GENERATIVE TERMS FOR ARCHITECTURE

Language of Space and Form

JAMES ECKLER

LANGUAGE OF SPACE AND FORM

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GENERATIVE TERMS FOR ARCHITECTURE

James Eckler

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INTRODUCTION: ON THE ROLE OF WORDS IN THE DESIGN PROCESS

What is a generative term? And what role does it play in the process of design?

Words are tools for architectural design. They engage each step of the design process—at the conception of intent, the generation of spatial conditions, the representation of elements, and the communication of ideas in a resolved project. In this way, they have the capacity not only to illustrate what has been done but also to generate the ideas that direct what is to be done.

The language of design is not one of identification, but of intention: what something *does* can be more important than what it *is*. This language has the ability to do more than just identify the components that make up our environment; it has the ability to challenge designers to consider the role those components play in the operation of space.

The words presented in this book are used frequently in the architectural design discipline. These words are intended to be a point of departure for two things: discussion and conception. Discussion is an avenue toward realizing the possibilities of design, and conception is a process of thought derived from that realization. It is through discussion (either the exchange of ideas among peers, or the introspective questioning of one's own ideas) that the possibilities presented by various techniques, elements, or positions in architecture can be considered in the development of space. This is the foundation of architectural conception. These possibilities define a framework for study and testing. They also provide a trajectory for advancement through an iterative process of making. A word can define an intention for spatial operation or experience, a strategy for the development of spatial systems, or a technique for testing spatial qualities. The language of space and form is a language for architectural thinking.

How can a term be used as a design tool?

The terminology of design acts as a tool for the development of design intent or strategy. The language of space and form is a language that allows a designer to read and understand space, as well as to construct the ideas that drive its creation. The language of space and form is generative in that it does more than describe architectural gestures: it has the potential to be a foundation for their invention. A generative term is a catalyst for thought and inquiry, for exploration and discovery. A generative term is one that opens up possibilities for design and frames an intention for making space and crafting form. A generative term is a starting point—a position on what the architecture should be.

This book divides terms into five facets of architectural thinking: process and generation, organization and ordering, operation and experience, objects and assemblies, and representation and communication. These categories are not ordered to describe a sequence for the design process. Instead, they are to be considered, more often than not, as overlapping or interdependent. For instance, generative strategies can rarely be used independently of an ordering system to define limits. These categories become useful as a means of codifying design intent—for defining a role that a particular word might play in your own way of thinking about design. They speak to the various ways architects think of space and its creation, from the acts of thinking and making to the reading and interpreting of existing spaces. They are codified this way to act as guide for the development of the design process. Each word is a starting point for imagining and developing ideas for creating form and space.

The **process and generation** terms outline modes of thought or ways of making in the creation of form and space. For a designer, thinking and making go hand in hand. With that in mind, many of these terms will describe techniques for making that might be used to frame a process

of thought. Others may refer to an intellectual strategy as a guide for the making of space. Use these terms to articulate a goal or intent for the space that is to be designed, or to formulate a strategy by which that goal can be achieved.

The **organization and ordering** terms refer to strategies for inventing relationships between forms and spaces. This could be a system for deciding which elements are more important than others in a design. Or it could be a system for arranging spaces, functions, or form to achieve a desired outcome. Terms that define techniques for organizing elements of a design can also bring clarity or resolution to an idea. Use these terms to define the ways in which different elements of a design might interact with one another—physically, spatially, or functionally.

The **operation and experience** terms describe ways that an occupant might perceive or interact with form and space, as well as design intention for creating spaces that facilitate that perception or interaction. These are the descriptors of architecture's ability to engage the senses. They define the influence that sensory experience can have over design process and intent. Operation and experience represent specific aspirations of architecture. They have the potential to be catalysts for both thinking and making. They can direct the design process by establishing a set of conditions to be created in space and form. Utilize these terms as descriptors to generate the intent of a project, or even a single space. Use them as a way of directing conception of space as well as a means to evaluate results.

Objects and assemblies terms refer to strategies for the use of physical elements to construct or define space. These terms define formal typologies and form-based strategies for design. Additionally, they address joint-making and object relationships as components of the design process. Use these terms to describe the influence of formal qualities on the creation of space. They may also be used to explore the many possible roles that a joint might play in the creation of space, possibilities that move beyond the act of connecting one object to another.

The **representation and communication** terms present possible ways in which ideas of space and form are communicated through the act of making. These terms address the communication of ideas as a connection between the ways that form and space is understood and the ways that it is made. Use these terms to guide production of design so that in making space, you might better understand that space.

Process goes hand in hand with speculation. Questions test the possibilities of space, experience, operation, and construction. Questions lead the designer to discover what something *can be* instead of identifying what it *is*. A generative term is not a static definition, but a starting point for that speculation. Preconceptions in the reading of the built environment are undone through critical speculation. In keeping with this spirit of exploration and discovery, the words and categories presented here are by no means canonical or absolute. In many cases words may fit into multiple categories, as there may be multiple potential roles for them in a design process. In those instances other possibilities for the term are suggested.

There may also be (and should be) possibilities for a term that are not addressed here. There may be other categories, or subdivisions within a category, that evolve as students better understand their own way of thinking. To this end students should add their own notes, sketches, or additional entries to this text. This document, as well as the techniques and thoughts described within, should evolve with the student. New applications of a word to the process of making or conceiving of space should be recalled in later design efforts. As discoveries are made that relate to a word, they should be recorded for later use. This expansion in the understanding of a word's ability to be applied to the generation of architecture is important to the advancement of a designer's architectural process. Generative terminology is a guide for exploration as opposed to a reference to static preconceptions. Language is malleable.

This book is a guide for the development of design process and intended to follow students as they advance. It is a studio companion through the foundation levels and beyond. Every entry has multiple stages of information regarding the word at hand in order to engage students at multiple points in their academic careers. The entries will contain the definition of the word in the strictest sense in order to link the term to the common, conversational use that a foundation student might reference. Additionally, each entry will present a short narrative, and many are supported by images of student work to begin the process of exploring possibilities for that word in design. The images presented are those from design students in their first or second year of design studio education. They are meant to illustrate the use of the term as a design that other students can readily understand and access. Each entry will also have a text that will guide students in more advanced investigations of the term as they move beyond the foundation levels of design.

It is intended to provide additional inspiration for continuing to test ideas related to the term, its connotations, or its previous manifestations. Principally, this is a field guide for architecture students, allowing them to explore new avenues for their creativity. These generative terms will become tools, among many others, that students will develop for conceiving and interpreting architectural space. Those tools will open up many possibilities for creating architecture. Generative terminology will contribute to a more versatile process of design.

1. TERMS OF PROCESS AND GENERATION

ABSTRACT

To represent a subject in a way that is not pictorial or responsible for documenting its actual existence

Abstraction: An interpretation of a subject based upon a study of particular characteristics

Generative Possibilities in Non-Figural Representation

The drawing was an abstraction of a real subject—in this case, the plan of a building. It didn't look like the building; it didn't seem to conform to the image of the building at all. Instead, it revealed how the designer was thinking about the structure. The intention behind its composition seemed to be to study organization or spatial relationships. Abstraction was used to document a process of thought that ultimately led to a new design. Even though a casual observer might not be able to understand it entirely, it was a useful tool for the designer, a tool used to understand the old and to create the new.

The origin of the word *abstract* is the Latin *abstractus*, which means "to draw away." To make something abstract is to represent it in a nonliteral way: to deviate from the actual. Everything that designers produce, from conception to the development of a design, is a form of abstraction. Drawings, models, and diagrams reduce a reality into a representation, and therefore an abstraction.

How can design benefit from representation that moves away from actuality? Since each stage of a design process is an investigation that tests possibilities of space and form against a generating idea, abstraction is a means for defining the scope of the study. For instance, abstraction might be used to focus the study on one particular idea, composition, or set of relationships; it may be used to spotlight typology, configuration, or function, or to define a language for representing any of the above. It is a method that has the potential to exclude superfluous information so that the subject of study is not diluted in the information that is gained. As a method, it is able to frame a process of thought in a way that facilitates iteration. It is a way of simplifying complex information sets, or focusing a study on information of particular relevance.

Through abstraction, a designer might be able to recognize possibilities that were previously not considered. Those discoveries drive subsequent investigations, which is the foundation of an iterative design process. When a representation is not abstract—that is, when it is figural—capturing the reality of the subject becomes a goal unto itself. That finality has the potential to limit discovery and undermine the iterative process.

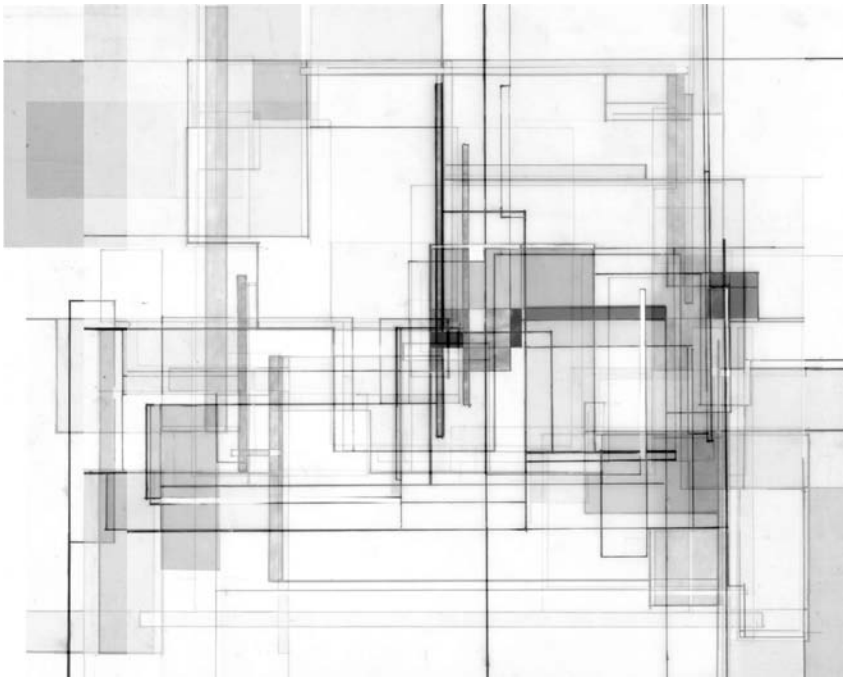

Figure 1.1. In this analytical mapping the student uses abstract graphic language to indicate relationships between elements of a composition. Components of the subject of analysis are reduced to orthogonal figures (an act of abstraction) in order to more easily identify relative position, alignment, overlap, and other instances of compositional relationship. **Student: Taylor Orsini—Critic: John Maze—Institution: University of Florida**

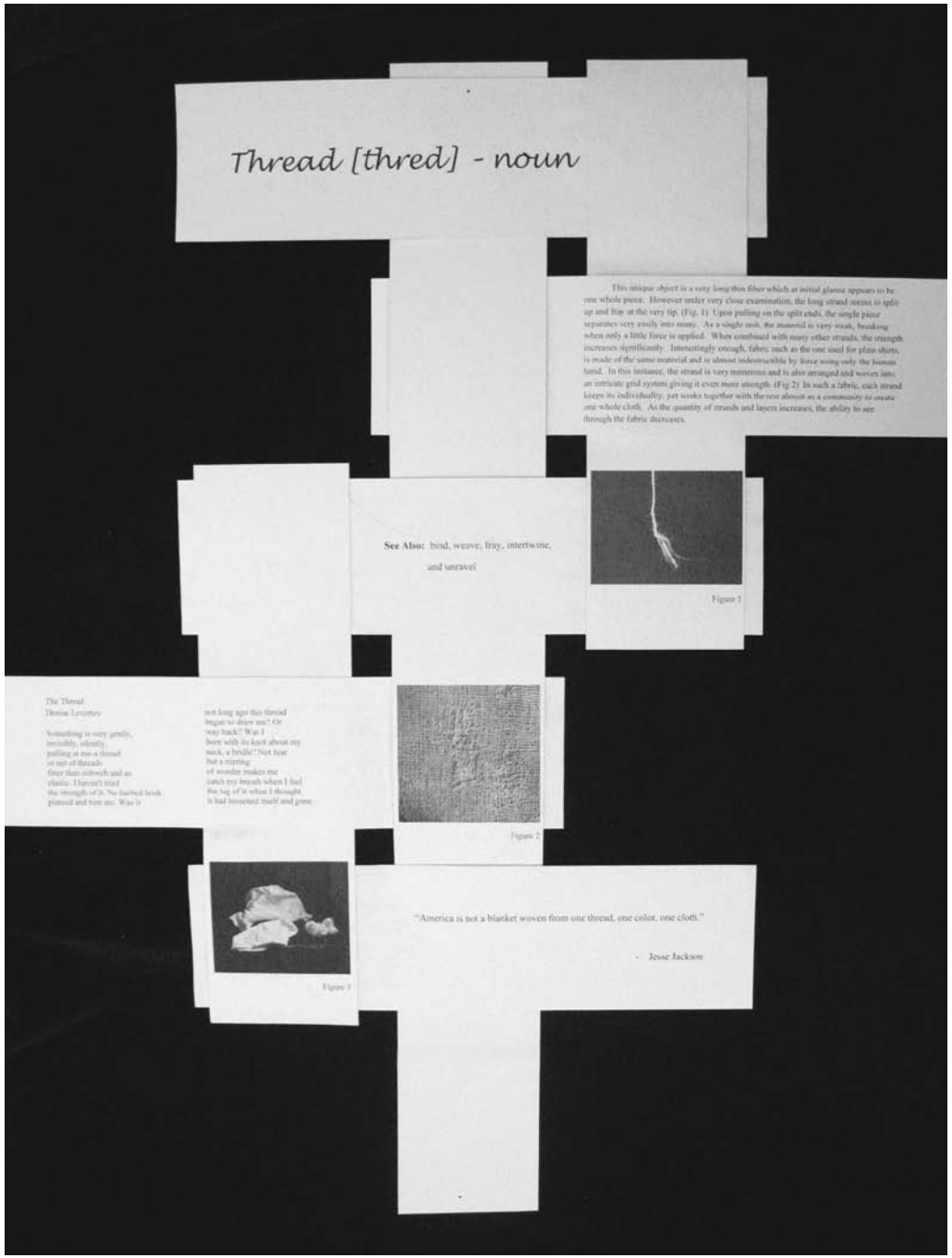

Figure 1.2. This is a presentation of information gathered through research. The information is composed in a way that reflects its role in the design it is to generate. In this case, information about form and material are abstracted into a method of assembly specific to the topic of research. This frames a point of departure for further design investigations. **Student: Bart Bajda—Critic: Matthew Mindrup—Institution: Marywood University**

ADDITIVE

A strategy of making characterized by accumulation

Generative Possibilities in Accumulation

Faced with a challenging and complex integration of spaces, each holding a different event, the student decided to employ an additive strategy for making. She did this in order to definitively articulate each space without changing the tectonic language that she had established earlier in the design. She continued to accumulate elements that defined each space and the joints between them until the density of components became confusing. Spaces began to lose their distinction, and the assembly of parts began to lose its rationale. At that point she began a subtractive process to edit the design. Her goal was to discover that perfect moment when the accumulation of components allowed each space to be distinct but still an integral part of the larger spatial composition.

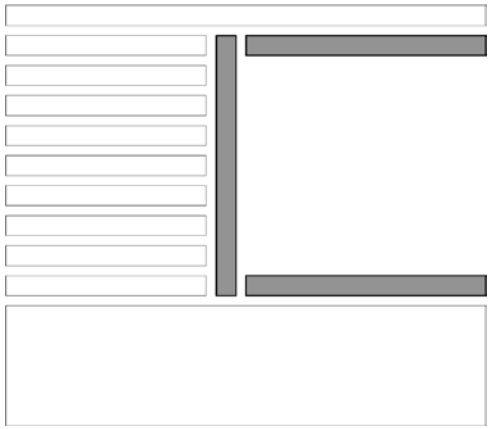

Figure 1.3. This shows how one might build up a component through an additive way of making. The single component is actually an assembly of much smaller parts. The opening to the right of the assembly is achieved by altering the size and configuration of elements rather than cutting away at the component.

Addition is a simple process that allows a designer to quickly iterate a design through intuitive decision making. As more and more objects accumulate, it becomes possible for progressively more ideas to be generated. This strategy for iteration fosters discovery; however, using it, the designer may become preoccupied with the forms that define a space, rather than the space itself. In

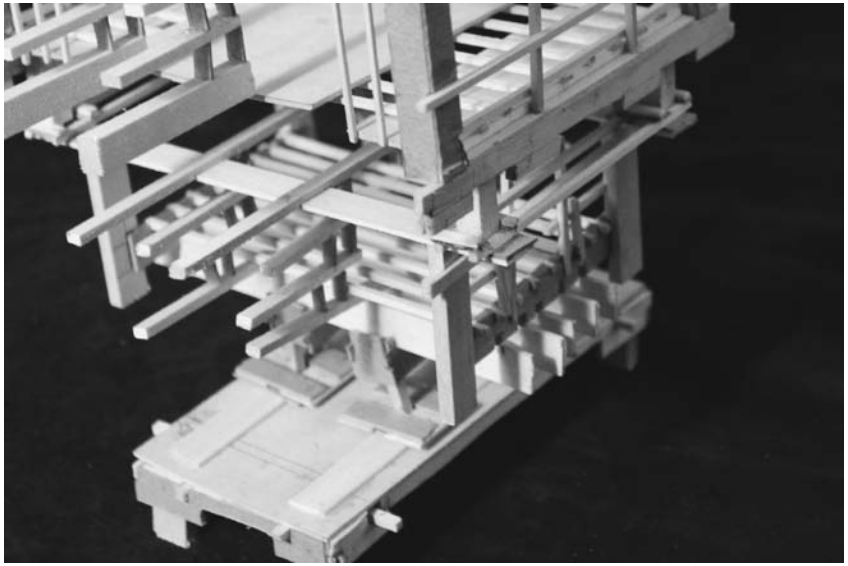

Figure 1.4. Additive making can be a strategy for assembly. Crafting intricate joints between many elements can provide opportunities for the design of the spaces they contain. It might be a way of affecting the space by filter light or providing access. It might also be a way of communicating relationships between parts through physical connection. **Student: Dan Mojsa—Critic: Reagan King—Institution: Marywood University**

that instance additive making is gratuitous and possibly a distraction from the primary design objective. It shifts the focus of the design process away from making spaces and toward a preoccupation with craft and objects.

In what ways might this, as a method, propel a design into another level of resolution, or begin the next iterative step? As a preliminary design technique, it could be employed to discern variations in spatial composition as described in the narrative. Or it could be used to develop a tectonic language for the communication of spatial information that can be employed in future iterations of a design. In addition to this strategy for making through accumulation, it can also describe a strategy for making at a smaller scale. Individual components or elements to be layered or built up can be developed through additive techniques. This contrasts with the subtractive carving of large pieces to create individual components. The additive and the subtractive speak to the difference between the tectonic and stereotomic methods for crafting.

» *See also* Subtractive.

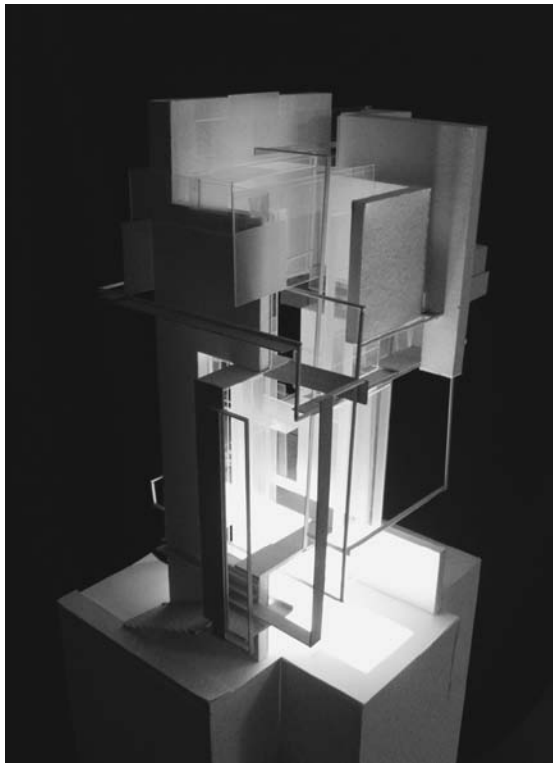

Figure 1.5. Additive making can also be a strategy for the configuration of space. Different materials can foster control over inhabitants' perceptions; the intricate assembly of elements can foster precise control over the configuration of spaces they contain. **Student: John Levi Weigand—Critic: John Maze—Institution: University of Florida**

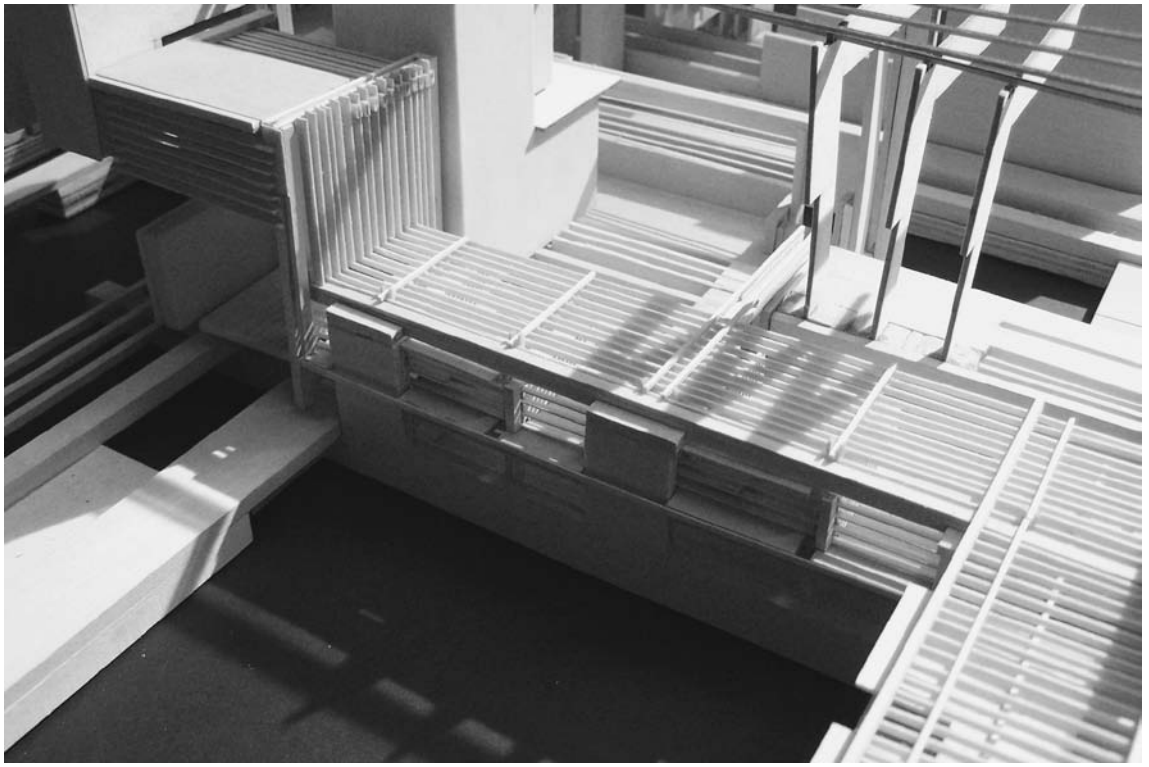

Figure 1.6. Additive assembly furthers control over the play of light in space. These techniques of assembly also establish a hierarchy through the size and configuration of elements. They help communicate a scale through the relative proportion of elements to the spaces they contain. They also communicate organizational logic by indicating direction, a relationship to other elements, and patterning. **Student: Liu Liu—Critic: James Eckler—Institution: University of Cincinnati**

ANALYSIS

The process of separating a complex subject into constituent parts so that each part can be studied independently

Generative Possibilities in Investigation and Inquiry

An architect has just received a project about which he is very excited. A couple who purchased an older, historic house has asked him to design an addition that preserves the character of the original structure.

Before design can begin, an extensive study of the existing conditions has to take place. The architect begins by analyzing the site, breaking it up into several categories of study: dimension and topography, existing site features, adjacent buildings, and public access. The addition will have to respond to the existing spatial composition of the house, so he analyzes circulation, program, and degrees of privacy. The new addition also has to respond efficiently to the environment, so he analyzes it in relations to daylight, solar orientation, and climate. All of these studies enable him to conceive of a design strategy through synthesis. The product of that synthesis is a single diagram that incorporates the information gained from each individual study into a spatial composition. He uses that diagram to develop the first set of process drawings and models.

Analysis is a type of abstraction in which a designer is able to isolate pieces of information from a more complex set of issues. Those isolated parts can then be more effectively studied. The primary goal of analysis is to generate information of something particular. How is the process of analysis generative? How does it generate information? How does it generate design?

Documentation is often confused with analysis. One might note the direction of the wind across a site; that is documentation. But studying the impact that wind might have on a design is analysis. Similarly, mapping the program in a building is not in itself an analysis because there is no study or generation of knowledge. But by mapping the programs of a building relative to the number of people inhabiting its spaces, the building's actual primary function might be determined. From this information new ideas for augmenting that building might be conceived. Analysis facilitates learning as a form of research and inquiry. Analysis generates new information as a function of design.

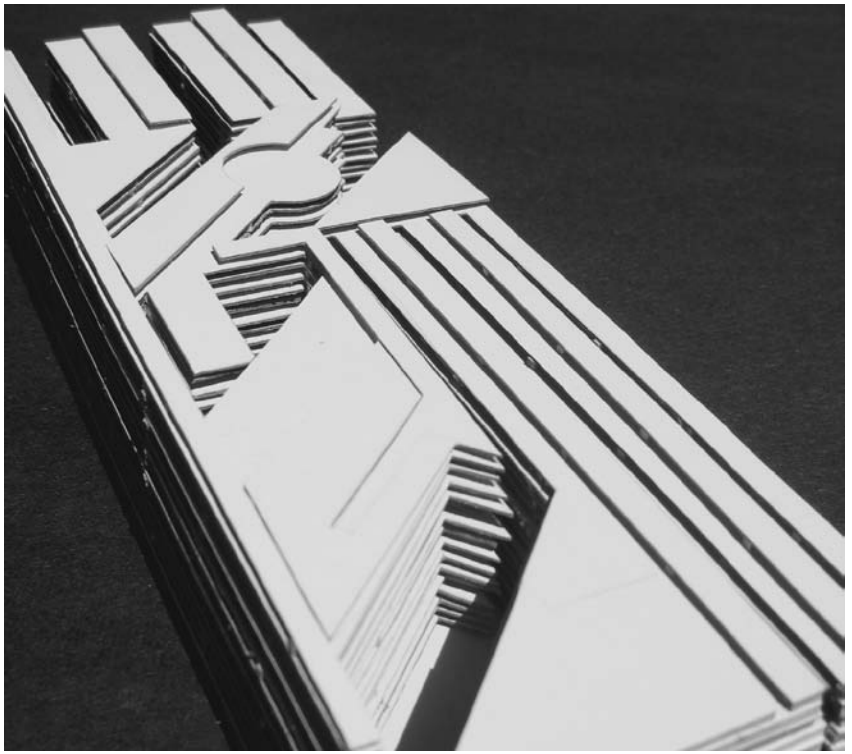

Figure 1.7. Components of a precedent building are analyzed to discover the ways in which they are related through both formal and spatial connections. In this analysis, the building is reduced to a set of interrelated systems. **Student: Elizabeth Sydnor—Critic: Milagros Zingoni—Institution: Arizona State University**

This is important to the design process, as it is often a vehicle for iteration. Analysis presents new possibilities for design as new information is generated. Discovering how far daylight penetrates into a space might lead to testing other design variations of an edge. An analysis of program as it impacts the arrangement of the new spaces in the previous example will lead to testing new methods for organizing and distributing the functions of the new design. The importance of analysis to a design process—especially when coupled with a synthesis of parts—lies in its ability to define limits for experimentation and measurable criteria for success.

» *See also* Synthesis.

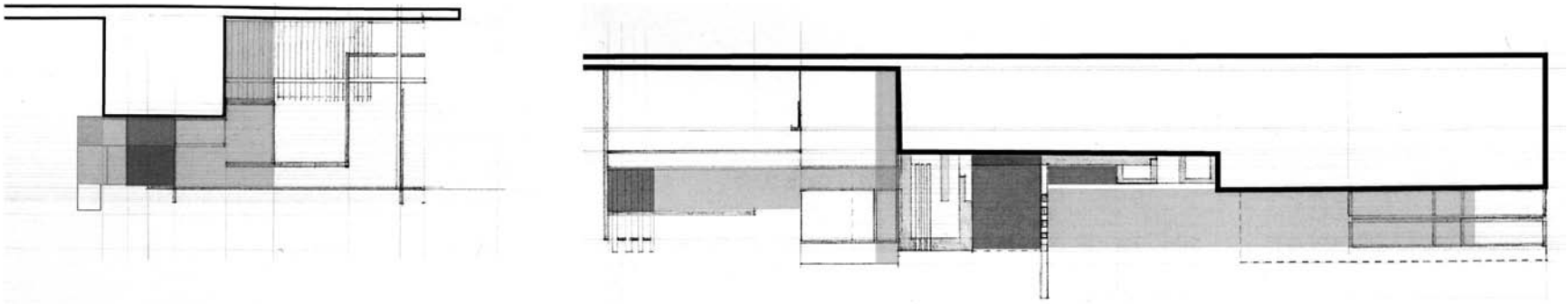

Figure 1.8. Analysis is a form of research and inquiry that relies on the separation of a complex system into its constituent parts. In this case the student investigates multiple spatial functions within her project. This analysis yields compositional information regarding spatial relationships relative to tectonic assembly. **Student: Michelle Mahoney—Critic: James Eckler—Institution: University of Cincinnati**

COMPOSE

To arrange the parts of a whole

To physically relate elements

To configure space or form through making

Composition: Any instance of arrangement, relationship, or configuration

Generative Possibilities in Configuring Elements

She made a set of models, each one in accordance with the requirements of a single function within the program. She had resolved the details specific to the various parts of the program, but she realized that she didn't know how the parts should relate to one another.

So she sketched out strategies for positioning the parts relative to one another. From those sketches she started to arrange the parts. She would place one next to, on top of, or interlocked with another. She would continually reposition parts, sliding one a little along the surface of another, or rotating a part in minute intervals. Through the composition of parts she was able to define the relationships between aspects of her project. The act of arranging generated ideas for the way in which parts would be linked together.

Composition consists of a set of principles that direct the positioning or arranging of elements. The compositional act occurs any time two or more components are arranged, and it is fundamental to architectural thinking. It is present in the processes of formal assembly and defining spatial relationships. Compositional principles can also be employed in documentation, analysis, and representation. Composition influences nearly every aspect of the architectural design process. One space cannot be related to another without relying on compositional logic to position them relative to each another. Composition is therefore inherent to design, whether it is a product of design intent or merely an afterthought. Compositional principles can be used as design tools; they inform decision making by providing criteria for relating elements.

If principles of composition are used throughout the process of design, how can they be specifically applied to individual goals? How can compositional principles be used to define particular methods within a process if it is

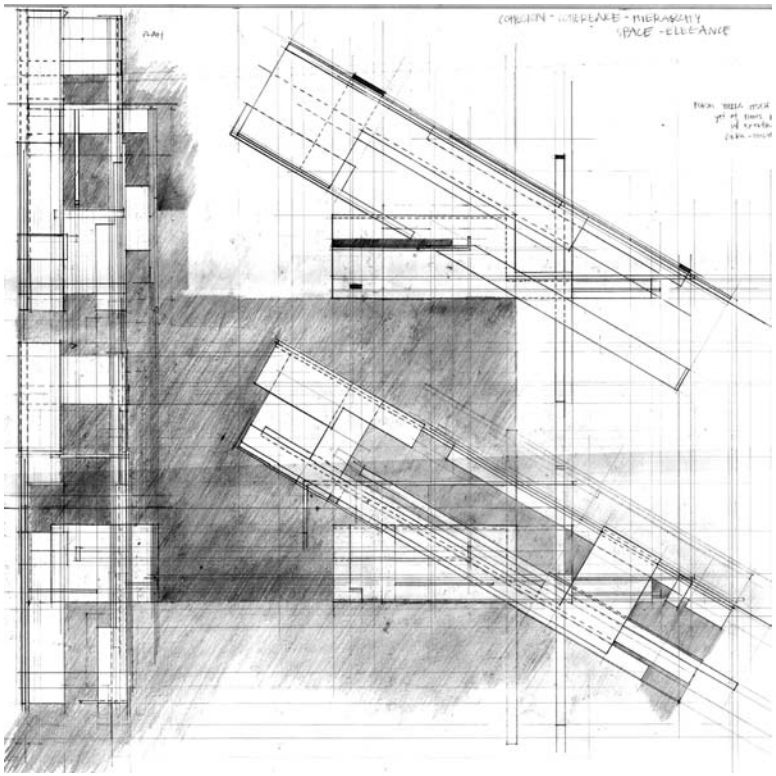

Figure 1.9. Composition is the adherence to a set of guidelines that allows us to determine relationships among components. Here composition is used to further the communication of spatial and formal configuration. Plan drawings are correlated with section drawings in the way they are composed relative to one another. Registration lines reinforce the correlation and specifically reference individual elements of the project. **Student: Ashley Eldringhoff—Critic: Michael Hamilton—Institution: Louisiana State University**

integral to so many aspects of process? All of the various applications of compositional principles to design thinking can be divided into two types. Those types are defined by the intent of the compositional effort and its position within the process of development. Composition can be either exploratory in nature, or it can be communicative.

Exploratory composition seeks to discover that which was previously unobserved. It is generative in that this type of composition is intended to develop design ideas or expand on existing ones. This process tends to be more intuitive than formulaic. It involves arranging components of a design through drawing, modeling, or other means of craft in order to figure out various configurations or relationships. Using composition as a tool for exploration results in a freedom from responsibilities greater than basic compositional principles. It is a method for iterating and testing ideas quickly based upon relationships that pertain to proportion, organization, proximity, and hierarchy. It can be a valuable method for forming a design intent, strategizing the way different elements might interact, or analyzing aspects of an existing condition that are not evident at first glance.

This exploratory intent is usually reliant on the abstraction of a graphic language in order to reduce the amount of information being processed through the act of making. Elements are reduced to basic components and evaluated according to simple ideas of relationship. This sometimes makes the information difficult to understand by those outside the process. Exploratory composition is primarily a tool for conception rather than communication, and as such it should advance the understanding of a project even if those ideas are not explicitly represented.

As opposed to the implicit information of abstraction and exploration, communicative composition relies on the explicit documentation of relationships. That documentation is meant to be clearly legible to a larger audience so that design ideas can be understood without explanation. This type of communicative composition often relies on conventions for representation—on a graphic language that is uniform and commonly accepted. At this stage in the process, composition becomes a tool for resolving more complex ideas. Here more responsibilities can be added to the process. Issues of proportion, organization, proximity, and hierarchy can be used to define issues of program, structure, scale, movement, and environment. Communicative composition is not necessarily relegated to documenting complete design ideas, but it can be used in bringing greater specificity to them. Whereas exploratory composition remains generic, communicative composition becomes specific through process.

Figure 1.10. Compositional principles can provide a simplified language for documenting and analyzing an existing project. They can also provide a simplified language to begin the design process of a new project, as in this example. In positioning, proportioning, and connecting various elements in a simple composition, decisions and discoveries can be made that help shape future iterations. **Student: Mckinley Mertz—Critic: John Humphries—Institution: Miami University**

Figure 1.11. The same principles that govern graphic language can also be applied to the architectural language of built form. In this instance composition relates the size, shape, and proportion of an aperture to the plane it penetrates. Composition provides a logic for the assembly that defines the aperture within the plane. It also determines the relationship between that plane and other components of the construct. **Student: Cari Williams—Critic: James Eckler—Institution: Marywood University**

DIAGRAM

An imprecise drawing meant to illustrate a plan or an idea

An abstract representation used as a tool for study or analysis

To create one of the above

Generative Possibilities in Simplified Representation

He wanted to understand his site, a busy street corner. The buildings were tall and often held multiple programs. The sidewalks were crowded with pedestrians, and the streets clogged with vehicles. There were too many variables to account for, and no obvious starting point for the design process.

He began diagramming. He wanted to simplify the information so that it could be more easily understood. He began mapping various aspects of the site: where people walked, where they paused, where cars would park, and the different programs around the intersection. He also documented physical characteristics of the site: its shape, the size and proportion of buildings around it, and environmental factors. Each of these issues was produced independently. Each was drawn on a separate sheet. When he understood each issue separately, he layered the translucent sheets. Looking through them he began to see relationships and correlations between different issues as they overlapped. The simplified graphic language enabled him to understand more about the site, and it provided a construct to which he could respond architecturally.

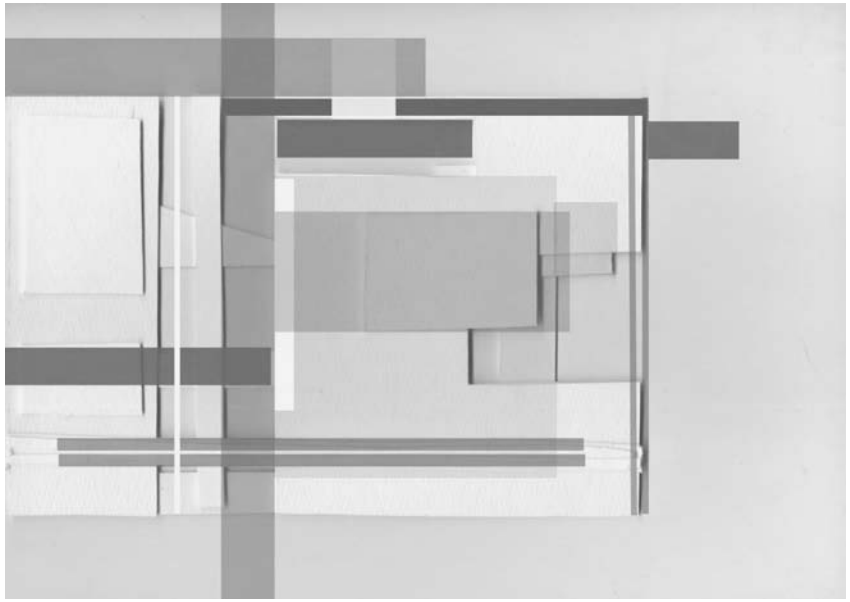

Figure 1.12. This diagram is overlaid onto an image of a model. It diagrams compositional relationships between parts of the model. The diagram is a tool that can be used for reading and interpreting an existing condition; it can also be used to generate new ideas. **Student: Unknown—Critic: John Humphries—Institution: Miami University**

The diagram plays a crucial role in the architectural design process. It is something that, through crude graphic language, can quickly illustrate rudimentary design ideas as well as formal or spatial patterns. The origins of the word *diagram* lie in the Latin *diagramma* and the Greek *diágramma*, which both refer to something marked by lines. This origin speaks to a simplicity important in current applications. The diagram, as it applies to architectural process, is something that strips away irrelevant content in order to illustrate a specific set of information. The reductive graphic language used to construct it makes the diagram simple to generate and simple to read.

How can simplicity of language contribute to a design process? How can it influence design ideas? Because of the minimalist quality of diagrammatic language, it can be applied in two ways. The diagram can act as a starting point for design or problem solving. Or it can be used to clearly communicate ideas to others.

The generative diagram relies on abstraction to establish a simple graphic language. This abstraction better enables the designer to quickly iterate

design ideas or to invent solutions to design problems. The abstract diagrammatic language creates a convention for representation in which only specific elements are included. This quality makes the generative diagram an ideal vehicle for most analytical exercises. Decisions can not only be made through the production of the diagram, but they can be tested through an iterative sequence. There is also the potential for the diagrammatic language to influence a more sophisticated design language developed later in the process. As the diagram is transformed from the first iteration to the next, more explicit information can be layered into its construction. As this occurs, the generic and abstracted language of the original diagram can evolve into the explicit and literal language of a resolved design.

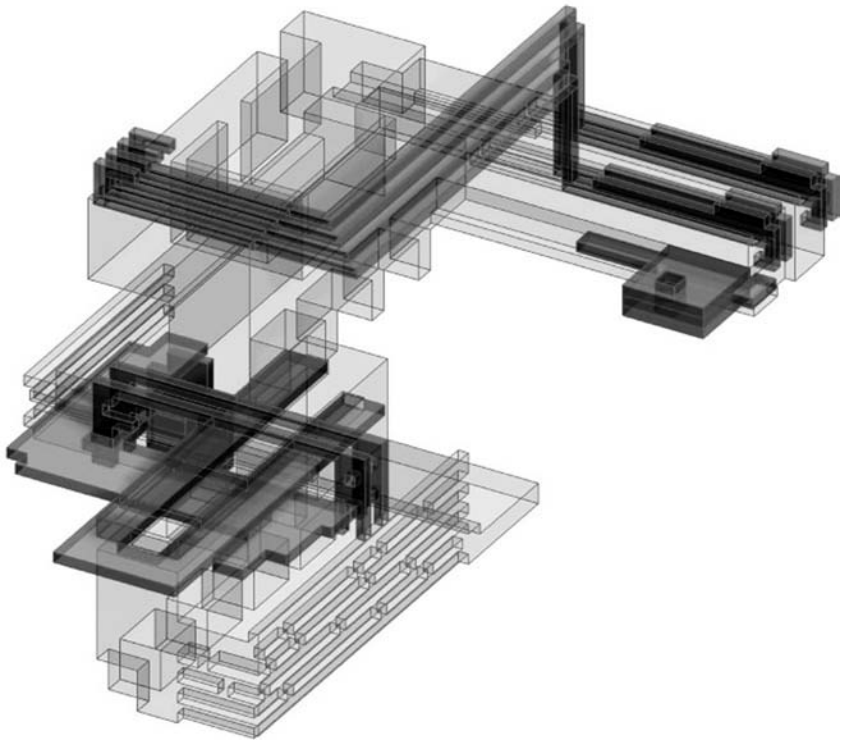

Figure 1.13. This is a generative diagram produced digitally. It studies the composition and joinery of components within an assembly. It is generative because every decision made in its production leads to a new discovery that ultimately motivates the student to change or reconfigure the design. It is a document that evolves; it is continuously reworked as it is produced. **Student: George Faber—Critic: James Eckler—Institution: University of Cincinnati**

Communicative diagrams establish symbolic conventions that can be used to quickly illustrate simple ideas or functions of a design. They are used less often to test or analyze than to simplify complex information sets. A broader range of people can more easily understand the simplified representation of architectural ideas in communicative diagrams. They reflect decisions that have already been made through process and documented in an easily accessible way. Often these communicative devices isolate one idea or function from others in a design in order to reduce overlapping information that may overwhelm or confuse someone unfamiliar with the project.

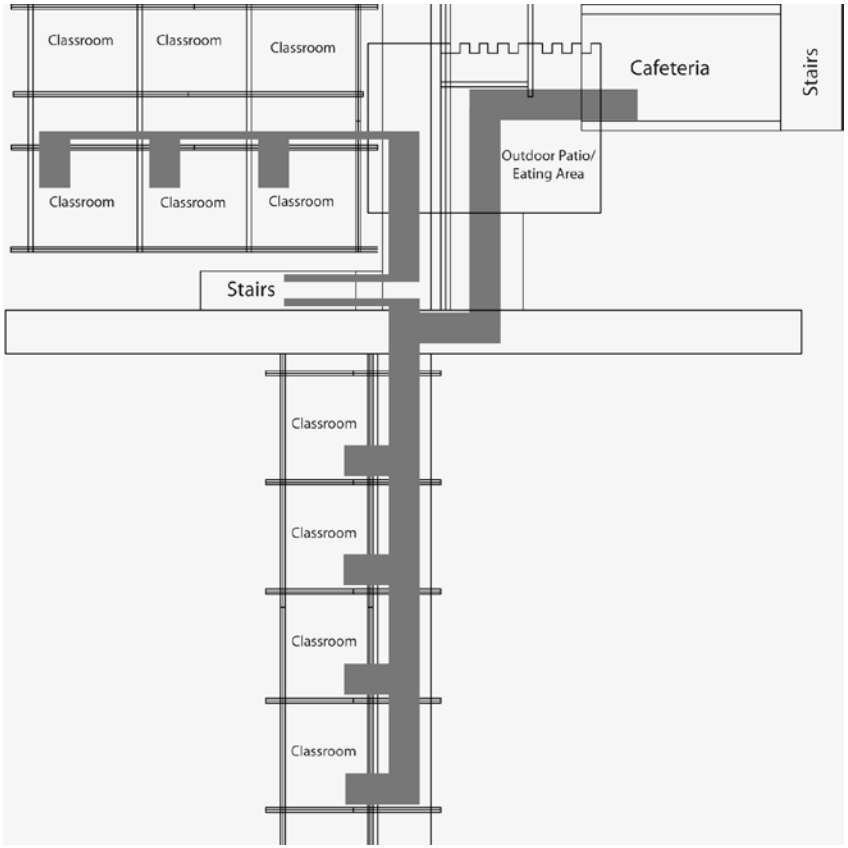

Figure 1.14. Not all diagrams have to be generative in nature. This one is used as a communicative tool. It reduces a complex set of spatial and formal conditions to a simple piece of information. It communicates the location of pathways through a project so that others might more easily understand the intent of the design. **Student: Tim Smith—Critic: James Eckler—Institution: University of Cincinnati**

GENERATE

To create or invent through process

Generative Possibilities in Found Ideas

He wasn't sure how to proceed. He had some ideas and criteria the design had to satisfy, but not enough to formulate a scheme. He began making a simple, gestural representation of one of his ideas applied to a small fragment of the overall project. As he made the model, crafting techniques and material limitations provided a framework for his thinking, and his ideas began to resolve. In making, the compositional decisions he made provided opportunities for even more development. The more he crafted, the more spatial and formal information existed that he could respond to in later iterations. Each decision generated opportunities for subsequent ones. As ideas became resolved in form and space, new concepts were generated to build upon those ideas.

Process results in the generation of something either physical or conceptual. Consequently, many of the creations of process can be used as generative devices. These devices are iterations or studies that precede, build up to, or facilitate the making or conception of something else—another iteration, or another conclusive product. The origin of the word *generate* lies in the Latin *generÇre*, meaning "to produce." However, the root is *gener–*, meaning "to give birth or beget." Two important connotations can be drawn from this history: that its relation to production correlates with craft, and that its reference to birth—or the creation of generations—correlates with iteration. Each successive generation is built upon those previous to it. It can also be inferred that each generation forms a foundation for those that come after.

What are the goals of a generative device in the design process? What makes a generative device different from one that is not? The generative device can be composed in many ways, using many crafting techniques

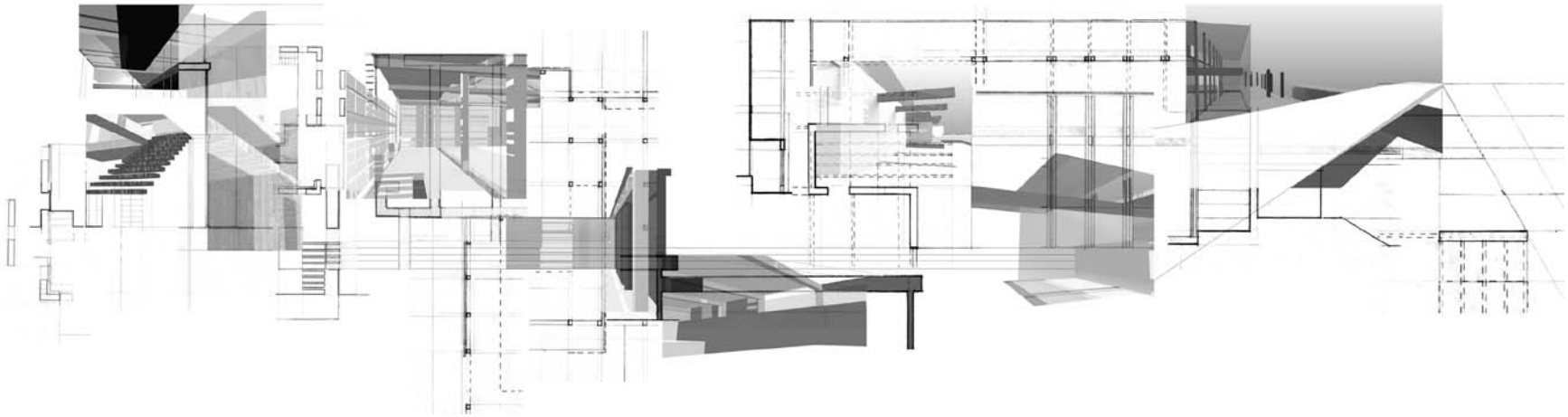

Figure 1.15. This document is a hybrid drawing of an itinerary through the spaces of a project. It integrates fragments of plan, section, and perspective as a study of the spatial and experiential consequences of tectonic assembly. It is used as a generative document—one from which new ideas emerge for design. It provides a point of departure for future design iterations. **Student: MaryJo Minerich—Critic: James Eckler—Institution: University of Cincinnati**

and media. It is created with the intent to develop some spatial idea, to test an idea, or to investigate techniques for representing or refining the idea. It is a tool for architectural conception that contributes to the linking of making and thinking throughout the design process. For instance, if a diagram produces an idea for the way a space is to be used, and then several models are created to test variations of that space to accommodate that use, the diagram was used as a generative device. Just as process refers to both physical craft and conception, generation can refer to both physical conditions and ideas.

Generating the physical condition, the form or space of architecture, can be based in production or testing. Production most often refers to aspects of craft intended to represent ideas. They may or may not become generative devices; they are often the final iteration or the outcome of previous stages of a process. Testing refers to the sequential creation of iterative studies. Each study has the potential then to be the generative device for those that come after it. Techniques for representation are important throughout this stage of process as well, but they are deployed with the intent to create or resolve an idea rather than being used strictly for communication.

Generating ideas for design is closely linked to physical craft. A design concept might drive the functional, spatial, or formal characteristics of architecture. And the physical production of space—the act of making—might yield ideas for the way it is to function or be used. Concept as a generative device may be rooted in metaphor, precedent, or a desire for a particular experiential event to be manifest in the architecture. Craft as a generative device can then resolve or refine those initial ideas.

» *See also* Iteration; Process.

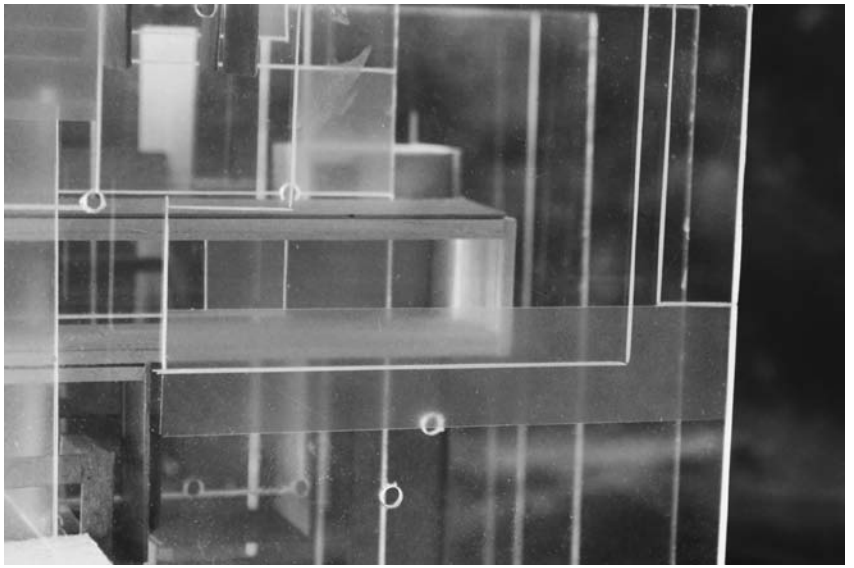

Figure 1.16. In this example, the student uses an analytical diagram as a generator. The original analysis is of compositional devices in a painting. That information is used as a guide for construction, assembly, and ultimately, for spatial composition. **Student: Dave Perry—Critic: James Eckler—Institution: Marywood University**

GRAFT

To attach one part onto another

A means of combining two or more unlike elements

Generative Possibilities in Conjoining

The project involved the design of an addition to an existing building. The building was old, and it was created using materials and techniques that are no longer available. The new addition would have to relate to the original building in some other way.

The architect decided to graft the new addition to the building: it would be conceived as distinct structure from that of the original, yet it would be connected as if fused to the older structure. Any attempt to re-create the characteristics of the first building, he believed, would result in a poor imitation at best. So the strategy called for each building to advertise its role and its place in the evolution of the structure.

He chose materials that were noticeably different from those of the original. He composed the facades in a way that would immediately distinguish the newer portion from the older one. Similarly, spaces were composed using a very different set of guidelines so the new structure could accommodate different programs. At the point of connection between the old and new, pathways and corridors met one another to provide spatial continuity. The two were attached but maintained their individual identity.

Grafting is a technique of formal composition in which two unlike elements are physically attached. The process involves a physical transformation of both objects at the point of the graft. Connections of adjacency or simple assembly do not typically constitute a graft because the process of connection does not entail the physical transformation of the objects. Furthermore, in the typical scenario for grafting, an existing element receives a new element as an addition or augmentation. Grafting a newly designed component onto an existing one takes advantage of the previously established formal distinction between the two entities. Otherwise, two newly designed elements that are integrated with one another may provide the appearance of a grafted joint. However, because they were conceived as conjoined objects, they lack the distinction that makes grafting possible.

This augmentation can produce three types of relationships between the elements that are connected: synthetic, symbiotic, or parasitic. A synthetic relationship between components implies that the connection fully

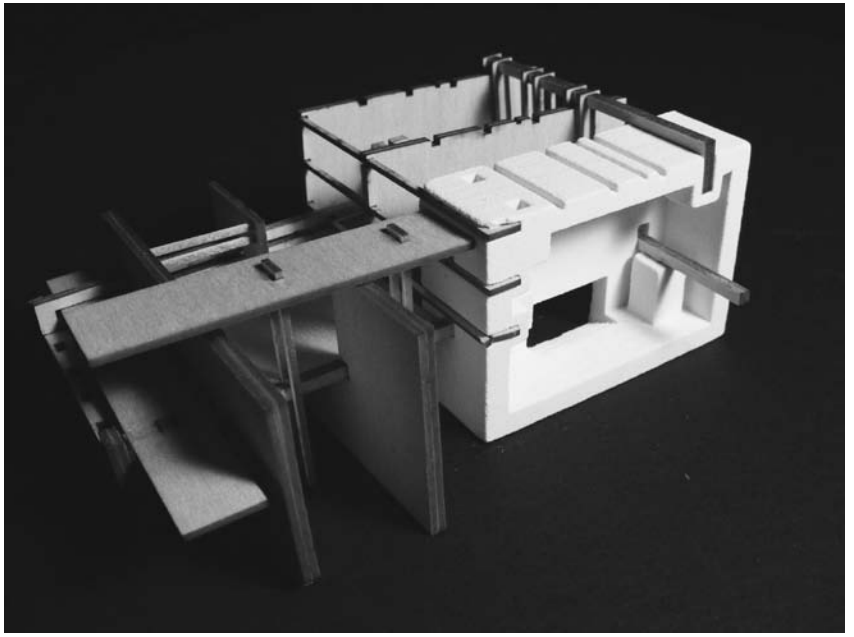

Figure 1.17. The wooden planar structure on the left side of the image is grafted to white mass on the right. Members are elements inserted into grooves in the mass, making a seam joining the two constructs.
Student: Tim Smith—Critic: James Eckler—Institution: University of Cincinnati

integrates their forms and functions into a singular construct. A symbiotic relationship between the components of a grafted joint implies that the two elements maintain some formal distinction but operate as complements to one another, both compositionally and programmatically. A parasitic graft implies that both components remain as distinct elements despite the physical connection between them, and that one is formally or programmatically dependent upon the other.

How might this act of joinery impact spatial conception? A graft is a technique for making; however, it might also be a reflection of the intent to relate elements. Grafting one piece onto another could be an appropriate method for combining the spaces that hold two distinct programs. It may also be one method of extending an existing spatial construction while maintaining the ability to recognize the original versus the addition. Formally grafting one element to another in order to achieve a particular compositional relationship might be driven by the need to define that same type of relationship between spaces, programs, or disparate organizational structures, or between experiences within a spatial sequence.

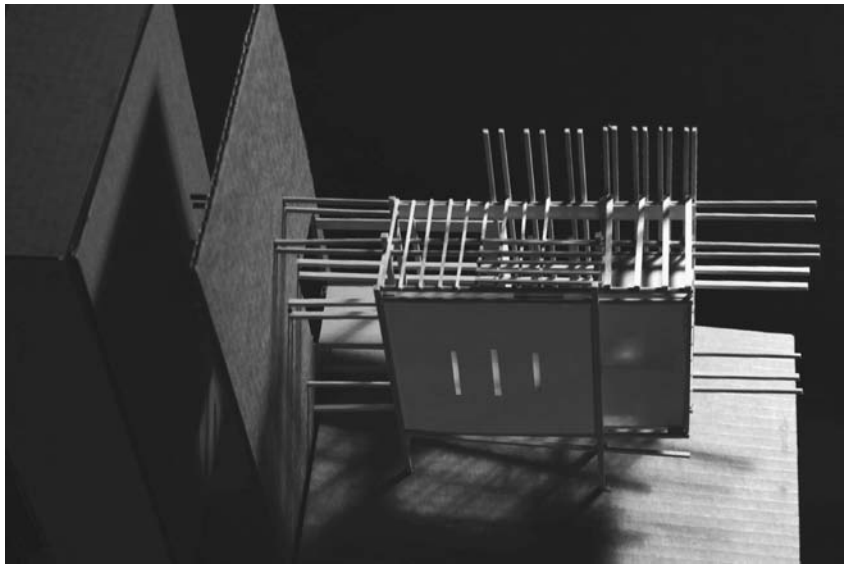

Figure 1.18. In this example, framing elements extend from the main body of the construct to penetrate the surfaces below and to the side of it, grafting it to them. **Student: Kendall Klaus—Critic: John Humphries—Institution: Miami University**

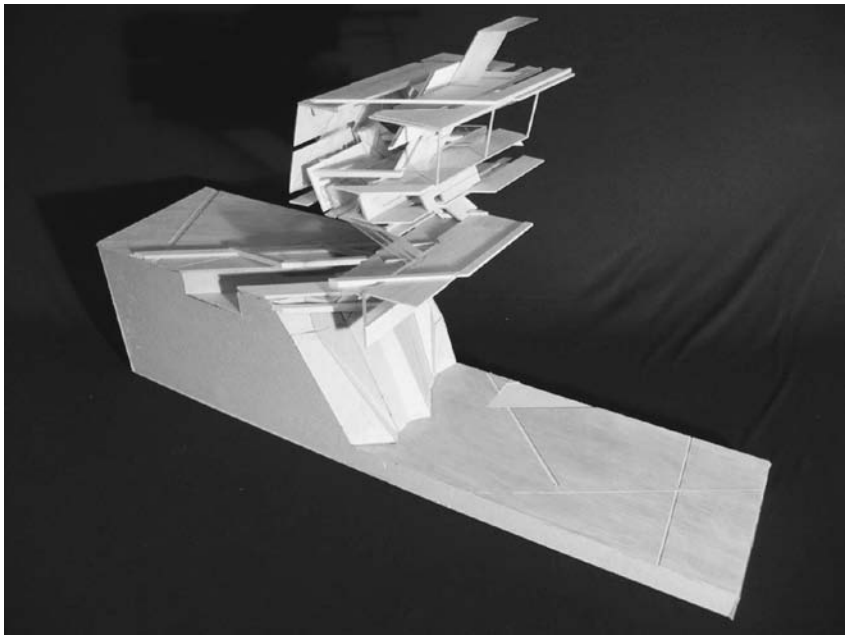

Figure 1.19. The projection of the spatial construct from the surface below it is accomplished using a graft. The lower portion of the model is attached to the ground plane using a series of stacked and embedded planes, grafting it to that surface. **Student: Wendell Montgomery—Critic: Jason Towers—Institution: Valencia Community College**

INJECT

To place or force into

Generative Possibilities in Positioning Within

There was an old factory on Main Street. It had been abandoned for years. The people of this town had become apathetic toward it. When they walked from one store to the next, they ignored the looming brick building with broken arched windows. This perception changed when a local man purchased the old factory with the intention of turning it into residential units.

In an effort to keep the shell of the building undisturbed, except where it needed repair, the new units would be built within the existing outer walls. The design concept was to build a new building within the old shell. The interior of the factory was demolished, and new walls erected in their place. The joint between the older shell and the newer interior was made obvious.

The units varied in size; some had one of the big windows, and others had two. In some places the residences were moved toward the interior to provide circulation up against the old wall of windows. It was in those places that it was most apparent that the newer apartments were injected into the previous structure. They were designed without any intent to respond or be structured by the existing shell.

Injection is a principle of formal composition in which an existing element is altered in order to receive another positioned within it. The implication of a forced placement of one element into another is a result of altering the existing element while maintaining the integrity of the new object. Additionally, after the process is complete, both components preserve their distinctiveness; one will always be read as being within the other.

In this instance injection implies that a form is being regarded as a kind of small-scale context within which another is inserted. How might this action influence the generation of architecture? This compositional principle is an act of making in which one element is placed within space that is created by another. This physical relationship between the form that receives and the one placed within it can also reflect a conceptual relationship between programs or experiences. One spatial quality might be set within a larger volume, thereby defining a different zone that impacts sequence, progression, experience, and program. A smaller addition to an existing programmatic scheme might be manifest through the injection of small structures into a larger volume. As with other techniques for making, injection has the potential to frame a way of thinking about the spaces and forms that result from it, influencing the conception of architecture.

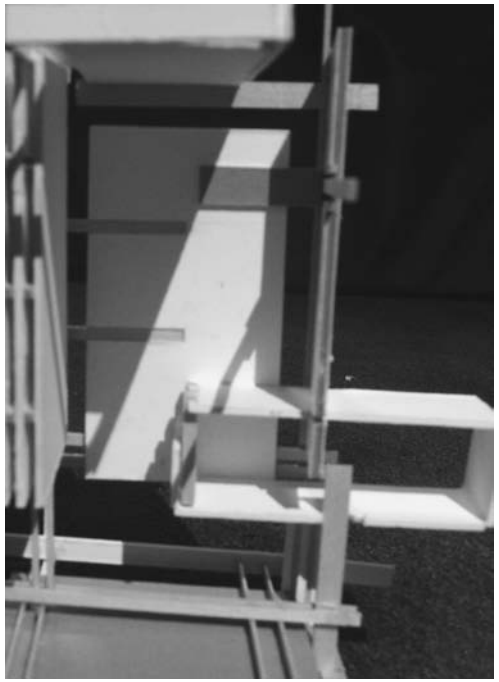

Figure 1.20. The small horizontal volume on the right side of the image is inserted into the main volume as if by injection. **Student: Michelle Mahoney—Critic: James Eckler—Institution: University of Cincinnati**

Figure 1.21. The space in the background of the image is contained within an assembly distinct from those around it. It is brought into the larger volume as if injected into the space guided by the rails beneath it. Student: Nick Reuther—Critic: James Eckler—Institution: Marywood University

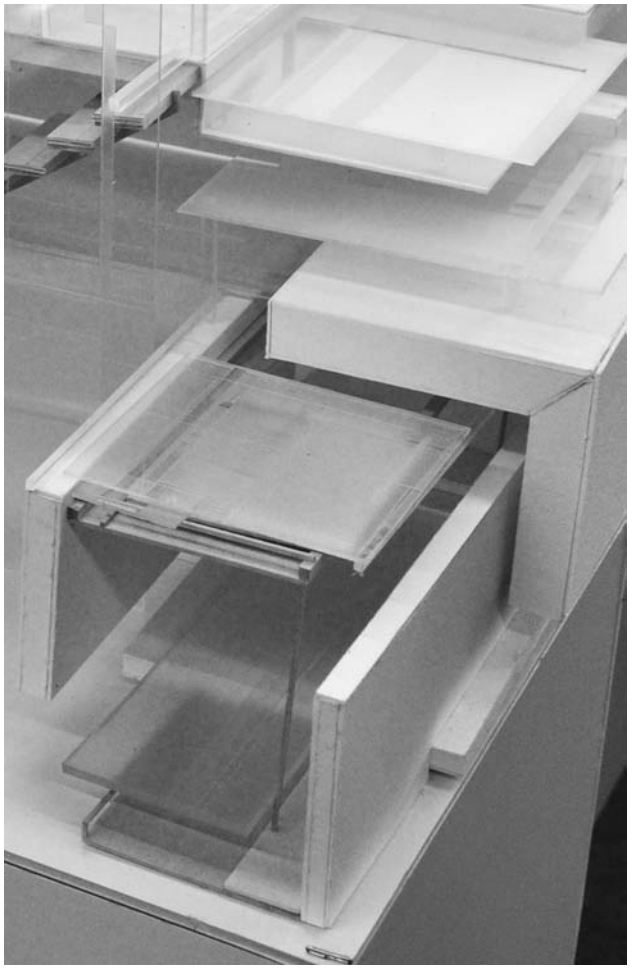

Figure 1.22. The smaller assembly of frames and planes are injected into the cavity within the larger white mass. Student: Nika Bonapour—Critic: John Maze—Institution: University of Florida

INTERVENE

To interrupt or place between

To involve an element or event in a larger circumstance in a way that affects both

Generative Possibilities in Interruption

The town has a particular character. Street vendors line the sidewalk. Each table of trinkets is similar to the others next to it. Most buildings come right up to the sidewalk as if in unison. This creates a narrow walk between the vendors and the storefronts. Each morning the same group of people park in the vacant lot and have breakfast in the local diner before work. This would change however. The vacant lot was the proposed site of a new building. Construction would begin in a few months.

The designer knew about each of these systems to which his new building would have to respond. He was one of the morning patrons at the diner. Each system would be interrupted or altered by the addition of the new building. He could either use the project to try to change the way things worked or to reinforce the customs of the place. He chose the latter. The front facade was eventually placed right next to the sidewalk. The new clientele that it brought encouraged more vendors to hawk their wares on that side of the street.

Not all remained as it was, though. Every intervention leaves its mark in some way, and this new building was no different. Now people parked on the street. Traffic was a little more congested, and it took a little longer to get to work each morning.

Intervening is an act of placement, wherein an element is positioned between or within existing conditions. Intervening within an existing condition is a process for defining relationships between that condition and the addition. Unlike injection, intervention implies a reciprocal relationship. Both the element and the set of conditions it is set within will be altered by the presence of the other. A context is transformed to receive the element, and the element is made to conform to its surroundings.

Intervening implies the existence of context. That context is composed of whatever existing conditions are being impacted by the added presence. It may be as conventional as a new building intervening within an established city block. Or it can be an abstract process in which intervention is the study of conceptual relationships without the realities of built form.

In what ways might this process impact the development of spatial ideas? Placing an architectural intervention within a context, either physical or conceptual, forces the consideration of external relationships. The spatial relationships between the intervention and existing structures will be defined by placement, orientation, scale, and proximity, each of which is a consideration in the act of intervening. The organizational structure of a context will be impacted by the insertion a new element, one that has the potential to reinforce that organizational pattern or to interrupt it.

Intervention is also an act that implies transformation. The addition of a new element to an existing condition inevitably alters the characteristics of that condition. That transformation may be subtle or profound, depending on the design intent behind the development of the intervening structure. A context defines the limits to which an intervention must conform. It affects the production of the intervening element. Likewise, the act of placing the element is an augmentation of the context it is placed within. It affects the preexisting systems and functions of context. Intervention reflects a sequence of design decisions as much as it does composition.

There are three contextual scales to consider in a process of intervention: the scale of the site, the local scale, and the scale of the region or territory. Site refers to the immediate surroundings of the intervening element. The local context refers to the more broad surroundings of the site. And the region consists of any surrounding elements that have even minimal contribution to a context. Considerations at the scale of the site might include spatial connections between interior and exterior, or the direct physical association with surrounding elements. Considerations of a local context might

include organizational structure, the compositional characteristics of the surrounding area, or programmatic relationships between context and intervention. Regional scale implications might include formal vernacular, or environmental issues. Any act of intervention guides a process of response. The intervening element will respond to the conditions of its surroundings in one way or another. The act of intervention implies control over that response as a product of design intent.

» *See also* Context.

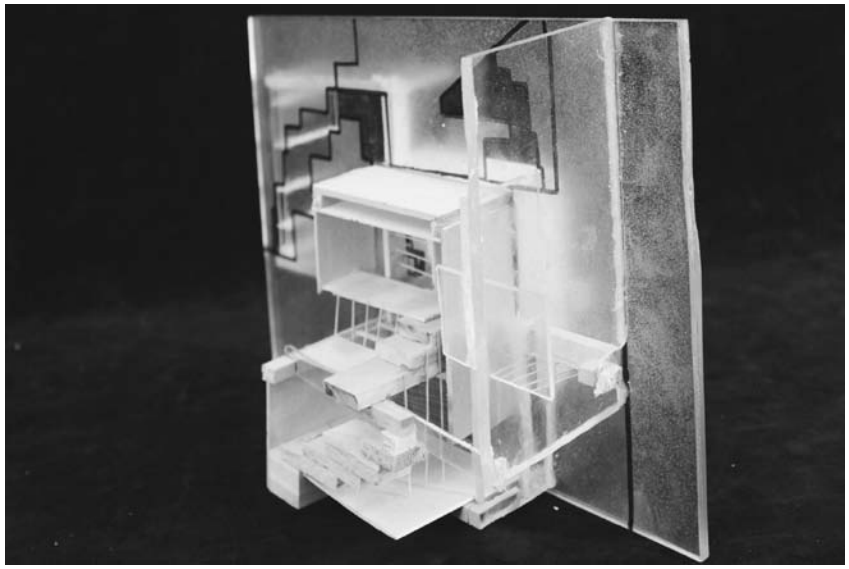

Figure 1.23. Intervention is the introducing something new or foreign to a context. It affects its new surroundings, transforming them. Likewise, the qualities and characteristics affect the configuration of the intervention. This example shows an acrylic construct marked and carved to receive a new construction. Its design is driven by characteristics of its context. **Student: Mike Stauffer—Critic: James Eckler—Institution: Marywood University**

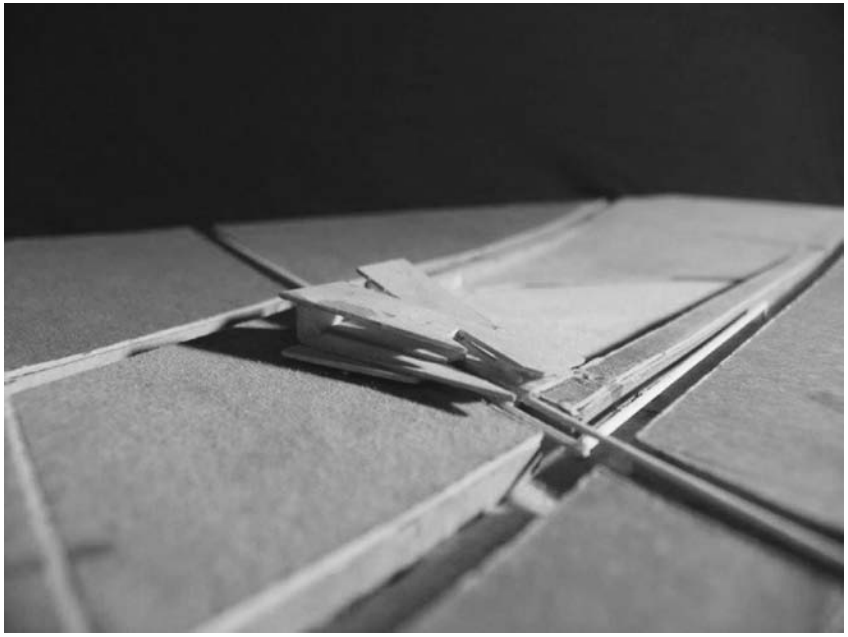

Figure 1.24. In a more conventional context—a field—the architecture is placed strategically to correspond to a larger organizational logic. The field is carved to receive the architecture. It is divided into territories around the intervention. The design is shaped by the characteristics of the field. **Student: Nick Young—Critic: Jason Towers—Institution: Valencia Community College**

INVESTIGATE

To examine systematically

To engage in a process with the intent to acquire knowledge

Generative Possibilities in Seeking Solutions

It was important to her that the building she was designing respond well to its surroundings so that it would be well received by the people of the small town in which it was to be built. She realized that if the design were rejected or misunderstood, it would fail. People would avoid it when possible and seek the first opportunity to replace it. She wanted this to be a lasting contribution to the growth of the town—a step in its evolution. This meant that design decisions

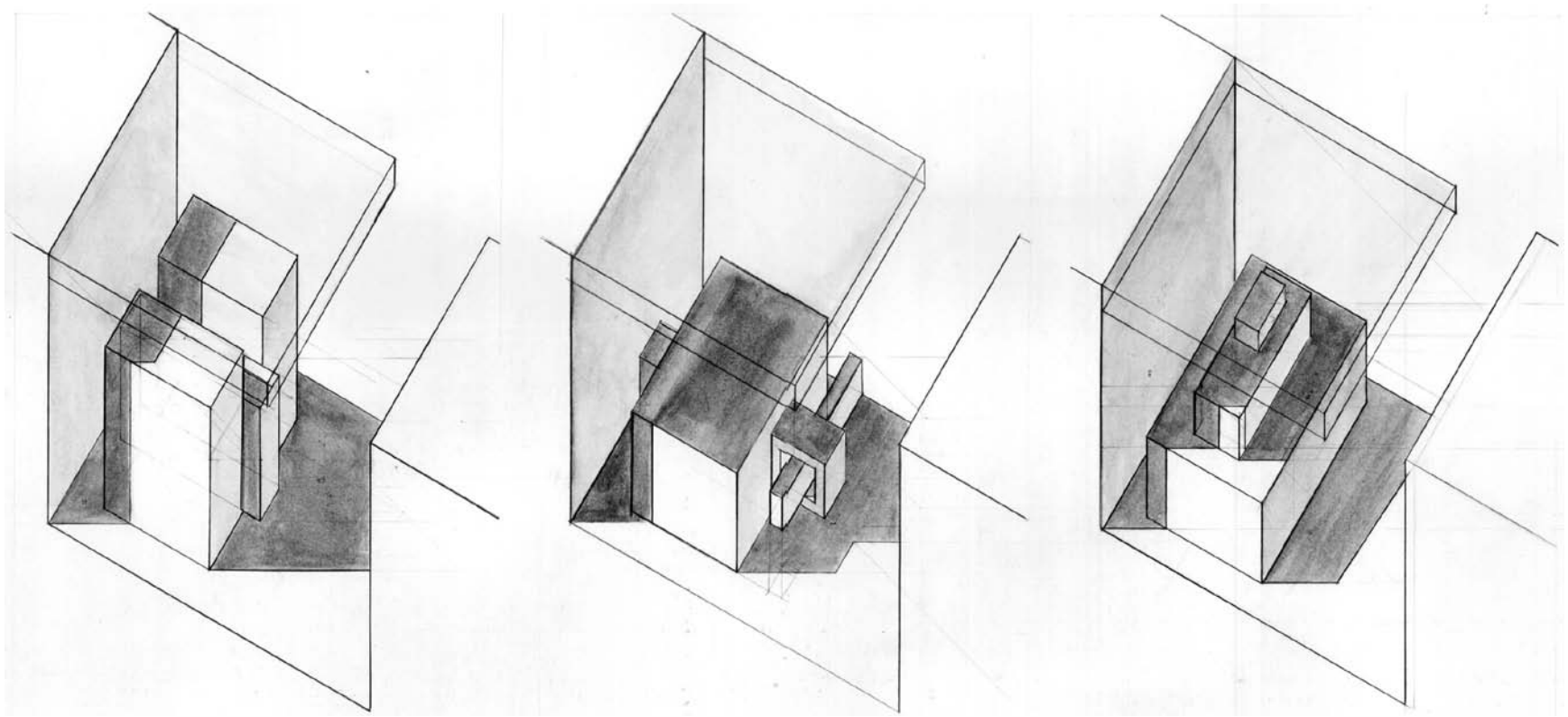

Figure 1.25. Much of process is dedicated to investigation. It is an effort to test ideas relative to various design criteria. It is a way of generating new and innovative solutions to design problems. In this example, compositional variations are studied according to the behavior of light as it interacts with form. Shadows are shaped by the configuration of elements. Multiple scenarios are investigated. **Student: Katherine Cormeau—Critic: John Humphries—Institution: Miami University**