ABSTRACT

Title of Thesis: CONSCIOUSNESS OF DESIGN: TRANSFORMING THE ACADEMIC ENVIRONMENT

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Employing didactic design, this thesis seeks to explore advances in traditional design teaching methods to provide architecture students with hands-on interactive learning environments. These methods are emphasized through the human body's connection to architecture. Traditionally, higher education puts a focus on cognitive knowledge with a disregard to the bodily experience. The proposed academic design curriculum allows students to learn how to design using multi-sensory interactions with the built environment.

CONSCIOUSNESS OF DESIGN: TRANSFORMING THE ACADEMIC ENVIRONMENT

by

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Chapter 1: Theory

"The duty of education is to cultivate and support the human abilities of imagination and empathy […] the education of the senses and the imagination is necessary for a full and dignified life"

Juhani Pallasmaa

What is the origin of the phrase 'the pictures don't do it justice'? How often is a childhood home described through experiences had in that place? This is sensory architecture at play. The experiential quality of design allows it to be one of the most diverse yet simultaneously functional forms of artistic expression. The human component and interaction inherently ties architecture to a multisensory experience. It is impossible to describe a childhood home without describing how it made someone feel, the pictures of a vacation don't do the place justice because simply observing the images optically isn't able to engage the other senses. The role of the body and sensory perception is intrinsically tied with the built environment and is what keeps the mind in spaces long after the body has left.

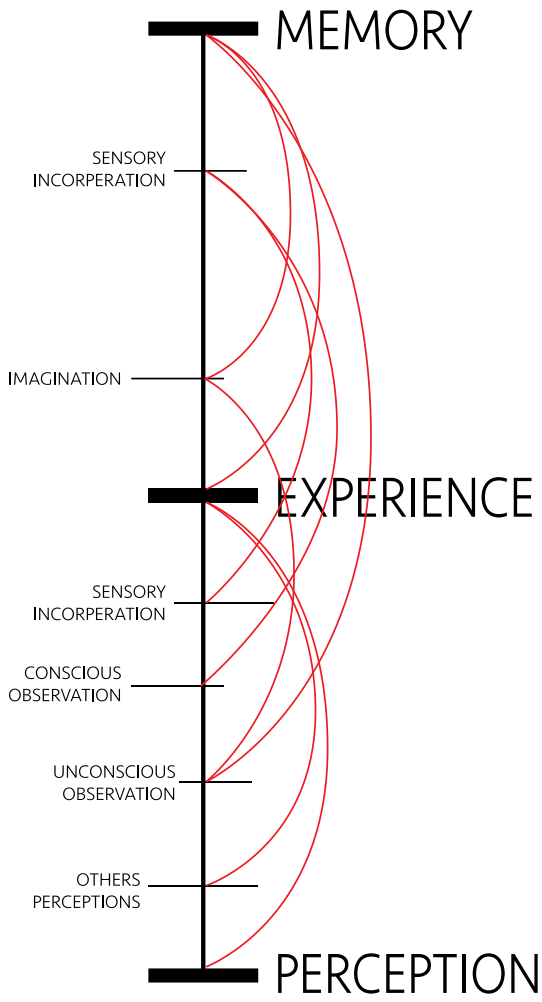
Architecture is a profession that has its origin in numerous years of formal education. This form of education is unlike any other discipline in higher education. Design thinking and courses such as studio set students apart from other traditional learning environments. The way in which studio is taught fosters a process of non-linear thinking that is vital to design. Typically, studio is the most creative learning environment while other courses follow an educational paradigm similar to the quality and structure of a higher education classroom. This aspect of architectural education begs the question is this typical lecture based environment the correct model or have campuses begun to settle with historic methods of teaching? The academic side of architecture lacks the connection to the multisensory experience, that of both the students and the users that they will

eventually be designing for. If students do not understand the ephemeral qualities of space how are they to design successful experiences themselves? Students need the background in phenomenology and perceptual understandings to have the necessary repertoire to draw on in their own process. If they understand architectural experience in this way, they will have the ability to cater their designs to produce emotions and experiences.

Architecture holds a dynamic position between arts and science. A completely intuitive designer cannot be successful without considering analytical methodologies and a completely scientific designer cannot be successful without considering artistic elements. This therefore becomes a necessary balance within the academic architectural community. The process of design is a thoughtful and all-encompassing one; each step of the process requires the full investment and exploration of the designer. Many different tactics and scenarios must be taken into consideration. The teaching of architecture should be approached in the same manner with varied and all-encompassing methodologies. To achieve this, various teaching methods must be executed. This involves looking at the academic environment in a whole new way. Studio courses are a great model of how to move away from passive learning and towards an enriched environment. This can be taken even further by introducing a new paradigm in architectural education alongside the studio track. This educational track would help students to use the spaces around them to begin to understand the experiential qualities of design. This additional environment could allow students to not only gain a more realistic view of the multi-disciplinary professional world but could also provide the opportunity of a more active learning environment that mirrors their studio experience and the overall design process.

College campuses exist simultaneously as teaching and learning institutions. For centuries, techniques have been used to deliver the information necessary for students to progress in these

environments and further into the professional world. The comparison of historic teaching methods and modern progressive ideals warrants a closer consideration of the current model of higher education. How can we get the most out of our college campuses and higher education learning environments? What types of teaching methods would these new models require? How will technology and the physical environment of these settings play a role? Through observation of current teaching and learning techniques the main ideals of education can be drawn out and further applied to design techniques for these settings specific to architecture.



"The body knows and remembers. Architectural meaning derives from archaic responses and reactions remembered by the body and the senses."

-Juhani Pallasmaa

Figure 1, Process of Phenomenology

(Source: Author)

To gain a thorough understanding of the incorporation of the senses into our everyday lives, and the architectural environment, it is necessary to turn to psychological areas of study such as phenomenology. The focus of this theory is experiential qualities with an emphasis on consciousness, both recognizable and unrecognizable: "phenomenology studies the structure of various types of experience ranging from perception, thought, memory, imagination, emotion, desire, and volition to bodily awareness, embodied action, and social activity, including linguistic

activity."[1] Rather than looking to physical aspects, it pushes further to bring a quantifiable justification to some of the qualitative sides of research in individual perceptions of spaces or situations. One of the central themes of this area of study is intentionality. This points to the overarching idea that each person initially comes to an experience with their own personal background and intention. "Memories of prior personal and cultural experiences play their part in conditioning […] perception of these patterns" of both architecture and social interaction.[2] As stated by one of the catch phrases of the theory: "all consciousness is consciousness *of*." [3] Overall, this concept seeks to bridge the gap between the object being experienced and the person who is experiencing it. By doing so, it joins the two entities as one, defining them as "internally unified".[3] This points to the full-bodied experience of perception and the all-encompassing nature of experiences. The science of phenomenology is now recognized as one of the most significant philosophical movements of the twenty first century and has been further applied to the phenomenon of architecture.

[1] David Woodruff Smith, "Phenomenology" *The Stanford Encyclopedia of Philosophy* (Winter 2016 Edition), last modified December 16, 2013, last accessed October 29, 2017. https://plato.stanford.edu/entries/phenomenology/

[2] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (University of Minnesota Press, 2004), 3.

[3] "Phenomenology" *New World Encyclopedia*, last modified April 24, 2015, last accessed October 29, 2017. http://www.newworldencyclopedia.org/entry/Phenomenology

Figure 2, Therme Vals (left), Chapel of St. Ignatius (center), Jewish Museum Berlin (right)

(Source: Homeli, Steven Holl Architects, Studio Libeskind)

Through architectural theorists such as Juhani Pallasmaa, the philosophical ideas surrounding phenomenology are being applied to architecture. The purpose of this connection is to begin to consciously design experience, allowing for a stronger connection between the human body and the built environment. The impact of the awe-inspiring designs of Peter Zumthor, Steven Holl and Daniel Libeskind is not accidental. There is a reason that a visitor feels calm stepping into the Therme Vals, spiritual when moving through the Chapel of St. Ignatius or heavy hearted when traveling down the corridors of the Jewish Museum Berlin; this is a conscious design decision by the architect. It is impossible to evoke these types of emotions without understanding and applying the concepts of human consciousness and perception, in other words providing a multisensory experience. "Phenomenology demonstrated in architecture is the manipulation of space, material, and light and shadow to create a memorable encounter through an impact on the human senses."[4] The dynamic senses create human perceptions that allow the body to connect with

[4] "Theory of Phenomenology: Analyzing Substance, Application and Influence," *The University of Kansas*, https://cte.ku.edu/sites/cte.drupal.ku.edu/files/docs/portfolios/kraus/essay2.pdf.

our built environment; focusing on phenomenology in architecture allows for designers to highlight experience early in the design process rather than approaching it as an accidental result of design.

This focus on phenomenology can be manifested within the academic setting by using techniques to transition this unconscious absorption of our environments into a conscious understanding. This can be achieved through critical analyzation of our senses. This type of analyzation comes from things such as studying sight lines, the way in which wavelengths of sound interact with particular materials or masses, the various textural qualities of materials or even the branding or intensities of smell. Once these are able to be identified within spaces then students are able to base future design decisions off these discoveries.

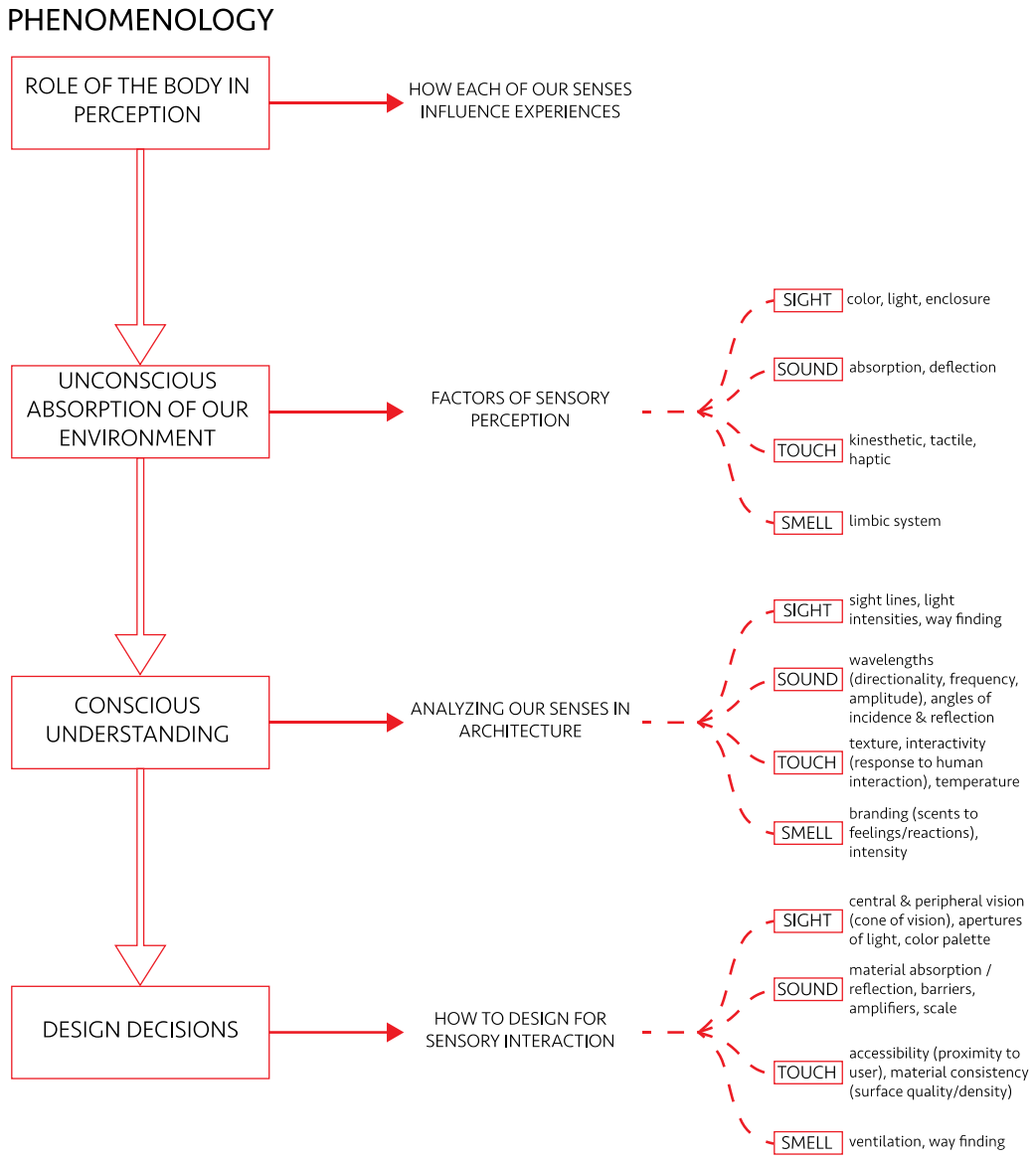


Figure 3, Phenomenology Applied to Sensory Understanding (Source: Author)

Current Architectural Teaching

As a first-year architectural student on a college campus, one of the first projects typically assigned is the design a pavilion within a park setting. To begin this assignment, the first thing that the class did was sketch out the desired form of the pavilion. This resulted in massing models to

understand the overall shapes. From there, students began to carve out the interior space. Lastly, each student cut out a scale figure and glued it into their completed models. While the projects may not all be exactly a park pavilion, each first-year architecture student goes through a similar project yielding the same design process. This exact process is the perfect example of how much consideration is given to what design looks like and how little is given to what design feels like. The very first step was to imagine what the pavilion was to look like and the very last step was figure out the human scale relative to what was being created. While this may have been one of the first projects attempted by students with little knowledge of architecture, the result was unobtainable forms and gross scales that felt unnatural and disconnected to the human form when further examined. As students progress through school, they learn appropriate scales and dimensions but many also carry with them this initial understanding of form first, human scale last. Moving up through a typical college education, as students arrive to graduate level courses it becomes apparent that this is not the most beneficial thought process. As modernism progresses, design moves closer towards a reliance on sight and vision and further from the consideration of the other four senses. "In Western culture, sight has historically been regarded as the noblest of the senses" and this is no exception to architectural education. [5] "Modern architectural theory and critique have had a strong tendency to regard space as an immaterial object delineated by material surfaces, instead of understanding space in terms of dynamic interactions and interrelations." [6]

Moving towards a multi-sensory design approach requires putting the human body first. It is impossible to consider the human body's connection to architecture without discussing the works of Vitruvius and Renaissance design. In this period of design, man became the measure for

[5] Juhani Pallasmaa, *The Eyes of the Skin* (John Wiley & Sons Ltd, 2012), 18.
[6] Juhani Pallasmaa, *The Eyes of the Skin* (John Wiley & Sons Ltd, 2012), 68.

the built environment. Vitruvius specifically produced *The Ten Books on Architecture*. This was a commentary on proportion and the ideal nature of Renaissance design. It pointed to the symmetries and overall ideal proportions of the human body and how those similar ideals should be applied to architecture. While the ideas of symmetry may not be applicable to all designs, much can be learned from Vitruvius' thinking. He breaks down the human body to dimension and proportion then applies these calculations to classical temple design. This creates direct proportional connection between the architecture and the human body, which was taking place even before Vitruvius' time. "Primitive man used his own body as the dimensioning and proportioning system of his constructions." [7] This type of thinking allows each space to take into consideration the scale, proportion and therefore feeling of the end users that will be occupying it. This is one of the fundamental works to return to in order to gain an understanding of scale that can then be further applied to modern theories such as phenomenology. This is the aspect of design when philosophers such as Maurice Merleau-ponty come into play. He argued for the human body being the experiential center of the world. In his book "Phenomenology of Perception", he incorporates the human body into previously perceived notions of phenomenology, incorporating more of the scientific notions surrounding biology, behavioral and social sciences. This integral aspect allows for a structure to interpret and analyze experience in a more quantifiable manor.

In order to take advantage of and awareness of the senses as a teaching tool within the educational environment, it is necessary to rethink the pedagogy of this learning environment. The proposed academic paradigm shift of focus to the body as a source for design and learning requires a stronger emphasis on all five of the senses, but more specific to architecture: vision, hearing, touch and smell. To physically understand the qualities of an occupied space, all the senses are put

[7] Juhani Pallasmaa, *The Eyes of the Skin* (John Wiley & Sons Ltd, 2012), 64.

to work in unison. The body is all at once seeing, smelling, hearing and feeling, whether consciously or unconsciously, to perceive the space that it is within. This in turn produces the experiential quality of space. Accordingly, design tactics pertaining to each sensory environment must be understood and assimilated into methods of design education.

Vision Design

"Architecture holds the power to inspire and transform our day-to-day existence. The everyday act of pressing a door hand and opening into a light-washed room can become profound when experienced through sensitized consciousness."

Steven Holl

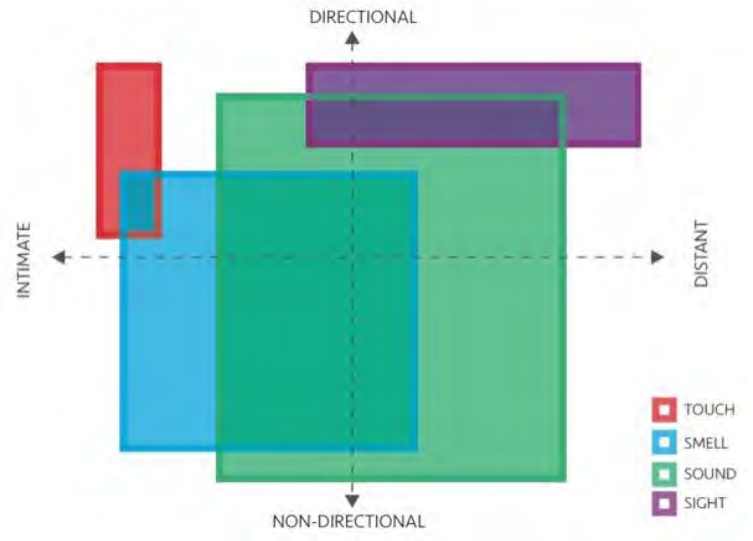


Figure 4, Qualities of the Senses Comparison (Source: Author)

It is necessary to understand the degree to which each sense effects the perception of space before beginning to design for them. For the purposes of this thesis, the four senses that will be focused on are visual, auditory, tactile and olfactory. Due to its hierarchical position in current design tactics, the visual sense is a good place to begin. Observing a space visually creates more of a distant relationship as compared to the other senses. One does not have to get up close and personal with a place or object to view and experience it visually. In some cases, it is more of a survey than a physical interaction. This in turn at least partially isolates the viewer from the space.

The visual sense is directional in nature. Unlike some of the other senses, humans can only perceive what is in their limited cone of vision and therefore only experience incomplete aspects of a space without the aid of the other senses. To start designing, it is important to keep these qualities of sight in mind while also understanding its quantifiable attributes. Most aspects of design can be partially interpreted through sight so it becomes more beneficial to identify the attributes that are unique to visual perception. The first of these attributes is the quality of light. Using sight, it is immediately understandable as to how light or dark a space is and the quality of that light, ranging from florescent to natural daylighting. The spectrum of intensities of light creates spatial perception and emotion. Darkness creates more dense, heavy space while brightness creates a more open, airy feeling.

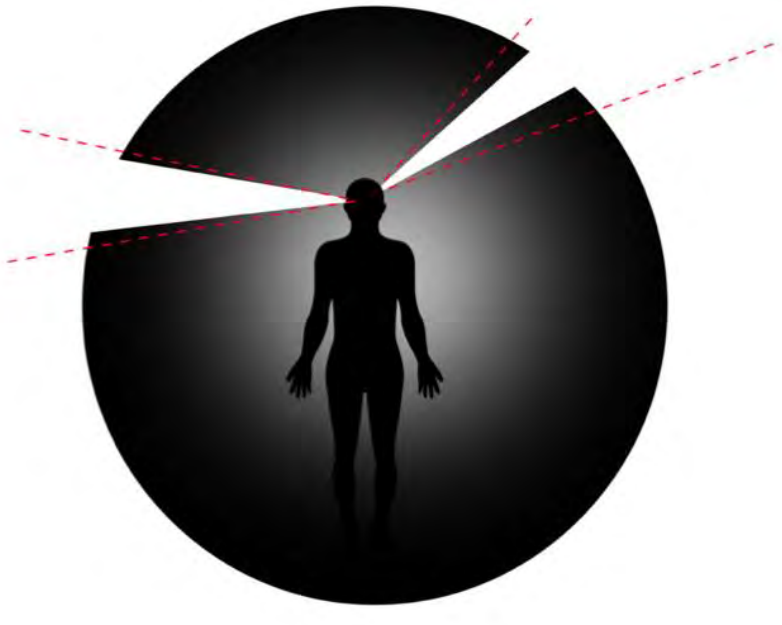


Figure 5, Spatial Qualities of Vision (Source: Author)

As previously discussed, much of the relation of sight to architecture has become a topical connection that limits physical connection. In order to delve deeper into the senses in terms of architectural design, there are existing paradigms that may be adopted. One of these is biophilic design. In general, biophilic design connects our built environment to nature in a more ephemeral, psychological sense. These connections can "reduce stress, improve cognitive function and creativity, improve our well-being and expedite healing". [8] These benefits are all due to an improved environmental quality within architecture. Rather than

directly implementing natural elements into every design, biophilic design advocates for the implementation of the ideals present within nature. In terms of the measurable design qualities of the visual sense, this can apply to a visual connection to nature but also further to material applications that provoke a sense of nature. The visual connection to nature essentially takes the incorporation of natural light into a space to another level. It has been proven through the study of non-rhythmic sensory stimuli that looking out to a natural, living setting for a few moments then returning to the task at hand creates a heightened level of interaction. This entire phenomenon ties back to scientific studies related to periphery vision movement reflexes. In terms of the visual incorporation and materiality to provide calming cognitive functions, one design tactic is to use biomorphic forms and patterns. This provides "symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature." [8] These references can have a calming effect on our perceptions because our brain can easily recognize these patterns. Many spaces, especially in the academic setting, that require this type of calming environment. Choices of material not only impact the visual functions of a space but also the haptic sense.

[8] William Browning, Joseph Clancy and Catherine Ryan, "14 Patterns of Biophilic Design" *Terrapin Bright Green*, last modified 2014, last accessed October 29, 2017. https://www.terrapinbrightgreen.com/reports/14-patterns/.

Haptic Design

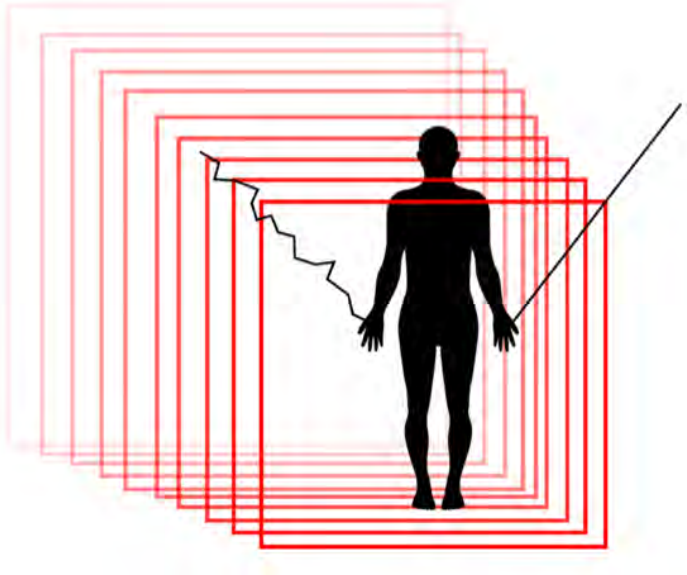


Figure 6, Spatial Qualities of Touch (Source: Author)

The second important sense to consider early in design is the tactile sense. This is a much more intimate sense as compared to visual. It requires an up close and personal connection with the object or material to understand its textures and overall feeling. Inevitably this sense of physicality also ties to a strong sense of movement. When absorbing the tactile qualities of a space or object humans do not simply lay a finger on it to fully absorb it. The body must become enveloped by the perceptual qualities, running a larger portion of the body along the surface, such as running a hand down a wall. This is true for material qualities on both a smaller and grander scale. "The surface of an old object, polished to perfection by the tool of the craftsman and the assiduous hand of its users, seduces the stroking of the hand." [9] While on a grander scale "Space is perceived by the visualization of its limits and by kinesthetic experience, i.e., by the sensation

[9] Juhani Pallasmaa, *The Eyes of the Skin* (John Wiley & Sons Ltd, 2012), 62.

of our movements." [10] In other words, the visual and haptic sense must be linked together in order to fully understand occupied spaces.

This overall sense of motion can be evoked architecturally in a number of ways. The materiality of a certain type of flooring, for example, will encourage either fast paced movement through the space or a leisurely stroll. This dynamic process then brings the kinesthetic perception to the next measurable quality: texture. Whether it's a space that the body is perceiving or an object that it is tactilely interacting with, different textural qualities each have their own feeling. Rough materials or sharp edges feel harsh and uncomfortable while smooth, soft materials and shapes are perceived as welcoming.

Auditory Design

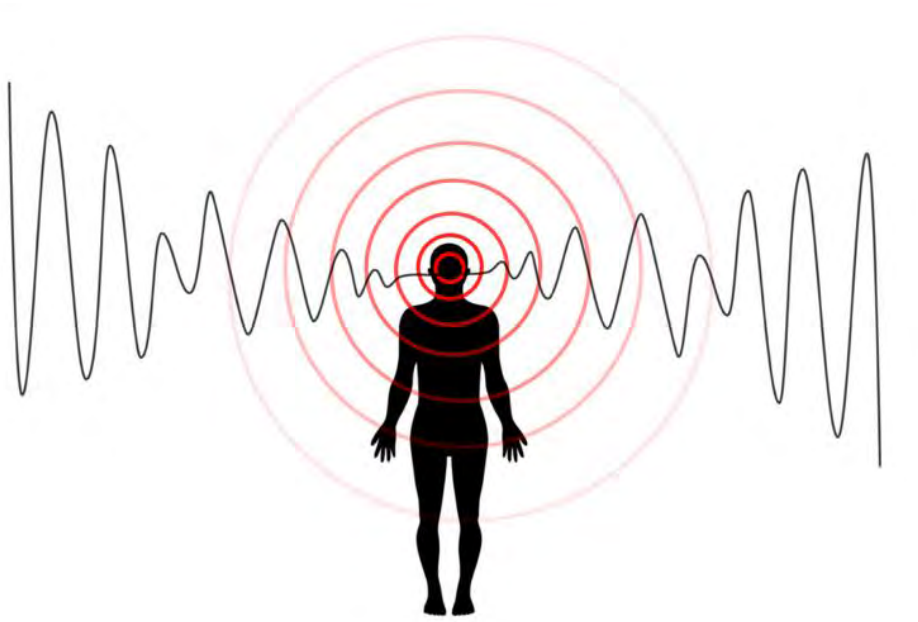


Figure 7, Spatial Qualities of Sound (Source: Author)

[10] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (University of Minnesota, 2004), 42.

The auditory sense has unique qualities that make it important to perceiving space. One of its greatest qualities is the ability to fill whatever form it occupies. Unlike sight or touch, this is a sense that each person in a place can experience simultaneously, together, regardless of if they interpret that sound identically or not. This not only connects the architectural space but also the people that are occupying it. Sound has a unique duality in that it can be both omnidirectional or directional. Sound experience can come from a very specific, recognizable place, such as when having an intimate conversation with someone, or as an all-encompassing feeling which fills the entire space that it occupies, such as an organ in a cathedral. This property of sound allows it to portray emotional responses. For example, if music is filling an entire space it feels much more open and grand while putting headphones in creates a small secluded space, regardless of the environment that someone is physically occupying. This carries over into echoes and reverberations as well, such as an echo evoking a hollow, empty feeling. Similar to the other senses, there are some measurable qualities to sound. These measurable qualities are much more scientifically recognized and clear than some of the qualities of the other senses. The first definitive measurement is decibels. The higher a decibel is, the louder that sound is going to be; therefore, lower decibels are more intimate because a person must be within a close range to hear while higher decibels can be heard from farther distances and do not need to be in as enclosed of a space. Frequency is another recognized measurement of sound. This measures the pitch of a sound. Higher sounds have higher frequencies while lower sounds have lower frequencies. The higher a sound is, the harder it is for someone to hear and some frequencies are inaudible to the human ear. This too may be translated to spatial quality in the sense that lower frequencies become more calming and intimate while higher frequencies become more activated and high energy.

In order to further quantify auditory senses in terms of architecture, it is necessary to examine materiality. The general layout and scale of spaces can help to produce particular levels of sound in terms of decibels and frequencies. Materials can take this process even a step further by means of absorption or reverberation. If a sound within a room is more heavily absorbed then the overall silence of the space creates a heavy, serious environment. A room in which sound may bounce around has a more light and energized feeling. Materiality in terms of sound can also tie back to biophilia with the incorporation of various natural, calming sounds.

Olfactory Design

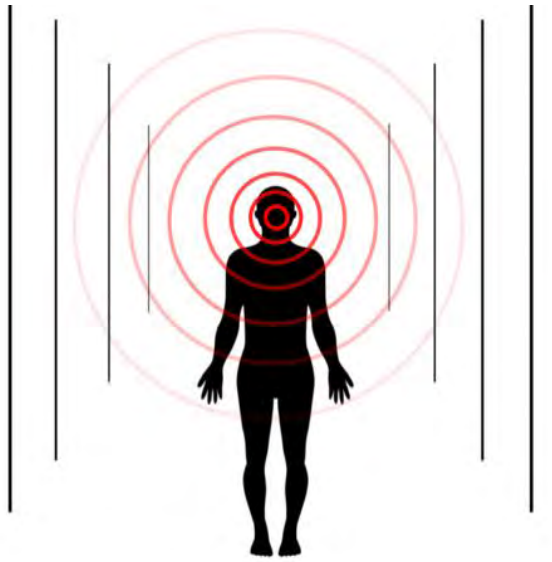


Figure 8, Spatial Qualities of Smell (Source: Author)

The sense of smell has a multitude of beneficial qualities. As compared to the other four, this is the sense that is most directly tied to memory. "We need only eight molecules of substance to trigger an impulse of smell in a nerve ending, and we can detect more than 10,000 different odours. The most persistent memory of any place is often its smell." [11] This is a good example of

[11] Juhani Pallasmaa, *The Eyes of the Skin.* (John Wiley & Sons Ltd, 2012), 58.

how architecture influences the human body even after it no longer occupys a space. There are limited resources to draw from in order to more systematically measure smell or the olfactory sense. Although, smell does still have qualities that may be directly related to architectural qualities. The first of these includes sequence. Like sound, scent can be both omnidirectional and directional. This causes it to be a great source of wayfinding, or creating a sequence of emotions as moving through a space. Different recognizable and unrecognizable scents may be employed dependent on the program of the building. In an architecture school for example, one of the strongest most recognizable scents are those coming from creation spaces. These types of spaces include wood shops or laser cutting rooms. These types of scents can evoke a positive emotion that could help to lead the circulation through the building. It has been found that pleasant fragrances can "enhance performance by serving as a source of environmentally generated positive affect." [12] To further this connection to designed space, smell has a very strong sense of confinement. Smell needs to be held within a limited area otherwise it will no longer be experienced. This sense of enclosure is another one that may be desired in particular instances within design especially to aid a desire sequence.

Designing Architectural Learning for the Senses

"The design process is based on a constant interplay of feeling and reason. The feelings, preferences, longings, and desires that emerge and demand to be given a form must be controlled by critical powers of reasoning, but it is our feelings that tell us whether abstract considerations really ring true."

Peter Zumthor

[12] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (University of Minnesota Press, 2004), 130.

Not only is a multi-sensory experience important to architectural design itself, but it is also an important part of the learning process. Perceptual learning is one efficient tool to use in an architectural environment. According to psychologist Eleanor Jack Gibson, "perceptual learning entails an increased ability to extract relevant information from a stimulus array as a result of experience." [13] Essentially, this integrates the ideals of phenomenology into an educational setting. Perceptual learning focusses on practice and experience to produce a permanent change in perception for the learner. This approach yields highly beneficial results. In the case of architectural education, this type of learning allows for these perceptions to be geared towards the built environment. If students learn to perceive the spaces that they are within than they can begin to recognize the commonalities of the successful and unsuccessful spaces.

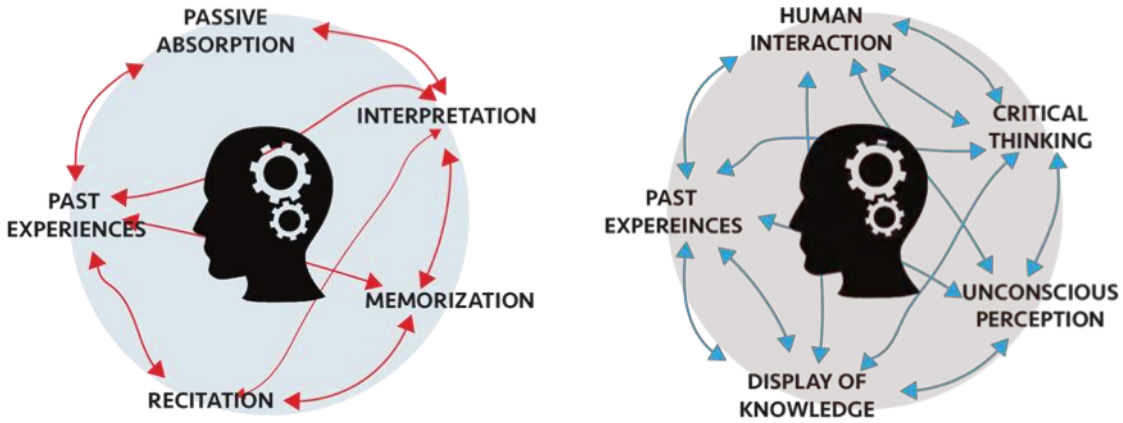


Figure 9, Typical vs Active Learning (Source: Author)

Throughout much of higher education as well as within the architecture educational environment there are a culmination of typical and historic methods of learning that take place. In a typical class, students enter the environment having some background knowledge in regard to the material that they are going to be presented with. This may come from either a reading

[13] Karen E. Adolph and Kari S. Kretch, "Gibson's Theory of Perceptual Learning" *NYU Department of Psychology,* accessed October 29, 2017, http://www.psych.nyu.edu/adolph/publications/AdolphKretch-inpress-GibsonTheory.pdf

assignment completed prior to class time, or general background knowledge from other educational experiences. With this information in the back of their mind, they are then placed in a static setting: a classroom. There are various teaching techniques that are employed from this point on. In most typical cases, the model will be one of two things. The two basic forms of classes are either a seminar based course or a lecture based course. In the seminar setting, students are encouraged to discuss and participate within the class and with their classmates. In a lecture based setting, students are passive receivers of information. This lecture based model is the one that has proven to be most inefficient. On average, a student can focus on between 60%-70% of any given lecture, with the rate of focus being a function of time. [14] "Passive lectures provide the lowest knowledge retention rate of any method of learning and encourage learning at the lowest levels of cognitive function." [15] Unsurprisingly, high cognitive functionality is vital to academics. "Cognitive functioning encompasses our mental agility and memory, and our ability to think, learn and output either logically or creatively." [16] This understanding of the qualities of passive learning environments has prompted academics involved in higher education environments to explore better methods of delivery.

This shift in the academic environment can be seen in the form of active and experiential learning. "Active learning is a process whereby students engage in activities, such as reading, writing, discussion, or problem solving that promote analysis, synthesis, and evaluation of class

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[14] James Farley, Alan Kingstone and Evan F. Risko, "Everyday Attention and Lecture Retention: The Effects of Time, Fidgeting, and Mind Wandering" *Frontiers in Psychology* 619, no. 4 (June 2013) accessed October 29, 2017, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3776418/.

[15] Joseph T. DiPiro, "Why Do We Still Lecture?" *American Journal of Pharmaceutical Education* 73.8, no. 137 (December 2009) accessed October 29, 2017, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2828296/.

[16] William Browning, Joseph Clancy and Catherine Ryan, "14 Patterns of Biophilic Design" *Terrapin Bright Green*, last modified 2014, last accessed October 29, 2017. https://www.terrapinbrightgreen.com/reports/14-patterns/.

content." [17] This type of environment correlates directly with experiential learning and therefore becomes very beneficial to architectural learning. In both cases, traditional modes of delivery, such as lecture based learning, are used much less regularly and other forms of delivery, such as student to student interaction, are more frequently employed. Incorporating these types of environments into academic settings has proven positive results. A study conducted by Hord Coplan Macht and Morgan State University compared the settings of an active classroom alongside a typical lecture-based classroom, keeping the course material being delivered identical in both cases. The results showed that a higher class grade (2.95 as compared to 2.33) and GPA (2.84 as compared to 2.70) correlated positively with an active learning environment.[18] The level of engagement also significantly increased in the active environment. This engagement provokes a sensory stimulated setting that allows students to learn and retain more. Architecture students have an even stronger opportunity to learn from this type of environment than some of their higher education counterparts. Creating a building that fosters this type of active environment then becomes a teaching method. By exposing students to multiple environments present within one building, they begin to learn from experience as to what type of space fosters what specific types of interaction which then allows them to physically be a part of both successful and unsuccessful design strategies.

One of the most important factors of creating a learning environment, or designing any architectural space, is to cater the design to its end users, in this case, the students. Each student

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[17] "Active Learning," *University of Michigan Center for Research on Learning and Teaching*, accessed October 29, 2017, http://www.crlt.umich.edu/tstrategies/tsal.

[18] Mary Anne Akers, James Determan, Christine Hohmann, Catherine Martin-Dunlop and Isaac Williams, "Learning Space Design for the Ethnically Diverse Undergraduate Classroom," *Hord Coplan Macht and Morgan State University,* accessed October 29, 2017, http://www.hcm2.com/wp-content/uploads/2015/04/Learning-Space-Design-for-the-Ethnically-Diverse-Undergraduate-Classroom2.pdf.

has a sense that they rely on most heavily for learning. The various types of learners include visual learners, tactile learners, active learners, passive learners, reflective learners, those who use 'global understanding' and those who use analytical understanding. [19] Each of these types uses varying degrees of three main senses employed in education: touch, seeing or hearing. The active and global learners use the widest variety of senses therefore allowing them to efficiently learn in multiple different environments. A student who uses global understanding is a spontaneous and creative non-linear thinker, similar to the majority of architecture students. The optimal learning environment for these types of students include interpersonal connections, understanding the bigger picture and person-to-person communication whether that be in the form of teacher to student or student to student interaction. Therefore, an academic architectural environment should foster this sense of communication. In the current paradigm of higher education, social spaces often are not considered vital to the learning environment. Psychologists such as Lev Vygotsky have advocated for the interaction of the individual and its social environment and that cognitive development is an advancement of varied cultural knowledge, which stems from social interaction. In an academic setting, this type of environment is also known as an informal learning environment. The Organisation for Economic Co-operation and Development has defined informal learning as "Learning resulting from daily work-related, family or leisure activities […] (and) tends to be the outcome of incidental learning through everyday experience." [20] This makes a strong argument for the integration of an increased number of social spaces for accidental or informal interaction within the academic environment of higher education.

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[19] "Learning Styles," *Baltimore County Public Schools,* accessed October 29, 2017, https://www.bcps.org/offices/lis/models/tips/styles.html.

[20] Francesca Beddie and Sian Halliday-Wynes, "Informal Learning: at a Glance" *National Centre for Vocational Education Research,* accessed October 29, 2017, https://www.ala.asn.au/wp-content/uploads/research/Informal_learning-At_a_glance.pdf.

The higher education environment has unlimited opportunities for multi-sensory stimulation, particularly when looking at architectural education. This unique discipline causes students to be surrounded by the physical manifestation of what they are learning about every day. Not enough architecture schools harness the power of experiential education or allow the built environment to teach by example. Students get limited exposure to architectural techniques and varieties of spatial qualities within their respective buildings. The grueling nature of an architecture degree causes students to seldom leave these buildings. Architecture itself has the opportunity to mitigate this. By creating de-centralized sensory stimulating spaces, students would be forced to step outside of their building and be exposed to the different types of environments that they could be creating. Constantly being exposed to these environments allows students to gain the unconscious knowledge of the positives and negatives associated with spaces and how they affect each of the senses. This will unconsciously instill in them the feeling of spaces and the power to reproduce the qualities that provoked those feelings.

Creating an experiential opportunity outside of the architecture building itself also poses the opportunity for multi-disciplinary collaborative spaces mirroring the professional environment of architecture. Many universities have taken to this initiative in the form of joint majors. For example, the prestigious Carnegie Mellon University offers an Architecture – Engineering – Construction Management joint master degree. As they set forth, this program allows the student to get a wider range of understanding of the built environment and progress them to leadership roles. While this is a great offering, schools that currently have architecture programs in place should, at minimum, have more comprehensive offerings focused on multi-disciplinary opportunities. The natural connection to architecture and engineering with the professional environment is seriously lacking within the academic curriculum One of the reasons that this is

lacking so much is the architectural separation of each of the disciplines on a typical college campus. American universities are planned such that each discipline has its own separate building. This causes a physical divide with little collaboration space offered to combat this.

In the design of architecture space has the perceptual opportunity to mitigate some of the faults of the educational upbringing of designers. Creating a building that fosters active and experiential learning becomes a teaching method in itself. A paradigm shift away from an emphasis on the visual sense in the mainstream of architectural education can be made possible through a new look at the spaces that students learn within. With the built environment, we can create better learners and therefore better architects. Our educational environments should seek to enhance the users in any and every way possible to ensure a better built environment of the future.

Chapter 2: Program

Typical Studio Program

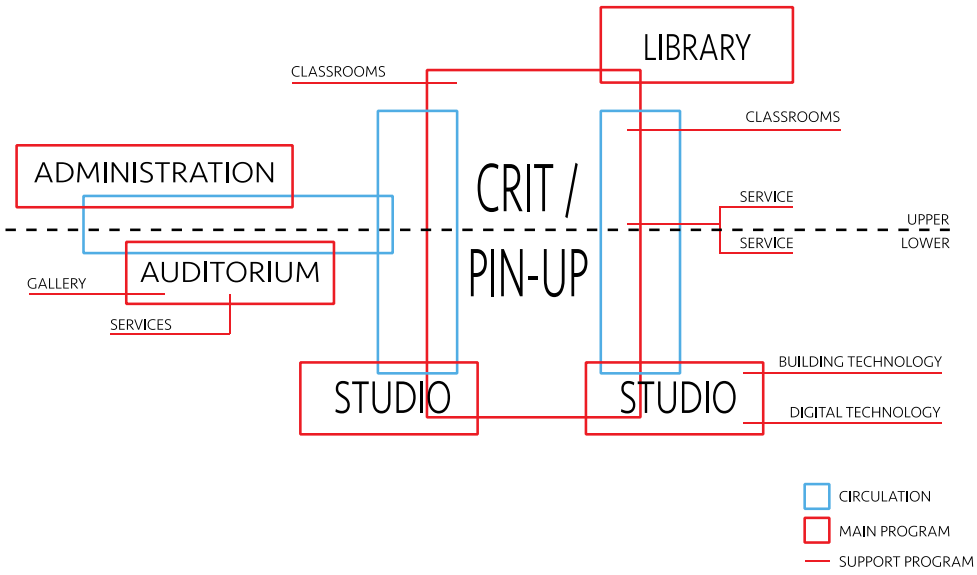

Figure 10, University of Maryland Studio Program Section Diagram (Source: Author)

In order to thoughtfully propose a new paradigm in architectural learning, the existing program typical to higher education architecture must be explored. The University of Maryland College Park campus provides a strong curriculum within the School of Architecture, Planning and Preservation. Especially in the case of graduate courses, there is a strong connection to the studio curriculum and therefore hands on learning. This gives a strong base to further multi-sensory approaches within education. Keeping this in mind, it becomes necessary to fully understand what a typical academic architectural studio looks like programmatically. In the case of the University of Maryland School of Architecture Planning and Preservation, the main programmatic element is the critique / pin-up space. This is the main atrium that also serves as a multi-functional space with more informal gathering after class time. The rest of the program feeds off this main space with the studios occupying the area surrounding the great space. This is a typical model throughout numerous academic architecture buildings within campus settings and is reflective of the current academic program. The pin-up and studio space tends to occupy most of the building, typically being at the physical center of the program. This relationship alludes to the fact that studio is where architecture students spend most of their time as the studio course requires the highest work load. These courses not only require the studio space but the pin-up space also becomes a vital aspect to the program. This is also the part of the curriculum that is most hands on and therefore envelops the concepts of active learning, making it the easiest programmatic element to begin to build an experiential learning curriculum off.

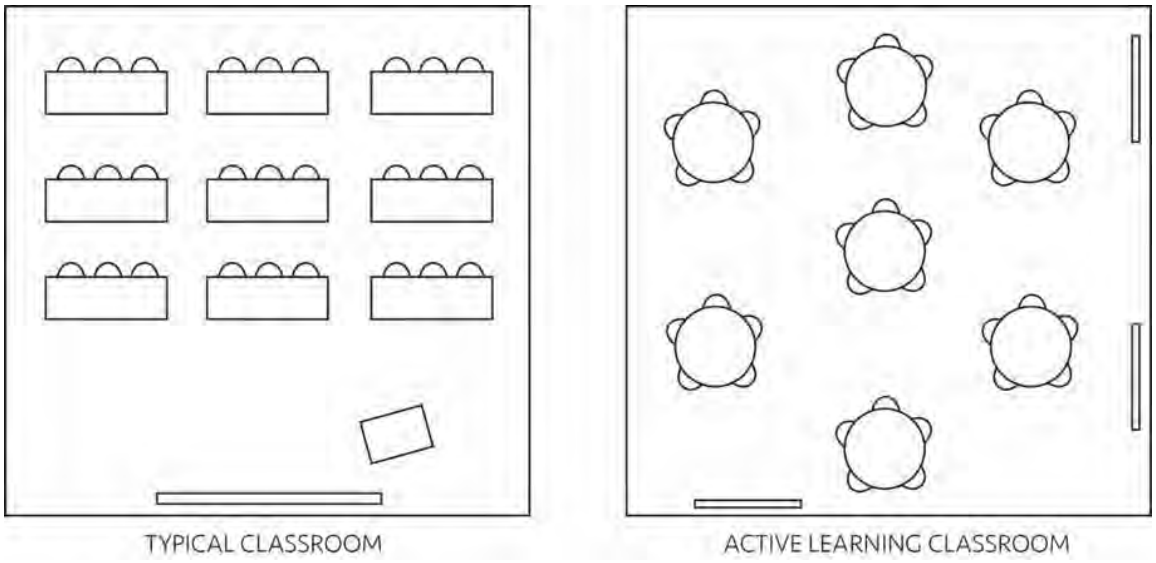

Figure 11, Typical vs Active Learning Classroom (Source: Author)

Other than studio, there are many programmatic elements required for a successful academic architecture building, both in terms of functional requirements and discipline specific requirements. In terms of architecture specifically, one of the unique requirements other than studio and pin-up space is space for technology, including building and digital. Building technology comes in the form of a wood shop or similar maker space. This allows students to realize models for their own personal projects and explore various construction methods. As compared to the other classroom spaces present within the building, the maker space is the most hands on and therefore has slightly different spatial requirements. These spaces can range in scale dependent upon the reliance of these types of building and modeling methods in the academic program of the school. As compared to a typically functioning classroom, these spaces are much more open, with a stronger sense of flexible gathering space dependent upon what activities are taking place in the class at the time. This flexibility of design is a strong proponent of an active learning environment, and can be dictated all the way down to the layout of a room, as demonstrated in Figure 10 on page 25.

There are other functionalities related to an architecture building that come in the form of technology. The level of complexity of this part of the program is dependent on the school. Most broadly, at minimum, an architecture school will have a computer lab. The advancement from this level can range from laser cutters, to makerbots to virtual reality. The overall spatial requirements of this space will differ depending on the type of technology that is being used and its integration into the curriculum. In the case of University of Maryland, the technological needs are sectioned off to the west side of the building with some of the smaller equipment being mobile. Relating back to functional requirements of an academic architecture building, these are general programmatic requirements of an educational facility, which could include your basic technology. Spaces also include program elements such as administrative, auditorium, classrooms, library and typical service space such as janitorial closets and restrooms. Most academic architecture buildings also contain some type of more permanent gallery space. These usually showcase work from professional artists or architects from outside of the school allowing students to be exposed to a wider range of techniques and experiences as they relate to design.

One of the drivers of program in an architecture school is the National Architectural Accrediting Board (NAAB) and the accreditation process. Becoming a licensed architect is a lengthy process that not only requires years of schooling but also a series of registration exams after receiving an accredited degree. These exams are facilitated through the National Council of Architecture Registration Board (NCARB) which oversees the accreditation of individual architects. The NAAB works alongside the NCARB to oversee the accreditation of schools of architecture. There are many paths that an individual may take to qualify for the registration exams but one of the most direct first steps is to receive a degree from an NAAB accredited program. Not every school that has an architecture program is necessarily accredited. For example, the M.Arch

program at the University of Maryland is accredited but the Bachelor of Architecture is not. [21] The NAAB lays out a series of standards that a program must achieve to receive accreditation. Other than overall educational goals of the program, there are a series of physical programmatic elements that must also be included. Part One Section Two of the 2014 Conditions for Accreditation lays out the physical resources needed for a successful architecture program to be eligible for NAAB accreditations. As stated by this section, there must be:

> Space to support and encourage studio-based learning. Space to support and encourage didactic and interactive learning, including labs, shops, and equipment. Space to support and encourage the full range of faculty roles and responsibilities, including preparation for teaching, research, mentoring, and student advising. Information resources to support all learning formats and pedagogies in use by the program.[22]

This document even specifically calls out the need for access to architecture librarians, therefore an architecture library is needed. Using this set of guidelines, the programmatic requirements of an academic architecture studio can be laid out as follows: studio space, critique space, interactive learning space and administration space. The idea of how this space physically manifests itself is relatively open ended and can be interpreted differently based upon the needs of a program. While these aspect will not all have to be included within this thesis proposal, the guidelines are a concrete tool to understand the basic necessities of an educational architecture environment.

[21] University of Maryland, "NAAB Accreditation," *School of Architecture, Planning and Presentation,* accessed December 13, 2017, http://www.arch.umd.edu/arch/naab-accreditation
[22] National Archiectural Accredditing Board, Inc., "2014 Conditions for Accreditation," *National Architectural Accrediting Board,* last updated July 18, 2014, accessed December 13, 2017, http://www.naab.org/wp-content/uploads/01_Final-Approved-2014-NAAB-Conditions-for-Accreditation.pdf

Programs Involving Sensory Stimulation

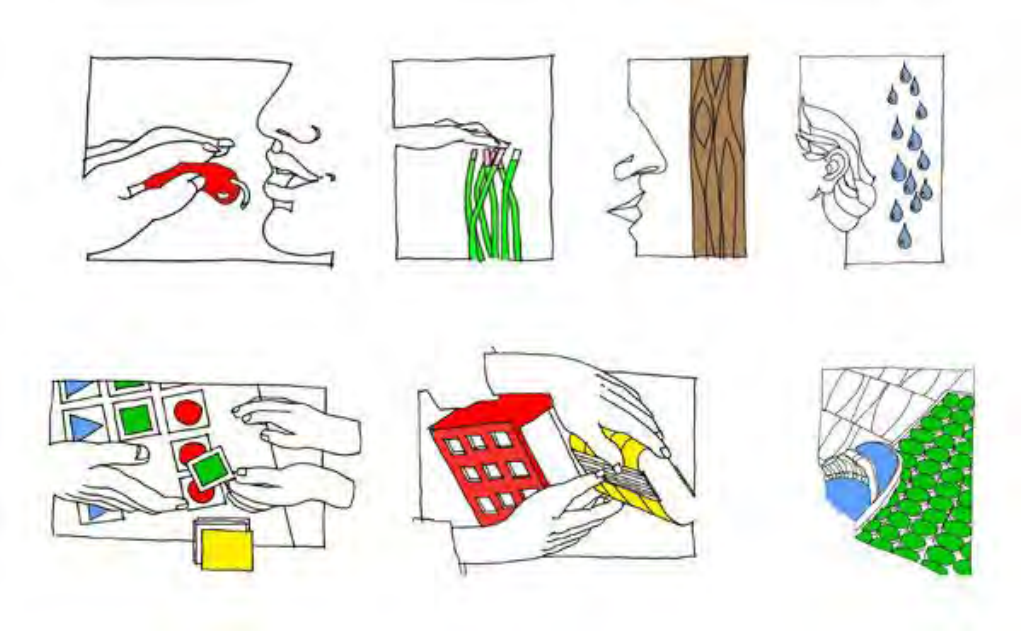

Figure 12, Hazelwood School Glasgow: Concept Drawings (Source: Alan Dunlop Architect)

There are some academic paradigms already in place that have a strong consideration for the senses in terms of the programmatic elements. A sector heavily focusses on this is academic establishments catered towards students with disabilities. A good model to examine for this typology is the Hazelwood School Glasgow for the blind, deaf and cognitively impaired. Due to the unique circumstances of the program and its users, the architect Alan Dunlop was forced to allow the senses to lead his design. Functionally, this building operates as a specialized school that teaches students overall life skills to help them become more independent. The main programmatic elements are those typical to any normal functioning school with spaces such as classrooms, gyms, cafeteria and administrative offices. The programmatic elements that serve this student body more specifically are those that become most directly related to the senses.

One of the largest components of the building is a sensory wall which serves a dual function as a wayfinding element and a storage unit. In this way, the programmatic element becomes based upon motion. It provides both tactile wayfinding for the blind students while also housing some of

the larger scale equipment used to help students increase their mobility. Some of the other unique programmatic elements include music rooms, play space, a pool and a life skills house. While not these are not all applicable to a program centered around architecture students, design ideals present within Hazelwood school can applied to this new paradigm for architectural learning. For example, having some sort of acoustic space similar to a music room would be extremely beneficial to architecture students in order to help them understand how different elements of design perform in regard to acoustical design. This could be a small practice room for the musical arts students of the university to use which could double as a 'classroom' for acoustical engineering classes for architecture students. Much could be learnt about the relation of architectural performance and sound through the lens of a student studying music. In addition to these spaces, smaller design elements, such as a tactile wall, could help students to more comprehensively understand the ways in which users respond to various materials in addition to providing wayfinding based on senses other than just vision.

Learning as the Program

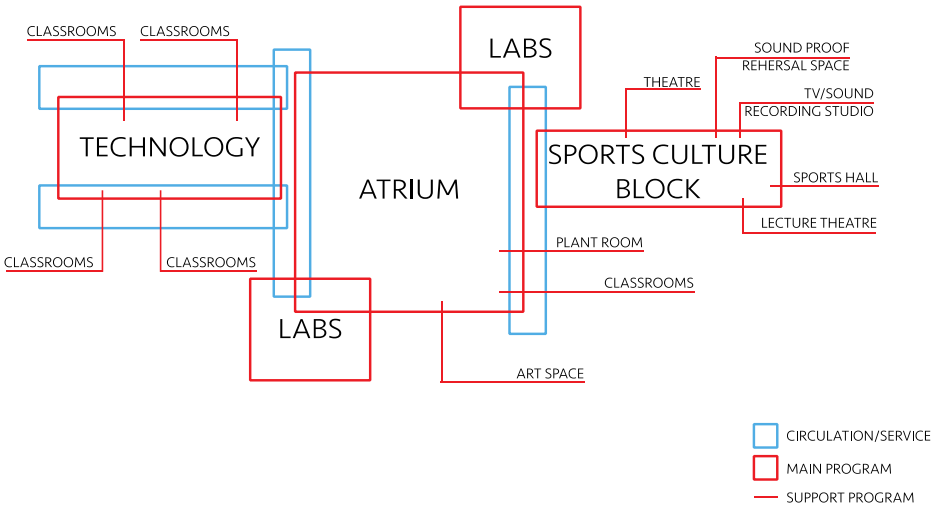

Figure 13, Langley Academy, Slough, UK (Source: Author)

To fully utilize the possibilities of a new academic paradigm, it is necessary to look out to other disciplines beyond architecture. Much of the success of the studio environment is its experiential learning properties, further understood as hands on learning throughout project development. This type of environment proves its success through muscle memory as many of the aspects of design become second nature to the students. Donald Schon, philosopher and professor of urban planning at Massachusetts Institute of Technology, calls this "knowing-in-action" as we reveal our knowledge "by our spontaneous, skillful execution of the performance".[23] This method of learning is most directly tied to our senses allowing for a multi-sensory environment. It is further recognized by the world of psychology as learning by doing. Learning by doing allows for experiential learning and knowing-in-action to be brought together as one educational discipline. "Learning by doing means learning from experiences resulting directly from one's own actions, as contrasted with learning from watching others perform, reading others' instructions or descriptions, or listening to others' instructions or lectures." [24] Engaging with academics in this manner allows for a multi-sensory learning environment that results in more engaged students with longer lasting impressions and retention of material. This type of learning is present within many academic disciplines outside of architecture, especially throughout higher education.

Of the disciplines within higher education, one of the strongest correlations of knowing-in-action can be made with musical education. In this type of learning atmosphere, the skill necessary to play an instrument is taught through hands on repetition to master the art rather than simply observing someone else completing the tasks. Eventually, the act becomes muscle memory

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[23] Donald A. Scholn, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions,* (Jossey-Bass, 2014), 25.

[24] Hayne W. Reese, "The Learning-by-Doing Principle," *Behavioral Development Bulletin,* no. 11, (2011), 1, accessed November 15, 2017, http://psycnet.apa.org/fulltext/2014-55719-001.pdf

and a musician no longer needs to think about what to do to make an instrument respond appropriately. Through the control of motion and auditory aptness, the body unconsciously performs the task. This is also apparent within sports. Athletes train their body to respond at a moment's notice without consciously thinking about how the body should react. If a soccer player has played for long enough, they no longer command their legs to respond in a certain manner, their body simply performs the task as a second nature. This training can be further applied to how humans interact with architecture, and furthermore how architecture students design. Whether consciously or not, people will move throughout space in a certain way, act a certain way depending upon the form of the environment and emotionally respond to materials. The main goal of this new educational paradigm is to utilize didactic design to transform this unconscious absorption and perception into a conscious act. By helping architecture students realize exactly how they are responding to space they will be able to apply these techniques within their own design.

Figure 14, Type of Learning by Discipline (Source: Author)

When looking further into the program that surrounds knowing-in-action, there are some schools which physically manifest this through both the curriculum and academic environment. One such school is Langley Academy in Slough, UK. This is a specialist science academy that focuses its campus, which consist of one large scale building along with some playing fields, around a multi-disciplinary environment. One of the academy's goals is to embrace subjects that are not typical to a science academy. This includes studies such as forensics, museum curating, music and sports. Pushing the envelope further, the design allows these programmatic elements of to be highlighted. The main space, a large-scale

atrium used for a variety of assemblies and exhibitions, becomes the central focal point with the science labs 'floating' within. This centralized space becomes the convergence of all the disciplines within the building, allowing for the multi-functional program. Various assemblies and exhibitions take place within the space, all being forced to observe the happenings within the science labs, the core program of the building. This is a design tactic that will be necessary with the introduction of multiple disciplines within the proposed program of this thesis.

Langley Academy embraces atypical academic environments in addition to the typical classroom. 'Play' areas of the program become informal gathering space for both the interior and exterior, including areas for activities such as sports. These spaces become just as important as the educational spaces, as they become learning spaces within themselves. This is a recent trend being embraced among higher education. New educational facilities "are designed to offer a mixture of formal and informal learning experiences aimed to provide a quality rich environment where students want to be, not only to study, but to socialize and learn." [25] These programmatic elements exist simultaneously within one footprint, allowing both formalized and accidental interaction among students that may have never otherwise crossed paths.

The type of accidental interaction that a multi-disciplinary environment provokes becomes a strong counterpart to the knowing-in-action process. The success of the higher education department "is accomplished through some combination of the student's learning by doing, her interactions with coaches and fellow students, and a more diffuse process of 'background learning'". [26] Each of these aspects are fostered by a student's daily interactions which can either

[25] Maarten de Laat and Fleur R. Prinsen, "Social Learning Analytics: Navigating the Changing Settings of Higher Education," *Research & Practiece in* Assessment, last updated 2014, accessed December 13, 2017, http://www.rpajournal.com/dev/wp-content/uploads/2014/10/A5.pdf

[26] Donald A. Scholn, *Educating the Reflective Practitioner: Toward a New Design for Teaching and Learning in the Professions,* (Jossey-Bass, 2014), 38.

be limited or furthered by their immediate environment and inherently the program present within that environment. Pushing the connections between disciplines, such as music and science in the case of the Langley Academy, allows for programmatic, user and architectural interaction that enhances learning capabilities.

Proposed Program

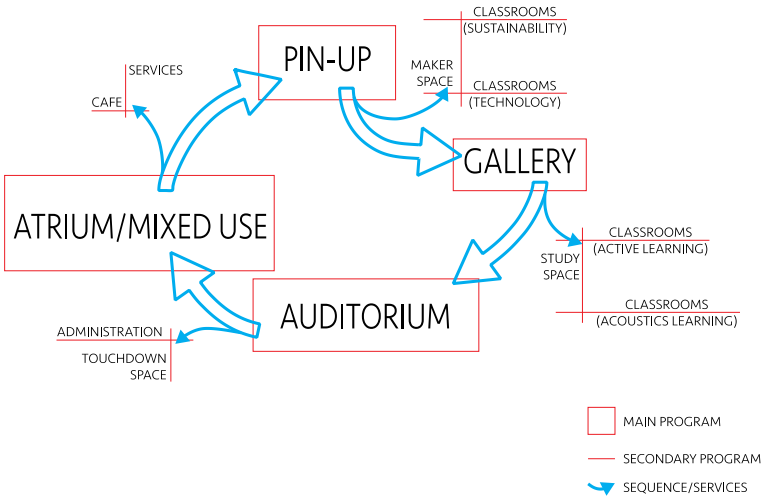

Figure 15, Overall Program (Source: Author)

The ideal academic environment exists somewhere between each of these academic paradigms. After considering all of this, it becomes necessary to ask the question who exactly will be using this building. In the case of the proposed program for architecture students, there is an opportunity for collaboration between other disciplines on campus as demonstrated by the earlier multi-disciplinary precedent, Langley Academy. The most plausible programs to connect with for architecture students are landscape architecture and engineers, based upon their connection to the built environment and architecture in a professional setting. In addition to this, the art and music program pose a strong correlation in the way in which they operate academically, based upon the learning by doing approach. (Refer to Figure 13, page 32) With the introduction of these new

disciplines under the same roof, the transitional programmatic spaces become just as important as the more formalized space. The shared space for larger scale gathering, such as a centralized multifunctional atrium, offers opportunity for accidental interaction that fosters cognitive advancements within social settings. These are also the spaces that allow for students to become more relaxed and engage in studying that can be either communicative or individualized which allows them to be generally comfortable within their environment. This in turn points to the importance of the sequence of the spaces. These moments of circulation offer strong opportunities for highlighting the senses. In addition to this, they help to further the idea of communication between a variety of students that may not otherwise interact.

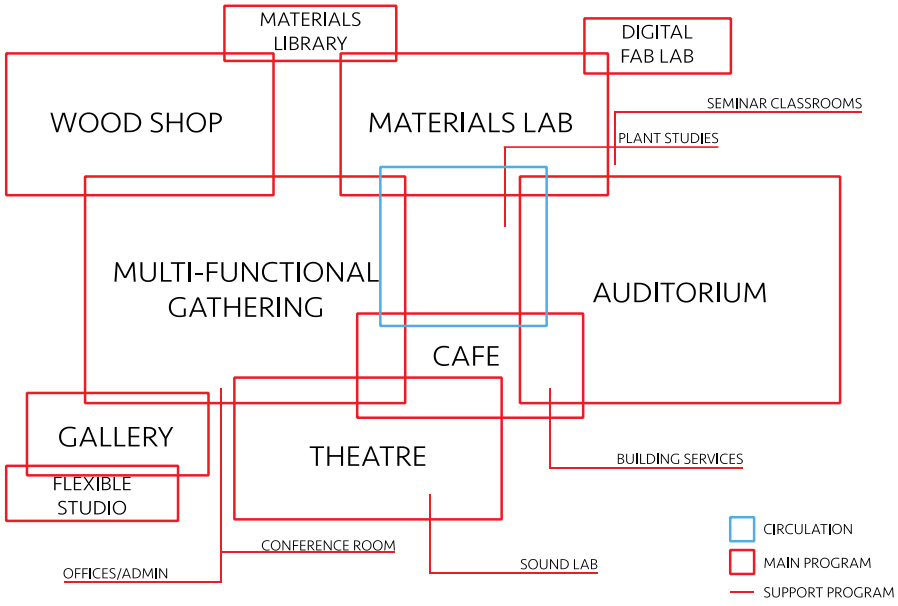

Figure 16, Specific Program Relationships (Source: Author)

The most unique programmatic element to this proposal is the classroom space. While there is a need for some more traditional classroom space, with the proposed academic paradigm shift, there is a stronger need for more active learning spaces that take the place of the typical classroom. These are the spaces that allow the students to interact and learn from their environment in a multi-sensory fashion, therefore retaining more from their education. Flexible spaces, such as transitional

studio space for both the architecture and art students to use simultaneously, will become vital to the success of this building. Allowing students to have a degree of participation in the transformation of these spaces offers a further experiential learning opportunity. These types of environments could be introduced in a small scale into various gathering spaces and at a larger scale in the form of transitional walls. Taking this a step further, in the place of the traditional classrooms will be labs and maker spaces that bring an active learning environment to every class taking place within them. These will include aspects such as the programmatic elements listed in Figure 16 on page 37. The concept of shared spaces becomes another important one to the design initiative in order to fully embrace the coming together of multiple disciplines and taking full advantage of the connections that have not yet been made on the University of Maryland campus. With this in mind, each programmatic element proposed will cater towards at least two of the three disciplines that will be welcomed into the building.

PROGRAM ELEMENT	SIZE	QUANTITY	DEPARTMENT USE	TOTAL
MULTI-FUNCTIONAL GATHERING	4,000 SQ FT	1		4,000 SQ FT
CAFE	2,500 SQ FT	1		2,500 SQ FT
SEMINAR CLASSROOMS	400 SQ FT	5		2,000 SQ FT
PLANT STUDIES	850 SQ FT	2		1,700 SQ FT
FORMAL GALLERY	2,000 SQ FT	1		2,000 SQ FT
DIGITAL FABRICATION LAB	850 SQ FT	1		850 SQ FT
AUDITORIUM	4,000 SQ FT	1		4,000 SQ FT
STUDIO	1,200 SQ FT	1		1,200 SQ FT
WOOD SHOP	3,000 SQ FT	1		3,000 SQ FT
MATERIALS TESTING LAB	3,000 SQ FT	1		3,000 SQ FT
MATERIALS LIBRARY	850 SQ FT	1		850 SQ FT
SOUND LAB	450 SQ FT	1		450 SQ FT
ADMINISTRATION	120 SQ FT	10		1,200 SQ FT
CONFERENCE	1,200 SQ FT	1		1,200 SQ FT
SERVICES	850 SQ FT	1		850 SQ FT
				29,000 SQ FT

ARCHITECTURE DEPARTMENT
ENGINEERING DEPARTMENT
ART DEPARTMENT
MUSIC DEPARTMENT
LANDSCAPE ARCHITECTURE DEPARTMENT

Figure 17, Program Layout (Source: Author)

Chapter 3: Design Precedent

In order to get the most thorough understanding of the design ideals necessary for this building, precedent's beyond the typical architectural studio must be explored. There is a wide range of sensory and educational initiatives present throughout a range of typologies. The sectors explored for this thesis include academic buildings, architecture studios, art installations and sensory focused designs.

Academic Precedents

Figure 18, Langley Academy (Source: Author)

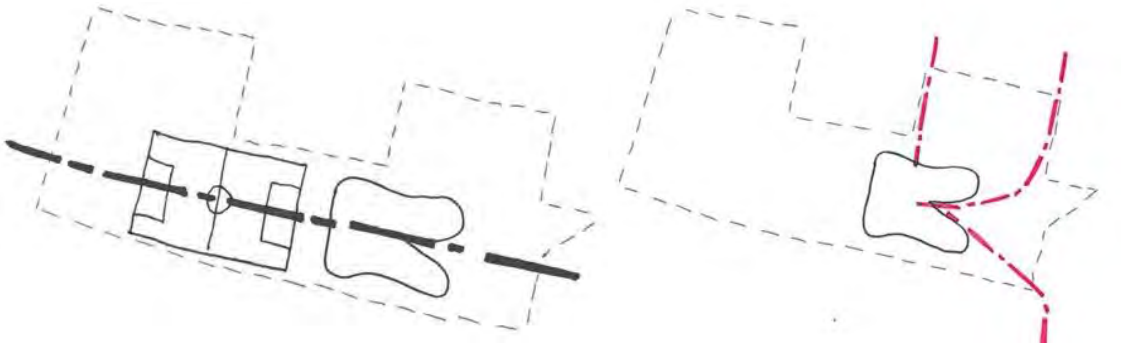

Figure 19, Axis [left] & Circulation [right] (Source: Author)

Langley Academy is a science academy in the UK that was previously explored in this paper due to its successful programmatic elements. Looking deeper into this precedent, the design of the building reflects its transparent program. The science labs are highlighted and brought out into the main circulation space so that they may immediately be understood upon entering the building. Putting these spaces on display in such a manner allows for the visitors of the building to immediately recognize who the everyday users of the building are and exactly what they are doing. These cylindrical forms sit above the multifunctional space and are accessed through bridges from the upper levels of the lobby, allowing them to constantly have this visual interaction.

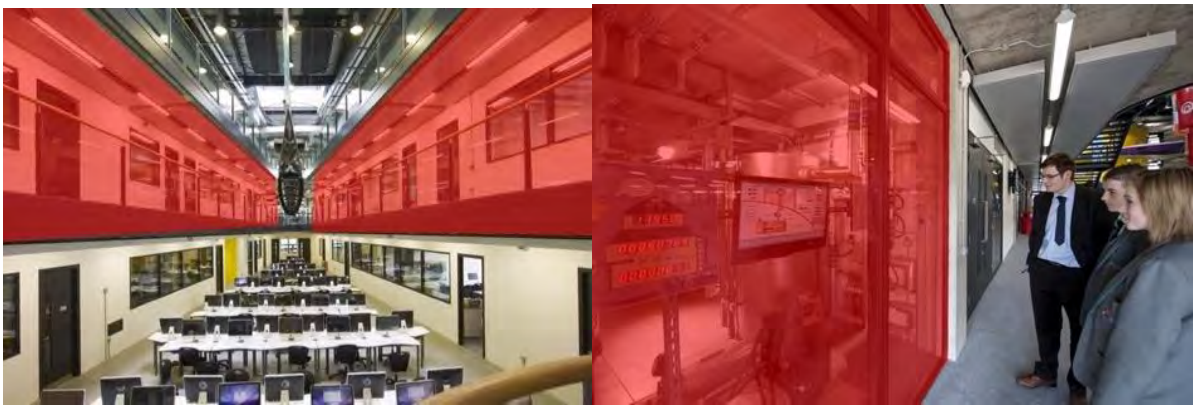

Figure 20, Interior Courtyard & Interactive Learning (Source: Langley Academy/Author)

Figure 21, 'Floating' Labs (Source: Langley Academy/Author)

The central multifunctional space is one of many interior courtyards utilized by Langley Academy's design. These other courtyards seek to fulfill that same visual connection to the hands on activities taking place within the academy. One such courtyard houses the computer lab. This

allows the technological aspects of the program to be understood and on display, using the circulation as a means of connecting the users of the building together. By forcing people to understand the physical program that they are traveling by, not only is visual wayfinding provided but the user may also understand classes that they may not have otherwise known about. This is a perfect example of how strong of an influence the circulation of an academic building has on its users. This is furthered by putting the buildings inner workings on display. The environmental capabilities are visible to students by enclosing the mechanical rooms in transparent glass walls. Direct access to this information takes didactic design to another level, allowing for the operations of the built environment to be a teaching tool.

Figure 22, Hazelwood School Glasgow (Source: Author)

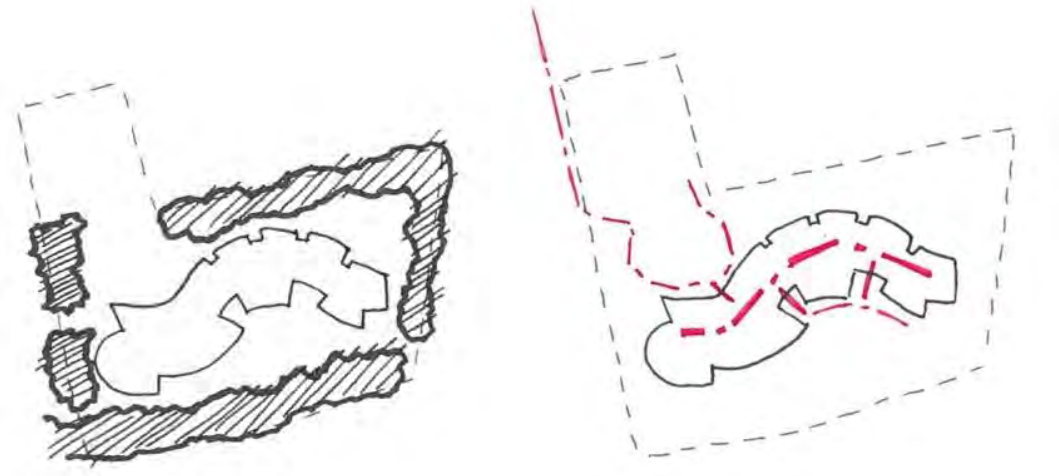

Figure 23, Tree Coverage & Exterior Space (Source: Author)

An important concept for most buildings, but especially educational design, is wayfinding. When thinking about wayfinding as it pertains to sensory perception, these design elements become an opportunity to include a multisensory experience rather than just a visual one. Different materiality, spatial sequence or even smells can help to lead a user through a building. A good example of this approach is within Hazelwood School Glasgow.

The architect, Alan Dunlop, uses the main foyer as a spine that the program of the building feeds from. Being the main circulation, this spine allows the overall layout of the building to be easily understood. With the school servicing blind students, as well as deaf and cognitively impaired, it becomes very important for the students to understand where they are along this foyer so that they can navigate the building independently. To facilitate this, Alan Dunlop created a tactile wayfinding wall along the length of this main hallway. He utilized different tactile materials at waist height that each represented a different part of the building. Parallel to this wall runs a fully exposed curtain wall. This contrast between the tactile wall and light that can be felt on the opposite side of the hallway allows students to further understand which direction they are traveling. This design demonstrates two very different and successful uses of the tactile sense, a physical materiality change and the warmth of light touching the skin. Both tactics may be utilized

as a means of wayfinding in buildings for normally functioning students as well as those that are not apt to all their senses.

Figure 24, Wayfinding Sensory Wall (Source: Andrew Lee/Author)

Hazelwood School offers design precedent to understand how to capture exterior space to further the academic setting. On the exterior of the building sits teaching gardens, play spaces and ambient tree coverage. The façade of the building reaches out in these areas to claim the exterior space for the building itself. These exterior spaces are critical to the development of the students at the school and are therefore highlighted from the interior as well. The main spine of the building sits along these spaces and allows visual connection to what activities are occurring within them. Although, due to the nature of the student body, these views are cut off from the classrooms. As the students frequently get distracted, this becomes necessary to this particular educational program. When looking at a typical higher education architectural student body, these exterior views could be further drawn upon to enhance focus. The materials for the interior and exterior of the building were heavily considered not only for their visual qualities but also their tactile and auditory qualities. For example, the sensory wayfinding wall is composed partially of cork due to its warm quality. Slate is used on the exterior Southern wall to contrast the softer feel of the timber

cladding typical to the rest of the building as well as its ability to be a strong heat source. Much of these design considerations show strong positive benefits to students even if they are not visually impaired. Understanding the tactile qualities of such materials allows for designers to better understand how they affect the overall feeling of a space. The warm or rough qualities of these materials also dictates the activities that feel comfortable occurring within that space. By bringing a variety of such qualities into a space, students understand what these various responses are.

Architectural Studio Precedents

Figure 25, Melbourne School of Design (Source: Author)

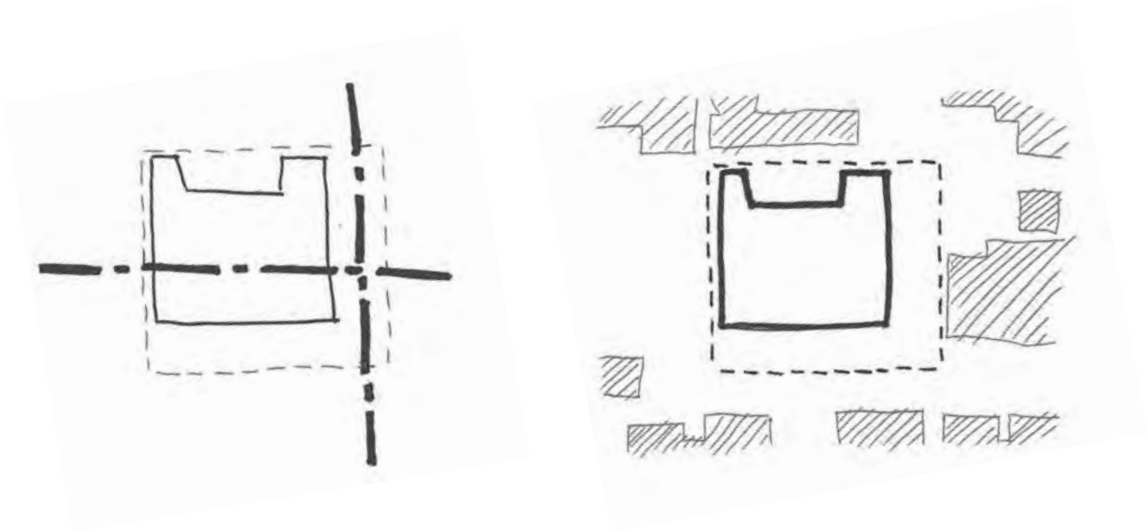

Figure 26, Axis [left] & Surrounding Buildings [right] (Source: Author)

The existing paradigm of the academic architectural studio is composed of many successful design elements that can be drawn upon for this expanded educational paradigm. One school recently completed in 2014 is the Melbourne School of Design at the University of Melbourne.[27] The most prominent feature of this design is the large-scale atrium, which serves as an informal gathering space as well as more formalize critique space, similar to the main gathering area within Langley Academy. At the Melbourne School of Design, the atrium uses a multitude of techniques to allow it to be consistently occupied and overall successful. The first of these is the variety of spatial forms represented through transitional walls and materiality changes. While it is a large-scale space at approximately 7,500 square feet, it is broken up into more intimate sections based upon the layout, furniture and materiality. Such furniture includes highly mobile soft seating that can be grouped for small conversation or larger scale gathering. On the ground floor, the openness of the floor plan provides optimal space for studio exhibitions. Similarly to the manipulation of

[27] "Melbourne School of Design University of Melbourne" arch daily, updated April 23, 2015, accessed November 26, 2017, https://www.archdaily.com/622708/melbourne-school-of-design-university-of-melbourne-john-wardle-architects-nadaaa

the atrium space within the architecture school at The University of Maryland, different mobile walls may be moved throughout the space in order to provide the optimal layout for whatever activity is necessary at the time. The additional studio space around the perimeter is easily manipulated by movable walls that allow for smaller more intimate critique space or an entirely open building when appropriate.

The centralized focus surrounding the atrium space is used as a parti throughout the upper three levels of the building. The flexibility of walls is utilized up through each floor surrounding the atrium so that it may be closed off when needed. In addition to this, the main circulation runs around this central space so that the user is consistently interacting with it. Looking further into the programmatic elements on each floor, the second level is expanded studio space overlooking this main atrium. With the private studios tucked into the back, larger scale working tables line the overhang so that students may work while also being engaged visually and through sound with what is taking place on the ground floor of this main space. The next floor up is designated as research collaboration. This provides more enclosed space and room for technology. Bar-type seating lines the atrium on this floor, so that researchers may bring their laptops to the space and visually interact with, and to some extent hear, the activities within the atrium. Finally, on the top floor, collaboration space frames the grand hall. This provides bench seating and a more relaxed atmosphere. This multitude of functions surrounding the atrium extend its multi-functionality throughout the rest of the building.

Figure 27, Section Perspective (Source: archdaily)

Figure 28, Transitional Gathering Space (Source: Peter Bennetts/Author)

Beyond the multifunctional features of the main atrium, the Melbourne School of Design utilizes this space as a central core. Directly below this hall is an exterior public space connecting the East and West side of the building. This allows the building to further interact with its site and not sit as a barrier to pedestrians moving throughout the campus. Below this, sits what the designers, John Wardle Architects and NADAAA, call the lecture theatre. This placement speaks to the overall site conditions and restrictions. Beyond this, each façade of the building behaves in a totally different manner, with materiality ranging from metal cladding to precast panels. Each distinct façade is specifically responding to the architectural context to

which it faces. These site considerations provide necessary precedent to understand how to respond to the University of Maryland's campus.

Figure 29, John W. Olver Design Building, UMass Amherst (Source: Author)

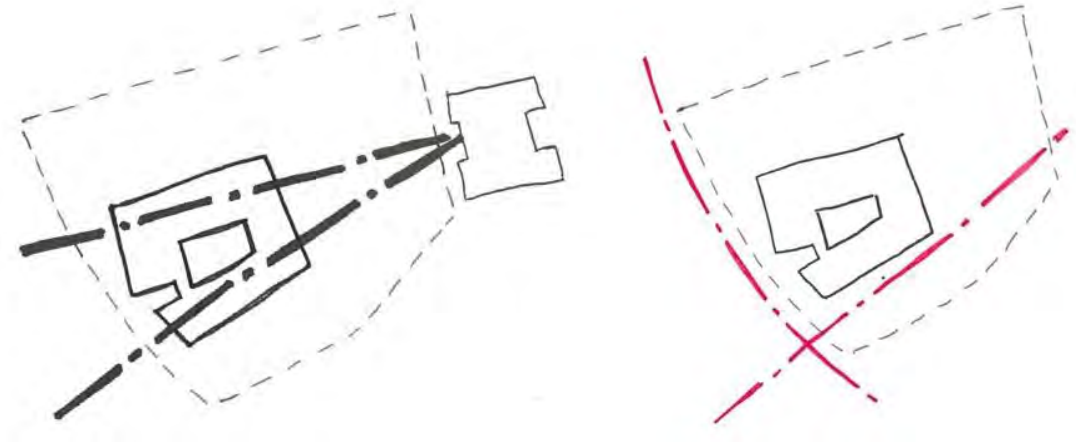

Figure 30, Axis [left] & Pedestrian Circulation [right] (Source: Author)

The large scale multi-functional gathering space is typical to most architectural schools. University of Massachusetts (UMass) Amherst is no exception. Their newly completed John W. Olver Design Building features a collaborative open space with informal gathering stairs as the

focal point of the design, along with the innovate use of wood. [28] The interior courtyard features these gathering steps with multi-purpose space at the base appropriate for exhibitions, informal gathering or lectures. It is a compliment to the exterior courtyard located directly above this interior space which is utilized as a green roof and gathering space. The building also features a café adjacent to the ground level gathering space that allows for an extension of this informal gathering. To further push this idea of interaction beyond the student body, the program present within the rest of the building was split in an unconventional way. Rather than separate the studios and classrooms from the administrative space, the designers, Leers Weinzapfel Associates, integrated the offices throughout the building. This allows for a connection between the students and faculty that is not typically utilized when there is a large separation between the two departments.

Figure 31, Main Gathering Space & Exposed Structure (Source: Leers Weinzapfel Associates/Author)

One of the great features of the Integrated Design Building is that it is truly a teaching tool in itself. Currently, it is one of the largest mass timber structures in the United States, utilizing Cross Laminated Timber as its main construction material. Being at the forefront of innovative design provides an immense learning opportunity for the students that are occupying it. Much of the structure has been left exposed furthering the learning opportunity. The choice of material adds

[28] "Design Building: University of Massachusetts Amherst," Leers Weinzapfel Associates, accessed November 27, 2017, http://www.lwa-architects.com/project/integrated-design-building/

to the overall environmentally friendly nature of the design, once again allowing students to learn how to utilize materials to achieve this. Further than this, this innovative material choice pushes students to understand a new construction method while also inspiring them to push for innovation in their own designs.

Art as Precedent

Figure 32, Light Lab 5.1 (Source: archdaily)

Art installations serve a duality of purposes, with many of them focusing on the multi-sensory nature of the experience. Much of the same ideas explored within these installations may be applied to architectural design. One such installation is the Light Lab 5.1 by VAV Architects. This installation not only appeals to the senses but also has highly interactive features.

The installation is in a plaza in Finland, an area of the world in which sunlight is experienced for extended periods of the day, especially during the summer months. This installation seeks to provide refuge from the sun while also making the user wonder how the complete deprivation of light would affect the senses. In this way, those that interact with the installation have each of their senses deprived, therefore heightening the others by comparison.

The interactive nature of the exhibit forces users to respond to it. Upon approach to the pavilion, the installation appears to be completely closed off. After further examination, it can be

understood that the side wall must be slid open. Upon entering, the wall automatically shuts and the visitor is overtaken with darkness. After the visitors eyes adjust, the senses begin to understand the surroundings. Using the body to sense the space, the user moves forwards towards what is understood as a space decreasing in size. Once arriving at the end, there is a small seat highlighted by a sliver of natural light. This seat allows the user to lean back which activates a panel to open and reveal the brightly lit sky. This stark contrasting experience makes the user that much more aware of the ever-present sun light. The user must then retreat and experience the entire phenomenon in reverse.

Much can be drawn from installations such as Light Lab 5.1 and applied to the built environment in more functional settings. The interactive nature of the exhibit is especially intriguing to an educational setting for architecture students. Providing students with this type of flexibility in their environment not only allows for them to adapt it to the setting most appropriate to their needs but also provides a learning environment. Installations of this scale could easily be incorporated into some of the larger multi-functional spaces of the building allowing for students to manipulate their environment in order to understand the different levels of light and spatial qualities that each setting would produce. Beyond this, the building itself can begin to react to the users within it, whether that be through movable partitions or apertures connecting to the exterior.

Figure 33, Infinity Mirrored Room – The Souls of Millions of Light Years Away (Source: The Broad)

Many art installations focus on full bodied experience. The artist Yayoi Kusama has just recently moved from the world of painting to installation, although her works have always had a similar focus. Due to a cognitive condition she struggles with hallucinations causing this alter reality be the focus of much of her artwork. Her world is experienced completely differently than the average person, her environments totally altered. Her reality therefore becomes one focused on the deprivation of the senses and bodily awareness. This evokes a whole new idea of sensory perception. In her artwork, it is easy to feel this sense of deprivation. In her installation, Infinity Mirrored Room – The Souls of Millions of Light Years Away, mirrors encompass the room and hundreds of small lights hang from the ceiling. This creates a disorienting sensation that does not allow the senses to fully understand where or what the body is occupying. The sense of scale and proportion is removed, creating this infinite atmosphere.

The idea of removing portions of sensory perception could prove just as enlightening as heightening the senses. Much in the case of those that are sensory deprived, once one sense is removed or disoriented the others are then heightened. This heightened sensation can allow for the body to better understand its environment based on senses it does not typically rely on. One way to physically manifest this would be in moments of circulation throughout an academic environment. For example, leading down a hallway could have varying degrees of light making

it difficult for the user to visually understand the progression of the space, forcing them to rely on tactile or auditory qualities to navigate. This would allow users to experience the space in the way that others, such as Yayoi, suffering from mental illness or a blind student at Hazelwood School Glasgow, might interpret that progression.

Sensory Design

Figure 34, Jewish Museum Berlin (Source: Author)

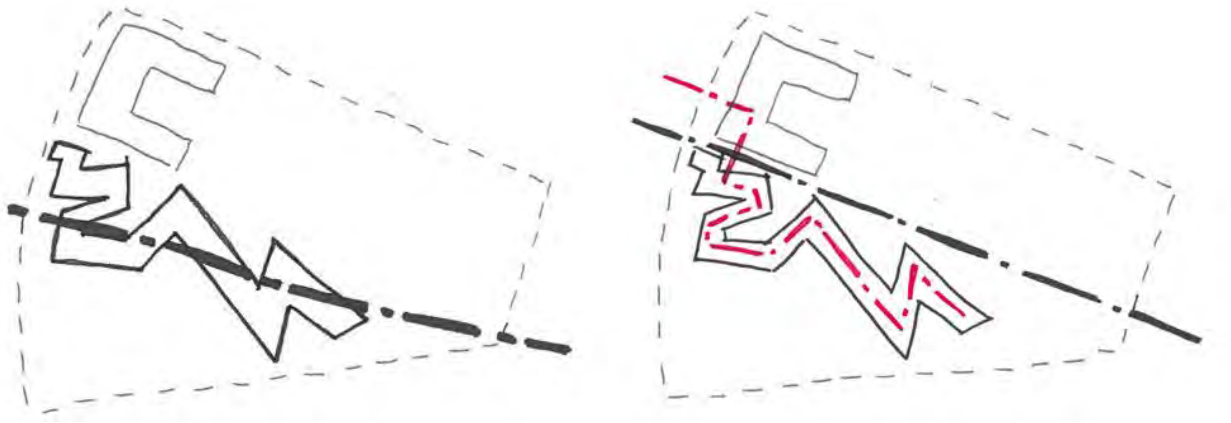

Figure 35, Axis [left] & Pedestrian Circulation [right] (Source: Author)

Progressing further into sensory design, there are numerous architectural examples that specifically look to the senses for design inspiration. One typology that tends to hold the senses in high regard is museums. This sector of architecture has a huge opportunity for the manipulation of sequence and bodily awareness. This is especially apparent in Daniel Libeskind's Jewish Museum Berlin. In this design, visitors follow an organized yet disorienting circulation pattern, with moments of light and void following along with the fragmented circulation. Through this experience, visitors to the museum get a sense of the loss and disorientation that the Holocaust victims suffered. Therefore, the building is allowing the visitor to partially understand the haphazard nature of the experience. One of the ways that Liebskind achieves this is through the massing. The shape itself cuts and weaves across the landscape, with a row of overhead light to understand what would be the straight access from an aerial perspective. Even the access to the building mirrors this fragmented quality. While it appears as a separate structure from the adjacent Kollegienhaus museum, visitors must travel through an underground tunnel coming from the Kollegienhaus to enter the building. Simply the experience of coming up from underground rather than entering on street level creates a total different understanding of the museum and plays off of the disorienting nature present within some of the earlier discussed artworks.

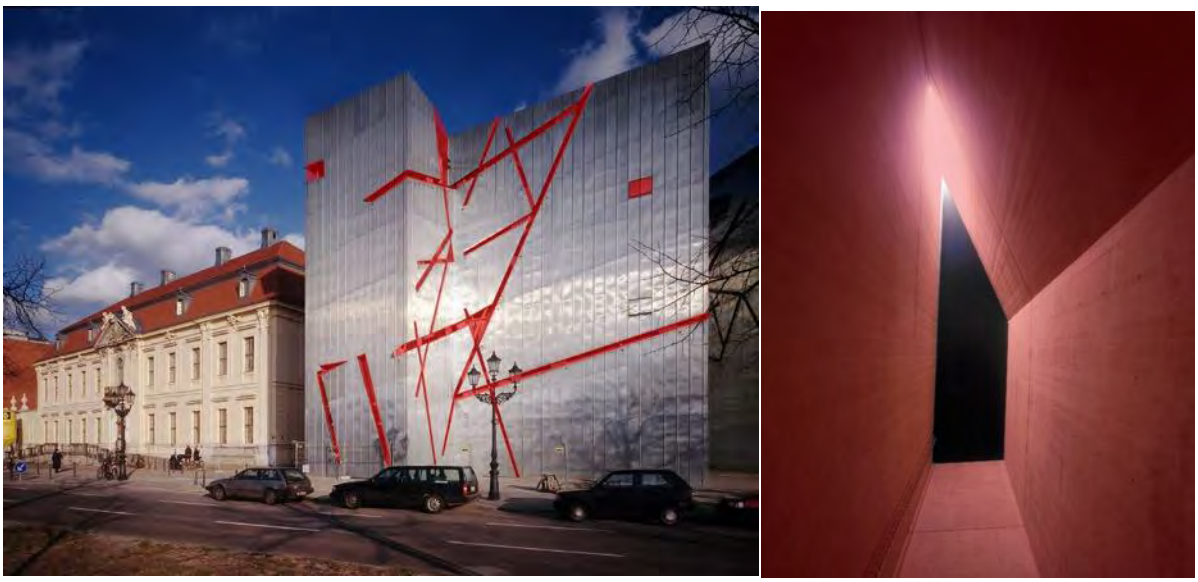

Figure 36, Façade Slashes & Void (Source: JBitterBredt/Author)

Empty space also plays a huge role in the experience of the Jewish Museum Berlin. The incorporation of void is just as important as the filled space. These voids become centers for contemplation and realization of the human scale. The power of these voids come from their overall size as compared to the users. These spaces help to push the concept and understanding of the immense loss of the Jewish community and the physical void that their deaths created. Not only does the large scale of these empty spaces further this perception but the materiality brings the experience to a multi-sensory level. The main void space is composed of a concrete structure with a single ladder running up the length of the wall, reminiscent of the gas chambers. This void is known as the Holocaust Tower. The overall bare nature of the materiality creates a visual as well as auditory vastness. The concrete allows for maximum reverberations through the space highlighting the immense emptiness. In addition to this, the void ties into the experience of the circulation. The Holocaust Tower sits at a dead-end corridor, forcing the user to fully comprehend

the space and then return back along the original path, retreating to what could be perceived of as a safer space.

Figure 37, Therme Vals (Source: Author)

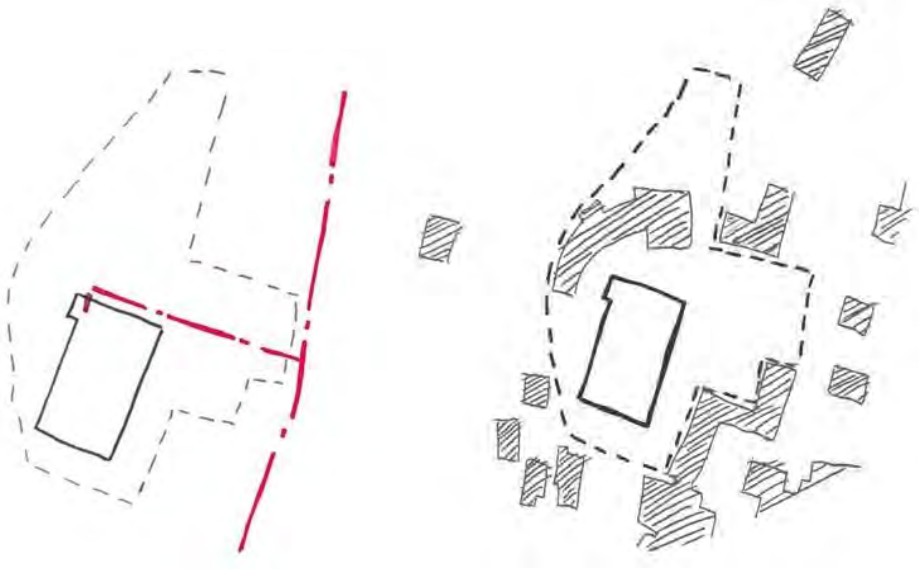

Figure 38, Pedestrian Circulation [left] & Surrounding Buildings [right] (Source: Author)

Another means to highlight the senses in design is through the use of light, which may appeal to the both the visual and tactile. This is especially apparent in the Therme Vals by Peter Zumthor. The design uses a monolithic nature to highlight the contrast of light and dark. Zumthor takes the opposite approach of many modern designs and removes the overflow of natural light into each of the spaces allowing him to manipulate the light in a more direct fashion. Strips of light spill into the dark space to lead visitors through the building or create moments of refuge throughout the spa. This also furthers the understanding of the natural versus artificial light and the different qualities that each produces. The purely artificially lit spaces produce a stronger feeling of enclosure and isolation while the naturally lit spaces have a more freeing feeling. A contribution to these light qualities is the fact that most the building sits underground. Like the Jewish Museum Berlin, the building is accessed from underground, solidifying the enclosed feeling of the spaces experienced upon entry. As the visitor moves up through the building, they are slowly exposed to larger quantities of light with an exposed bath on the roof.

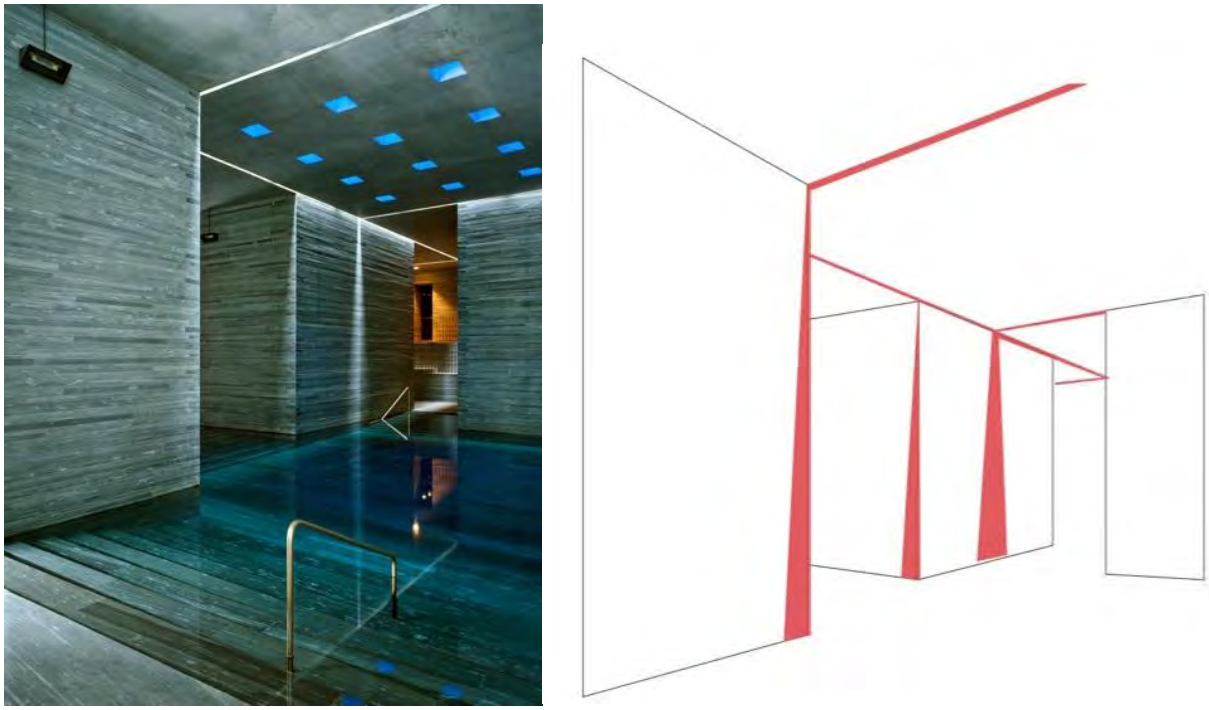

Figure 39, Massing & Natural Light (Source: Designphile/Author)

The monolithic nature of the Therme Vals largely comes from its use of materiality. The building is composed of local quartz stone that Zumthor allowed to be understood throughout the entirety of the building, exposing the rough nature of the stone along the walls. These materials draw from and play off the surrounding mountainous landscape. Carving into the landscape with the stone allows for a natural feeling that does not upset the surroundings. The purpose of this being that the convergence of nature and the man-made built environment can inform and respect one another. While this is an important aspect of the design, "It is not so much an architecture of forms as an architecture of senses." [29] The mass itself appears to be growing out of the ground, speaking to the sensory qualities of the environment as well.

Each of these sensing precedents highlight the overall importance of sequence, light, materiality and form when highlighting the senses within the built environment. These principles may also be applied within an educational setting to further educational learning environments. The strongest opportunity for such implementations is throughout the circulation and larger scale gathering spaces. Creating spaces that can be understood through a variety of sensory ques allows for designers to understand what is important to highlight in their own designs and further their understanding of spatial sequencing.

[29] "Vals Thermal Baths," arcspace.com, last modified November 17, 2014, accessed November 22, 2017, https://arcspace.com/feature/vals-thermal-baths/

Chapter 4: Site Analysis

Overview of Options

Figure 40, University of Maryland Site Overview (Source: Google Maps)

The consideration into the site selection stems from the introduction of this new academic paradigm. While this program will be intrinsically tied to architecture, there is a vast number of users from earlier mentioned disciplines across campus that will be welcomed into the design. All of these disciplines, music, art, landscaping, engineering, lack a communal gathering space whether that be formal or informal. It is unlikely that an engineering student will cross paths with an architecture student, not only within the curriculums but also within the physical space that each discipline resides in. This is true for the layout of campuses in general but also at the University of Maryland. With the realization that the University of Maryland had very strong existing programs for these disciplines to build this new academic paradigm off, the investigation into the University of Maryland campus as a site began.

Existing Architecture Building Addition & Renovation

Figure 41, Architecture Building Site (Source: Author)

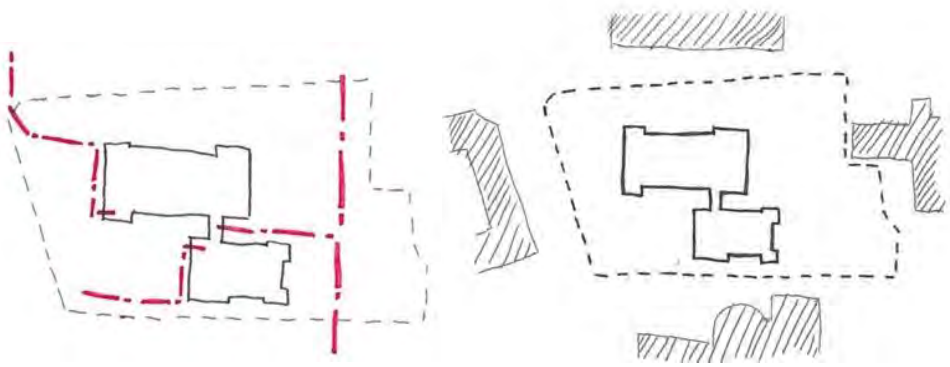

Figure 42, Pedestrian Circulation [left] & Surrounding Building [right] (Source: Author)

The first site to consider is a renovation / addition to the existing architecture building. This is the first and most obvious site choice due to its existing relevance to the architecture program. The entirety of the architecture student body currently exists within this building with little to no classes taking place outside of the school. The opportunity to connect and share resources therefore becomes very easy. The physical infrastructure and academic support is already in place and can

simply be expanded upon with the new initiation of curriculum. Being so close in proximity makes these connections that much easier. This also allows for the program to build off the existing history of both the architecture and academic history of the program. The history of the program begins with its founding in 1964 with the currently occupied school being completed in 1972. [30] Understanding that this step forward in the academic paradigm will always be tied to the roots of the program is a vital distinction. It is important to respect and grow off this history rather than ignore it and start anew. The program is in the ideal position to begin to grow along with new age design ideals and lead into the progressive future.

Another positive to this site location is its proximity to existing green space. The Mayer Mall is a large scale gathering space that runs adjacent to the Smith School of Business and serves as one of the main pedestrian routes for architecture students, business students and the campus. Currently, the space is underutilized and mainly used for this circulation to the rest of the campus. By placing a new building at the termination of this axis, the green space could easily become activated. This would be beneficial to the interior of the building as well due to the inherent benefits from the visual connections to nature within an academic environment. The other positives to this location is its accessibility from Lot 1, the parking lot most used by students. This makes the circulation to the building very direct for the students that will be using it.

[30] "History," School of Architecture Planning & Preservation, accessed November 24, 2017, http://www.arch.umd.edu/mapp/history

Figure 43, Concept Conditions (Source: Author)

In addition to the typical site considerations, the basis of this proposal makes it necessary to investigate the sensory qualities of the site. Visually, the strongest connection relates to the previously discussed Mayer Mall. The building would act as a gateway between this green space and the rest of campus. Although, it would to some degree also be a barrier dependent upon the treatment of the design. Further in relation to barriers, Campus Drive to the North and Mowatt Lane to the West bring the most sound to the site. These are both traveled rather frequently by commuters and other visitors to the campus. In terms of smell, there are a few locations relative to the proposed site that produce recognizable odors. The strongest of these is the strip of retail on the ground floor of Domain, the apartment complex to the West of the architecture building. The other olfactory locations include the woodshop within the architecture building and the café within the business school to the South. Interestingly, each of these olfactory producing locations are directly related to gathering space. The cafes themselves serve as these spaces while the main great space sits adjacent to the wood shop within the architecture building.

Figure 44, Architecture Building East Facade (Source: Author)

With these benefits in mind, the downsides to building on this site must also be considered. One of the largest benefits, the accessibility for the architecture students, also becomes one of the largest drawbacks. Due to this physical connection to the existing building, it will become much more difficult for students outside of the architecture department to access the building. It is unlikely that a student from the other disciplines meant to occupy the building will enter the space unless they have a class inside. The space will inherently belong to the architecture department. This limits the opportunity for informal interaction beyond the scope of the architecture students. If the building were to have more of a physical separation from the current architecture building, than it could instead belong to the campus. In addition to this, providing a separation between the two spaces would force the architecture students to leave the building every once and a while. Currently, students get absorbed into their projects and forget that a world outside of their school exists. Just stepping into a different environment occasionally can provide different learning opportunities and allow students to step back from their work and understand it in a different manner.

The design of the current architectural building becomes a large proponent of this site. A building that holds such a historic presence will have inherent design restrictions when adding an

addition and/or renovation. Beyond this, proposing an addition would make it necessary to reorganize some of the existing spaces within the building. The larger issue with proposing a renovation is that the overall parti of the existing building is strong and does not need much improvement. The central atrium space with the surrounding studios works well to include everyone present with the building and allow them to be aware of what is going on within some of the other studios. It is the same general idea proposed within the previous precedents. The largest improvements needed for this building are more functional based such as outdated mechanical equipment. The need that is stronger than a renovation is additional space, which does not necessarily need to be directly attached to the building. The current program is shifting to have more of an undergraduate presence, therefore limiting the space available in the existing building. This information lends itself towards creating a new building rather than renovating the existing building and adding a directly associated addition.

Preinkert Hall

Figure 45, Preinkert Hall Site (Source: Author)

All of the positives and negatives associated with the existing architecture building as a site push the investigation across the mall. Looking towards this area would allow for the earlier mentioned separation while still allowing direct access for the architecture students. With this investigation, came the introduction to a site just to the East of the building, Preinkert Hall. This building is currently underutilized and holds no presence to help in unifying Mayer Mall as a centralized axis. The campus is under the same impressions of this building and the 2030 Facilities Master Plan reveals their idea to demolish the structure.

Figure 46, 2030 Facilities Master Plan – South Campus (Source: University of Maryland)

This master plan lays out what the campus will look like by the year 2030. This includes new buildings that will exist on the campus, some of which are already underway, as well as the demolition of some existing buildings. One of the buildings proposed to be demolished is Preinkert Hall. The proposed replacement of this building is called out as S5 in Figure 46 and will be the visual arts and cultures building. Within this plan, it is also pertinent to note the two additions that are being proposed to the existing architecture building.

With the design of this master plan, Mayer Mall becomes an even stronger driver of design. It proposes a very strong edge condition with each of the new buildings working towards that centralized space. With this condition comes many opportunities. The cross-axis connection running perpendicular to the mall from the architecture building becomes an important design opportunity. The way in which students circulate across this space becomes vital. Similarly to the site previously discussed, this begins to dictate what type of form should sit at the head of the mall. Ultimately, this axis needs to somehow be terminated whether that be through architectural or landscape design.

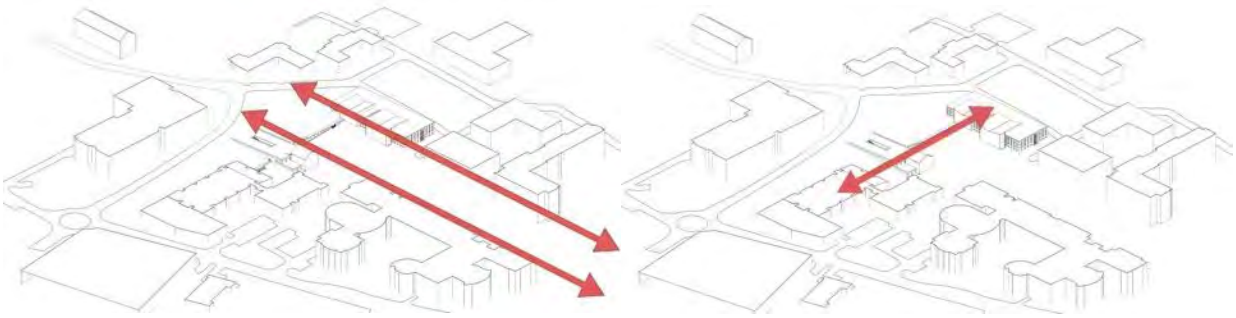

Figure 47, Mayer Mall Site Conditions (Source: Author)

Some of the apparent issues that present themselves in the master plan is the addition to the existing architecture building (S1 on Figure 46). The addition to the East side of the building provides and undersized exterior central courtyard that is basically inaccessible. In addition to this, the overall massing and roof slopes of the existing architecture building do not lend themselves to this type of floor plate as an addition. These qualities lend themselves to a design that offers more separation between the existing architecture building and a proposed structure, causing the ideal site location to be located more to the East and the center of Mayer Mall. This location would also allow for the architecture students to have more of a connection to campus and be forced to step outside of the studio on occasion. In addition, some type of architectural element would be the perfect connection to lead students along the cross-axis of Mayer Mall.

Mowatt Lane Garage

Figure 48, Mowatt Lane Garage (Source: Author)

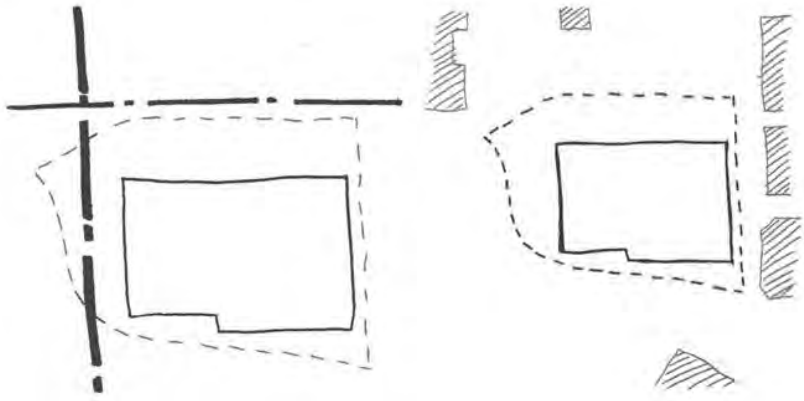

Figure 49, Axis [left] & Surrounding Buildings [right] (Source: Author)

The next site to consider is Mowatt Lane Garage to the South of the Architecture Building site. The original consideration for this site stems from the future initiatives of the campus. These

initiatives surround the push to reduce carbon emissions on campus by 50% by 2020.[31] Along with this initiative, there are many new considerations for the town of College Park. One such consideration is the push to become a more walkable city. The University of Maryland is following alongside these ideals with their sustainable goals. As it relates to the Mowatt Lane Garage site, the university is looking to change some of the traffic patterns of commuters to encourage walking and public transportation with different ideas such as restricting the parking to the perimeter of the campus. This will allow for increased walkability while also making room for the purple line that will be integrated into campus. While Mowatt Lane Garage is located along the exterior edge of campus it is still very much connected to the heart of campus. Repurposing this site would therefore work alongside these initiatives and allow for a stronger connection of some of the surrounding exterior spaces. Much like the architecture building, Mowatt Lane Garage sits adjacent to Mayer Mall and holds the potential to activate that currently underutilized space. This could push the overall walkability and attraction to this portion of campus much further.

Figure 50, North of site (Source: Author)

[31] University of Maryland, "Climate Action Plan 2.0," Sustainable UMD, accessed December 13, 2017, https://sustainability.umd.edu/progress/climate-action-plan-20

Figure 51, Concept Conditions (Source: Author)

The sensory qualities of the Mowatt Lane garage site are similar to those of the architecture building. Once again, the strongest visual connection is that to Mayer Mall. This space also provides one of the tactile material qualities, those qualities relating to the natural aspects of the site. The strongest sound barrier becomes Mowatt Lane traffic to the South of the site, although this is relatively low compared to other streets on camps. The strongest olfactory connections relative to the are those to the café within the business school. The adjacent gathering spaces are somewhat arbitrary dependent upon the day and time of year. During football season, the green space to the North of the site becomes a gathering space for tailgating, although this is not consistent throughout the rest of the year.

The accessibility to the building poses both positive and negative qualities. The proximity to the architecture building allows students to easily get to classes within the building while still forcing them to experience other areas of campus. It is approximately a quarter mile from Lot 1 which is where most commuter students park. While these are both positive factors, the site is not close in proximity to any of the other disciplines that the building is trying to attract. Very few visitors use Mowatt Lane to access campus, therefore they will not happen upon the site. In addition, the art building is the only discipline other than architecture that would have easy access by foot to the site. The performing arts center is over a half mile in the opposite direction from the

parking lot and the engineering department is on the totally opposite side of campus along with the landscape architecture students. These ultimately pose the same issue as the addition to the architecture building in that the building would start to become more exclusively part of the architectures curriculum as opposed to combining the disciplines.

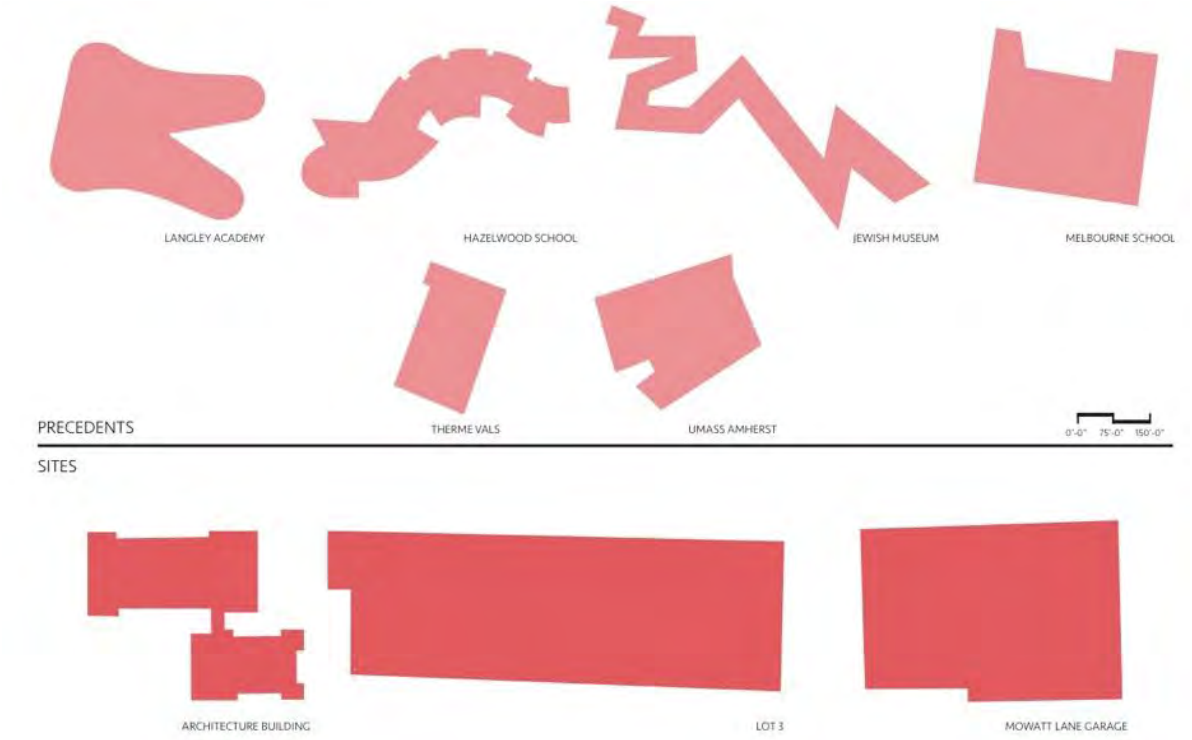

Figure 52, Scale Comparison (Source: Author)

The other downside that ultimately led to the choice of a different site for the proposal is the existing garage present on the site. The most ideal scenario would be to adaptively reuse the existing structure. The issue with this is the scale of the garage structure. The footprint of the structure is approximately 80,000 square feet. The program of the proposed educational building is approximately 35,000 square feet. This means that the entire building could fit on half of the ground floor of the garage without even needing a second level, and the current parking garage is six levels. Most of the structure would therefore have to be removed. This causes for additional environmental strain on the sight as well as an immensely higher cost than the other two sites.

Stand Alone Building: Parking Lot 3 / Lot 1

Figure 53, Lot 3 / Lot 1 (Source: Author)

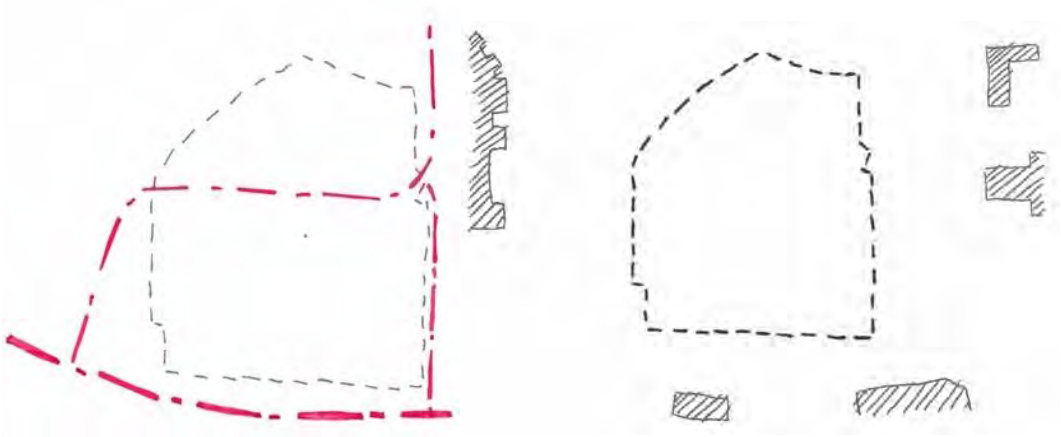

Figure 54, Circulation [left] & Surrounding Buildings [right] (Source: Author)

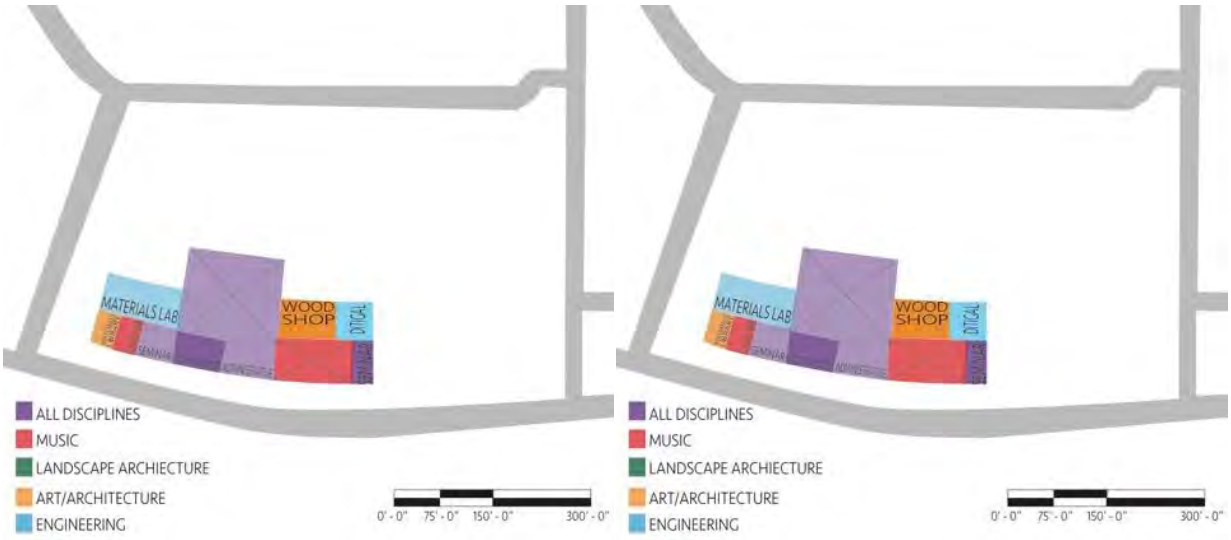

Figure 55, Program Ground Level [left] & Level One [right] (Source: Author)

The final site to consider is Parking Lot 3 / Lot 1. This site poses the most flexibility as it is currently a large surface level parking lot. The overall size of the site is one of the strong benefits. While in the case of Mowatt Lane Garage, the overly large scale became a drawback, the open nature and lack of existing structure of Lot 3 allows for the large scale to be a benefit. There is a lot of space for development and opportunities for different arrangements within the site. In addition, at 390,000 square feet, there is more than enough space to propose taking over less than half of the site and allowing for the remainder of the site to become a multi-story parking structure, therefore not losing any of the parking that currently exists there. This also allows for the manipulation of the space to reach beyond the footprint of the building. There is a strong opportunity to develop exterior space that will help the curriculum for the landscape architecture students as well as providing a relaxing and comprehensive environment for the other students present within the building. The scale can be further understood by the scale of the program on the site, as shown in Figure 55.

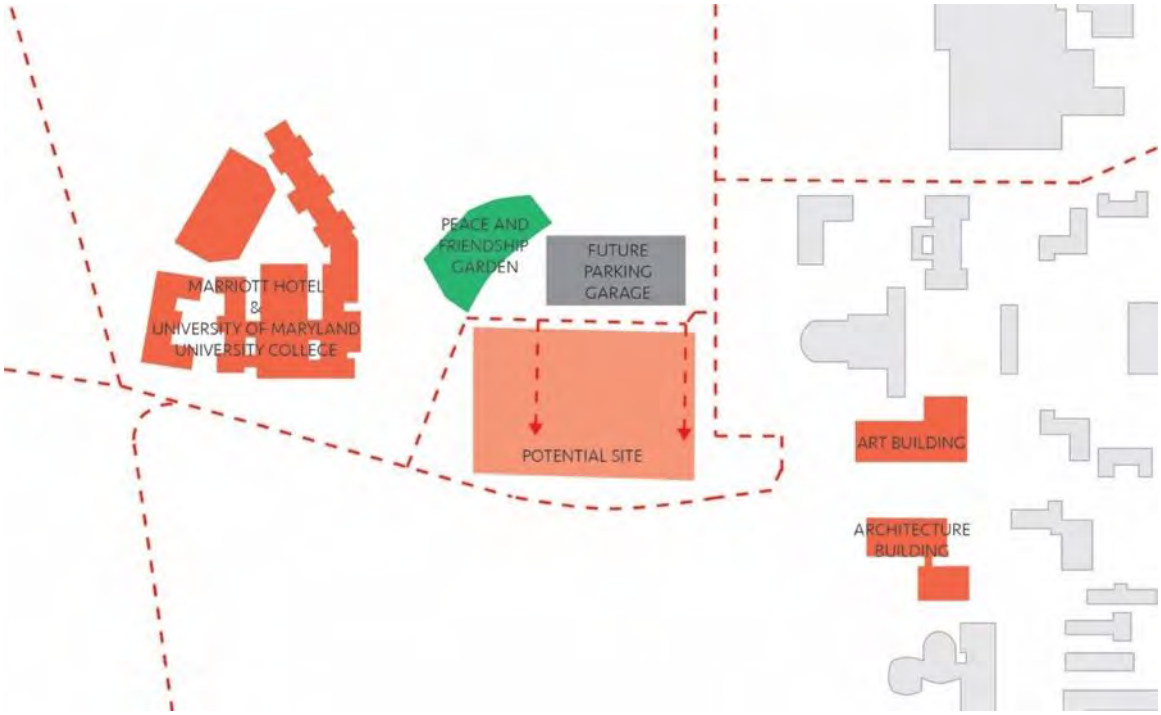

Figure 56, Site Influences & Circulation (Source: Author)

The location of the site relative to the campus is another positive. Placing it directly adjacent to the parking for the commuters means that they will pass by the building every day. Architecture students have just a short walk to and from their building, one that those who commute to campus already do. The art school is right across the street from the architecture building therefore these users have ease of accessibility as well. To the south of the site is Campus Drive. This is a heavily trafficked street and used as one of the main commuter entrances onto campus. Although it is one of the most used entrances, the threshold into campus lacks a presence. Other than a small sign to the side of the street, it is hard to even know where this threshold exists. Ultimately, placing a building on this site would allow it to become the new gateway into the campus.

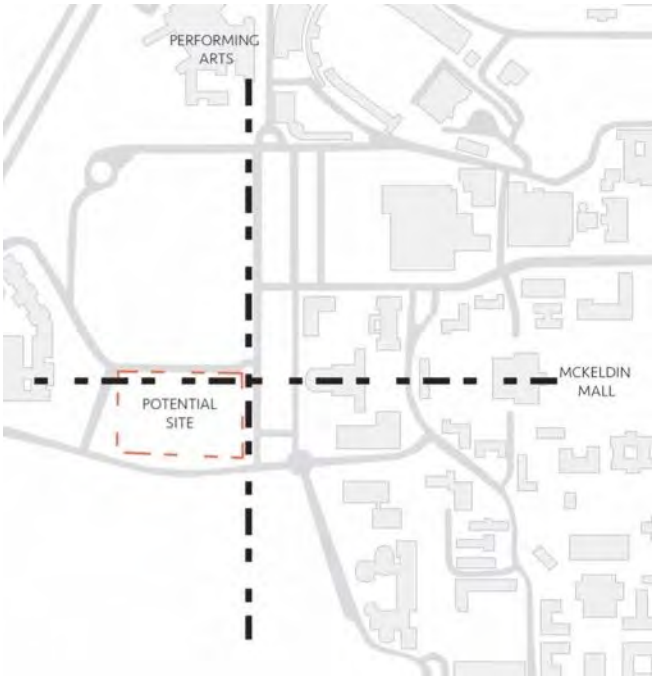

Figure 57, Axis (Source: Author)

The parking lot site also poses opportunity in terms of its relationship to the rest of campus. Lot 3/1 is on a direct North – South axis to The Clarice Smith Performing Arts Center. In addition to this, it is on a direct East – West axis to Mckeldin Mall. The intersection of these two axes are in direct correlation with the combination of the two main concepts of the proposed program. This building is representative of the concepts of knowing-in-action and informal academic gathering coming together as one. The axis coming from the performing arts center is representative of the aspects of knowing-in-action. Music students use hands on tactile and auditory tactics throughout their classes allowing them to learn from experience. Not only will the principles of this discipline be carried down along this access but the music student themselves will also be welcomed into the building. McKeldin Mall is one of the largest informal gathering spaces on campus, and most popular for outdoor studying. Once again, these informal educational opportunities as well as the students themselves could be brought along this axis and into the site.

Figure 58, Campus Drive (Source: Author)

One of the negatives to this site location is the lack of context to draw from. With the site being so open, there are few design ques that could be directly related to a proposal. The closest architecture to draw from is the array of buildings along campus drive which range from an apartment complex to a church, none of which directly relate to the program being presented. This therefore begins to turn the proposal into the idea of a master plan of the entire parking lot. While the site could benefit from this planning, it begins to take away from some of the root issues being addressed within this thesis proposal and shifts the attention to the needs of the specific campus of the University of Maryland. While all buildings need to be connected to the sites that they inhabit, this program is meant to be easily transferrable to any architecture program across university campuses and entire master plan of an area does not lend itself to that type of transition.

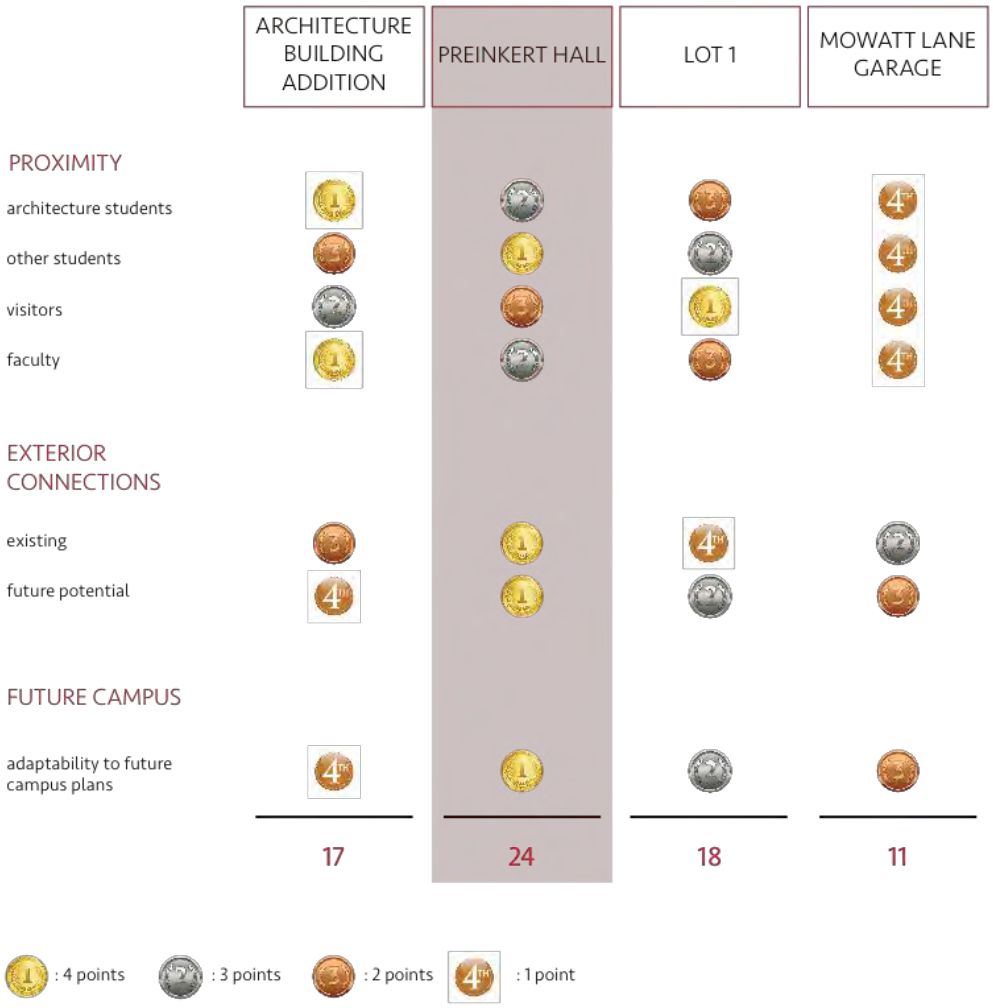

Figure 59, Site Matrix (Source: Author)

Ultimately, Preinkert Hall provides the most opportunities for this proposal. With the building already being demolished within the 2030 Facilities Master Plan, a new proposal on this site will follow along with the future needs of the campus. In addition, the architecture building, and therefore program, can begin to extend itself out into the campus by providing a cross axis connection across Mayer Mall. This will not only welcome the architecture students to step outside of the studio environment but will also welcome multiple different disciplines to come and enjoy the space whether it be for more formal academic or more informal gathering purposes.

Chapter 5: Design

Design Intention

Through the research and investigation into multisensory space and learning techniques, several design intentions have arisen. First and foremost, the intention of sequence. The circulation or progression through the building is directly tied to the users understanding and perception of that space. This proposal resides in an academic environment, so the circulation of the spaces must be straightforward and easily navigated by its main user group, students. Even if a student has never been inside the building before, they must be able to easily find their classroom or ultimate destination. Architecturally, this leads to many transparencies within the design allowing for the user to understand what activities are happen in different spaces within the building. The overall journey through the built environment provides a unique learning opportunity. Wayfinding is typically geared towards the visual sense and in very few architectural instances takes note from the other sensory experiences. While things like signs and room numbers are necessary, the tactile interaction with these environments can also act as a wayfinding device. Materials that facilitate movement should be located around these circulation spaces and remain consistent throughout the main spine of circulation. This is not only indicative of the material located along the floor, but all surfaces of the space. Providing a material along the walls of the main circulation can evoke an emotional response within the user and invite them into portions of the building that they may not have otherwise explored.

The design intentions within this building can all be related back to the material and proportional choices. Whether that be opacity of material, dictating the amount of light that is present within the space; the density of these materials, dictating the heaviness or weight that the user may experience within the space; the tactile qualities dictating the comfortability of those

materials or the overall acoustical qualities that each possess. Further than this the overall proportions of each of the spaces and their relationships to one another speak to not only the importance of the activities taking place within those spaces but also the types of interactions that will take place within those spaces.

Site Placement

One of the first design considerations is how much of the site should be occupied by this proposal. To respect the edges of Mayer Mall and still provide a cross axis connection, the introduction of two separate structures becomes necessary. As illustrated in Figure 60, this thesis proposes two structures connected by an underground walkway that may also be understood at site level. This allows for one of the structures to act as a pavilion at the head of the mall, providing a face as well as a beacon to the termination of that axis. This structure also responds to the steep topography by physically growing itself out of the site. With this move, the roof of the structure becomes gathering space for students to pause and have a moment of stasis along the circulation through the mall.

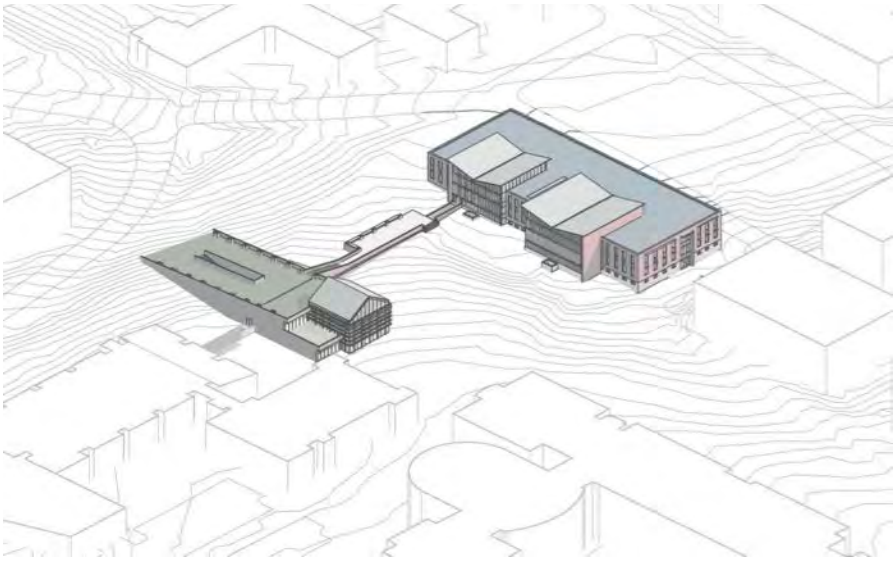

Figure 60, Site Axon

(Source: Author)

With this proposal, architecture becomes the uniting element of circulation. The bridge sitting across the mall not only allows for the exterior circulation to continue down Mayer Mall but still invites users into either of the two structures. The glass enclosed aspects of the design welcome some modern elements into the University of Maryland Campus while also highlighting the main programmatic elements of this proposal, the maker spaces.

Programmatic Development

As this site and overall mass was settled upon, a reinvestigation of the program placement and development became necessary. With two separate structures being introduced, the program must also become divided. This causes an investigation into what the most necessary aspects of the program are and which aspects must be adjacent to one another. Of the new classroom environments, the flexible maker spaces become the most conducive to the hands-on learning environments. These transitional spaces allow for a multitude of activities to take place ranging from socializing, model making, one-on-one critiques to larger scale events if necessary. Some of these spaces must be more flexible environments, similar to the great space that is located within the existing architecture building, while others require specific equipment, such as saws within the woodshop, and therefore must be more strictly programmed. The importance of this space facilitates it as a uniting element between the two buildings.

The additional programmatic elements build off the maker spaces based upon the necessities of each of the disciplines invited into the building. With the separation of this program into two separate structures, one may be treated as the more public building with one being treated as the more private. Based upon the existing circulation of Mayer Mall, the pavilion structure located to the West lends itself to the public development. Placing a flexible

maker space, café and gallery space within this building invites any student that is walking by the building to stop in to observe and even participate in the activities taking place. This serves as a uniting element, and moment of pause for the campus as a whole. The informal gathering

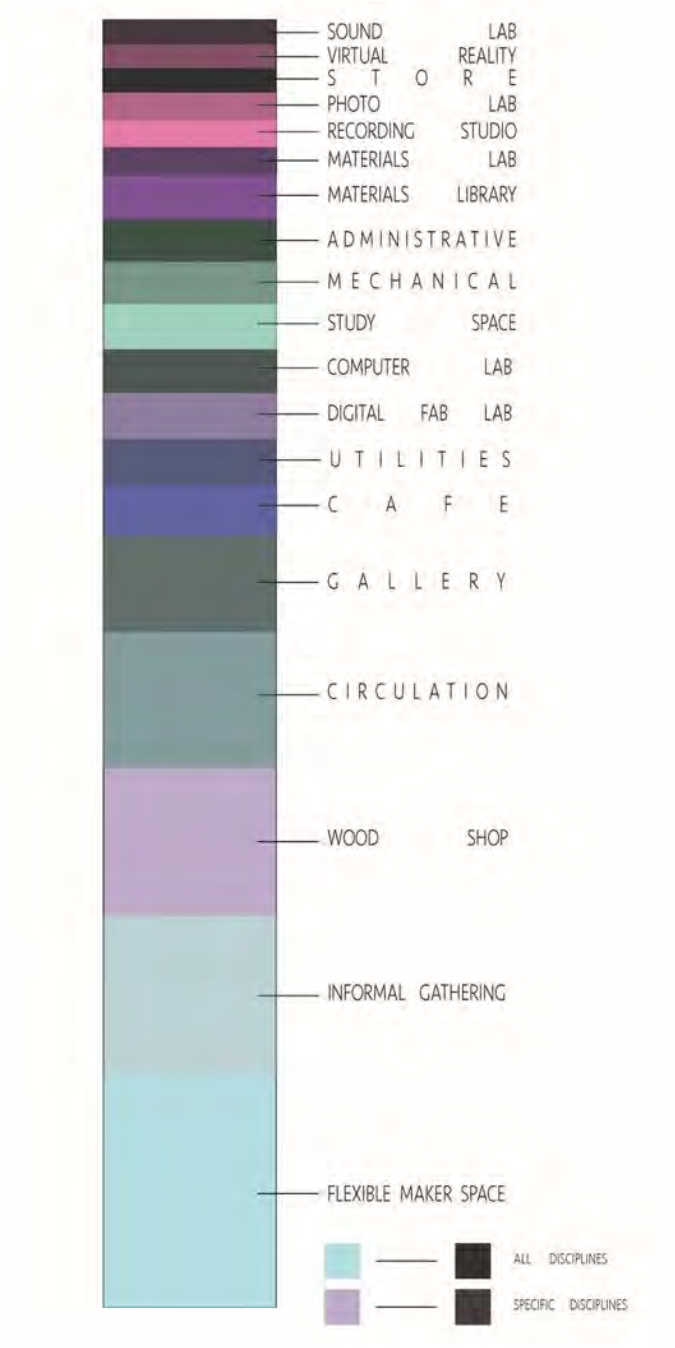

Figure 61, Program Development (Source: Author

spaces, such as the café space within the Makers Pavilion, will then continue into the Makers building allowing for multiple different environments for studying, socializing and group meetings of different scales.

Within this program, the gallery space is the most inclusive to all disciplines, allowing art or architecture students to display the projects that they are currently working on. This aspect gives the rest of campus a window into the type of work that these students do. With that as a uniting element, the gallery can then be furthered into the entire circulation of the building. Leading the user from the Makers Pavilion to the Makers Building where the denser programmatic spaces are located.

Materiality and Sensory Space

Looking back to one of the design intents, the materiality of the interior spaces plays a large role in the overall perception of the environment. Materiality for these spaces was chosen based upon not only the aesthetics but also the tactile and acoustical quality of those materials. As the design progressed, it became apparent that materials that absorb sound create a denser sensory environment and those that reflect it create a lighter sensory environment. This can be applied to visual and tactile sensory perceptions as well. If a material is a lighter color that either reflects more light or allows more light into a space than it is going to create a lighter sensory environment. More rough, denser materials create a heavier tactile environment. Some of these lighter materials include warmer woods, light paint colors and smooth concrete. Some of these denser materials include textured concrete, acoustical panels and certain vinyl composition tiles. To fully tie the perceptual environments together, these material qualities can be combined with the ideas surrounding sequence.

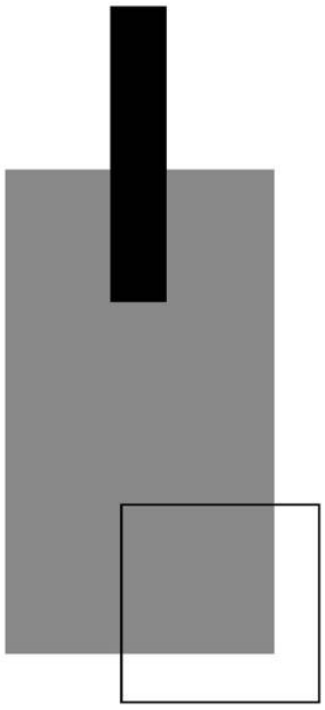

Figure 62, Makers Pavilion Parti (Source: Author)

One of the challenges of perceptual learning and allowing for architectural students to learn from their environments is making that transition between unconscious absorption of our environments to conscious absorptions. Transitioning the sensory sequence of the spaces from dense sensory spaces to open sensory spaces is one way to help the user become more aware. This is what led to the overall parti of both the Makers Pavilion, as demonstrated in Figure 62, and the Makers Building.

In the case of the Makers Pavilion, the topography lends itself to physical descent down into the building. This decent sets the tone for a transition from dense sensory space to light sensory space as you progress South through the building. To achieve this, the user is first met by a textured concrete entry way (Figure 63), progressing to a lobby with warmer and more acoustically reflective materials (Figure 64), and finally arriving at the flexible maker space (Figure 65). This space acts as a beacon for the head of the mall from the exterior, and as a light filled open environment on the interior. It is also the first time that the user is met with the hands on learning activities that will be taking place within the space.

Figure 63, Makers Pavilion Main Entry (Source: Author)

Figure 64, Makers Pavilion Lobby (Source: Author)

Figure 65, Makers Pavilion Flexible Maker Space (Source: Author)

Figure 66, Makers Building Gathering Steps (Source: Author)

Progressing from the maker space the user can move through the underground walkway to arrive at the Makers Building, where they are immediately welcomed by a large scale informal gathering space, displayed in Figure 66. This is a space in which a whole new type of learning interaction can happen in a much more relaxed environment. This is an area where lecture type classes may still take place but by setting them within this environment students will feel more comfortable and have more of an opportunity for both student to student interaction as well as student to professor interaction. In addition, this acts as a social gathering space. This is an environment that is often overlooked in academic settings but is vital to the cognitive advancement of university level students. Finally, this type of gathering space poses opportunities for impromptu cross discipline interaction.

The Makers Building follows a similar parti to the Makers Pavilion, with more of a contrasting sensory sequence. As the user moves down the centralized circulation street, as

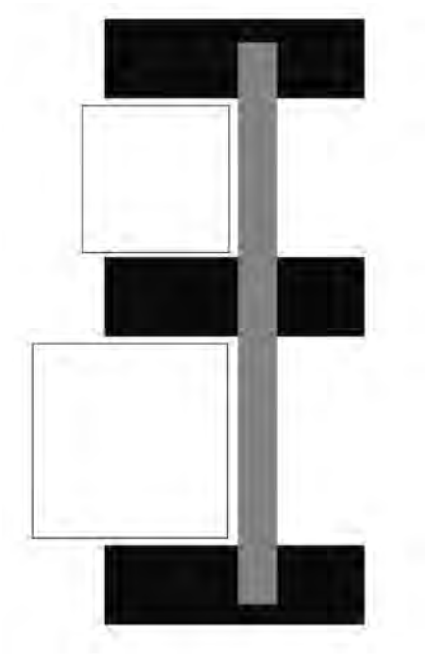

Figure 67, Makers Building Parti (Source: Author)

in Figure 67, they are met with the juxtaposition of a condensed sensory environment followed by an open sensory environment, allowing the larger scale maker spaces to be the highlight of the design. The spatial qualities that evoke this sensation not only come from scale and amount of light but also from material choices. Many of the materials are similar to the Makers pavilion with the addition of some more sound absorptive materials, such as vinyl composition tile, in some of the informal gathering spaces to not only make it a more comfortable environment but also slow the movement through the space.

Chapter 6: Conclusions

This proposal allows all users of the building to become more aware of the human body's connection to architecture. In addition, it allows for students to take advantage and learn from the environments that they are occupying daily. This is achieved through several design initiatives. One such initiative is the overall scale of the spaces created. With students having the ability to study and understand what types of interactions are provoked in a smaller environment versus a larger environment through the juxtaposition of these two environments together, as demonstrated in Figure 68. The sequence throughout both the Makers Pavilion and Makers

Building allow for this juxtaposition to be easily understood. In addition to this, the structure has been left exposed throughout the entirety of the design allowing for students to take cues from different structural materials. This can be most easily understood within the wood shop, demonstrated in Figure 69, where the inverted king post truss was chosen to visually show which members were in compression, the larger heavy timber members, and which were in tension, the smaller cables. The structural choices also further the overall parti of the buildings with concrete supporting the denser sensory spaces transitioning to a wood in the lighter sensory spaces. In conclusion, this didactic design can help to further advance architectural teaching and improve on the methods of learning within the higher educational environment.

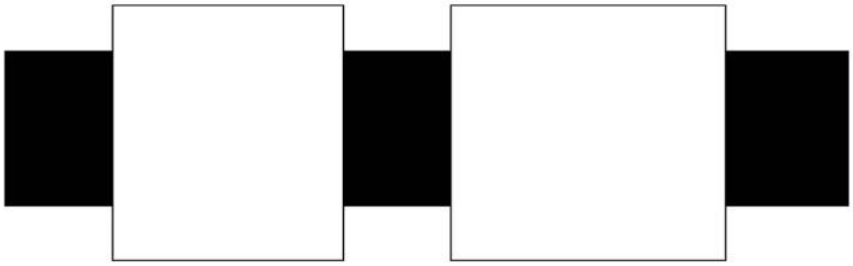

Figure 68, Makers Building Sectional Scales (Source: Author)

Figure 69, Wood Shop (Source: Author)

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