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Scalable Impact

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Scalable Impact

Introduction

Q: Why didn't you make it larger so that it would loom over the observer?

A: I was not making a monument.

Q: Then why didn't you make it smaller so that the observer could see over the top?

A: I was not making an object.

Tony Smith's replies to Robert Morris's questions about his six-foot steel cube [a work titled Die].

The engagement with scale has a long tradition in architecture education beginning with the full scale mockups of details in apprentice guilds to the inclusion of plaster casts of architecture details and building elements in support of a Beaux-Arts education. There is also the collection of scale drawings for the reference of students to study great works of art and scratching out a plan in the dirt as the start to a rudimentary construction project. We engage in conversations of scale at the beginning design studio to create a shared language for discussion of the work. How we teach this technical knowledge also has the capacity to go beyond just the scale of representation. It can begin to speak to the exactness of appropriate scale and to the capacity of the scale of impact. From the object to the monument to that which is neither, how we engage in the discussion of scale as a design tool is a critical part of the profession as we create new spaces.

The introduction of scale is a fundamental component of the beginning design studio. Students utilize their architectural scale to develop drawings and models of their site(s) and design(s). Students engage in discussions about what is the appropriate drawing or model scale to develop their design, asking questions about what can be seen at different scales and the level of detail required for each scale. Beginning design students are also introduced to concepts of scale related to users and context. Students are asked to relate the human scale to the context and describe how their design relates to a person or group of people. Students also examine the context and how their design relates to the existing scale. Through different methods of design representation, students zoom in and out of their design and test their iterations at different scales and evaluate the appropriateness of their design for users and the context. All this development equips them for future design studios in how to utilize scale to represent and evaluate design. But there is more to scale than size and notation of measure, there is magnitude and amplification.

The beginning design studio discussed here is framed by a pedagogy based on the following questions: Can the fundamentals of teaching scale to beginning design students include amplification to demonstrate the impact of design on the built environment? Can small projects or interventions be evaluated on their ability

to be transferable to a larger context as a means of teaching scale through scalability? Can a sequence of assignments exploring scalability and amplification, magnitude of scale(s), give agency to students to realize the potential of architectural performative spaces for positive change?

Studio Framework

In the beginning design studio at Montana State University, students engaged in questions of scale related to their design's capacity to amplify an intervention's impact and its ability to be scalable and transferable to a larger or different context through a series of projects over the course of one semester. The studio framework utilized sites students could easily return to for investigation, such as the architecture building and the waterways of the town of Bozeman, Montana. Students were assigned a zone in the building and a specific transect in town to observe and document specific phenomena generated by nature and human desire. They identified the interconnected relationships happening on the site and causality / feedback loops that manifest the existing conditions. Based on this analysis, students then designed for people to engage in an existing phenomenon and the amplification of that condition.

As iteration in design and methodology are critical to the development of internalizing learning, the studio was organized into a short introductory project followed by a longer project, both utilizing the same methodology. The longer project was able to build on the introduction and add complexity and depth to the student engagement with scale. The projects worked with a multiplicity of scales over the course of the semester with each iteration adding more dimension to the use of scale in design.

Introductory Project

To introduce the design process and relationship of people to the environment, the students were placed into teams to examine the space of the architecture building. The students began by looking at the organization of the spaces and how the different school policies and pedagogies of the faculty, virtual ordering systems, shaped the space. They also observed how natural phenomena, like the sun or wind, have an influence on the space and human behavior. They examined how these impacted an individual, a small group, a class and all that inhabit the building. They examined and documented the scales of impact these phenomena, policies and pedagogies that informed the resultant space through photographs and diagrams.

Once students could demonstrate how the existing systems influenced space, they moved to full scale testing of strategies that could work with these existing ordering systems. The goal of the project was to amplify one or more of the existing systems to enhance its goals or influence. Students developed and tested strategies that looked to increase collaboration, reduce overall noise while not limiting individual's sound, work with recycling policies to increase student learning, and to improve the air quality of the building among many others. The strategies were installed within the studio environment and engaged both students in the course and others in the building as a way of evaluating the scale of the installation in relationship to a person and the scale of impact each installation had on the existing environment.

Students worked quickly with multiple iterations of their intervention over the course of a week, resulting in a final installation for discussion and group evaluation. The final documentation of their intervention incorporated photographs of the installation that were annotated with the scalar impact of their design that connected back to their earlier diagrams.

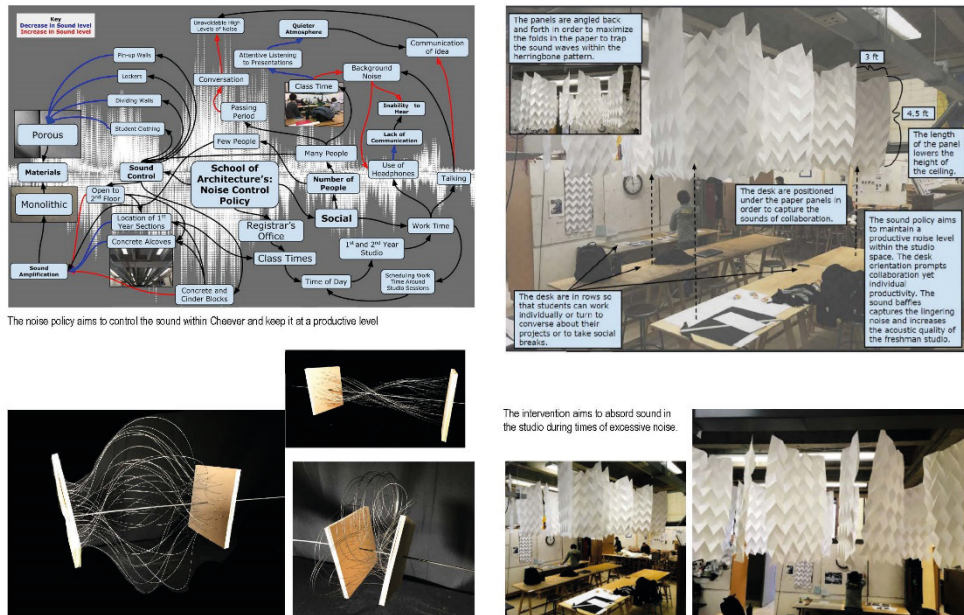


Fig. 01. Studio Intervention Documentation showing how the system diagram and parametric tool were used to generate an intervention in the existing studio to engage and manipulate the existing ordering systems of the space.

Source: Chole Andrews, Christopher Kearns and Rachel Macklin

Through this four week exercise the students went through the process that would be utilized in the longer project for the remainder of the semester. The group work built a small group dialogue that could be utilized in the individual project that followed for peer-to-peer learning. The short project also built confidence in first year architecture students that they have the capacity to observe a site, document how that environment is constructed and utilized, and that they could determine design interventions that would enhance an existing ordering system based on their research and not the direction of someone else. Students commented on how they had very little knowledge that this is what architecture is, but that they could see how the logic could aid in future designs. All of this equipped the students to repeat this process in a new site and with new parameters that utilized scale in its multiplicity.

The Iteration Project

The next project moved to the waterways coursing through the town and students were assigned a transect for the remainder of the semester. This allowed the students to go through the same process as the introductory project but with more time and iterations of the design, creating a deeper understanding of the methodology. Students again developed a site analysis mapping of the causal relationships and ordering systems of the site. They looked at both physical and virtual logics that informed the site conditions. Through their analysis they identified a specific phenomenon that had a significant influence on the form of the site and were asked to create a new relationship with this phenomenon for exactly one person.

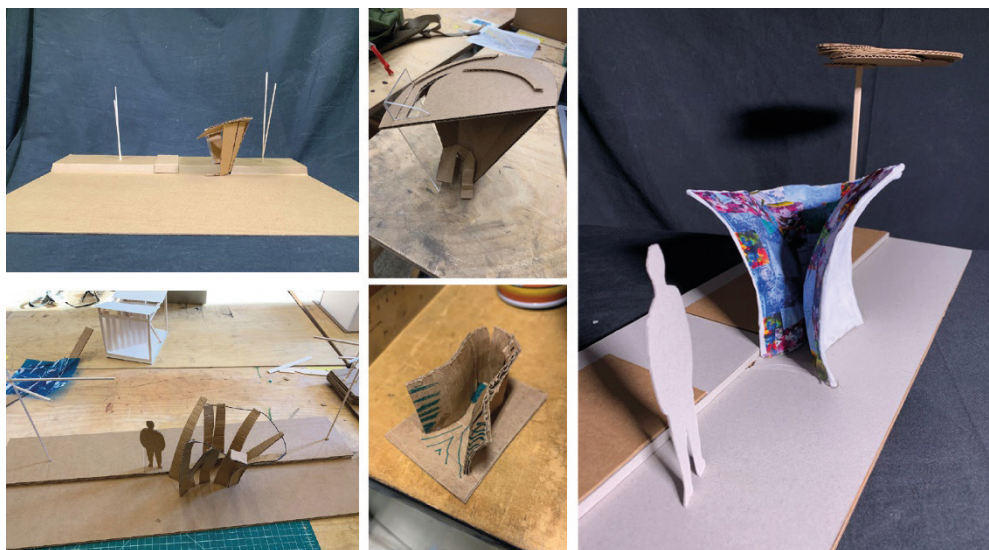


Fig. 02. Model iterations of the Space for Exactly One Person to engage in the existing natural phenomenon.

Source: Jack Sells

The design of the space for exactly one person began with an in-situ peer assignment where students used their bodies to describe the architectural space for one person to engage in an existing natural phenomenon. They acted as both a person and not a person to evaluate the scales of the site, the phenomena and that of one person. This created a low stakes design exercise that allowed for multiple iterations in a shorter period of time as compared to the design iterations of models and drawings, linking into the scale of time invested. Students documented their spaces through photographs that were then used to inform the next iteration of their design through physical modeling. The models were developed at 1:10 scale, a foreshadowing of the larger relationship to scale for the studio. The designs were then further developed through section drawings at the same scale as the model (1:10) and a detail at full scale (1:1). The drawings included photographs of a user exactly inhabiting the space. The evaluation of their design focused specifically on the volume of space for exactly one person, requiring students to calibrate the space to position the inhabitant to relate to the phenomenon.

After the discussion of their designed space for one, students returned to the site and reexamined the causal relationships on the site with a new objective, how to amplify the phenomenon. Students now engaged in concepts of scalability and transferability working in diagrams, a drawing that has both scale (its actual size) and is scaleless (can be applied at numerous scales). The diagrams identified the relationships of the site and what parameters could be manipulated. Once students understood the interconnected systems that informed their site, they were tasked to alter the site utilizing a leverage point or points. Students tested the capacities of the different systems and how changes to intensities or inputs would impact the overall. To do this, they created physical parametric tools utilizing materials that embodied the characteristics of their systems. These constructs allowed the students to manipulate one or more of the site parameters to reveal its influence on the rest of the site. In this process they were determining which inputs had more influence and which required significant effort for little change. The parametric device became a tool (1:1) for them to evaluate the site and their future interventions (scalable).

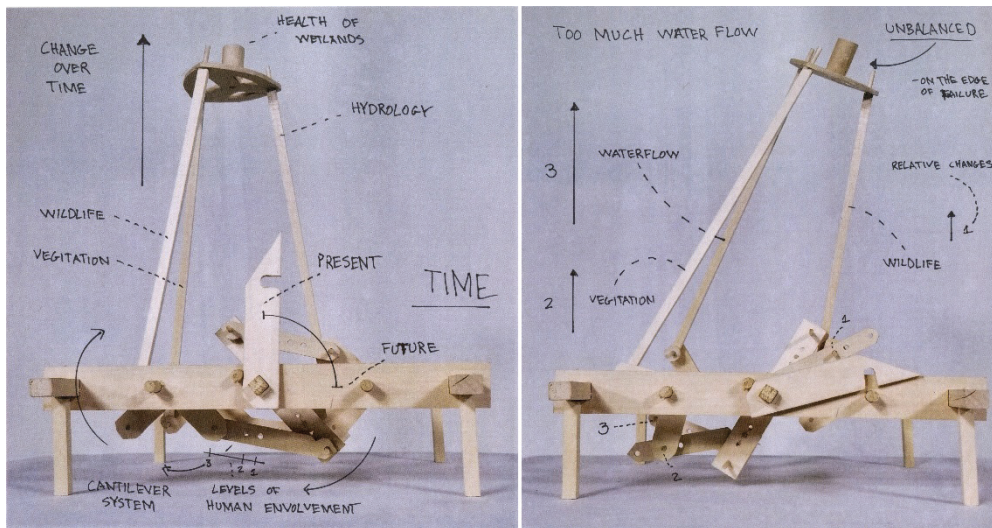


Fig. 03. Parametric Tool for evaluation of Design Intervention demonstrating the interconnected relationships of the systems and how a change to one aspect will impact the overall system.

Source: Logan Madsen

The next prompt was to increase the phenomenon and a human being's capacity to engage that phenomenon by a factor of ten. Critical to this process is that students can identify how the parameters are being amplified and not changed, similar to the way that a beach cruiser relates to a high-performance bicycle. Both have two wheels and are human powered by pedaling, but the high-performance bicycle can go ten times faster because of its mechanical design and positioning of the human body. The interventions continue to engage the students in an evaluation of the specific scale of a person while adding the capacity for design to change the existing context. This continues to deepen a student's understanding of the human scale and now expands the conversation to include how design can leverage existing conditions to have a larger impact, empowering students to see how small moves can generate a larger change.

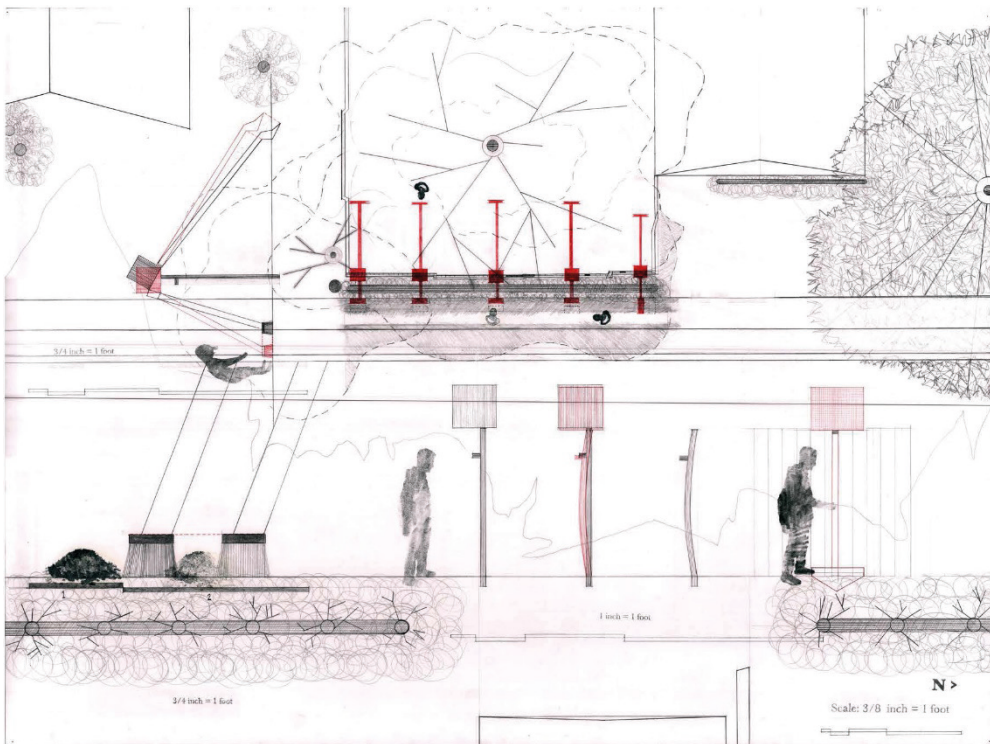


Fig. 04. Design Intervention drawing demonstrating how the intervention engages with the existing systems and creates a new space for an individual to engage the phenomenon.

Source: Shannon Eppard

The last project engaged students in the transferability and scalability of their logic. Students went back into the field and identified a new site that had similar relationships to that of their previously assigned transect. Utilizing diagrams, students presented their new site through annotated photographs that demonstrated the causal relationships of the existing context and described how their prior analysis was transferable to this new place. The students used their parametric tools to evaluate the new site and program, engaging them in the conversation of both the transferability of the tool, but also the scalability of evaluation criteria. The new space was for ten people to engage in a new phenomenon that was amplified by a factor of ten. In this project, students also had to determine the scale of their drawing to develop design, again returning to questions about what can be seen at different scales of representation. Asking the students to determine the scale of each new drawing gave them confidence in utilizing the fundamental tools of design communication. In the end, students presented this iteration of projects as a singular body with the ability to utilize the same analysis, diagram and parametric tool, as a way of describing multiple designs with different scales and magnitudes of amplification.

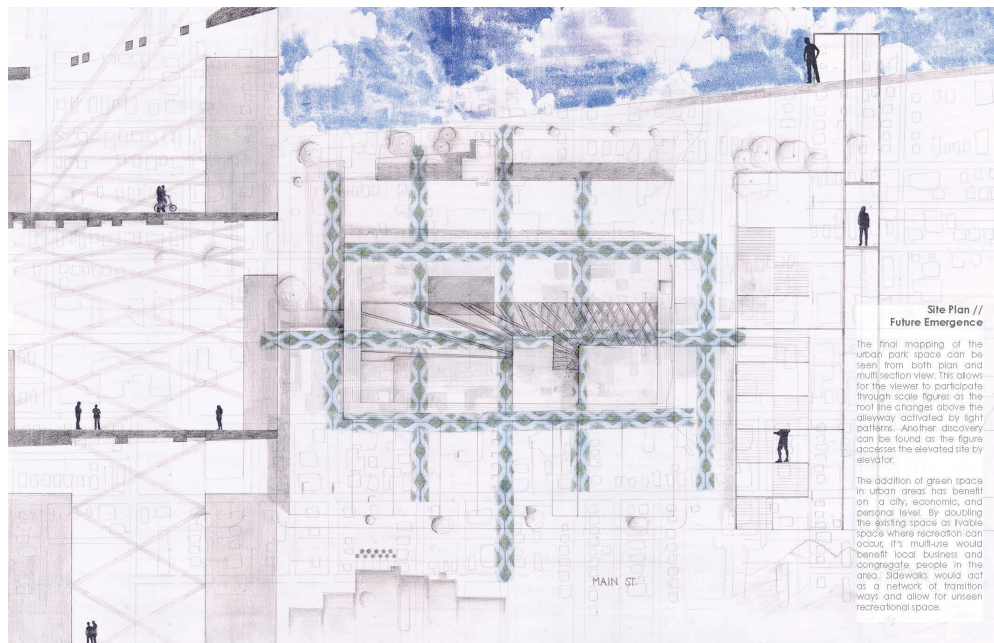


Fig. 05. Transferable and Scalable Design Intervention drawing demonstrating how the previously developed design strategy can be implemented on a new site using the established evaluation criteria.

Source: Anne Dominico

Conclusion

Through an iterative series of projects engaging in discussions of scale, students identified the interconnected systems and the micro-conditions of a specific site as agents for place-making. They engaged in different scales of design communication, human scale, and the scalable impact of design. Each assignment utilized the multiple ways in which scale is a part of design, with each iteration adding a layer of complexity to the discourse. The sequence of assignments equipped students with the necessary drawing and modeling skills for future studios and an ability to evaluate the scale of spaces while also enabling students to see how their design impacts the world around them and how logics can be scalable and transferable. The methodology gives agency to students for future design studios and empowers them to examine the world in a way that they can enact change. The pedagogy provided the capacity for students to engage in the nuanced conversation of scale generated by Morris's questions to Smith about the steel cube and to further interrogate the complexities of scale and scalable impact.

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