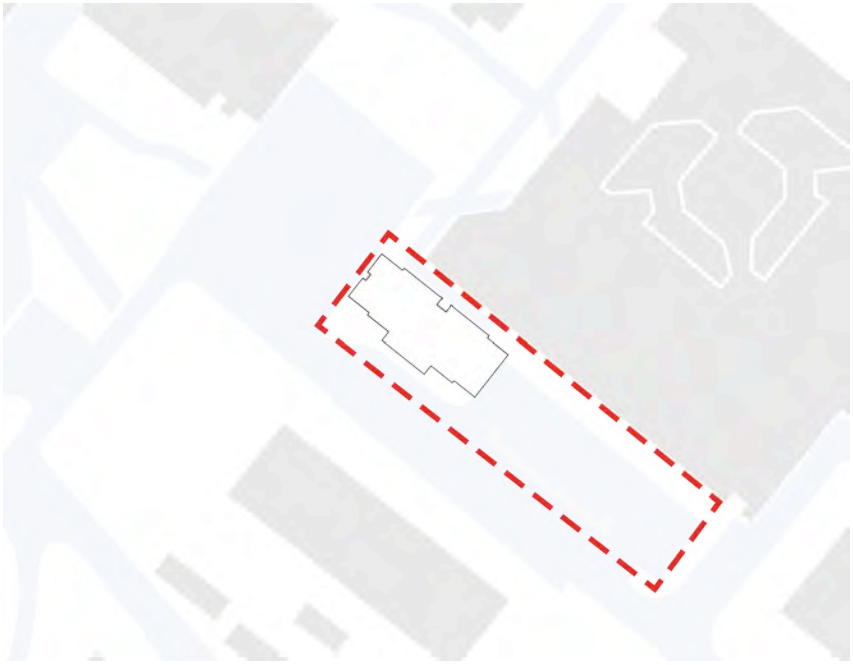

Figure 73: Project site with Option 2 proposed expansion – final choice

Source: Author

The chosen site is located in Honolulu, Hawai'i at the University of Hawai'i at Mānoa (UHM). Figure 74 displays the entire UHM Campus, as well as the site boundaries highlighted in blue. The site boundary is approximately 1,740,000 square feet, where the UH co.Lab project site is approximately 29,800 square feet. The site boundary was chosen based on the project site's visual connection with pedestrians entering the site. It is also based on the inclusion of the founding schools of UH i-lab project. Some of the founding schools include the College of Engineering, the School of Architecture, and Shidler College of Business (fig. 85).

Figure 74: Site boundary including supporting departments of UH co.Lab
Source: Author

Figure 75: Site boundary and site context

Source: Author

Site: Movement and Traffic

By locating the main entry points on site, connections are made through fluctuations of pedestrian inflow movement (fig. 76). The increased number of repetitive flows of pedestrian movement indicates higher volume of traffic, whereas the decreased number of lines indicates a decreased volume of traffic. Through observations, there is a large inflow of pedestrian movement toward the inner parts of University of Hawai'i at Mānoa campus (i.e., the Campus Center). The pedestrian inflow movement leads to and from the Campus Center, which is indicated by the Main Point of Interests (dotted in yellow in fig. 76). The location of UH co.Lab provides great opportunities for public exposure to students, faculty, and community members.

Figure 76: Main entry points, main points of interests, vehicular movement, and pedestrian movement
Source: Author

Figure 77: Parking locations within site boundaries
Source: Author

Within the site boundaries, there are numerous parking lots and parallel parking stalls (fig. 77). The existing project site, Building 37, is surrounded by two parking lots and parallel parking spaces. These parking lots provide the space necessary to allow for expansion.

Site: Natural

Wind direction, the sun's path, and shadow studies were conducted to understand the conditions of the project site. The dominant wind direction on the project site comes from the northeast. The project site does not receive much prominent wind flow because of its surrounding buildings, like the Art Building and Bilger Hall (fig. 78). According to sun path and shadow studies, the project site has limited shade coverage from the surrounding buildings, which necessitates some kind of shade coverage in the final design (figs. 79 and 80).

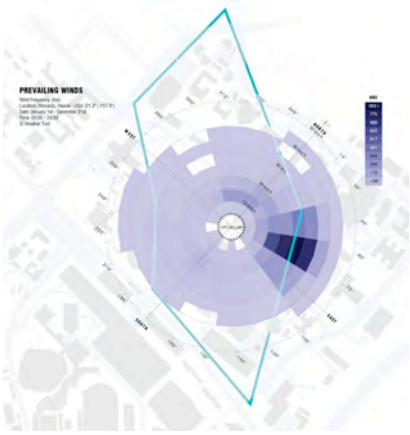

Figure 78: Wind direction

Source: Author

Figure 79: Sun path

Source: Author

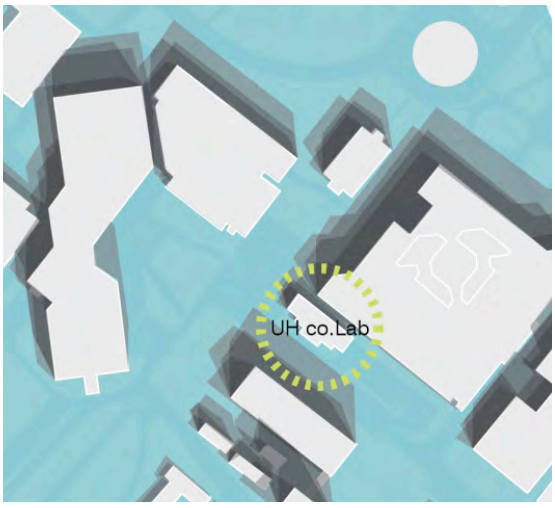

Figure 80: Shadow range study

Source: Author

Within the chosen site boundary, landscape, and trees occur frequently. The purpose of figure 81 is to understand and demonstrate the relationship between landscape and hardscape including buildings. Hardscape is man-made hard landscape materials of an outdoor area that is incorporated into landscape design such as driveways, bricks, walls, and pathways. This analysis gives an understanding to what surrounds the project site, and what occurs within the site boundaries.

A site section diagram shown in figure 81 is created to understand the building heights in relation to the current project site. Observations show that Building 37 is surrounded by buildings

that are at least twice its height and larger in square footage. Building 37's height in comparison to the surrounding buildings isn't much of an issue; however, for the UH co.Lab's architectural program design, it is most likely that more than a one-story is needed to provide minimal program requirements. If the UH co.Lab is more than one story high, the height of the building could be read as more relevant to its surrounding context.

Figure 81: Landscape of site boundaries with trees

Source: Author

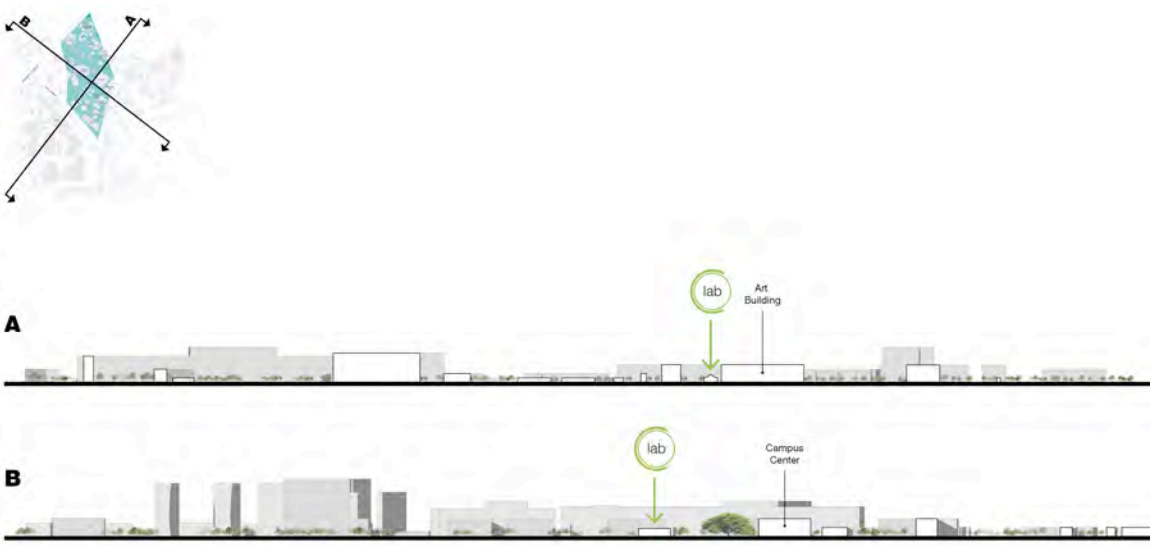

Figure 82: Site section through entire UHM campus

Source: Author

Site Context

According to Spencer Leineweber's *Campus Heritage Report*, "Building 37 is a one-story structure reinforced concrete structure with stucco finish building in the Territorial Style."[177] Spencer Leineweber was a Professor and Director of the Heritage Center at the University of Hawai'i at Mānoa, School of Architecture. Building 37 is largely a rectangular shaped building with a double-pitched roof (figs. 83 and 84). The northern facade faces the Art Building, while the southern facade faces Kuykendall Hall. The main entrance lies on the south facade, with double doors at the center. The secondary entrance is on the north facade and also has double doors in the center of the north facade. Between Building 37's south facade and Kuykendall Hall lies Correa Road, one of the very few roads within University of Hawai'i at Mānoa's campus that leads to Campus Center and connects to East-West Road. Building 37's east facade faces a small parking lot that is connected to the Art building and the Bilger Addition. The west facade sits beside another small parking lot, which connects to Campus Center and Warrior Recreation Center. Single door entry is only present on the west facade.

Before the UH iLab occupied in Building 37, the Information Technology Services (ITS) department occupied this building. In February 2014, the ITS department moved into its

[177] Leineweber, "University of Hawai'i Campus Heritage Report," 122.

new 74,000 square foot facility—a drastic change from Building 37's 3,800 square foot facility. This action left Building 37 vacant for nineteen months, until the soft opening of the UH iLab in September 2015 (fig. 84).

Figure 83: Historical image of Building 37
Source: Campus Heritage Report[178]

Figure 84: Exterior of Building 37 as of 2015
Source: Author

The UH iLab's initial mission would not have been possible without the support and interests of diverse UH departments and their faculty members. Some of the initial departments who played a significant role in creating UH iLab include the College of Engineering (founding department), the School of Architecture (design and furniture selection), the Shidler College of Business, the Department of Art and Art History, the Dance Program, the Academy for Creative Media, and the College of Education. The supporting departments and their relevant locations are shown in figure 85.

[178] Leineweber, "University of Hawai'i Campus Heritage Report," 125.

Figure 85: Location of supporting departments of UH iLab
Source: Author

One of the most important site analyses in architectural design is observing the existing surrounding context. The surrounding buildings consists of Kuykendall Hall, a half-century-old building dedicated to the English department; Campus Center, comprised of different areas such as the food court, Warrior Recreation Center (university gym) and various outdoor and indoor seating; the Art Building; and Miller Hall, home to the Apparel Product Design & Merchandising department. Perhaps the most influential surrounding context regarding the location of the UH iLab is Campus Center since it is a lively area that effortlessly brings students and faculty members together into one place. It does this by offering eateries, cafes, study areas, event showcasing and seating areas. Figure 86 displays the architecture and visual palette of the existing surrounding life relative to the project site.

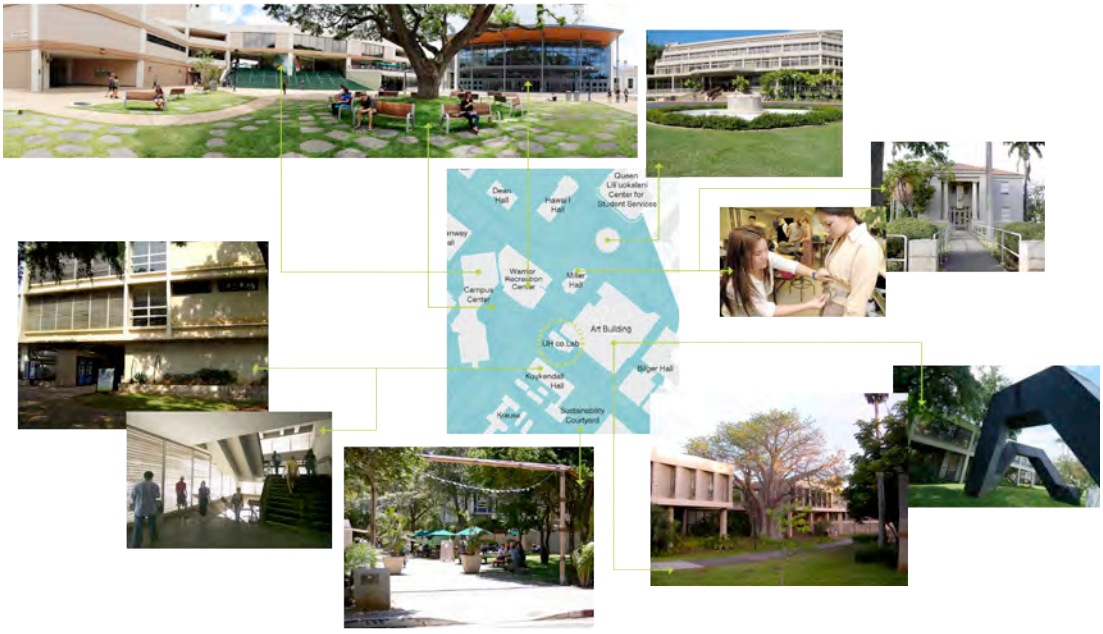

Figure 86: Surrounding life characteristics in relation to location of existing UH iLab
Source: Various Unknown Authors

On the University of Hawai'i at Mānoa campus, it is important to note the presence of the Sakamaki Innovation Zone because of similarities to the UH iLab. In 2012, KYA DESIGN GROUP, as well as a concentrated group of faculty members from Office of Faculty Development and Academic Support (OFDAS), and Office of the Vice Chancellor of Academic Affairs (OVCAA) designed the concept of the Sakamaki Innovation Zone.[179] Together, they created three different classrooms. The classrooms provide a "special and technological structures enable and sustain multiple and simultaneous platforms of teaching and learning, emerging from instinctively kinetic rather than monastic traditions."[180] These three classrooms all have mobile desks and furniture, though the only equipment that is stationary is the monitor screen. There is no specific program assigned to these classrooms, though it does offer faculty and students a different type of teaching/learning space supported by more comfortable furniture.

Jennifer Wong from Ka Leo O Hawai'i, the University of Hawai'i at Mānoa student newspaper, stated that some instructors said that students found it difficult to take notes due to

[179] "Sakamaki Innovation Zone," accessed February 1, 2016, http://www.cte.hawaii.edu/Sakamaki/about.html.
[180] Ibid.

the lack of furniture.[181] In addition, there were difficulties when writing on the SMART Board versus dry-erase whiteboards (fig. 89). The Sakamaki Innovation Zone is still fairly new since it was completed in 2014, and is ideal for certain classes, but not all. These classrooms can be used by faculty and are not open to the public or for student meetings. The limited student access to Sakamaki Innovation Zone classrooms presents an opportunity for the UH co.Lab, as it will provide students, faculty, and community members a space that they can all utilize for different designated purposes.

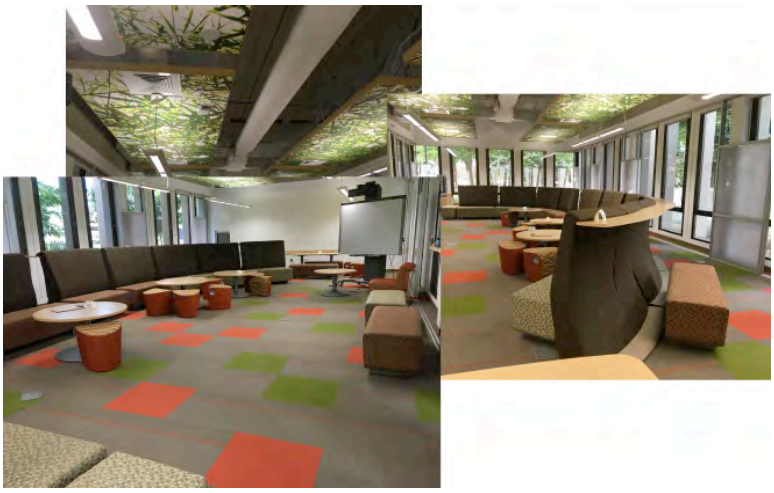

Figure 87: Sakamaki Innovation Zone, Room D-101, collage
Source: Author

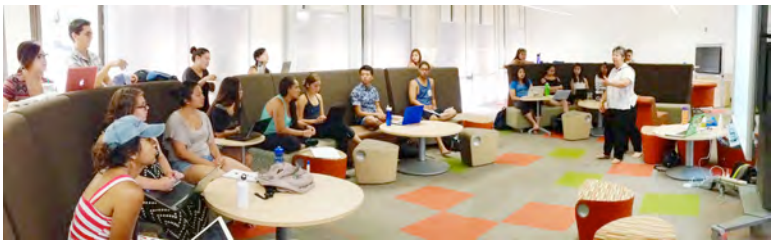

Figure 88: Sakamaki Innovation Zone, Room D-101
Source: University of Hawai'i System[182]

[181] Jennifer Wong, "University Evaluates Sakamaki Innovative Classrooms," accessed January 31, 2016, http://www.kaleo.org/news/university-evaluates-sakamaki-innovative-classrooms/article_346fb28a-6538-11e4-bd57-0017a43b2370.html.
[182] "Sakamaki Classroom Renovation," accessed January 31, 2016, https://www.flickr.com/photos/uhawaii/15482617965/in/album-72157648539397042/.

Figure 89: Sakamaki Innovation Zone, Room D-102
Source: Author

Figure 90: Sakamaki Innovation Zone, Room D-103
Source: Center for Teaching Excellence[183]

[183] "D-103 | Sakamaki Innovation Zone," accessed January 20, 2016, http://www.cte.hawaii.edu/Sakamaki/D103/Sakamaki103_1.jpg.

9.0 FINAL DESIGN

9.01 DESIGN GOALS

Design Goal 1: Design for Creative Productivity based on Visual Connectivity

- UH co.Lab acts as a primary node that pulls students and faculty of different disciplines.
- Develop spaces that empower users to create, make, and build.

Design Goal 2: Create spaces that support the co-design experience

- Discover a new way of approaching experiential learning for students.
- Neutralize hierarchy structure between community members/clients, faculty, and students.
- Community members/clients, faculty, and students become immersed in the co-design culture that creates dynamic working atmosphere.

9.02 PROCESS & EXPLORATION

The purpose of this chapter is to demonstrate the design process for the UH co.Lab. The process has been divided into four segments of design explorations: social workspaces and spatial relationships, massing (mentioned in Chapter 1), connectivity, and activated spaces. The divided four segments were driven by the research conducted previously in this dissertation and stand as the key design components that influence the final integrated composition of the UH co.Lab. For the remaining chapters of this dissertation, quotes from students who participated in a co-design session, conducted by the Author, are selectively dispersed to explore and validate decisions for this new architectural program design.

Process & Exploration: *Social Workspaces Spatial Relationships*

Through research and case studies, evidence shows that effective social co-working spaces involved a blend of different types of spaces that provided different levels of privacy while still maintaining large amounts of open space within the floor plan. Using various design furniture pieces such as semi-transparent dividers like mobile shelves created the various levels of privacy, while walls define private rooms. Variety types of furniture also defined spaces.

An exploration of spatial relationship configurations based on the various levels of privacy, visual connection, different user groups, and furniture options acted as the basis for the spatial diagram in figure 91. The UH co.Lab will be a space for both the community and the university; therefore, it is crucial to form some sense of both public and private spaces to differentiate various user groups and functions within the spaces. As a user enters the UH co.Lab, most of what is visible to the eye is public spaces such as the Café, Lobby, Student Gallery, Community Art Gallery (located outside), and Impromptu Studios. Then the public spaces transition into semi-private spaces such as the Co-design Lab, Faculty Studios, and Active Studios. From these semi-private spaces stem the private spaces such as Visualization Lab, Classrooms, Project Initiative Hubs, and Meeting Room.

> This University needs a public space that doesn't "belong" to a specific participant. This makes everyone feel welcomed.[184] – Architecture Student

[184] Group discussion with students, March 22, 2016.

An important aspect of designing the spatial relationship layout was keeping in mind what different user groups will be visually connected as they journey through the space. Relatively, it was important to place the Co-design Lab within range of sight through the main entrance. To enhance the visual working dynamic between spaces, the Co-design Lab was placed between the Impromptu Studios and the Active Studios. The Co-design Lab will be a space filled with different types of users that either is comfortable expressing creativity or not. Given that the placement of the Co-design Lab occurs between these two high-leveled creative studios will hopefully inspire those participating in a co-design session.

Most diagrams provided in the next sections will be color-coded to consistently relate the same type of spaces by categorizing them in different levels of privacy. Blue means public, green means semi-private, and red means private.

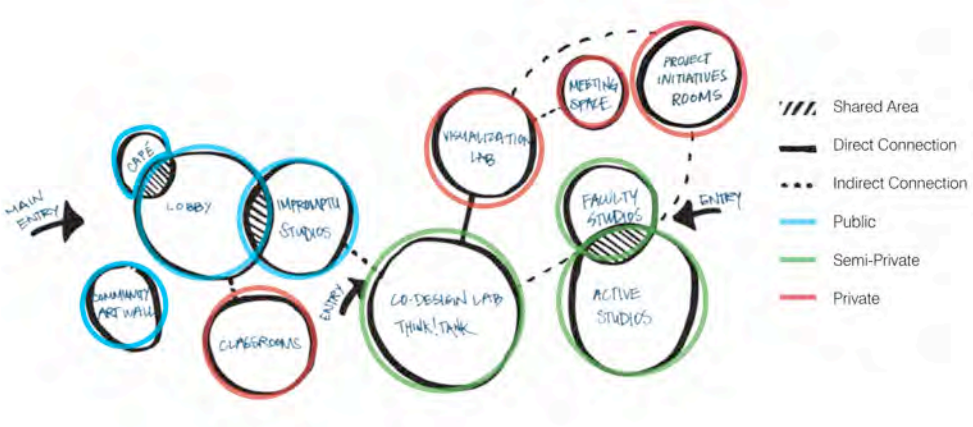

Figure 91: Spatial relations diagram

Source: Author

By using the Spatial Relations Diagram in figure 91, the UH co.Lab program will be divided into two floors. Figure 92 shows the spatial layouts of the first and second floor. The priorities set in the "Spatial relation diagram" in figure 91 are maintained in "Spatial relations distribution between first and second floor" in figure 92. Some program spaces are integrated with one another. For instance, most of the public spaces are merged together, while other spaces like Active and Faculty Studios share a portion of their space. The merged spaces are necessary to support visual and physical connection between users to maintain productivity. It is generally understood that if a person is surrounded by a group of productive people, it is likely that this

person will also be productive himself or herself. The concept of visual connection is prominent in the overall design; therefore this notion will be mentioned often. A further dissected diagram of the first and second floor spatial layout within each bubble is displayed in figure 93 and figure 94. This diagram helps visualize how groups of people would assemble in each given space.

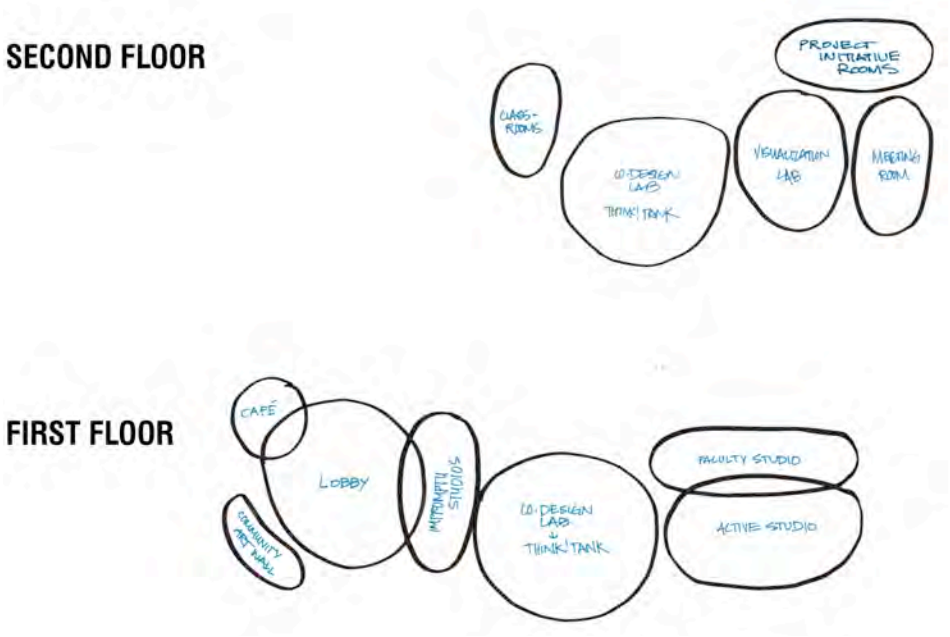

Figure 92: Spatial relations distribution between first and second floor

Source: Author

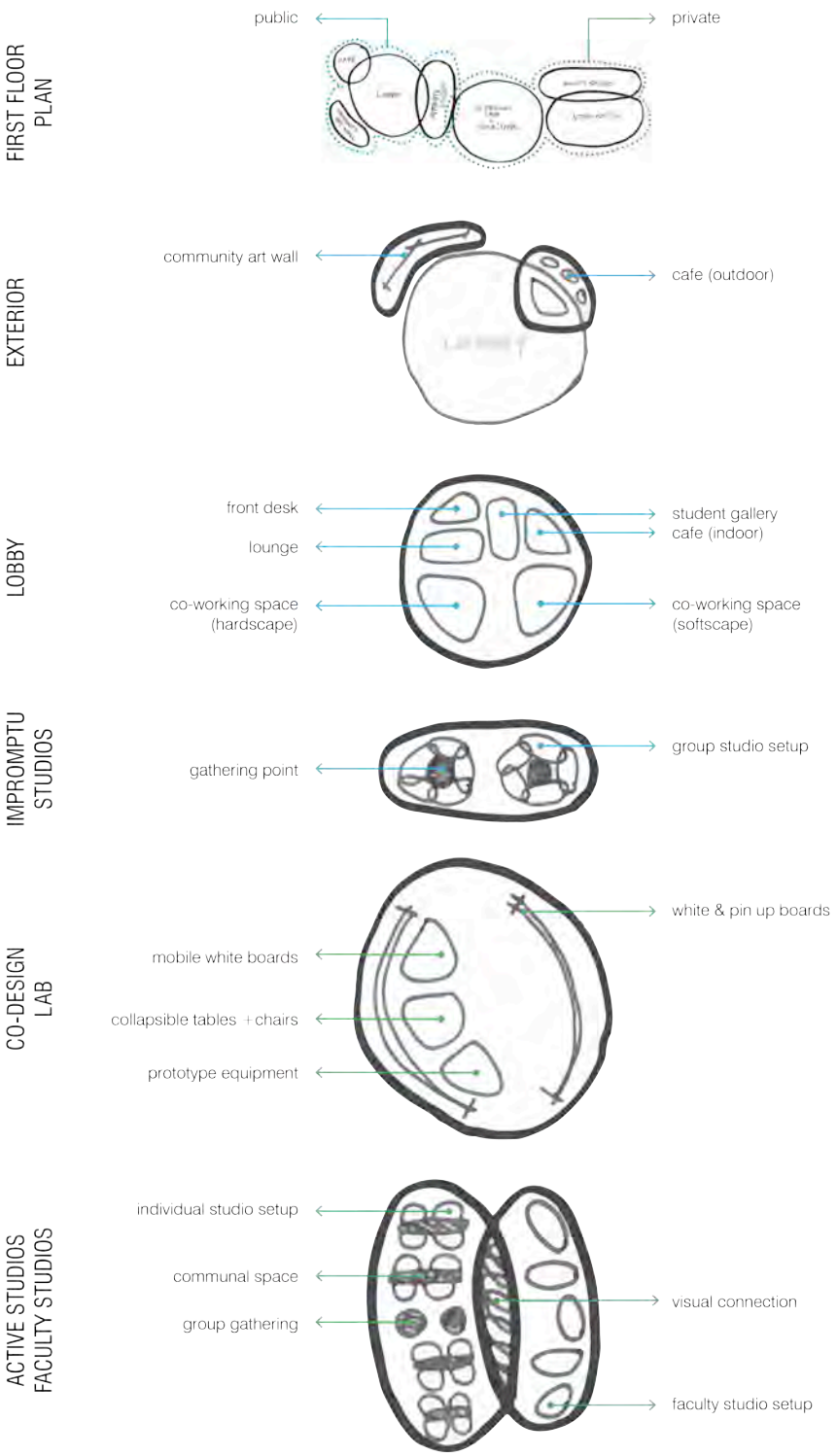

Figure 93: First floor: Spatial bubble diagram further expanded

Source: Author

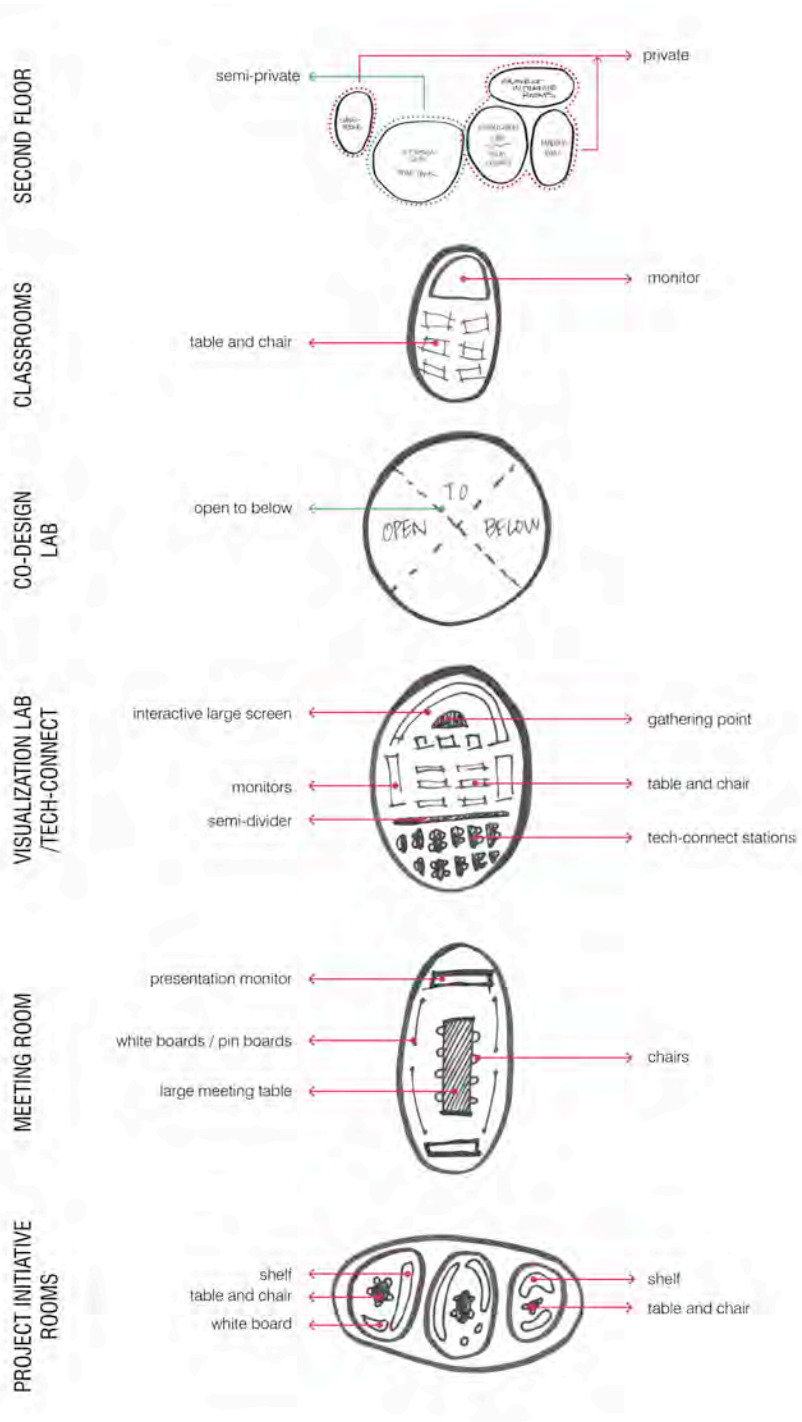

Figure 94: Second floor: Spatial bubble diagram further expanded

Source: Author

Description of Spaces

The next section describes each type of space in its similarities, differences, and special characteristics divided by floors. In addition, it explains reasons for the spatial adjacencies.

The first floor of the UH co.Lab consists of the Community Art Gallery, Student Gallery, Café, Admin, Lounge, Co-working Spaces, Impromptu Studios, Active Studios, and Faculty Studios.

The Student Gallery as well as the Community Art Gallery (on the exterior of the UH co.Lab) serve the purpose of attracting users into the UH co.Lab by sparking curiosity. Both are similar to installation pieces that would mostly change content and occasionally change its rigid structure. For example, the framing of the Community Art Gallery could be similar to a cube-like wooden frame itself. The cubic wooden frame would not change as often as the content. The Community Art Gallery serves the purpose of providing a co-designing activity on the exterior of the building to reflect what occurs within the UH co.Lab. The experience is discussed in a later section of this dissertation. The Student Gallery is a walk through gallery that displays previous and current students' projects that are created from the courses offered at the UH co.Lab.

> I learn best when the atmosphere is welcoming.[185] – Mathematics and Secondary Education Student

The Lobby and Café are the most transparent spaces in the UH co.Lab. They are spaces are to provide different types of areas to study and meet others. At the Café, there are two types of seating offered: interior and exterior. Within the interior, there is a long bar where students can study while observing the baristas brew coffee. For both the interior and exterior, there are areas with small tables and chairs that seat two people comfortably. There are a couple spaces merged within the Lobby, which are at the Front Desk and Lounge and two Co-working Spaces. The Front Desk is an open desk area for the receptionist. The Lounge provides two types of sofas, one that is a typical soft seating sofa, and the other is a built-in sofa. The built-in sofa is to provide a different type of human body seating arrangement that imitates the sitting on the floor without one actually sitting on the floor. It also provides a stiff backrest so users can place their laptops on their laps will working.

[185] Group discussion with students, March 22, 2016.

> My ideal studio space is making sure I have a space to work privately. I dislike it when people peer over my shoulder and try to have a conversation with me when I am immersed in my work.[186] – Political Science Student

The two co-working spaces are adjacent to one another, where one is connected to the Café and the other is connected to the Lounge. The Co-working Spaces are separated by semi-transparent dividers that allow visual connections to still be made. Although they are both co-working spaces, they differ in subtle ways. One provides circular furniture, and the other provides hard or soft furniture. These different options are supportive of the user's intention of setting up their first-come-first-serve co-working spaces. These spaces are equipped with media display screens and mobile dry-erase whiteboards to provide rapid brainstorming tools.

> Visuals help within communication as well as sharing ideas. In terms of visual space, I think a connection within the surroundings are as important.[187] - Architecture Graduate Student

The space in between the Co-working Space and the Impromptu Studios are meeting pods. It is placed between two spaces that are open spaced, so the users maintain some level of visual connection. The meeting pods act as semi-transparent dividers; however, it is a transitional space that provides a program use. The meeting pods provide some level of privacy when studying or meeting others.

Impromptu Studios are more structured than the Lobby and Café area. It is equipped with large tables with adjustable height for users to work standing or sitting. Adjustable chair heights are provided to support that. These tables are handmade out of recycled wood. The Impromptu Studios offer a more casual and industrial ambience than the Active Studios. The Impromptu Studios are not as permanent like the Active Studios. This gives reason for the choices in material for furniture as they are expressive and provide the users a sense of freedom to use the space however they please. Tools and equipment to support individual creativity and teamwork are provided such as dry-erase whiteboards, pin-up boards, construction/building areas, and common meeting areas.

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[186] Group discussion with students, March 22, 2016.
[187] Ibid.

> It [the UH co.Lab] is a good space to meander around, like oh I don't feel like sitting at a desk anymore, so I want to now change into another space to lay down.[188]
> – Recent Civil Engineering Graduate, Currently Specializes in Structural Engineering

The Co-design Lab is the largest space in the program for its intended to house many users for the implementation of the co-design method. The Co-design Lab is used for events, lectures, movie night, and co-designing sessions. The Co-design Lab is meant to act as the "blank slate." The blank slate concept is important to the design process. There are two types of spaces that foster creativity according to the conducted research. One should be like a studio, where users work, and think about their own design process. In the studio, users are able to pin up content that is easily in visually available. However, there are moments when the creativity process needs a blank clean space to work out ideas. These moments could be referred to as creative block. Creative blocks typically occur when a user is trying to solve a problem and is unable to do so at their individual studio desk. This is where a space like the Co-design Lab is useful. The Co-design Lab is a blank slate for users (students, faculty, and community members) to start over and scribble all ideas on a surface - whether it is on a wall, board, or on the floor. After users are done with the Co-design Lab, it is important to reset the space for the next set of users. This space is equipped with rapid prototyping materials such as scissors, pipe cleaners, tape, foam, construction paper, and glue. The Co-design Lab has the capability of scribbling on the floor assists in the user's creative flow. There are also mobile dry-erase whiteboards and pin-up boards.

> I learn best when I have the ability to draw or write when I'm listening or learning... if I'm not doing one of those two things I'm probably not actually listening.[189]
> – Architecture Student

The Faculty and Active Studios differ from the Impromptu Studios in that the Faculty and Active Studios provide sturdy furniture because it is a designated space for students and faculty who are permanent contributors to the UH co.Lab program. This means that the users of the Faculty and Active Studios are attending school or teaching courses at the UH co.Lab. This

[188] Group discussion with students, March 22, 2016.
[189] Ibid.

space provides room for user creativity. The specific equipment will be elaborated further upon later in this chapter.

Although the furniture is sturdier, it does not hinder the fact that it also has the ability to be configured to how the user needs their studio spaces to be. The Faculty and Active Studios face one another in a horizontal motion to provide visual connection while working alongside one another. These two studios are divided by a circulation path that allow passerby's a glimpse of what studio culture at the UH co.Lab is like. Lying within these studios are spaces that provide incentive to gather, a similar atmosphere as the Lounge, without the users having to be in the public space.

> A space that encourages socializing in a relaxed environment. I would like to escape the assumptions people have about engineering students not appreciating artistic qualities.[190] – Recent Civil Engineering Graduate, Currently Specializes in Structural Engineering
>
> Personally what is important to me in a studio space is an open desk to draw and write, multiple pens (line weight), color pens (diagrams), trace paper (jot down ideas), pin-up board to visually see all schemes.[191] – Architecture Graduate Student

The second floor of the UH co.Lab consists of Classrooms, Project Initiative Hubs, Visualization Lab/Tech-Connect, and Meeting Room.

The Visualization Lab acts as two entities, as a second filtration of the co-design session method, and as Tech-Connect. As a second filtration of the co-design session, the visualization room helps users who completed a co-design session to be able to see everything that occurred in the co-design session. It basically acts as a "recap" session and goes over all the content that was created in the co-design session. The Visualization Lab is where the facilitator visually communicates what was mutually agreed upon in the co-design session, and, if any discrepancies arise, the Visualization Lab provides room to reiterate a co-designing session that is more confined than the usual process in the Co-design Lab.

> Visual connectivity highly impacts creativity, majority of students are visual learners, so access to projections screens is vital."[192] – Mathematics and Secondary Education Student

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[190] Group discussion with students, March 22, 2016.
[191] Ibid.

The Meeting Room is situated right next to the Visualization Lab, and it acts as the last filtration of the co-design session. This room is set up to present the final outcomes of the co-design session to its users and stakeholders. It is a necessary space to support the co-design session process in finalizing the outcome. This is where negotiation and mediation are encouraged.

Classrooms are provided to support the courses being offered at the UH co.Lab. To provide the necessary layouts for diverse classes, classrooms are free to be reconfigured based on the needs of the courses. There are two classrooms near the main entrance, and one large classroom at the opposite end of the UH co.Lab near Bilger Hall.

> I like privacy when I work. I don't really like to feel on display or distracted when I'm working. It also helps when the space around me is clean… this way I am not distracted.[193] – Art Student

Project Initiative Hubs serve the purpose of providing private studio/office spaces for teams that are pursuing confidential projects. These confidential projects are intended for academic publication in support of the overall goals of the UH co.Lab and to raise awareness of the success of the UH co.Lab. Users of the Project Initiative Hubs would be mixed between faculty, students, and community members and will be carefully selected by the UH co.Lab administrators and program managers.

Circulation

Circulation studies were created to understand how a user would journey through the UH co.Lab. Figure 95 shows a design decision based on increased visual connection experience of both the Faculty Studios and Active Studios. A passerby user would have a longer visual exposure to the Faculty and Active Studios if the spaces were oriented horizontally rather than vertically. The circulation outlined in red is the chosen path of user circulation for the first floor (fig. 95). The catwalk experience is one of the design elements that will be implemented to maintain the visual experience from second to first floor. The catwalk allows visual exposure only to spaces that would benefit from being visible to others from the second to first floor (figs. 96 and 97). The

[192] Group discussion with students, March 22, 2016.
[193] Ibid.

catwalk is the secondary circulation, while the primary circulation of the UH co.Lab will consist of typical hallways and corridors.

> We like the idea of the catwalk because of being able to see other people working on their projects.[194]

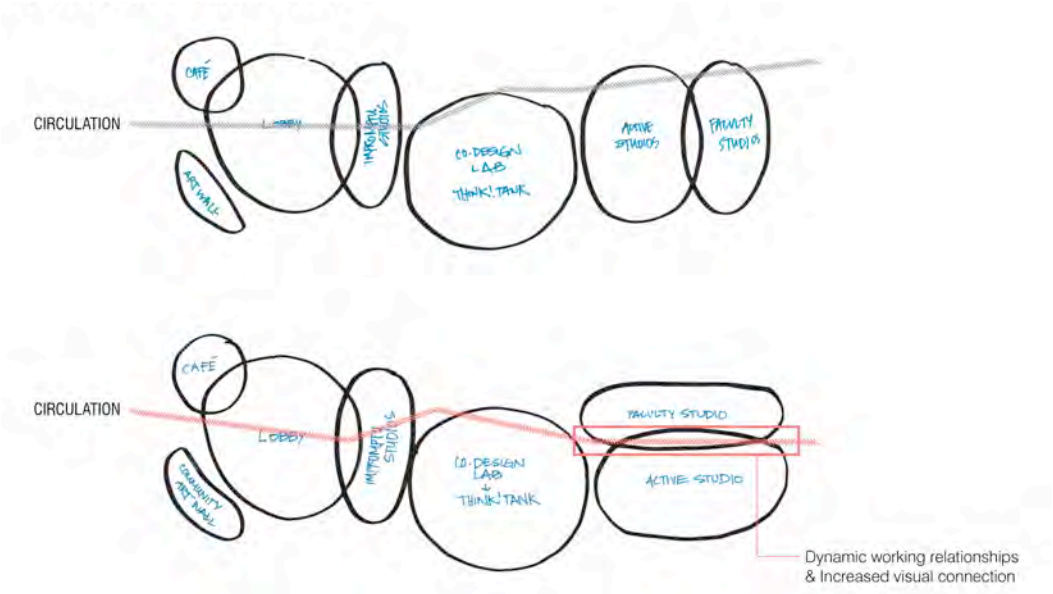


Figure 95: First floor spatial relation distribution with circulation study
Source: Author

[194] Group discussion with students, March 22, 2016.

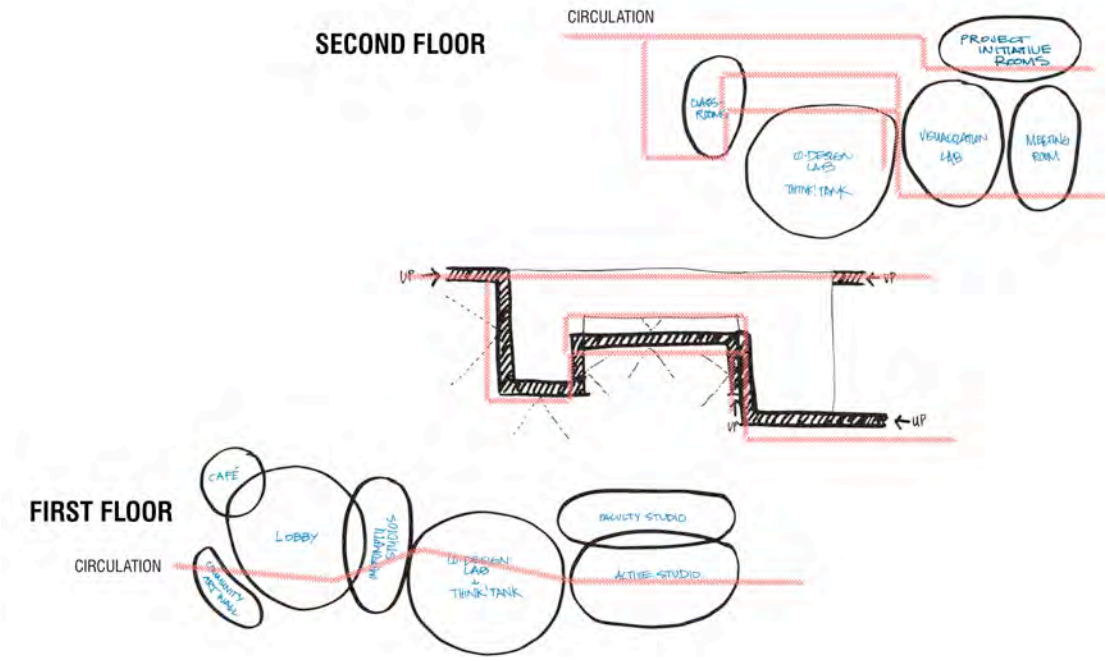


Figure 96: First floor and second floor distribution with circulation and catwalk

Source: Author

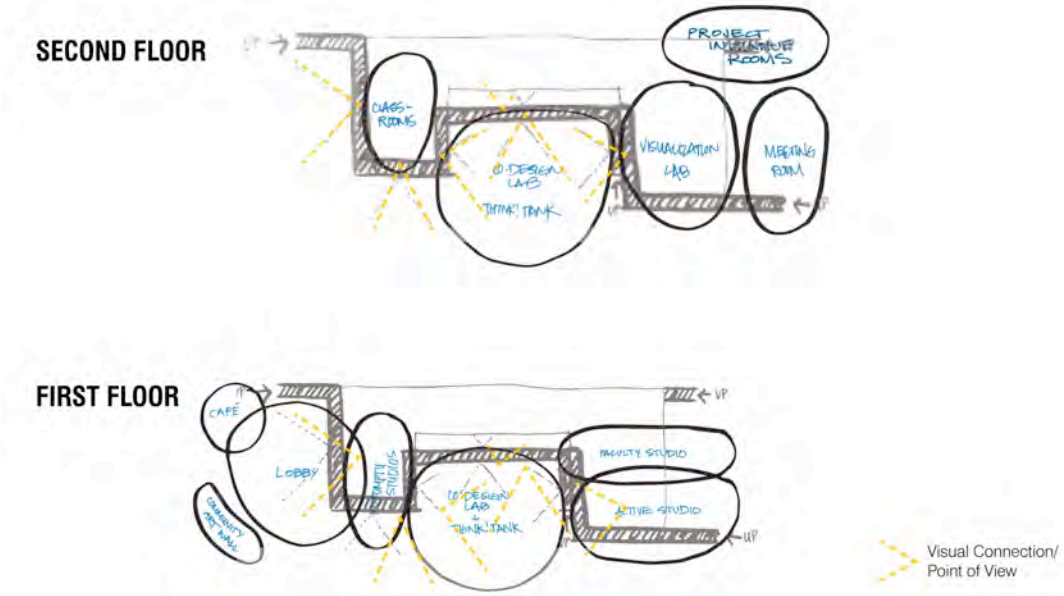


Figure 97: First floor and second floor catwalk experience to support visual connectivity

Source: Author

Process & Exploration: *Massing*

An exploration through massing (mentioned in Chapter 1) studies led to the following three figures. The shapes are restricted due to the decision of expanding on the existing short end of the perimeter (fig. 98). However, an elongated warehouse type of space seems attractive because it effectively steers the user circulation. Playing with the segmented shapes creates a language of differentiating volumes as a way of creating attractive and connecting forms to the public eye. Shifting segments of the program requirement spaces (fig. 98) and extruding heights of the different segments (figs. 99 and 100) are correlating responses to the initial spatial relation diagram.

The hierarchal language of segments is inspired by the concepts of negotiation and mediation and how they reflect levels of partnership between participants. As a result, the Co-design Lab is designed with the highest ceiling hovering over all the other program spaces to represent a neutralization of hierarchy through immersing groups of people into this space (fig. 100). This type of atmosphere adds to the effect of feeling free to express one's self creatively due to the amount of open space above the users.

> In terms of the Co-design Lab being over 70 feet, I think it's great, it's a big environment. I can see myself drawing on the floor, on the walls, and even grabbing a ladder and posting ideas up to the sky.[195] – Architecture Student

[195] Group discussion with students, March 22, 2016.

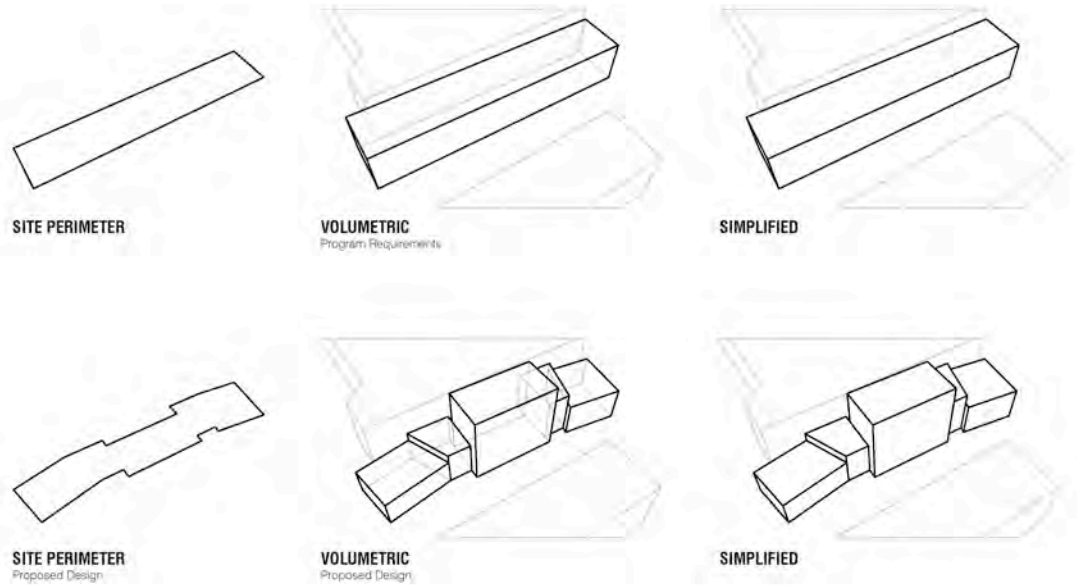


Figure 98: Massing study program requirements and proposed design

Source: Author

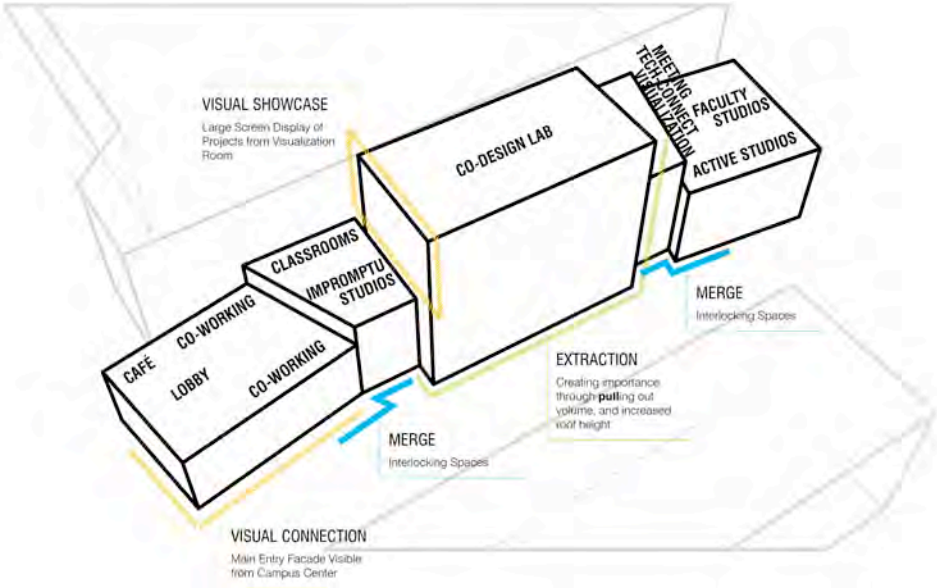


Figure 99: Massing study program intentions

Source: Author

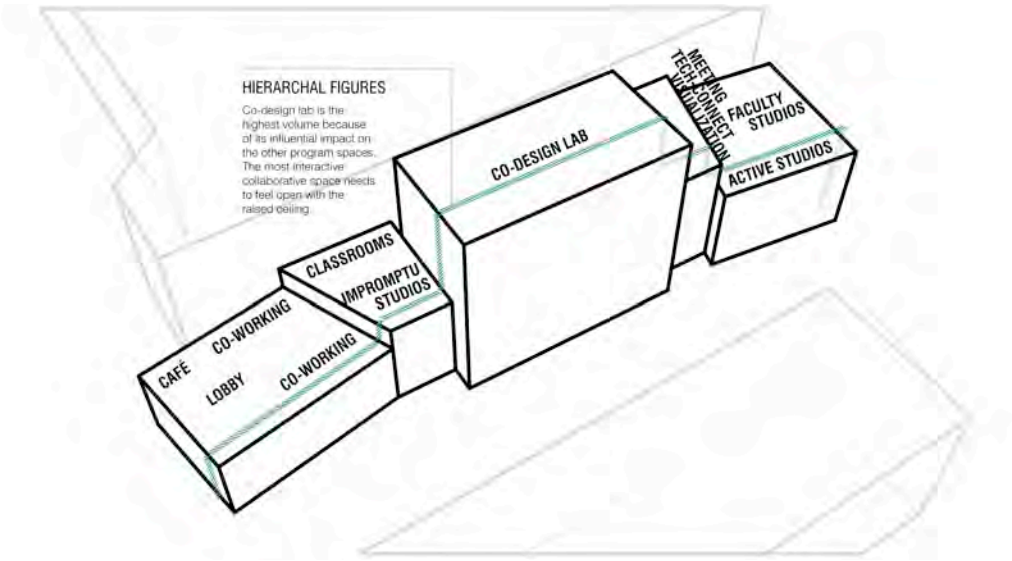


Figure 100: Massing study program intentions for the Co-design Lab

Source: Author

Process & Exploration: *Connectivity*

One of the most important design drivers of the UH co.Lab is connectivity. This connectivity concept applies to physical and visual elements of design decisions occurring between interior and exterior. Much of the visual connectivity concepts were previously discussed in other sections.

Based on the d.school and Harvard i-lab case studies, the projects selected to associate itself with an adjacent department to support use of the space. Usually, the adjacent department was a supporting department for the project. The UH co.Lab is created based on the University's intention to build on collaboration through the co-design method. This final architectural program design proposes to build physical connections to the Art Building with intentions to share program spaces. It proposes to share the Makerspace at the Art Building with the UH co.Lab to alleviate costs and avoid duplication of existing equipment on campus as illustrated in figure 101. In addition, this final program design proposes building a bridge on the second floor to share the Art Building's popular courtyard as a way to further connect students by offering mutual outdoor spaces. Another concept of connectivity is the visual connection of interaction occurring in the interior of the UH co.Lab being portrayed on the exterior of the UH co.Lab to provide public exposure. This connection is further discussed in the next section.

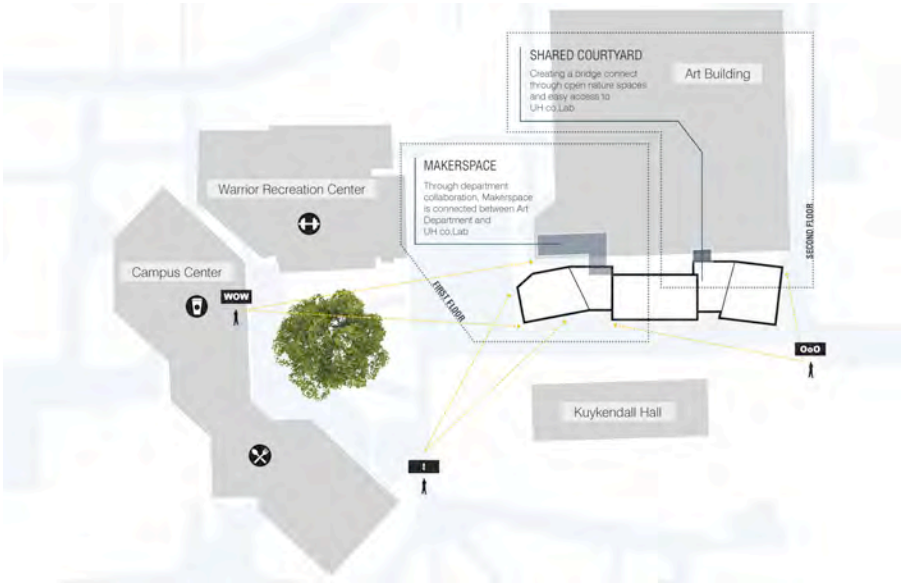


Figure 101: Connectivity elements from surrounding contexts to UH co.Lab
Source: Author

Process & Exploration: *Activated Spaces*

Activated spaces are a way to draw in the public eye and to spark curiosity. There are two kinds of activated spaces that are explored in this section of the dissertation. One is the Community Art Wall shown in figure 103. The Community Art Wall was briefly discussed in an earlier section and is described as an exterior reflection of what happens inside the UH co.Lab. The Community Art Wall is a collaborative art piece that is co-designed by the people who choose to contribute to it. The contributors could be a student, faculty member, or community member. The kinds of topics that will be on display for people to contribute to are as follows. Where is your dream vacation? The co-designer will then write on a post-it where their dream vacation is and add it to the Community Art Wall. The topics and activities would change occasionally every month to provide new interactions and interests to display. The topics and activities would be changed by UH co.Lab program manager based on suggestions by students.

> I like how in your [presentation of the UH co.Lab] diagrams - the focus in the yellow triangle displays how everyone is circulating through Campus Center. The community art wall would be very interesting to see happen and we thing that it would be effective in bringing different types of people from different backgrounds into the UH co.Lab.[196]

The other activated space is the visual showcase (fig. 102). The visual showcase is an exterior wall that is used as a large projection screen to show what is happening inside the UH co.Lab. The projection could be a display of a co-design session occurring in the Co-design Lab, or a live video feed of a student in Tech-Connect creating a 3D model of their next furniture piece. This space can also be used to display event information for interested viewers.

[196] Group discussion with students, March 22, 2016.

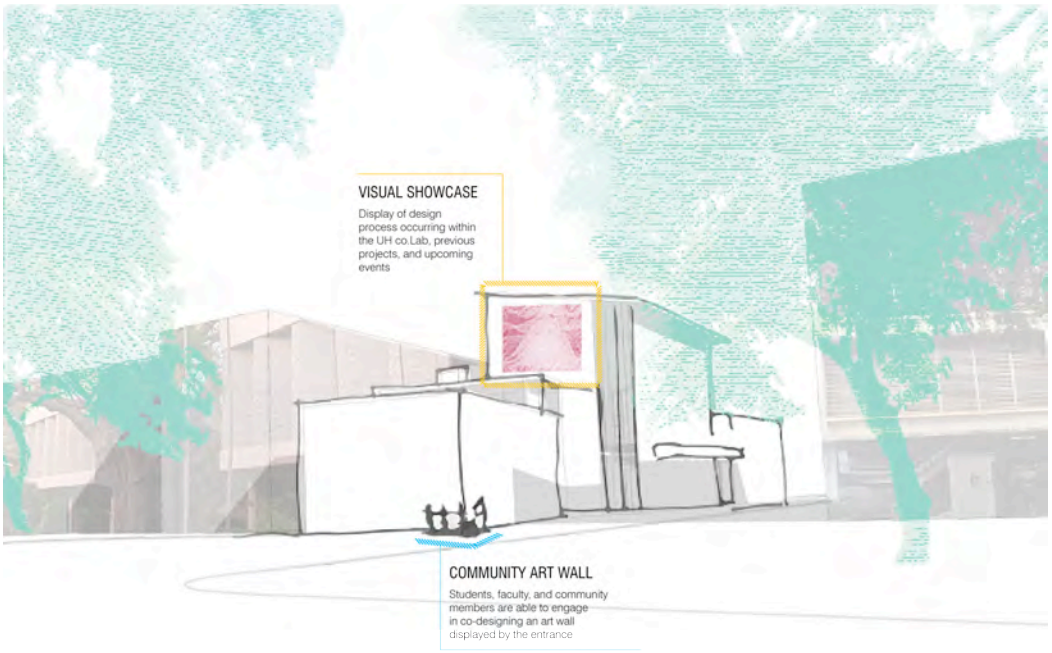


Figure 102: Activated spaces in perspective from Campus Center

Source: Author

Figure 103: Community Art Wall as an activated space

Source: Author

The Design and Exploration section of this design process has allowed the discovery of different ways to create value into the final design. All content from the Design and Exploration portion of this dissertation serve as design elements and designed moments that are integrated into the final programmatic design.

10.0 FINAL COMPILATION DESIGN

The final architectural program design of this dissertation is defined and illustrated in this chapter as a cumulative composition of all design research processes conducted for this doctoral project. The contents of this chapter are subdivided into three sections: 1) fundamental architectural illustrations, 2) analytical diagrams of comparison, and 3) experiential user journeys.

10.01 FUNDAMENTAL ARCHITECTURAL ILLUSTRATIONS

The first section of contents of this chapter includes fundamental architectural informative diagrams such as floor plans with spaces, volumetric visualization of program spaces, sectional experiential renderings in relation to the existing UH iLab, and current program offerings.

The first floor plan of the UH co.Lab as illustrated in figure 103 demonstrates the design intent of designating the first floor to the majority of the public. Dedicating the first floor to the public is crucial for UH co.Lab to seem welcoming to a certain degree so users can feel free to explore the space and explore their respective creativity. This maintains the design principle of visual connection between spaces, while users manage their own level of privacy with furniture and equipment.

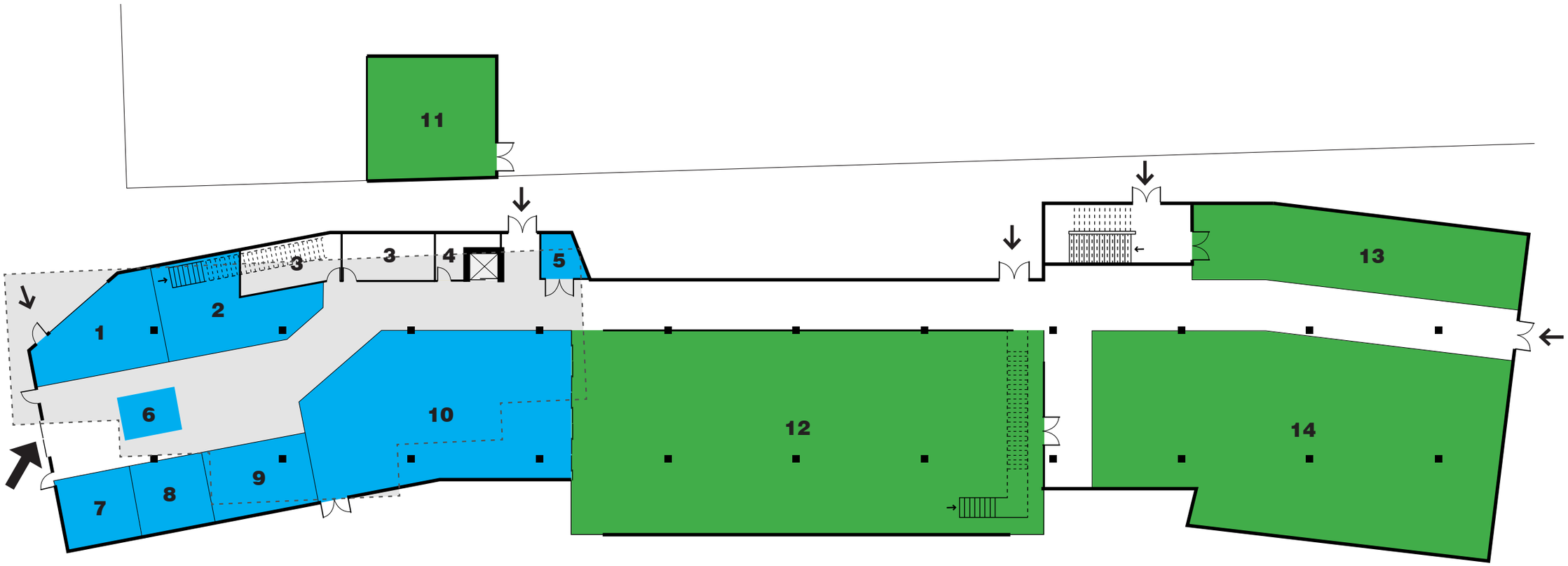
> As an engineer, we deal with drawings every day. I am a visual learner and seeing things throughout the day helps to inspire me and helps me to figure out solutions to problems.[197] – Recent Civil Engineering Graduate, Currently Specializes in Structural Engineering

As shown in the figure 104, a user entering from the main entrance would experience a gradual transition from public spaces into semi-private spaces as the spaces progress deeper into the UH co.Lab while maintaining a "welcome" factor. Semi-private spaces consist of program

[197] Group discussion with students, March 22, 2016.

areas that need a level of privacy, which is controlled by the user of the specific area. Some examples would be the Co-design Lab. The Co-design Lab would need a sense of privacy, because during a co-designing session, it would be distracting for the participants to be able to see people walking by the Co-design Lab, interior and exterior. Therefore, most of the walls are solid and provide for additional dry-erase wall space upon which participates can express their ideas. The gradual transition would continue from the first floor semi-private spaces to the second-floor private spaces.

The second floor plan, shown in figure 105, is mostly dedicated to users who are invested in the UH co.Lab program. The second floor private spaces consist of Classrooms, a Visualization Lab, Meeting Space, and Program Initiative Hubs. The Visualization Lab and the Meeting Space are located toward the center near the Co-design Lab because the Co-design Lab is an influential part of the co-design process a user would partake in if he or she were to participate in a co-design session. A user would partake in a co-design session to both gain experience of communicating and interacting with other students, faculty, and community members, and to contribute back to the community by giving feedback.



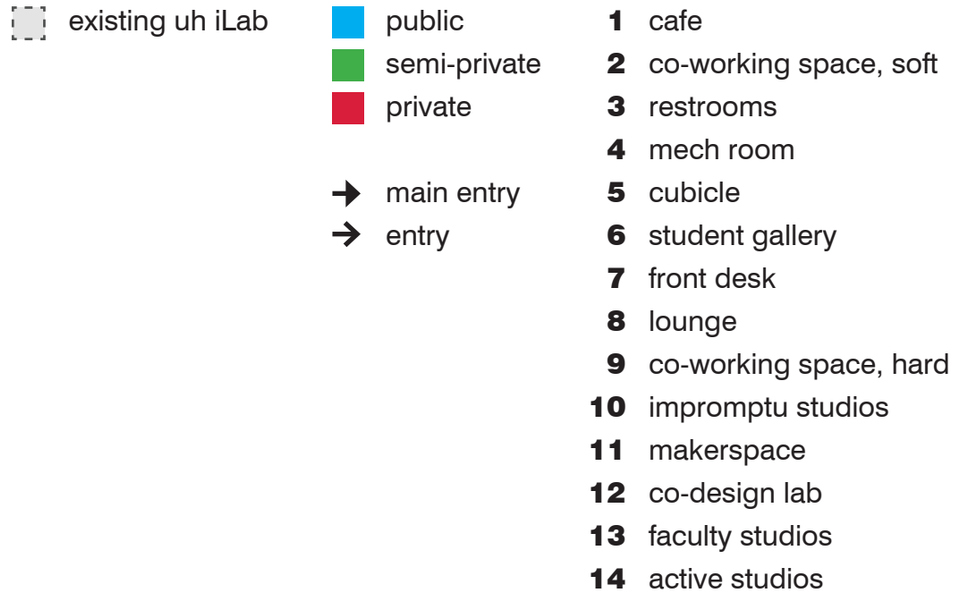
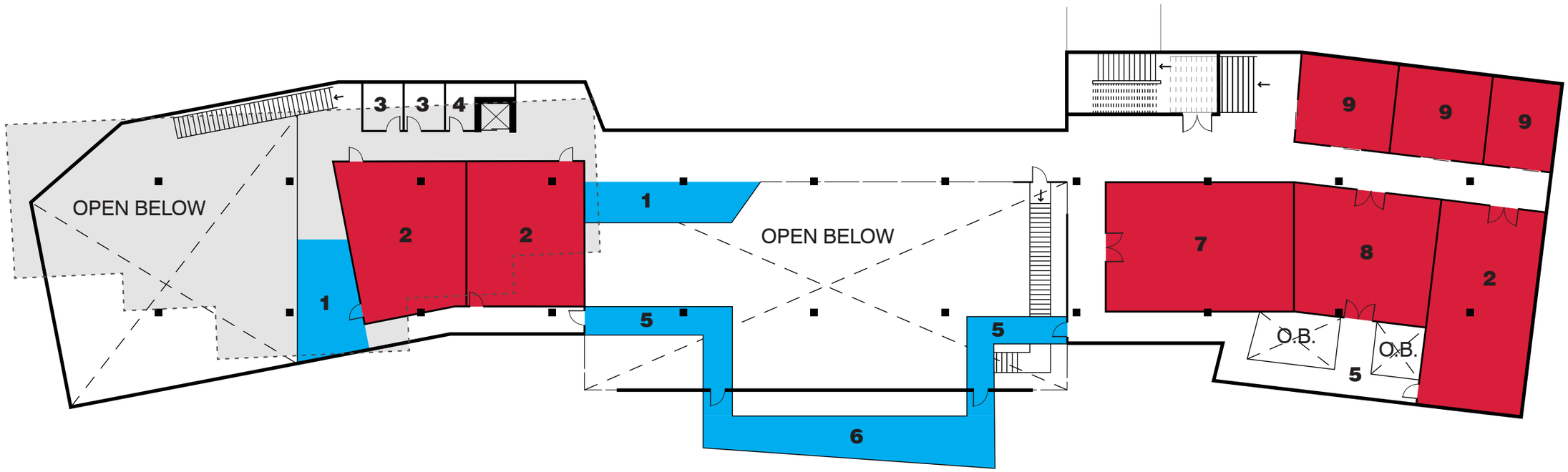


Figure 104: First floor plan: UH co.Lab
Source: Author



existing uh iLab

public
semi-private
private

1 impromptu meetup
2 classroom
3 restroom
4 mech
5 catwalk
6 outdoor impromptu meetup
7 visualization lab / tech-connect
8 meeting
9 project initiative hubs

Figure 105: UH co.Lab: Second floor plan
Source: Author

Figures 106 and 107 display a volumetric visualization of the program spaces that occur within the UH co.Lab. The relationship between public, semi-private, and private spaces are defined through color-coding, as well as a dotted line to show the current UH iLab to display how the new UH co.Lab design is adding space to satisfy the program requirements. Vertical circulation and catwalk horizontal circulation are highlighted in yellow to visualize how a user would journey from each floor.

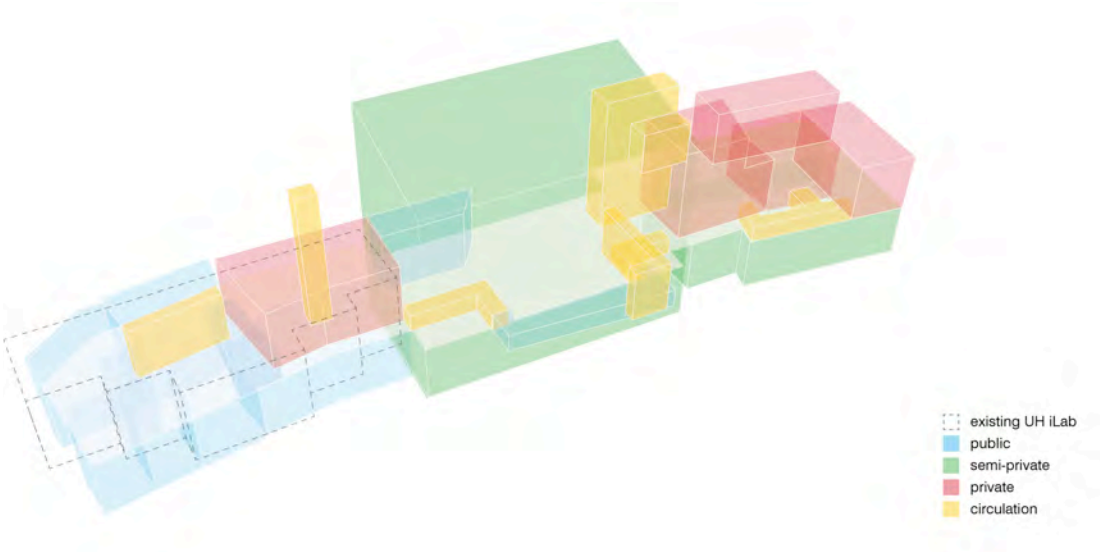


Figure 106: Volumetric visualization of program spaces

Source: Author

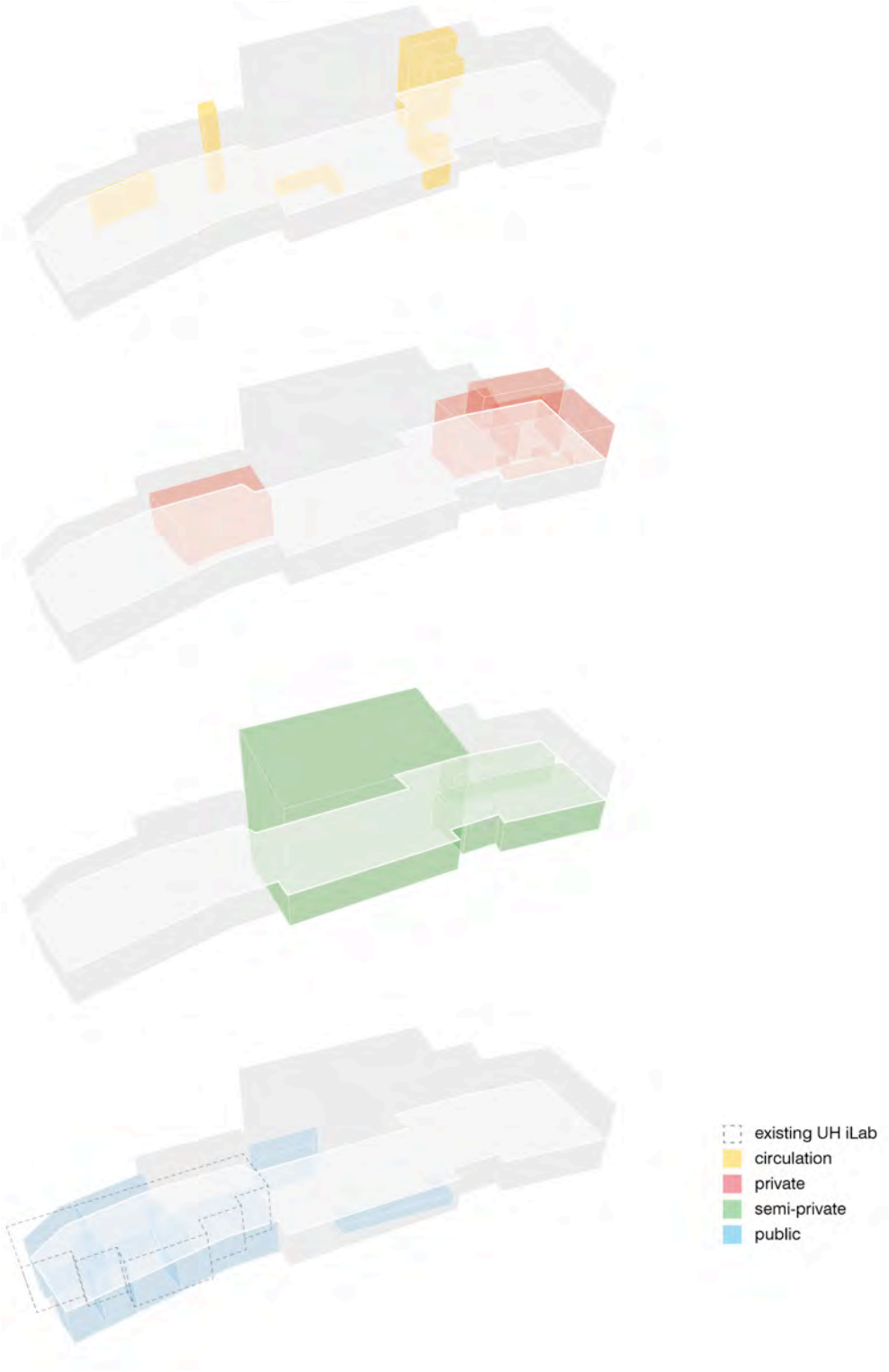


Figure 107: Volumetric visualization of program spaces: Axonometric view

Source: Author

Building sections with experiential renderings in figures 107 and 108 were created to demonstrate the type of interactions that would occur in the different social and work spaces, especially since most of the first floor is established as an open floor plan. Within these building sections, it is identifiable which spaces are used for individuals, small groups, and larger groups. In the figures that follow, the differences between heights within each space are defined. The spaces that contain more than a double-height ceiling include the entire Lobby, the Co-design Lab, and the Visualization Lab, as they were selected based on the need to making users feel as if the rooms are spacious.

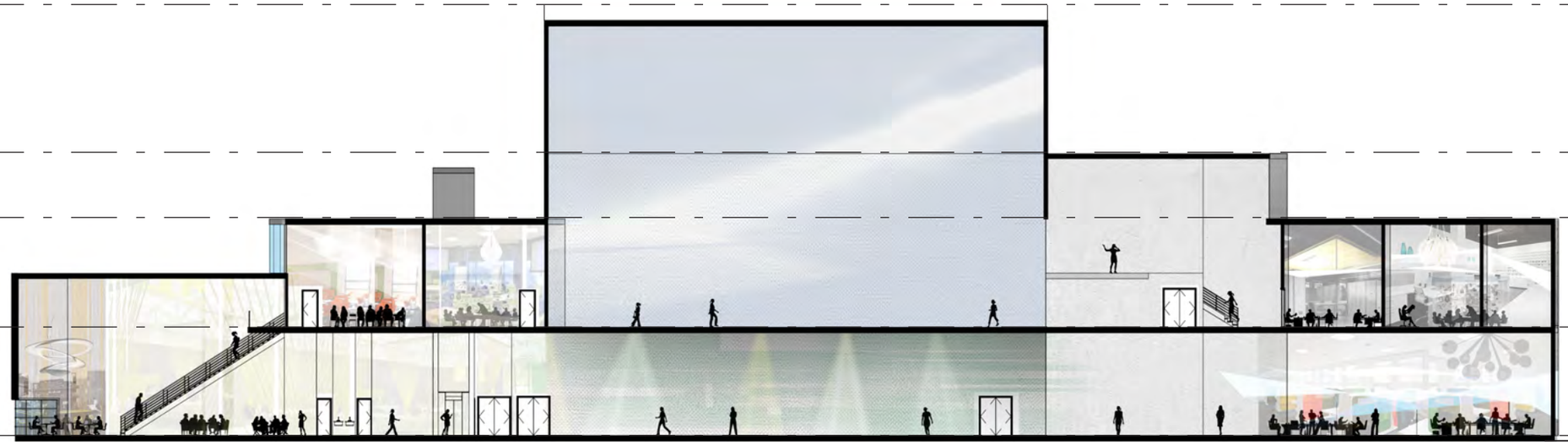
ROOF
78’-3 3/32”

LEVEL FOUR
52’-0”

LEVEL THREE
40’-0”

LEVEL TWO
20’-0”

LEVEL ONE
0’-0”



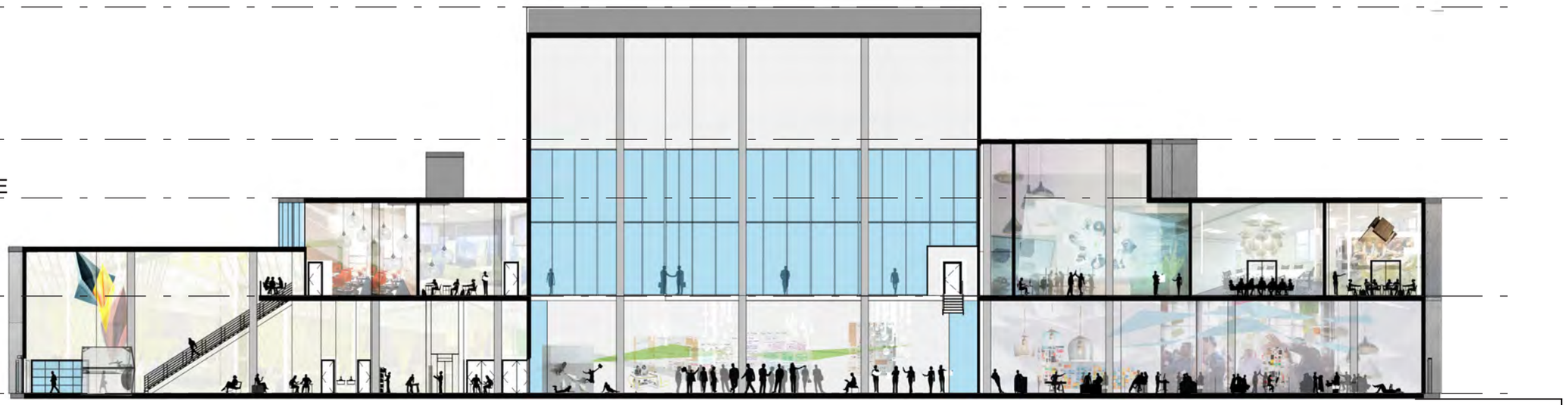
ROOF
78’-3 3/32”

LEVEL FOUR
52’-0”

LEVEL THREE
40’-0”

LEVEL TWO
20’-0”

LEVEL ONE
0’-0”



0 4’ 8’ 16’

SCALE: 3/64” = 1’-0”

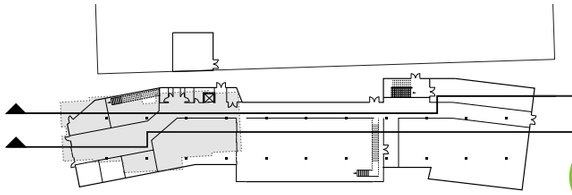


Figure 108: Building section experiential renderings of the UH co.Lab
Source: Author

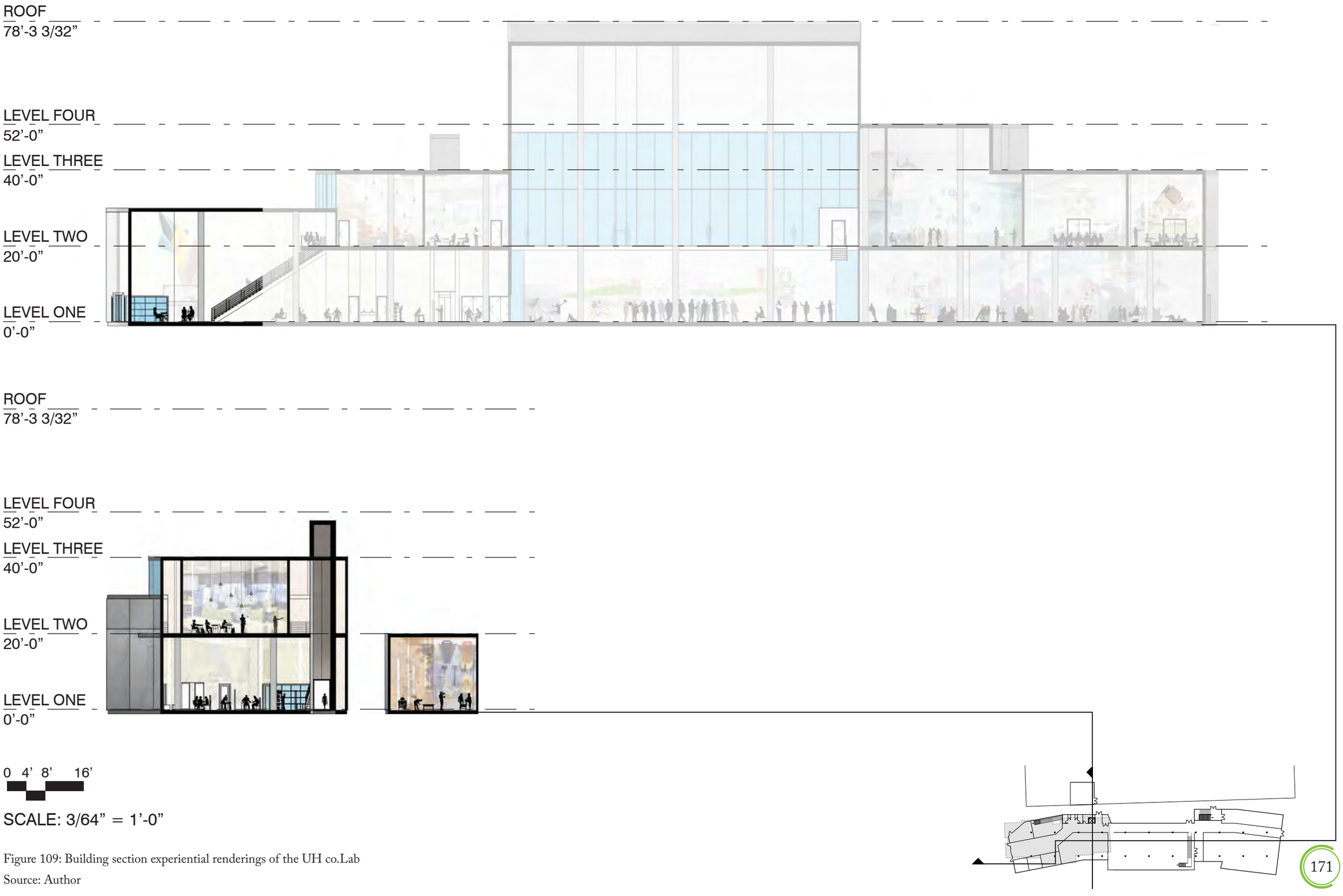


Figure 109: Building section experiential renderings of the UH co.Lab
Source: Author

10.02 ANALYTICAL DIAGRAMS OF COMPARISON

One of the most influential factors that make this architectural program design of the UH co.Lab unique is the fact that it includes spaces influenced by the co-design method. In turn, designing spaces that are based on both 1) the various levels user's familiarity of reconfiguring co-working spaces to fit his or her needs regarding creative workflow and 2) the nature of the space itself. The term for this relationship will be coined as "Progressionally Informed Composition." A *progressionally informed composition* scale defines how the spaces within the UH co.Lab are identified based on the dependency on the given user's familiarity of a studio-type culture in correlation with the nature of the design intent of use of space. Figure 110 shows the spaces can be broken down into three different zones on the progressionally informed composition scale. All spaces within the UH co.Lab are basically flexible, meaning that they are able to become complete open spaces if the occasion calls for it. However, the different zones on the progressionally informed composition scale will help categorize and identify these differences.

Zone One is described as having reconfigurable spaces but is likely not going to be reconfigured because of the nature of the space. For example, in figure 111 the lounge is considered Zone One, which means that the user can move the sofa furniture if he or she wishes. However, the possibility of needing to rearrange the sofa to meet the user's needs is unlikely. Therefore, most of the spaces in Lobby are considered Zone One.

Zone Two is described as spaces that are designed to be easily reconfigured; however, the likelihood of it being reconfigured is solely based on the user's familiarity of needing to rearrange the space.

Zone Three is described as spaces that, by nature, are able to be completely reconfigured and rearranged by the user and the user is likely to be familiar with the co-design studio culture of creating their own work space.

These three zones of progressionally informed compositions are assigned to different spaces in the UH co.Lab to further understand what makes this design of open collaborative spaces unique as compared to typical open work spaces that are generically categorized.

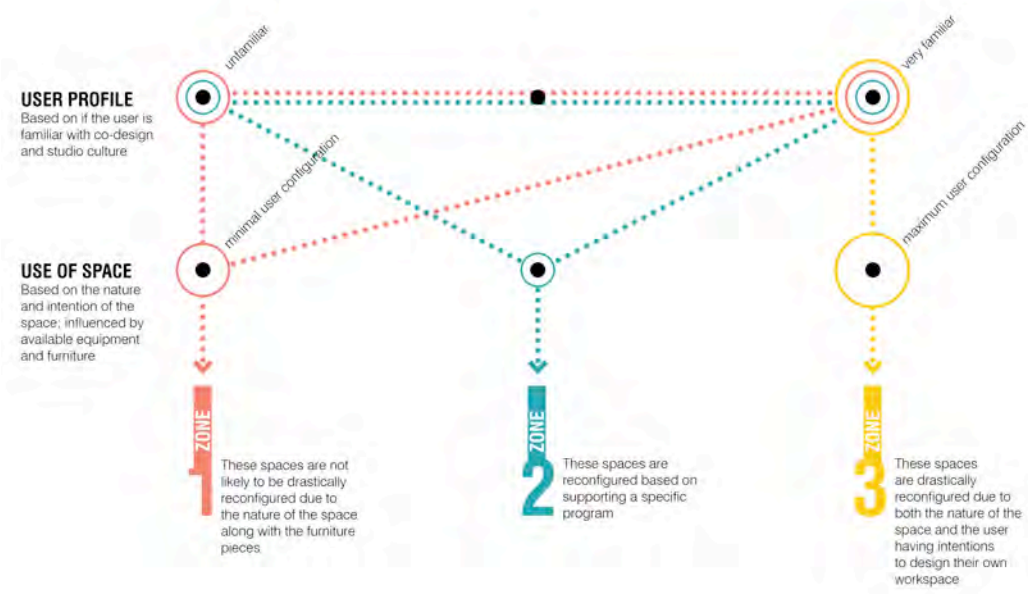


Figure 110: Progressionally informed composition scale

Source: Author

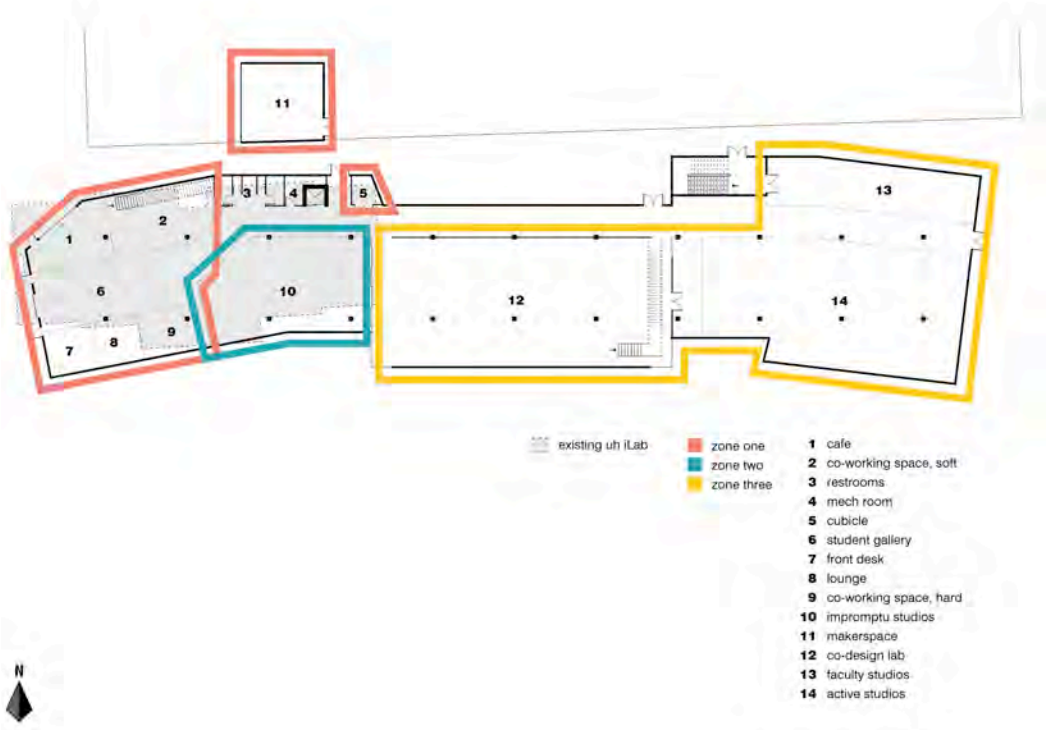


Figure 111: Progressionally informed composition: UH co.Lab first floor plan

Source: Author

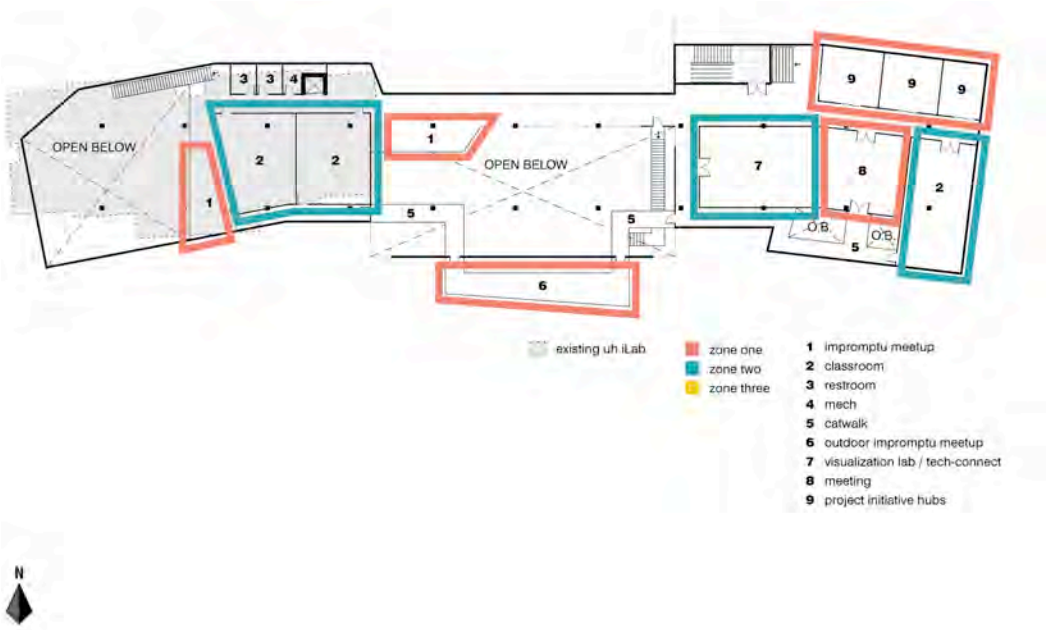


Figure 112: Progressionally informed composition: UH co.Lab second floor plan
Source: Author

The progressionally informed composition scale is also applied to the existing UH iLab. As seen in figure 113, the UH iLab contains both Zone One spaces and Zone Three spaces. Currently, as of March 2016, the spaces within the Zone One category at the UH iLab are defined through arrangement of furniture that is the default set up. Since the entire main space is open floor plan and the furniture are stackable and mobile, almost a quarter of the space is considered Zone Three—the highest level on the progressionally informed composition scale. The use of space within the UH iLab can be applied into the final design of the UH co.Lab. Defined spaces that are lacking within the UH iLab are integrated into the UH co.Lab. Similar uses that are assigned to the UH iLab currently relates to the Co-design Lab (in the UH co.Lab) as shown in figure 114. The UH iLab has potential to be a significant space to support students and their entrepreneurial endeavors. However, the UH co.Lab further supports all that the UH iLab is currently (in March 2016) and increases value by providing additional program uses. Figure 114 displays the incorporation of how the current UH iLab fits within the new program of the UH co.Lab.

Figure 113: Progressionally informed composition: UH iLab

Source: Author

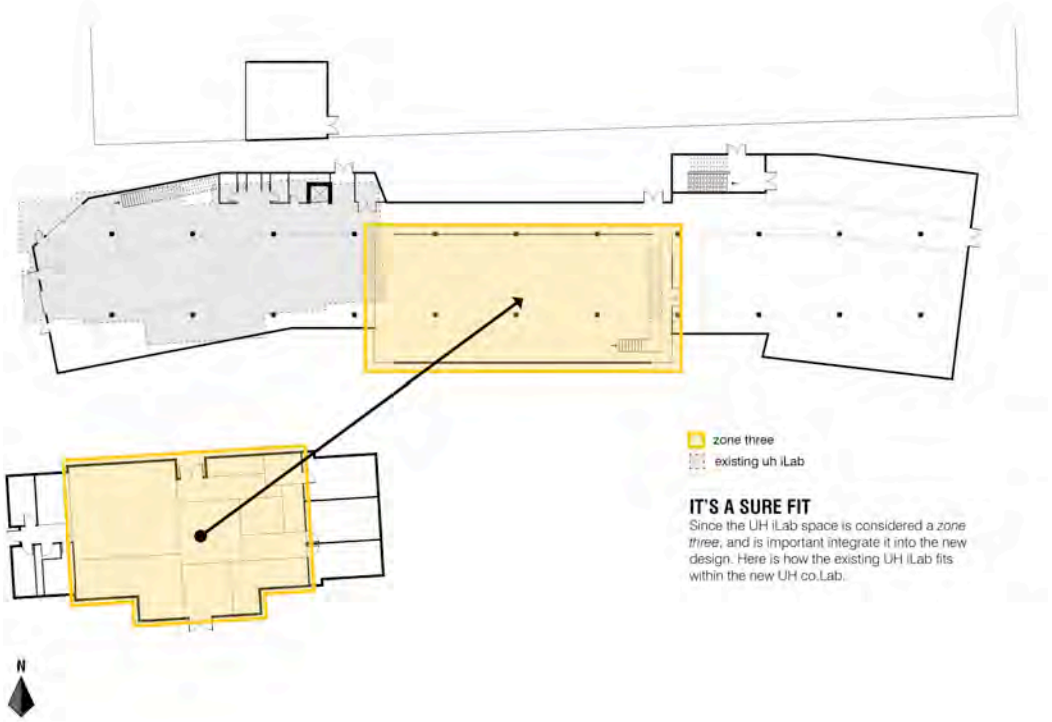


Figure 114: Progressionally informed composition: UH iLab within the UH co.Lab

Source: Author

By proposing that the use of the UH iLab as a space similar to the Co-design Lab within the UH co.Lab, further discussion on how they differ is needed. As stated previously, the UH iLab is currently defined by the furniture set up within the space (fig. 115). The Co-design Lab, on the other hand, starts off as a clean slate with all furniture and equipment stacked away and needs to be defined by the user setting up their entire workspace as needed. The clean slate creates a unique composition of the Co-design Lab every time a person utilizes it. Another unique factor that adds to the "blank slate" concept of the Co-design Lab is how it only contains rapid prototyping tools such as markers, paper, scissors and not machinery such as 3D printers and laser cutters. The prototyping machinery is located in the Makerspace and is not located within the Co-design Lab because the Co-design Lab is meant to support interaction amongst people is not meant to spend time on creating 3D printed models of a prototype.

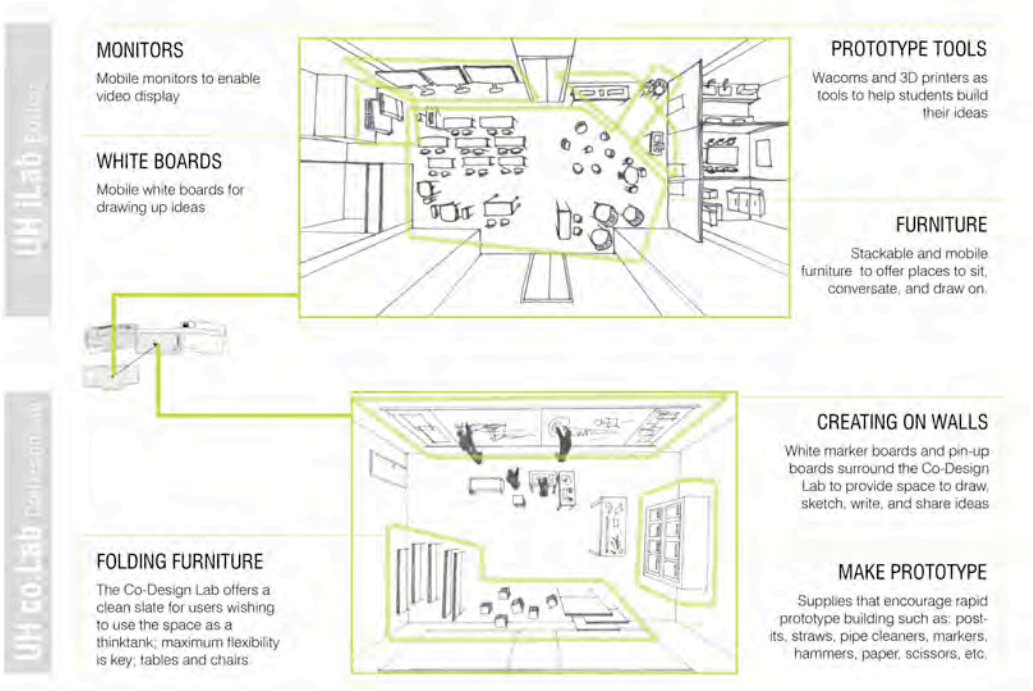


Figure 115: Comparison illustration of UH iLab and UH co.Lab
Source: Author

Within the UH co.Lab, various design elements are applied in relation and in comparison to existing elements in the UH iLab. Figure 116 displays some design elements that add value regarding the UH co.Lab in the sense of further defining how users would interact with

these elements. One element would relate to the functions of a table. The UH iLab currently has mobile and stackable tables. The UH co.Lab proposes to not just have a table but to create a creative gathering space where a table is a drawing surface. Things users create together are drawn on a tangible rolling piece of paper that can be later used to reflect upon or build upon. Rolls of paper are used instead of regular sheets of paper because the circular nature of the roll represents the endless iterative design process. The tables with rolls of paper occur in various places such as the Impromptu Studios, Active Studios, and Co-design Lab.

Another design element that resembles a table is one that transforms into three types of work modes—one, merely a table; two, a drafting table to support sketching and drawing; and three, elevating the table surface to support a standing computer work-mode, instead of the typical sitting at a computer work-mode. This table that transforms into three work-modes will most likely be located in the Active Studios and Faculty Studios because of that specific user group's needs.

Chairs that are mobile and stackable exist in the UH iLab to function merely as chairs. Arm chairs, also in the UH iLab, provide support for a variety of work positions. Within the UH co.Lab, built-in sofas provide various positions in which to work. These built-in sofas offer a similar body position to working on the floor, but with some cushion. The built-in sofas are used for those who prefer to work on their laps with full back support, rather than a typical desk and chair.

In addition, the Café provides indoor seating that consists of high stools and offers the opportunity to observe baristas prepare coffee as users study. Some may find it intriguing or soothing to watch baristas brew coffee as they work. The Café acts not just as a place to work but also a place to feel individualistically part of a group. The Café has interior and exterior seating that can comfortably seat 2-4 people at a table. This seating arrangement provides various kinds of environments to meet other people. The seating in the Café is also considered as impromptu meeting spaces.

As previously stated, impromptu meeting spaces are necessary for the UH co.Lab because it provides areas for people to meet without needing a reservation. The UH iLab currently has meeting spaces that consist of table and chair arrangements; however, there is no level of privacy provided. The only place that offers privacy is the conference rooms, which provide privacy through solid walls. In the UH co.Lab, meeting pods provide some level of privacy for users to

have discussions. Meeting pods minimally maintain visual connection by having openings on one or two sides. These meeting pods are used as transitional moments to subtly separate open workspaces such as the Impromptu Studios and Lounge.

> My ideal meeting space is a private area where I don't bother other people next to a communal space where I am able to work with others.[198]

A common tool used in any co-working space is a dry-erase whiteboard. The UH iLab possesses mobile dry-erase whiteboards that cater to the creation of creative thoughts but are limited to the dimensions of the white board itself. The UH co.Lab's Co-design Lab uses the surrounding surfaces as the user's creative canvas. Not only are dry-erase whiteboards attached straight to the walls but also pin-up boards are added to allow for previous ideas to be viewed alongside the new ideas being formed an expressed on the dry-erase whiteboards. Instead of stating the sky's the limit, in the Co-design Lab, the floor is the limit—users are able to communicate ideas through drawing or sketching in the boards or even on the floor.

> Visuals help within communication as well as sharing ideas.[199]

[198] Group discussion with students, March 22, 2016.
[199] Ibid.

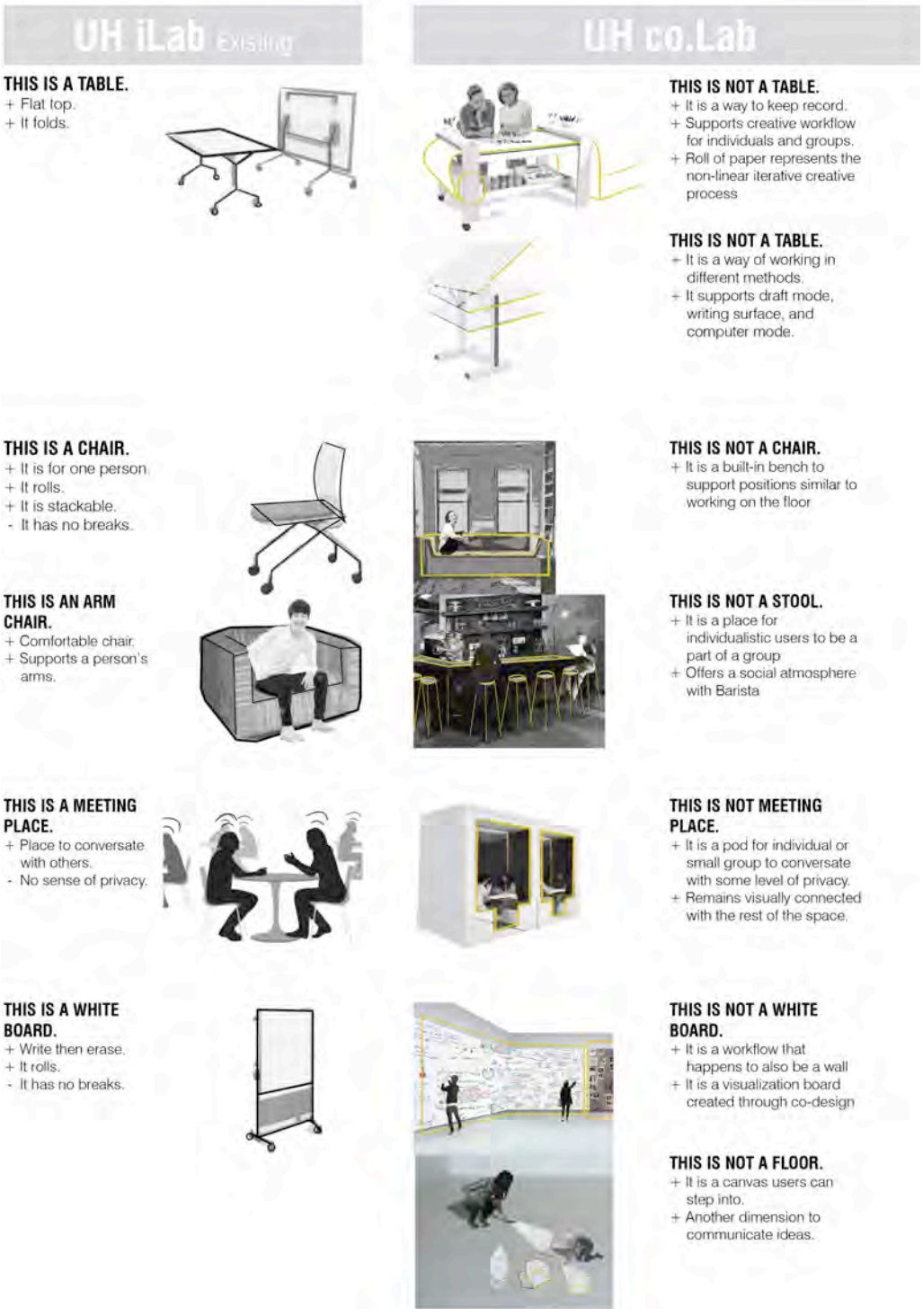


Figure 116: Comparison illustration of design elements in UH iLab and UH co.Lab

Source: Author

10.03 THE USERS

The three main user groups of the UH co.Lab are students, faculty members, and community members. Students are the primary users and have access to all the spaces except the Faculty Studios. Interested students range from various disciplines and different class standings. Faculty members are welcome to use all the spaces of the UH co.Lab, except for the spaces purely dedicated to students like the Active Studios. The Faculty Studio area is for faculty members who teach classes at the UH co.Lab. The Faculty Studio area is also for faculty members who want to be in this type of environment that allows them to have a studio space so they can work on their creative projects. Community members have access to all spaces except Active Studios and Faculty Studios. Community members, faculty members, and students can have access to the Project Initiative Rooms if they are successful in obtaining approval from the UH co.Lab program manager.

Community members are encouraged to use the Co-design Lab to conduct lectures, hold events, or co-design sessions with the understanding and mutual agreement that all events should be open for students to either observe or participate. The UH co.Lab's overall purpose is to spread the knowledge and exposure to different types of interactions between diverse people for students, in turn, the community should agree to support and provide this kind of learning environment.

User Journeys

User journeys are creating using three different profiles. They are created to assist in understanding how and why specific profiles would use and experience the UH co.Lab.

The first user is Alice (fig. 117). Alice is twenty-two years old and is an aspiring business student. Alice became interested in the UH co.Lab because she found that they were offering classes relative to the marketing aspect of design, and, thus, she decided to take a few courses. The following details define her user journey at the UH co.Lab on a typical day.

Meet Alice

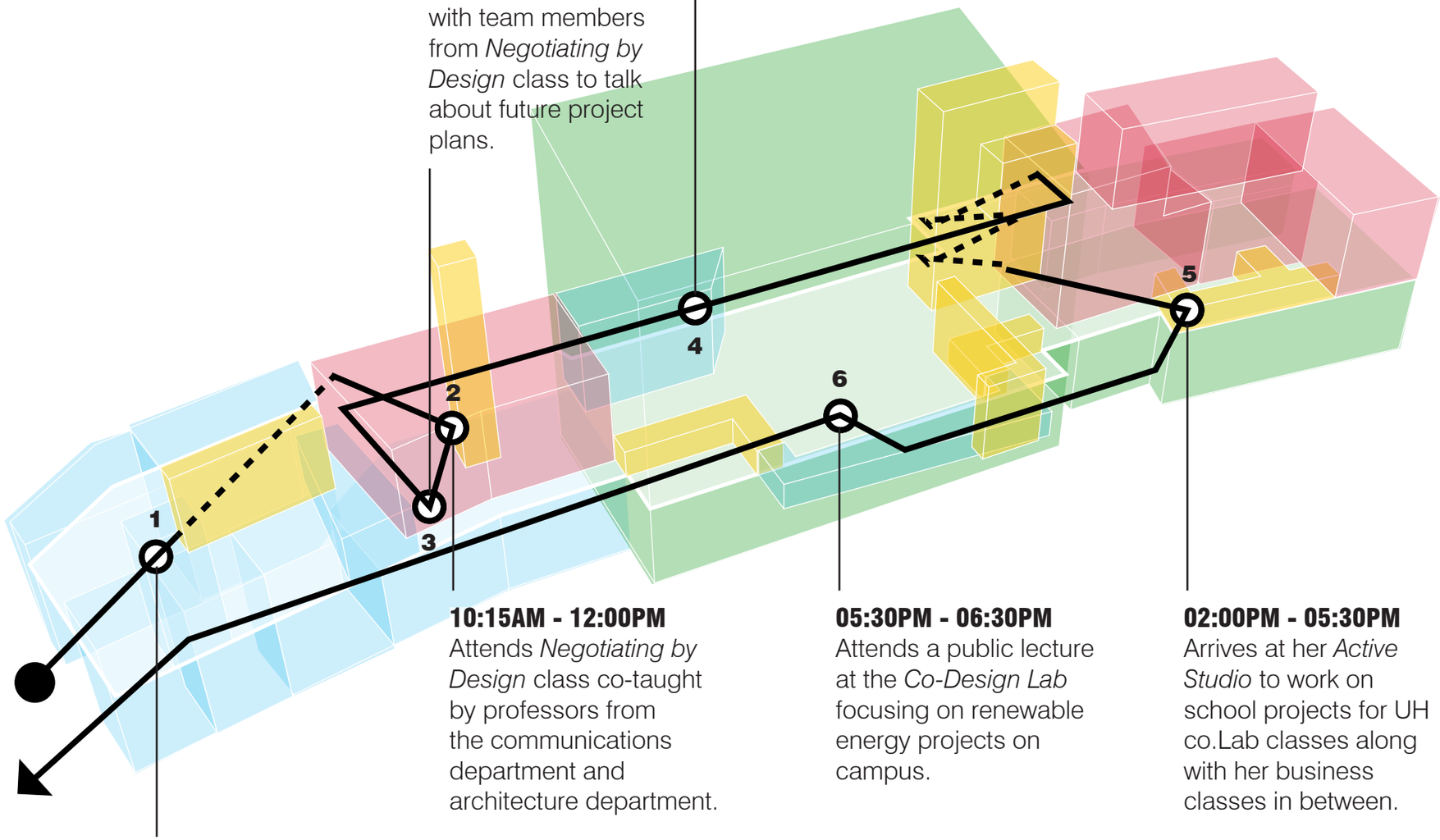
Alice arrives to campus at approximately 9:00 a.m., parks her car, and walks straight to the UH co.Lab where she knows she can get her coffee faster than standing in the long line at the Campus Center Starbucks. She enjoys her coffee from 9:30 a.m. to 10:00 a.m. during which time she also checks her emails. From 10:15 a.m. to 12:00 p.m., she attends her class located on the second floor of the co.Lab called "Negotiating By Design," which is co-taught by two professors—one from the communications department and the other from the architecture department. From 12:00 p.m. to 1:45 p.m., she meets with her teammates from the class she just attended. They have lunch discuss project plans within an Impromptu meeting space next to her classroom, also located on the second floor. On the way to her Active Studio, she saw that a co-design session was occurring. Alice was in an Impromptu meeting space located right above the Co-design Lab as she decided to observe the interactions between different user groups and facilitators and became passionate about joining or conducting one in the near future. She notices that this session involved the community, city representatives, and designers. The co-design session was focused on rebuilding the community parks. From 2:00 p.m. to 5:30 p.m., Alice arrives at her Active Studio space and works on projects dedicated to the UH co.Lab, in addition to the work she puts toward her business school projects in between her breaks. At the end of her day, Alice attends a lecture at 5:30 p.m. that focused on renewable energies on UH campus inside the Co-design Lab. She could not help but notice how the current users reconfigured the Co-design Lab to cater to a lecture, when a co-design session was just happening only a couple hours ago. By 6:30 p.m., the lecture ended, and Alice decides to leave campus to return home.

MEET ALICE.

Female / 22 yrs old.

Business student, however, curious about the design field.

Interested in the UH co.Lab because of the diversified classes and opportunity to meet other students of different backgrounds.



09:30AM - 10:00AM
Grabs coffee to make it through the day while checking her email.

10:15AM - 12:00PM
Attends *Negotiating by Design* class co-taught by professors from the communications department and architecture department.

12:00PM - 01:45PM
Eats lunch and meets with team members from *Negotiating by Design* class to talk about future project plans.

01:45PM - 02:00PM
Stops by an *Impromptu Meeting* space to observe the co-designing session that is occurring.

05:30PM - 06:30PM
Attends a public lecture at the *Co-Design Lab* focusing on renewable energy projects on campus.

02:00PM - 05:30PM
Arrives at her *Active Studio* to work on school projects for UH co.Lab classes along with her business classes in between.

Figure 117: User journey – Meet Alice
Source: Author

Meet Greg

Greg is an architecture faculty member who teaches courses at both the architecture school and at the UH co.Lab (fig. 118). He is one of the younger architecture faculty members at UH. His interests derive from creating visualization content in order to communicate ideas effectively. This user journey only portrays one day out of Greg's week. Greg spends most of his mornings at the architecture school prepping his studio students. At 12:30 p.m., he walks to the outdoor Café at the UH co.Lab to enjoy his lunch and an iced coffee. He finishes his lunch by 1:30 p.m. and heads to teach a large class on *Design Communication*. The class ends at 3:00 p.m.; then, he returns to the Co-design lab to act as the primary facilitator of a co-design session involving the University and students. At 5:00 p.m., Greg would wrap up the co-design session. From 5:00 p.m. to 8:30 p.m., Greg is relieved to finally spending some time working on his own projects involving publishing papers on creating applications for creating new relationships at the Faculty Studio. Greg leaves for home at 8:30 p.m. and exits through the Bilger Hall side since it is the nearest to his home route.

MEET GREG.

Male / 35 yrs old.

Architecture faculty member.

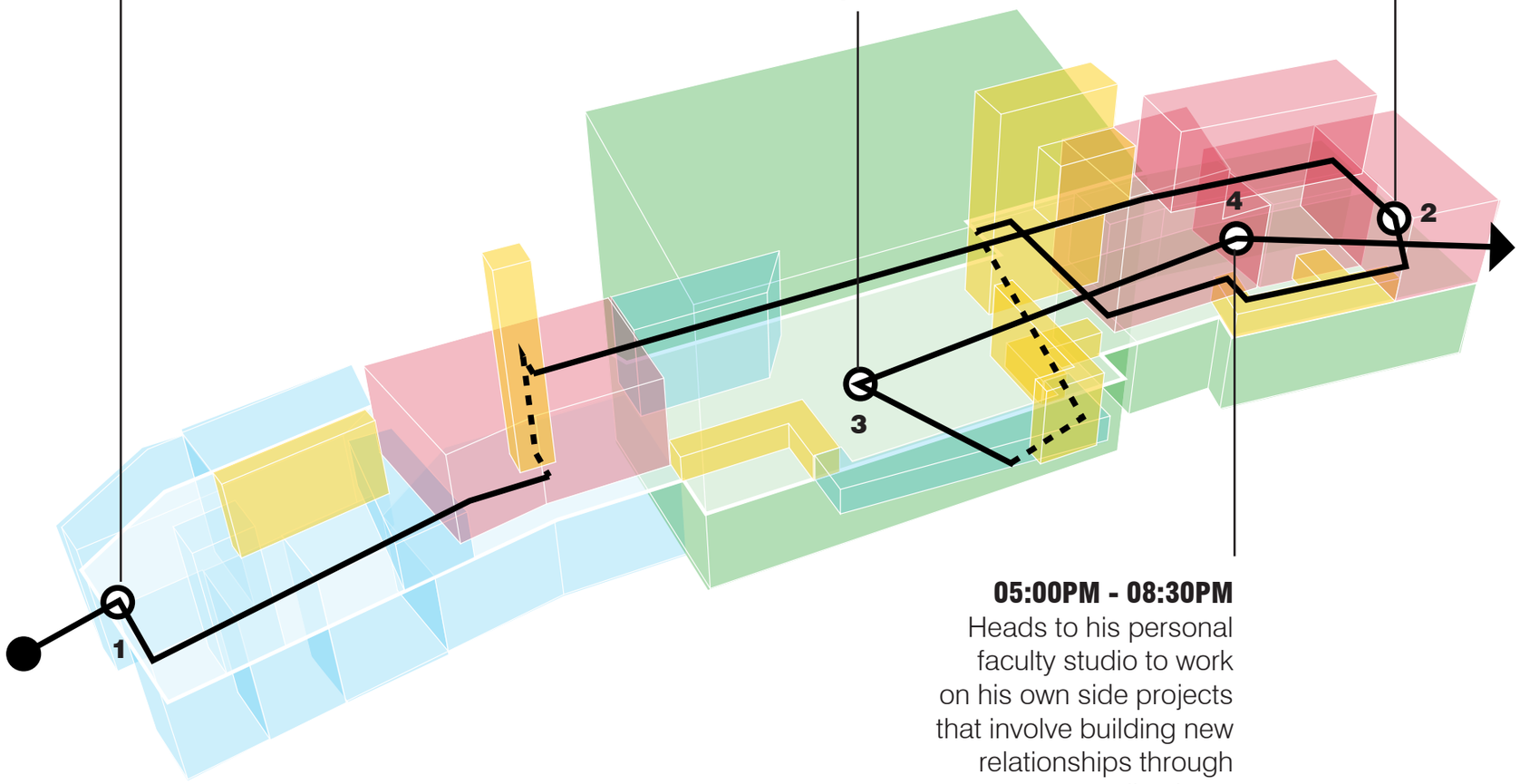
Teaches at both architecture and UH co.Lab.

Interest: Visualization techniques using different methods.

12:30PM - 01:30PM
Enjoys his lunch in the outdoor cafe area along with a fresh cup of coffee.

03:00PM - 05:00PM
Acts as the primary facilitator to the a co-design session involving University students and faculty.

01:30PM - 03:00PM
Teaches a class on *Design Communication* to 30+ students.



05:00PM - 08:30PM
Heads to his personal faculty studio to work on his own side projects that involve building new relationships through applications.

Figure 118: User journey – Meet Greg
Source: Author

Meet Grace

Grace is a woman in her fifties who is an active community member because she enjoys sharing her knowledge having background in education, design, and politics (fig. 119). Grace visits the UH co.Lab with intentions to participate in a co-design session. She is notified that the co-design session has three parts and is expected it to be a long one. She first arrives to the UH co.Lab and is fascinated by the space. This is her first time here, so she is excited. From 1:30 p.m. to 1:45 p.m., Grace is greeted by the individual at the front desk, and she checks in for the co-design session. The front desk assistant tells Grace to explore the UH co.Lab if she wishes until the co-design session starts at 2:30 p.m. From 1:45 p.m. to 2:30 p.m., Grace sits in the lounge area and decides to take this opportunity to catch up on her unaddressed texts and emails. At 2:30 p.m., Grace attends the co-design session in the Co-design Lab where she is greeted by the facilitator. Grace is introduced to the co-design method and gets actively involved. By 3:30 p.m., the remaining participants head upstairs to the Visualization Lab to observe their progress through the co-design session. In the Visualization Lab, Grace is amazed at how the co-design session she just participated in was concluded in visually effective way. At 5:00 p.m., the facilitator notifies the participants that the final stage of the co-design session will take place the following week in the Meeting Room adjacent to the Visualization Lab. Grace signs up to attend that final session. She expects the final session to be a wrap-up of the results from the co-design session and the discussions held in the Visualization Lab. Grace met some influential people from the co-design session and realized that, in a way, the co-design session was an effective networking event because everyone who decided to attend wanted to work toward a common goal. Grace and her colleagues decide to chat a bit on the second floor outdoor balcony from 5:00 p.m. to 6:00 p.m. By 6:00 p.m., Grace heads home from the UH co.Lab satisfied in that she had learned more about her educational focus area, having participated in her first co-design session and making connections.

MEET GRACE.

Female / 58 yrs old.

Active community member.

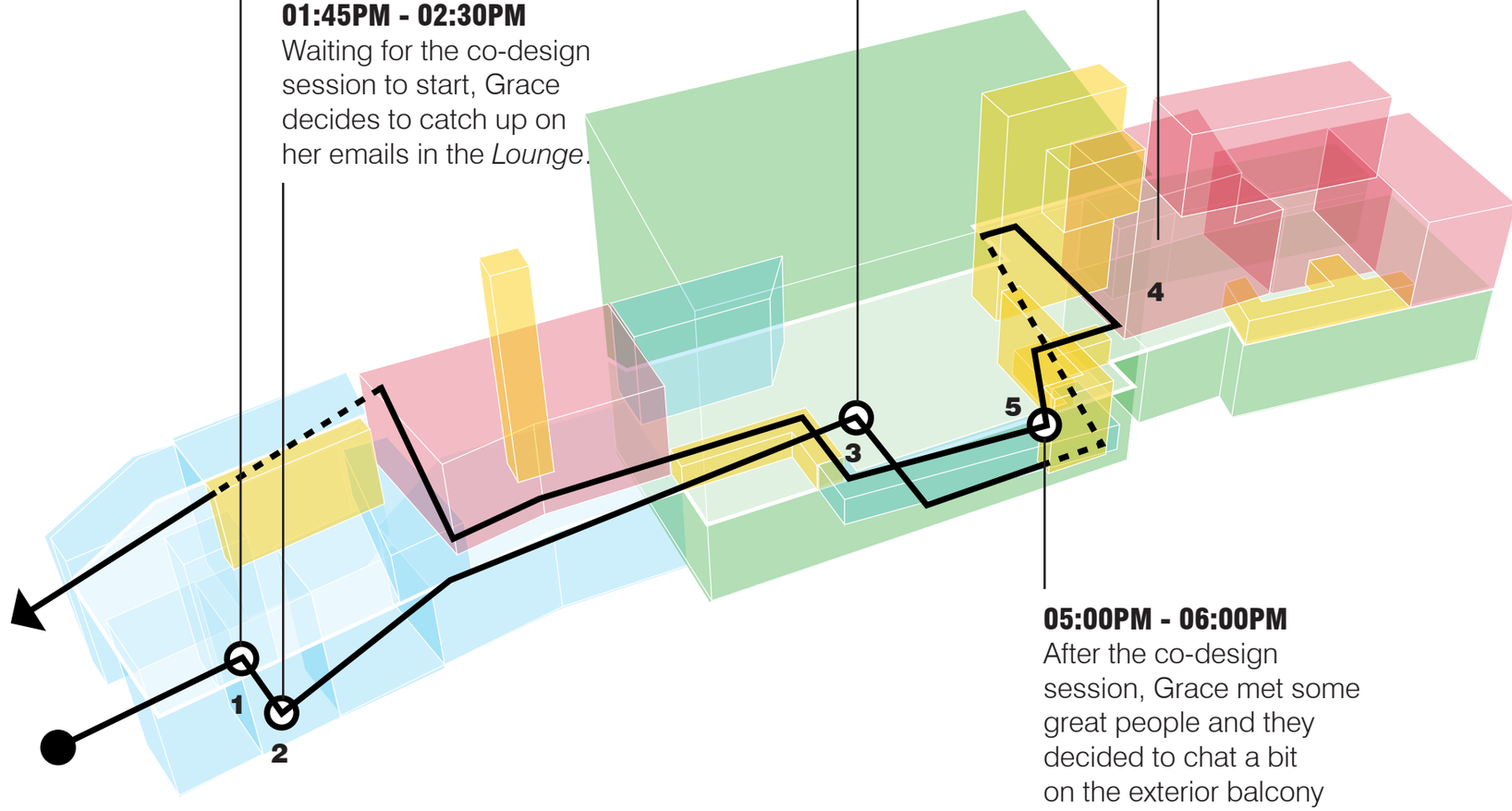
Passionate about early childhood education as she was a teacher for most of her professional career.

01:30PM - 01:45PM
Arrives at the UH co.Lab for the first time and is greeted at the *Front Desk* by personnel, also spends sometime observing the *Student Gallery*.

01:45PM - 02:30PM
Waiting for the co-design session to start, Grace decides to catch up on her emails in the *Lounge*.

02:30PM - 03:30PM
Attends co-design session, at the *Co-design Lab*, focusing on designing a new community park in Honolulu, HI

03:30PM - 05:00PM
Grace and other participants are guided to the *Visualization Lab* to continue the co-design session as part of the process.



05:00PM - 06:00PM
After the co-design session, Grace met some great people and they decided to chat a bit on the exterior balcony *Impromptu Space*.

Figure 119: User journey – Meet Grace
Source: Author

11.0 THE EFFECTS OF CO-DESIGN

About the Co-design Session

A co-design session was held by the Author at the existing UH iLab on March 22, 2016, to further investigate how the final design adheres to one particular user group of the UH co.Lab—students. This co-design session's purpose is to provide insight from participants in developing the architectural program design for the UH co.Lab. Current and recent graduate students of various backgrounds and disciplines volunteered to participate in this co-design session that focused on improving the current design stage of the UH co.Lab. The purposes of the co-design session are to gain insight on various topics about how students felt University of Hawai'i at Mānoa's (UHM) efforts of including students in the design process of new spaces on campus, what their own preferences are when it comes to creative environments, and direct feedback on the current design stage. The co-design session results consist of an accumulation of thoughts and feedback from students specifically from the University of Hawai'i at Mānoa, which reflect the social dynamics of this specific participant group.

Seven students of multidisciplinary backgrounds participated in this co-design session. Their areas of educational focus consist of engineering, political science, art, architecture, education, mathematics, public health, and business. They stand as a mix of graduate, undergraduate, and recent graduates from UHM. All cited quotations are indications of words exchanged during the group co-design discussion. The names of the participants are withheld by mutual agreement.

Figure 120: Co-design session with activity and tolls
Source: Author

University of Hawai'i at Mānoa Student Design Involvement

Before conducting the presentations of the UH co.Lab, it was important to understand how participants felt about UHM involving students in the architectural design process of new spaces on campus. The point of the co-design method is to acknowledge and reveal the effects of inclusion of users, clients, and other key professional stakeholders to gain insight to the shortcomings of design aspects.

For Sakamaki Innovation Zone, UHM included stakeholders within the design process, but the inclusion of students was not mentioned in Kathie Kane's "Why Space Matters! The Story of the Sakamaki Innovation Zone."[200] The Sakamaki Innovation Zone is primarily enabled by faculty to teach their classes, but, since students exist as the majority of users of the space, it would have been a wise decision to include students within the co-design session. Fortunately, the renovation of the UH iLab was designed by Steve Hill and his team of architecture students. Steve Hill is currently (2016) the UHM School of Architecture's 3D Lab Supervisor. One participant states, "Other than the iLab and architecture school, I have not seen or heard any spaces publicized on co-design with students."[201]

Another participant expressed that there is not enough effort from UHM to include students in the design of new spaces by stating, "I'm not very familiar with the architecture or design fields, but I don't think UHM provides enough opportunity to let students design new spaces."[202]

Another participant agreed, but questioned how many students would actually volunteer to participate in a co-design session if UHM made the effort by stating, "There is not enough involvement. I was never consulted in my opinion. However, I feel that very few students would put forth efforts to express their thoughts on these issues."[203] This participant could have the assumption of "efforts" as physically contributing time to a co-design session, but co-design has distinctive levels of participation. Most participants expressed positivity and optimism toward the idea of co-design for UHM campus because they felt that students could provide insight regarding what could be improved. One student from the Public Health Science Department

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[200] Kathie Kane, "Why Space Matters! The Story of the Sakamaki Innovation Zone," 2014, accessed March 28, 2016, http://www.cte.hawaii.edu/Sakamaki/about.html.
[201] Group discussion with students, March 22, 2016.
[202] Ibid.
[203] Ibid.

agrees by stating, "I feel like this [co-design method] is amazing and really gives the students like they are really contributing to better their school. Students go to the campus every day and know what should be improved or what's missing, and can be a great asset to the designing aspect of UHM."[204]

Overall Design Goals and UH co.Lab's Purpose

The UH co.Lab's purpose is to bring together students of all diverse backgrounds to build communication and leadership skills. This is made possible by providing the program spaces to support the co-design method with other students, faculty members, and community members. Participants were asked if they believed in the goals of the UH co.Lab and if the overall design intents supported or did not these goals. All of the participants expressed positivity toward the goals of the UH co.Lab and envisioned themselves using various areas of the UH co.Lab for different purposes. They recognized potential for the spatial arrangement and uses. One participant showed appreciation for the different types social and working spaces that support various ways of thinking.

> One thing I appreciate about this is that it involves many different places to support the different ways of thinking. Like if you need something really open, its there, or maybe you want a more private space, and that is there. You can move around the building to support your different type of thinking. In other words, different contexts of thinking are available in different areas of this building.[205]

Another participant voiced an observation on how the UH co.Lab would be successful because it is similar to Starbucks, where people from all different backgrounds come together and individually do work. Furthermore, the participant added that the UH co.Lab provides more than what Starbucks does because of the spaces that support the co-design studio culture and thinking. "It's kind of like a Starbucks because of how different people of different professional backgrounds and majors come in to work. But this project is an expansion of that great idea."[206]

A comparison of the UH co.Lab to the way Greeks lived was brought up to the discussion by a participant. The participant stated how the design of the UH co.Lab reminded

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[204] Group discussion with students, March 22, 2016.
[205] Ibid.
[206] Ibid.

him of the method of loci by stating "There's a good diversity between each other. The ancient Greeks would associate different ideas with different rooms—so it's kind of a good way of remembering how to use the space."[207] Nigel J. T. Thomas is an expert in Philosophy of Cognitive Sciences, Philosophy of Mind, and History of Science. He describes the method of loci in his chapter titled "Mental Imagery," in *The Stanford Encyclopedia of Philosophy,* "In one of the method's more straightforward forms, the orator would prepare by committing the layout of a complex but familiar architectural space (e.g. the interior of a temple) to memory, so as to be able to vividly imagine its various regions and features."[208] The method of loci is relevant due to the large area of differentiated open space areas (e.g. Lounge, Front Desk, Impromptu Studios) within that are defined through program distinction and the *Progressionally Informed Composition Scale.*

> We feel like this [the UH co.Lab] is a great space to come together to co-design.[209]

Successful Feedback

Participants communicated what they believed to be successful in different areas of the UH co.Lab. For instance, one participant said that he would be interested in seeing how the Faculty and Active Studios would create a new dynamic working atmosphere by stating, "The faculty being on the same level as the students I think would be great to experience."[210] This interest in the catwalk is most likely because the participants relate to how faculty offices are typically separated from the students and classrooms. In turn, visualizing faculty members producing work next to students would spark new social working connections. The working dynamic between the Faculty and Active Studios is designed to alleviate any hierarchal stature so students and faculty members can communicate ideas freely.

Another participant expressed appreciation for the design intent to bring in users of different disciplines into the UH co.Lab by creating an exterior community co-design art wall.

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[207] Group discussion with students, March 22, 2016.
[208] Nigel J. T. Thomas, "Mental Imagery," In *The Stanford Encyclopedia of Philosophy* (Spring 2016 edition), ed. by Edward N. Zalta, accessed March 19, 2016, http://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=mental-imagery.
[209] Group discussion with students, March 22, 2016.
[210] Ibid.

This participant stated, "The experience space with the community wall was very interesting, and we think it will work well with bringing different types of people in."[211]

Figure 121: Co-design session tools
Source: Author

The design intentions of the UH co.Lab as a place for students to work freely and not be limited to a cubicle setup was attractive to some participants. Three participants agreed that reserving rooms at university libraries was more difficult that it should be for students.

> We thought about the library, and the difficulty of getting a room all the time to study in groups and what not. And even at other out of state university libraries . . . it is very hard to get a room at a library. Doesn't matter who you are and what background you are in. Having the co.Lab there to supply this kind of group working, studying, and learning environment would benefit many students.[212]
> – Mathematics and Secondary Education Student

It is difficult because many students would reserve rooms in advance, and the rooms are filled quickly. Usually, students reserve these rooms because they need to have verbal discussions with one another or just to brainstorm regarding a given topic. The UH co.Lab's overall purpose is to create this type of group-based co-working atmosphere so as to support a way of learning while still providing design elements that provide various levels of privacy.

[211] Group discussion with students, March 22, 2016.
[212] Ibid.

Improvement and Concerns

After the student participants communicated what they thought were successful in the design, they were asked to elaborate on concerns and suggest ideas for improvement. Most of their concerns involved improving the social dynamics of the spaces rather than specific architectural changes. There were some concerns about the disconnection of the Makerspace in relation to the UH co.Lab. With the Makerspace being located in the Art Building and also being located near the Art Building's bathrooms, the participants showed some discomfort in that design decision. One student from the Political Science Department states, "The Makerspace feels disconnected. I am sure there are ways to visually connect somehow. Since the restrooms are right next to the Makerspace in the Art building that could pose an issue."[213] These same participants were informed that the area in between the Art Building and the UH co.Lab was not within the framework of this design project.

However, they still felt it would be important to identify what happens in between the two buildings. One student from the School of Architecture expresses, "The alleyway in between the UH co.Lab and the Art Building could be addressed and developed a little more. What happens or occurs in that space?"[214]

Although participants previously showed enthusiasm for the Faculty Studios being adjacent to the Active Studios, some participants questioned what purposes would faculty members have to use this studio space versus their own private office in their own departments. Participants also wondered if faculty members would find students distracting since the faculty would be readily there to have conversations. How much engagement would the students have with students? What are faculties doing there? How do faculty benefit from being in this space rather than in their own offices? Is it beneficial for the students to go into the faculty studio space when they are trying to do work? Would it be distracting to for the faculty? How accessible are the faculty? Do students get to see the work of the faculty? Though these questions are essential to understanding how student participants question the dynamic relationship between students and faculty in the studio space, this dissertation is not proposing to answer these questions, but will be considered in future studies.

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[213] Group discussion with students, March 22, 2016.
[214] Ibid.

One of the primary design goals of the UH co.Lab is to neutralize the hierarchy between users (faculty, students, and community members). Few participants developed improvement suggestions to the café area. In their experience, the best way to alleviate hierarchy between different groups of people is to create events that involve an alcoholic social gathering. The participants saw potential in the UH co.Lab as becoming place for social drinking and hosting events that would attract people of different backgrounds. One student from the School of Architecture expressed, "We think it would be great if the café also worked as a bar, like a social space, hosting events where you get students of different disciplines out of their departments and cubicles. With this kind of atmosphere would make them more free with the sharing of ideas through alcohol and social drinking."[215]

The catwalk experience was highlighted in the previous section, as one of the design elements that the participants felt was intriguing. The catwalk is located mainly within the second floor in the Co-design Lab, where the ceiling height is more than 70 feet high.

> We like the idea of the catwalk because of being able to see other people working on their projects. It would be really interesting to see installations or students' work hung exhibitions in the co-design lab so you can experience it from below [in the Co-design Lab] and [on] the second story catwalk.[216] – Architecture Student

User Journey Activity – Make Your Day at the UH co.Lab

All participants of the co-design session were asked create a hypothetical user journey of their day at the UH co.Lab. The purpose of this exercise is to understand which areas would the student participants use most and what they envision themselves using the UH co.Lab for. Participants saw themselves coming to the UH co.Lab, on average, 2 to 3 times a week. Their purposes at the UH co.Lab varied from social to educational.

One participant saw herself using the UH co.Lab as a means to venture away from her usual day on campus (fig. 122). Since she already has her own studio at her school (UHM School of Architecture), she did not see much of a need to have another studio located at the UH co.Lab. Instead, she saw herself using the UH co.Lab as a means for socializing. She, along with more than half of the participants, saw themselves observing interactions from the catwalk.

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[215] Group discussion with students, March 22, 2016.
[216] Ibid.

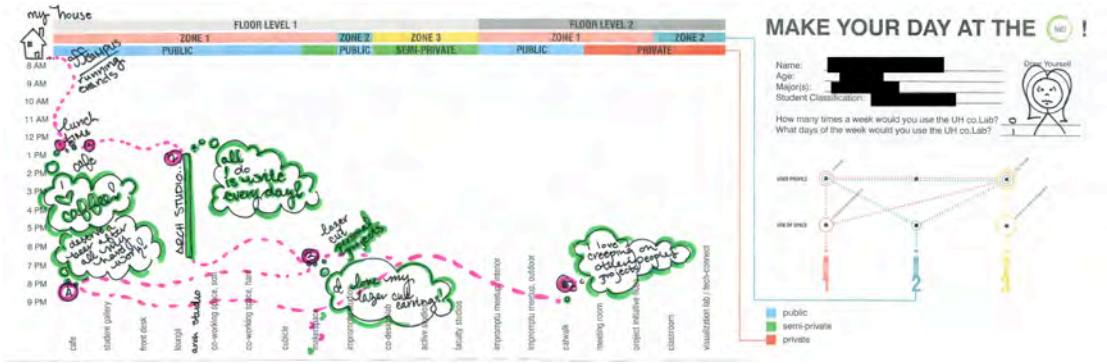

Figure 122: Participant's user journey with thinking bubbles

Source: Author

Another participant sees herself using various types of areas at the UH co.Lab. Her day consisted of eating breakfast at the café, taking a nap in the lounge for a bit, attending classes, participating in a co-design session, interacting with faculty members in their studios, attending meetings, observing interactions from the catwalk, and winding down in the Impromptu studios. This user's journey indicates that she would prefer to spend most of her day at the UH co.Lab, rather than other places on campus.

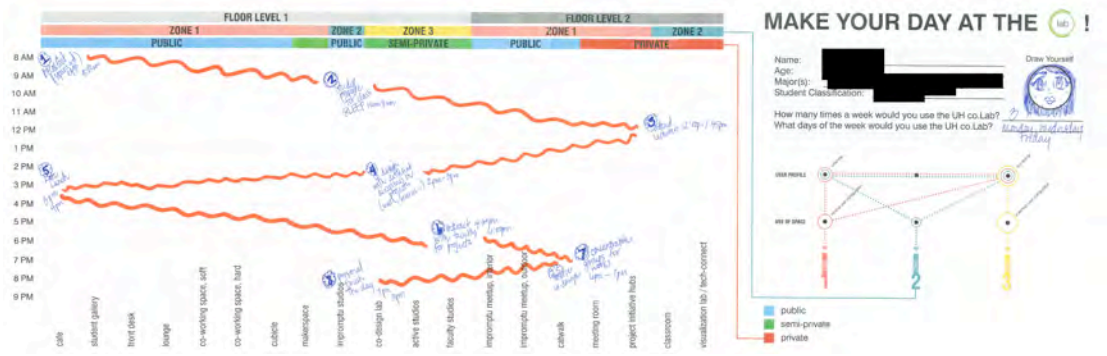

Figure 123: Participant's user journey focusing on use of spaces within the UH co.Lab

Source: Author

The results of the user journey assisted in gaining insight on how these particular student participants would utilize the UH co.Lab. Most participants saw themselves using public spaces such as the catwalk, Impromptu Studios, Cafes, Cubicles, and the Lounge. The semi-public

spaces that were mostly used were the Active Studios and the Co-design Lab. The private spaces there were mostly used were the Project Initiative Hubs, and Classrooms. The spaces that were least used at the UH co.Lab (Visualization Lab/Tech-Connect, Co-working Space, and Front Desk) could be due to the limits of this specific user participant group, their backgrounds, or further explanation on the use of these spaces.

Co-designing Session Overview and Observations

The co-design session was a success in terms of all participants giving productive feedback on essential aspects of the design. By selecting only local (currently living in Hawai'i) students to participate in this co-design session, this decision alleviated some hesitation toward expressing opinions within the group. This selected group of local students supported some elements of the co-design/workshop mentality previously discussed such as neutralizing hierarchy, mutual learning and respect, know your role, and transparency. The participants generally expressed positivity toward this idea of all various user groups coming together in one place to socialize and co-design on ideas. The UH co.Lab's goals already establishes an environment in which the sense of "welcome" and "let's create something together" exists. Most of the feedback produced during the co-design session gravitated toward the participant's personal beneficial uses, while only a few other participants gravitated toward speaking for the general student population. Student participants expressed difficulty in attracting people (students, faculty members, and community members) to attend events. In contrast, the participants believe that, if the UH co.Lab offers appealing classes, lectures, and social events, then the UH co.Lab will be successful in the gathering of different user groups.

The topics discussed between student participants and the co-design session facilitator provided perspective on aspects of design that could be further defined or altered to create a more successful design. From a designer's standpoint, the areas of the UH co.Lab that were the most appealing to the student participants were the Faculty Studios, the catwalk, and the Café based on the number of feedback, quality of feedback, and the number outcomes of the user journey exercises. Improvements should be made to the Faculty Studios, the catwalk, and the Café to further define the experiences a user would have in those specific spaces.

In addition, the participants believe that the spaces offered in the UH co.Lab do not yet exist on UHM campus. The suggested improvements based on comments from the participants

should be considered beneficial toward providing insight to moving forward in the next stages of design. For this co-design session, the inclusion of key professional stakeholders, such as engineers, UH iLab program manager, and contractor, with students did not occur. However, the results from co-design session with student participants revealed the possibility of more insight from the inclusion of key professional stakeholders in future co-design session. The inclusion of key professional stakeholders within a co-design session would add valuable insight toward the design of the UH co.Lab.

12.0 CONCLUSION

The beginning thoughts of this dissertation were initially to design an actual building or program space that would support the co-design method as a way of collaborating and designing with people of diverse backgrounds and disciplines. Thus, the final proposal within this dissertation includes the architectural program design of the UH co.Lab, a two-story building on the University of Hawai'i at Mānoa campus, whose purpose is to provide students with the opportunity to learn and create through the methods of co-design. This co-design method is an innovative way method of student learning in that they gain experiences through interacting and communicating with others, such as community members, professional clients, various faculty members, and students outside their respective majors, whom they would not otherwise have the opportunity without a program space such as the UH co.Lab.

The UH co.Lab's final program design, as proposed in this dissertation, supports the nature of co-design methods by providing visual connectivity through open co-working spaces, merging of studios, and the freedom to design within technologically advanced studio spaces. Essentially, maintaining various levels of visual connectivity within a given work space supports the co-design methodology. Visual connection is maintained through the intro spaces of the UH co.Lab such as the Café, the Lounge, the Co-working Spaces, and Impromptu Studios. Visual connection is, then, continued through the catwalk experience on the second floor where one can observe the interactions and activities on the first floor. As such, visual connectivity is key for inspiring participating individuals so as to spark their creativity. In addition, a merging of studios for diverse user groups including, perhaps, faculty and students supports the neutralization of the traditional academic hierarchy—a crucial element for the co-design approach to learning. Add to that, the freedom for students to design their own studio spaces, and it reinforces the co-design nature of students being in control of their own learning.

Methods of co-design are used to empower collective creativity through various levels of interaction and participation of people within the design process. Co-design is an approach allowing individuals to holistically understand even the most critically evolving societal problems within our world and to creatively solve them with fellow users, people actually experiencing the given problem, and experts who have specialized skills or knowledge on the relevant topic. Essentially, the benefits of co-design are drawn from two factors: 1) the participation of designers and non-designers and 2) the lead designer's ability to interpret and translate the results that arise

from the co-design method into specific design elements that speak to the overall purpose of the co-design project or session.

To investigate if the UH co.Lab's architectural program is viable for the UH campus and its student body, co-design as a method was implemented to validate the choices made within the final architectural program design. In architectural design, professional architects expertly predict usership—the likeliness of people using the program space. The focus of the co-design session created for the purpose of this dissertation was to gather UH students and accumulate their input and feedback on UH co.Lab's architectural program design so as to assess usership. Therefore, the final outcome of this dissertation is a combination of both an architectural program design and a co-design methodology, in which the architectural program design is driven by the co-design method.

The designer of the UH co.Lab acted as the facilitator of the co-design session by managing and designing it to extract information from a specific user group—students (undergraduate, graduate, and recent alumni). Since the co-design method used for this dissertation was on a relatively small-scale, as it involved seven students, the outcomes were limited to their exposure and experiences regarding the concept of a UH co.Lab, the existing UH iLab, and the University of Hawai'i at Mānoa collaborative working spaces in general. Many variables exist that influence the results of co-design sessions. The variables could include the purpose of the co-design session, the design of the co-design session, the various design stages in which the co-design session could occur, the type of participants (user target groups such as students or faculty), the specific individuals who participate, and so on. If any of the variables mentioned change, the results of the co-design session, meaning input and feedback from the participants, would be altered.

The results from this particular co-design session, conducted by the author on March 22, 2016, offered a wide range of valuable insight. It can be presumed that the outcomes of creating a series of co-design sessions, rather than just one, could offer further information regarding the realization of a comprehensive and unique co-design methodology and architectural design. In addition, the result of conducting a series of co-design sessions at various stages of design would benefit the overall architectural design in accordance with the accumulation and interpretation of a variety of participant input and feedback. It is important to take into consideration that the creation of participatory tools similar to those within the co-design method would only further

enhance the final program design. The results of conducting sessions within any level of the co-design can reveal, and thus allow designers to avoid, serious design flaws that might otherwise have been overlooked. The various three levels of co-design can be traced back to the Ladder of Client Participation, as discussed in section 6.06, the levels are as follows: consultation, placation, and partnership.

The most crucial part of a co-design session is how it is translated or interpreted by the lead designer of the project. Co-design is used to create a mutual understanding and respect of all participants' input and expertise. It is imperative to understand that every participant's opinion is to be voiced and documented by the lead designer during a co-design session, but it is nearly impossible to adhere to every participant's demands because not all feedback is directly beneficial toward the overall goal of the specific co-design session. The key component to co-design is the designer's expertise with assimilating and translating the contributions of many individuals into the next stages of design.

This dissertation, then, has developed an architectural program design to foster collective creativity among a wide range of users to suit an educational environment by integrating a co-design method with the input of university students. The architectural program design of the UH co.Lab supports an innovative educational space and integrates a new way of learning as it speaks to a new generation of students, often described as the millenials. As such, the co-design method challenges traditional approaches to teaching and learning, still prominent throughout universities across the United States. Traditional approaches often require students to learn strictly from an instructor, whereas the co-design method allows for experiential learning with a group of diverse individuals. Experiential learning supports students working individually or in groups by sharing their unique ideas, questions, and experiences. Based on three spatial studies of The Coop, BoxJelly, and Kakaʻako Agora, discussed in section 1.03, the UH co.Lab offers the local Hawaiʻi community an integrated co-working studio learning space within an educational environment that differentiates itself from these three already active co-working establishments.

In essence, the proposed architectural program design and co-design methodology answers this dissertation's two initial questions: 1) *How can students gain knowledge and confidence communicating the value of design through client interaction in an academic environment?* And, stemming from that, 2) *how can the learning spaces facilitate the integration of professional design and communication strategies?* Students can gain knowledge and confidence communicating design

value through client interaction in an innovative academic environment by providing them with the opportunity to interact with individuals through methods of co-design. Creating a space that will invite students to participate in experiences such as these will support the development of leadership and communication skills that can assist in each student's transition from academia into informed professional practice. Creative learning spaces that are based in co-design theory facilitate this integration of professional design and communication strategies by designing spaces that support various ways of sharing and learning, thus providing differentiating levels of interaction and participation and allowing students to design their own working environments to enrich their own diverse and unique learning experiences.

13.0 BIBLIOGRAPHY

Abramowitz, Ava J. *Architect's Essentials of Contract Negotiation.* New York: John Wiley & Sons, Inc., 2002.

Abras, Chadia, Diane Maloney-Krichmar, and Jenny Preece. "User-centered Design." *Bainbridge, W. Encyclopedia of Human-Computer Interaction* 37, no. 4 (2004): 445-456. Accessed May 27, 2015. http://uba-mobile.googlecode.com/svn/trunk/resources/Abras,%20Maloney-krichmar,%20Preece/Bainbridge,%20W.%20Encyclopedia%20of%20Human-Computer%20Interaction.%20Thousand%20Oaks%20Sage%20Publications%20-%20Abras,%20Maloney-Krichmar,%20Preece%20-%202004%20-%20User-Centered%20Design.pdf.

Arnstein, Sherry R. "A Ladder of Citizen Participation." *Journal of American Institute of Planners* 35, no. 4 (1969): 216-224. doi:10.1080/01944366908977225.

Ashkanasy, Neal M. Review of *The Future of Competition: Co-creating Unique Value with Customers*, by C.K. Prahalad and Venkat Ramaswamy. *The Academy of Management Executive* 18, no. 2 (2004): 155-157. http://www.jstor.org/stable/4166079.

"B105: Owner and Architect Agreement for Residential/Small Commercial Project - The American Institute of Architects." The American Institute of Architects. Accessed January 20, 2015. http://www.aia.org/contractdocs/AIAB088237.

Bell, Katherine. "Designing Spaces for Creative Collaboration." Accessed January 20, 2015. https://hbr.org/2012/01/designing-spaces-for-creative/.

Bratteteig, Tone and Ina Wagner. "Spaces for participatory creativity." *CoDesign* 8, no. 2-3 (2012): 105-126. Accessed January 28, 2015. doi:10.1080/15710882.2012.672576.

Bratteteig, Tone, Keld Bodker, Yvonne Dittrich, Preben Holst Mogensen, and Jesper Simonsen. *Routledge International Handbook of Participatory Design.* New York: Routledge, 2013.

Boxjelly. "Hawaii's First Co-working Space." Accessed January 5, 2016. http://www.theboxjelly.com/about-us/.

Bulfinch, Shepley. *Harvard Innovation Lab*. Brochure, 2011. Accessed January 11, 2016. http://www.shepleybulfinch.com/pdf/sb_i-lab_brochure.pdf.

"Cambridge Dictionaries Online." Accessed March 8, 2016. http://dictionary.cambridge.org/dictionary/english/design.

Carnevale, Peter J. and Dean G. Pruitt. "Negotiation and mediation." *Annual review of psychology* 43, no. 1 (1992): 531-582. doi:10.1146/annurev.ps.43.020192.002531.

Casali, Davide. "Co-design and participatory design: a solid process primer." *Intense Minimalism* (blog). November 28, 2013. http://intenseminimalism.com/2013/co-design-and-participatory-design-a-solid-process-primer/.

Ching, Francis D. K.. *Architecture: Form, Space, and Order*. New Jersey: John Wiley & Sons, Inc., 2007.

Cody Anderson Wasney Architects, Inc. "Peterson Building Renovation", 2010. Provided by Stanford University. Blueprint.

"Concept car – Reset." Accessed January 20, 2015. https://dschool.stanford.edu/sandbox/groups/dhandbook/wiki/1f6ab/attachments/80040/reset_concept_car_winter2011.pdf?sessionID=9f8d4937a15600d2832a0b895a3fc531d7a73e14.

CR. "Interior Improvements Building No. 37." April 2015. Provided by University of Hawai'i at Mānoa Facilities Management Office. Blueprint.

"Cross-University Courses." Accessed January 12, 2016. https://ilab.harvard.edu/explore/courses/.

Csikszentmihalyi, Mihaly. *Creativity: The Psychology of Discovery and Intervention.* New York: Harper Perennial, 2013.

Cuff, Dana. *Architecture: The Story of Practice*. Massachusetts: The MIT Press, 1992.

"d.school founder taps into humankind's innate creativity." YouTube video, 57:37. Posted by "John S. Knight Journalism Fellowships at Stanford." July 18, 2013. https://youtu.be/ag1PfUUXk_k.

Denison, D. C. "Off to torrid start, Harvard i-lab marks its first year." *The Boston Globe*, November 12, 2012. Accessed January 11, 2016. https://www.bostonglobe.com/business/2012/11/12/off-torrid-start-harvard-innovation-lab-marks-first-anniversary/G0oimnOz5CAtctQ8e13vUJ/story.html.

Dervojeda Kristina, Diederik Verzijl, Fabian Nagtegaal, Mark Lengton, Elco Rouwmaat, Erica Monfardini, and Laurent Frideres. "Design for Innovation: Co-creation

design as a new way of value creation, Case Study 14." *European Union* (2014). Accessed March 10, 2015. http://ec.europa.eu/growth/industry/innovation/business-innovation-observatory/files/case-studies/14-dfi-co-creation-design-as-a-way-of-value-creation_en.pdf.

"dschool fact sheet 2012." Stanford University. Accessed January 20, 2015. http://dschool.stanford.edu/wp-content/uploads/2010/09/dschool-fact-sheet-2012.pdf.

Emmons, Garry. "Welcome to the Future." December 1, 2011. Accessed January 12, 2016. https://www.alumni.hbs.edu/stories/Pages/story-bulletin.aspx?num=1032.

Fischer, Gerhard. "Social Creativity: Turning Barriers into Opportunities for Collaborative Design." In Proceedings of the Eighth Conference on Participatory Design: Artful integration: interweaving media, materials and practices, Toronto, Canada, 2004 1: 152-161. ACM.

Greenbaum, Joan and Daria Loi. "Participation, the camel and the elephant of design: an introduction." *CoDesign* 8, no. 2-3 (2012): 81-85. Accessed January 28, 2015. doi:10.1080/15710882.2012.690232.

Grimley, Chris and Mimi Love. *Color, Space, and Style*. Massachusetts: Rockport Publishers, Inc., 2007.

Guo, Alan. "Peterson Lab undergoes renovation." *The Stanford Daily*. May 29, 2008.

Harvard College. "About the i-lab – The Harvard Innovation Lab." Accessed January 10, 2016. https://i-lab.harvard.edu/explore/about/.

Harvard College. "About the i-lab – The Harvard Innovation Lab." Accessed January 10, 2016. https://i-lab.harvard.edu/explore/about/our-approach/.

"Hawaii's First Co-working Space." Accessed January 5, 2016. http://www.theboxjelly.com/about-us/.

Hershberger, Robert G. "Programming." *The American Institute of Architects* (2000). Accessed March 26, 2016. http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab089267.pdf.

"Innovative indoor park and pavilion opens in Kaka'ako." *Khon2*, June 8, 2014. Accessed January 26, 2016. http://khon2.com/2014/06/08/innovative-indoor-park-and-pavilion-opens-in-kakaako/.

"Introducing the i-Lab." *Harvard Magazine Inc.,* 2012, accessed March 10, 2015, http://harvardmagazine.com/2012/01/introducing-the-i-lab#article-images.

Iversen, Ole Sejer, Kim Halskov and Tuck W. Leong. "Values-led participatory design." *CoDesign* 8, no. 2-3 (2012): 87-103. Accessed February 1, 2015. doi:10.1080/15710882.2012.672575.

Kahn, Ronald H. "The Changing Role of the Architect." *23 St Louis ULJ* 23 (1979): 216-218.

Kane, Kathie. "Why Space Matters! The Story of the Sakamaki Innovation Zone." 2014. Accessed March 28, 2016. http://www.cte.hawaii.edu/Sakamaki/about.html.

Kürtüncü, Burçin, Sait Ali Köknar, and Pelin Dursun. "Decoding Spatial Knowledge and Spatial Experience." In proceedings of Design Train Congress, Amsterdam, The Netherlands, 05-07 June, 2008.

Lefebvre, Henri. *The Production of Space*. Translated by Donald Nicholson-Smith. Oxford: Blackwell, 1991.

Margerum, Richard D. "Overcoming Locally Based Collaboration Constraints." *Society & Natural Resources: An International Journal* 20, no. 2 (2007): 135-152. Accessed February 27, 2015. doi:10.1080/08941920601052404.

Martin, Charles L., and Donald Hackett. *Facilitation Skills for Team Leaders: Leading Organized Teams to Greater Productivity.* Menlo Park, CA: Course Technology/ Cengage Learning, 1993.

Muller, Michael J. and Sarah Kuhn. "Participatory Design." *Communications of the ACM* 36, no. 6 (1993): 24-28. Accessed February 1, 2015. doi:10.1145/153571.255960.

Nicol, David and Simon Pilling. *Changing Architecture Education: Towards a New Professionalism*. London: Spon Press, 2000.

"Our Approach – The Harvard Innovation Lab." Accessed January 11, 2016. https://i-lab.harvard.edu/explore/about/our-approach/.

"Our Point of View." Stanford University Institute of Design. Accessed March 14, 2016, http://dschool.stanford.edu/our-point-of-view/.

Ozcelik, Derya, Javier Quevedo-Fernandez, Jos Thalen, and Jacques Terken. 2011. "Engaging users in the early phases of the design process: attitudes, concerns and challenges from industrial practice." In Proceedings of the 2011 Conference on Designing Pleasurable Products and Interfaces, Milano, IT, June 22-25, 2011. doi: 10.1145/2347504.2347519. ACM.

Prahalad, C. K. and Venkat Ramaswamy. "Co-creation Experiences: The Next Practice in Value Creation." *Journal of Interactive Marketing* 18, no. 3 (2004). Accessed March 10, 2015. doi:10.1002/dir.20015.

Revans, R. W. "What is Action Learning." *Journal of Management Development* 1 (1982): 64-75. Accessed February 20, 2016. doi: http://dx.doi.org/10.1108/eb051529.

Rocheleau, Matt. "City approves $20M Harvard Innovation Lab project in Allston." Last modified March 11, 2011. Accessed January 12, 2016. http://www.boston.com/yourtown/news/allston_brighton/2011/03/city_approves_20m_harvard_inno.html.

Roethel, Kathryn. "Stanford's design school promotes creativity." *SF GATE*. November 26, 2010. Accessed January 20, 2015. http://www.sfgate.com/education/article/Stanford-s-design-school-promotes-creativity-3244664.php.

Roggema, Rob. *The Design Charrette: Ways to Envision Sustainable Futures*. New York: Springer, 2013.

Rosett, Richard N. "Business Education in the United States." Selected paper no. 59, University of Chicago Graduate School of Business, 1982. https://www.chicagobooth.edu/~/media/02DC5B04961049B89187464885876053.pdf.

"Sakamaki Innovation Zone." Accessed February 1, 2016. http://www.cte.hawaii.edu/Sakamaki/about.html.

Sanders, Elizabeth. "From User-centered to Participatory Design Approaches." In *Design and the social sciences: Making connections*, edited by Jorge Frascara, 1-8. United Kingdom: CRC Press Inc., 2002.

Sanders, Elizabeth B. N. "New Spaces, Places & Materials for Co-designing Sustainable Futures." *Design Research Journal* 4 (2013): 20-23. Accessed February 1, 2015. http://www.maketools.com/articles-papers/Sanders2013NewSpaces.pdf.

Sanders, Elizabeth B. N. and Pieter Jan Stappers. "Co-creation and the New Landscapes of Design." *CoDesign* 4, no. 1 (2008): 5-18. Accessed January 28, 2015. doi:10.1080/15710880701875068.

Schmitt, Bernd. "Experiential Marketing." *Journal of Marketing Management* 15, no. 1-3 (January 1999): 53-67. Accessed March 5, 2015. doi:10.1362/026725799784870496.

Shepley Bulfinch Richardson & Abbott, Inc. "Harvard Innovation Lab." September 26, 2011. Provided by Harvard University. Blueprint.

Simon, Robert-Jan, Jos Van der Linden, and Tom Duffy. "New learning: three ways to learn in a new balance." In *New Learning*, 1-20. Heidelberg: Springer Netherlands, 2000. Accessed January 1, 2016. doi: https://dx.doi.org/10.1007/0-306-47614-2_1.

Soini, Katja. "Industrial Designers as Facilitators: How to Enable Collaboration in Multidisciplinary Workshops." In proceedings of Connecting-A Conference on the Multivocality of Design History & Design Studies, Helsinki – Tallinn, August 23-25, 2006. Accessed March 10, 2015. http://www2.uiah.fi/~kvirtane/julkaisut/KS_Industrial_Designers_as_Facilitators_Connecting.pdf.

Spinuzzi, Clay. "The Methodology of Participatory Design." *Technical Communication* 52, no. 2 (2005): 163-174.

"Stanford d.school – case study." YouTube video, 3:32. Posted by "Steelcase." December 6, 2010. https://youtu.be/NSjezj7_6mc.

"Stanford Executive Education: Executive Leadership Development: Analysis to Action." Accessed on February 24, 2016. http://www.gsb.stanford.edu/exed/eld/.

Straus, David and Michael Doyle. "The Architect as Facilitator: A New Role." *Journal of Architectural Education* 31, no. 4 (1978): 13-15. doi:10.1080/10464883.1978.10758144.

Thackara, John. *In the Bubble: Designing in a Complex World*. Massachusetts: MIT Press, 2005.

The American Institute of Architects. "B105: Owner and Architect Agreement for Residential/Small Commercial Project - The American Institute of Architects." Accessed January 20, 2015. http://www.aia.org/contractdocs/AIAB088237.

"The Coop | Coworkspace for Fashion Industry." Accessed January 26, 2016. http://www.hawaiifashion.org/coop/.

"The NCI Charrette System." Accessed January 23, 2016. http://www.charretteinstitute.org/charrette.html.

Thomas, Nigel J. T. "Mental Imagery." In *The Stanford Encyclopedia of Philosophy* (Spring 2016 edition). Edited by Edward N. Zalta. Accessed March 19, 2016. http://plato.stanford.edu/cgi-bin/encyclopedia/archinfo.cgi?entry=mental-imagery.

Tischler, Linda. "The Idea Lab: A Look at Stanford's D.School." *Fast Company*, June 2010. Accessed January 10, 2016. http://www.fastcompany.com/1637759/idea-lab-look-stanfords-dschool.

Tracy, Brian. *Brian Tracy Success Library: Marketing*. New York: AMACOM Books, 2014. Accessed January 7, 2016. ProQuest ebrary.

Ulwick, Anthony W. "Turn Customer Input into Innovation." *Harvard Business Review*, January 2002. Accessed January 20, 2015. https://hbr.org/2002/01/turn-customer-input-into-innovation.

Watkins, Michael D. "Teaching Students to Shape the Game: Negotiation Architecture and the Design of Manageably Dynamic Simulation." *Negotiation Journal* 23, no. 3 (2007): 333-342. Accessed March 24, 2015. doi:10.1111/j.1571-9979.2007.00146.x.

Weatherhead, Arthur C. "The History of Collegiate Education in Architecture in the United States." PhD diss., Columbia University, 1941.

Wilson, Kenneth G. *The Columbia Guide to Standard American English.* New York: Columbia University Press, 1993.

"WGBH – About Us." Accessed January 11, 2016. http://www.wgbh.org/about/.

Wong, Jennifer. "University evaluates Sakamaki innovative classrooms." Accessed January 31, 2016. http://www.kaleo.org/news/university-evaluates-sakamaki-innovative-classrooms/article_346fb28a-6538-11e4-bd57-0017a43b2370.html.

14.0 APPENDICES

14.01 APPENDIX A – ACSA ANNUAL MEETING PROCEEDINGS ANALYSIS

Figure 124: Categorization table of 100th ACSA Annual Meeting Proceedings, Digital Aptitudes

Source: Author

Figure 125: Categorization table of 101th ACSA Annual Meeting Proceedings, New Constellations, New Ecologies
Source: Author

100th ACSA Annual Meeting Proceedings, Digital Aptitudes - 2012	Co-Design/Collaboration/ Client Relations/Negotiation	Environmental/Ecology/ Landscape	Material/Structure/ Installation/Design-Build	Case Study/Specific Study	Urban/City	Public Interest/Globalization/ Housing	Technology	Culture/History/Theory	Drawing/Collage/ Creative Means	Education/Pedagogy/ Research	
(Ma)Behaviors of Drawing							x				
4D Environments and Design: Prototyping Interactive Architecture							x				
A 21st Century Approach to Trans-disciplinary Sustainable Design Education										x	
A Cybernetic House Between: A Safe Zone Between Out Technological Flesh and the Technological Field							x				
A Materiality of Agency// Speculations on the Impact of Biological Computation on Materia			x								
A New Regional Platform for Computational Fabrication							x				
A Small House Nation: Making Our Stuff Fit						x					
Activating Agency: Assessing Impacts of Global Collaborative Practices	x										
Aerial Vision-Based Model of Urbanism					x						
Aluminet: A Stidy in Technology Transfer and Radiant Barriers Post-Sputnik		x									
Appropriateness in the Design of Ubiquitous Computing Environments							x				
Architecture for the Public Good, A Problematic Development Process						x					
Beauty + the BIM							x				
Beyond Arrows: Natural Ventilation in a High-rise Building with Double Skin Façade		x									
Biochemical Injections- Architecture as a Biotechnical Interface in a Post-parametric		x									
Blow-Up: Architecture and the Technology of Contemporary Art							x				
Bootstrapping a Computational Discourse							x				
Bricks and Bones: Discovering Atlanta's Forgotten Spaces of Neo-Slavery								x			
Building SocialisticArchitectural Schools: The Transformation of China's Architectural Education from American Beaux-Arts Model into										x	
Cloud Code: Public Space in 4 Dimensions							x				
Communication Theory as an Anti-Environment for Understanding the Effects of Technological Environments upon Cultur								x			
Computation as an Ideological Practice							x				
Computational Design Methods							x				
Digital and Analog Aptitudes in Emergency Shelter Design and Fabrication			x								
Digital Distortion							x				
Digital Pleonik: Vienna Years							x				
Drawing Energy Abu Dhabi: Critical Reflections		x									
Drawing the Line; or Surrender, but Don't Give Yourself Away...									x		
EcoArchitectural Machines		x									
Emission		x									
Eulogy to Paperless Studios: The Kernel for Pulsation in Architecture										x	
Evaluating Progressivism: A Critique of Biomimetic Architecture		x									
Extreme Makeover; or How the F-Word Shaped Contemporary Architecture								x			
Fibrous Boundaries: ' Green' Composites in Architectural Applications		x									
Folded Sun-Shades: From Origami to Architecture			x								
Four Transit Villages for Nashville: A Case Study in University Research and Livable Communitie				x							
From Digital Materials to Self-Assembly			x								
From Orthographic to Eccentric: Tall Architecture of Extreme			x								
From the Park to Parking: The Evolution of Suburban Mobility					x						
Haitian Rebuilding Initiative: Technological Solutions that Hinge on Empowerment						x					
In Support of Pre-Professional Relations: Guidelines for Effective Educational	x										
Informing Material Specification			x								
In-situ Processing of Thermoplastic Composites for Large-Scale Structures			x								
Integrated BIM and Parametric Modeling: Course Samples with Multiple Methods and Multiple Phases							x				
Integrating BIM into the Comprehensive Design Studio							x				
Intelligent Infrastructure: Mobile Networks as Tactical Transportation							x				
Laid Bare: Debating an Expanded Role for Infrastructure at the World Trade Center					x						
Laminar Folds: Fabric Structure Molds to Jogs			x								
Learning from Disasters: Lessons from Community-Based Design in Haiti						x					
Leftovers: Residual and Risk in " Our Digital Present"			x								
Material in Performance- driven Architectural Geometry			x								
Material Postproduction			x								
Millennials and Design Education										x	
Modeling Spatial Activity Distributions in Complex Urban Conditions : The Markov Chain Model for Wal					x						
Nouveau Pulsation-100 Years of Craft Evolution: From Art Nouveau to Digital Pulsation							x				
On the Use Value of History: Historiography in the Global Information Age								x			
Opportunities & Challenges: Learning Experience from International Architectural Students In the US										x	
Optimization Takes Command:Miscalculations in Performative Design							x				
Other Urbanisms: A Scalar Approach Towards Pervious Design					x						
Parallel Tracks: Digital \ Analog Dialogue in Toy Development			x								
Parametric BIM as a Generative Design Tool							x				
Performance-Based Generative Design. An Investigation of the Parametric Nature of Archi-			x								
Photosynthetic Energy and Ecological Recycling: The Architectural Potential of Alga		x									
Reaching for Sustainability Using Technology and Teamwork: Teaching Integra	x									x	
reCOVER: Transitional Disaster Recovery Housing						x					
Reflections of Kinetic Reticulated Frameworks			x								
REis: Renewable Energy Infrastructures		x									
Representing Information: Envisioning the City through Data					x						
Risky Business: from Digital Fabrication to the Abstract Workshop										x	
Self-organizing strategy: An Adaptable Growth Model for Architecture							x				
Signature Architecture Franchising: Improving Average Architecture Using BIM							x				
Simulating Visual Comfort and Energy Performance of Organic Energy Harvesting E	x										
Software: Jack Burnham and the Medium as System								x			
Spectacle of the Hyper-Real: Environmental Simulation, Cybernetic Subjects, and Urban Design							x				
Tactile Values: A Political Economy of Smooth Surfaces								x			
Tending to Detail								x			
The Autonomous Nature of Creativity in Juxtaposition to the New Structuralism								x			
The Death of Film in Architecture								x			
The On-Again Off Again Romance Between Nature and Technology in Healthcare Settings							x				
The Ontological Performance of Sustainable Design		x									
The Parameters of the Posthuman								x			
The Predicament of Diversity through the Architectural Pedagogy of Beginning										x	
The Solaris Mirror								x			
The Stylus Vector									x		
Topological Future: Generative BIM							x				
Transparency: Literal, Phenomenal, Digital							x				
Uneasy Green: The Value of a Semi-Autonomous , Productivity Critical Green Archit		x									
Utopias/Dystopias: from the Progressive Era to a Sustainable Future					x						
Yes, They Do Walk in Suburbia : Multifamily Housing and Trips to Strips					x						
Zero + Spatial Deployment of Thermoplastic Structural Panels via Robotic Manufacture			x								
TOTAL	3	13	15	1	8	5	25	11	2	8	TOTAL 91

Figure 126: Categorization table of 101th ACSA Annual Meeting Proceedings, New Constellations, New Ecologies
Source: Author

Figure 127: Categorization table of 101th ACSA Annual Meeting Proceedings, New Constellations, New Ecologies
Source: Author

Figure 126: Categorization table of 102nd ACSA Annual Meeting Proceedings, Globalizing Architecture/ Flows and Disruptions

Source: Author