

# Pedagogical Reverberations: A Taxonomy of Design Studio Responses

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## ABSTRACT

The impetus for this research derives from our aspiration to gain a deeper understanding of how we can effectively teach students to navigate the design process. Consequently, our endeavors have culminated in the creation of a catalog and taxonomy matrix that attempts to decipher and encode prevalent trajectories in architectural design studio pedagogy. This was achieved through the curation and systematic analysis of project briefs from over fifty design studios used in a wide range of architectural institutions throughout the United States over the past eight years. Each project brief was studied to determine the approach and methodology employed. Based on recurring themes, we categorized the briefs into distinct approaches and created a taxonomy matrix.

The catalog serves two primary functions. Firstly, it aims to establish the context of design studio pedagogy by documenting the various approaches employed in studios. Secondly, it categorizes different tactics to examine how these methodologies prepare students to reach the higher tiers of Bloom's taxonomy, particularly in terms of analyzing and evaluating complex design problem-solving. It is important to note that our research does not advocate for any specific design approach. Instead, it serves as a reference and resource for educators and students, providing insights into current pedagogical approaches while also encouraging critical reflection on our own ideologies.

The focus of this paper is to refine and contextualize the catalog within the thematic lexicon and historical forces that influence architectural education. We use the book *Architecture School: Three Centuries of Educating Architects in North America* as the initial framework for our work but recognize that, as Joan Ockman states in the introduction, it reflects the time when it was written<sup>1</sup>. Therefore, we also reference more contemporary approaches in architectural studios that are constantly redefined and influenced by current global discourse. As evidenced in the book *Radical Pedagogies*, particularly during times of urgency, teaching

**practices are called on to revisit their approaches, experiment, and consider their future evolution.<sup>2</sup>**

## INTRODUCTION

"As Architecture has evolved, so too has the way architecture is taught."<sup>3</sup>

-Robert Stern and Jimmy Stamp

In architectural pedagogical discourse, an important vein of discussion pertains to the methodologies and frameworks established by educators to facilitate the structuring of threads between concept development and the physical articulation of architecture. The prompts we select are intended to foster and provoke students to innovate, reverberate with current dialog, and develop relevant and meaningful responses to architectural problem-solving. In many instances, the incorporation of prescriptive methodologies has emerged as a strategy to assist students in translating ideas into architectural solutions. As Joan Ockman writes:

"Geared to producing skilled practitioners and founded on concepts of discursive formations that have evolved since the time of Vitruvius, it combines technics and aesthetics, sciences, and humanities. Schools are called on highly disparate types of knowledge, negotiating the architect's multiple identities as craftsman, technician, and creative artist; public servant and businessman."<sup>4</sup>

To gain insight into how we, as educators, are instructing students to approach the design process, we conducted a comprehensive analysis of more than fifty studio project briefs. Our objective was to discern the methods and approaches utilized within these briefs. Subsequently, we developed a taxonomy matrix to systematically classify the predominant approaches we identified. However, as we aimed to further refine our research and increase its rigor, we recognized that the first iteration of the matrix relied on our own interpretation of the project's intentions. Consequently, we revisited the catalog to further reflect and study how it resonated within the broader theoretical and

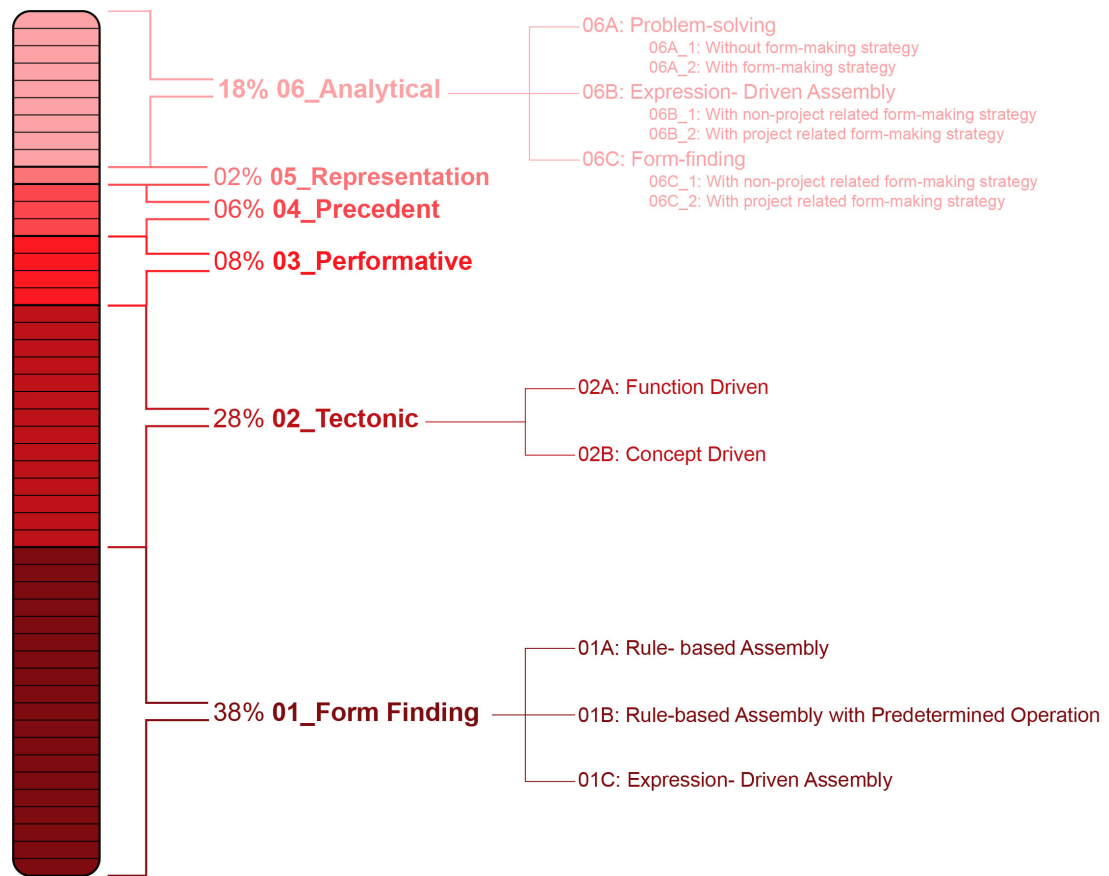


Figure 1. Catalog - Iteration 01

historical context of architectural discourse. This led to the development of the second version of the catalog where we re-categorized the project types based on recurring discussions concerning the intricate relationship between formalism and contextualism, as articulated in Michael Hays's influential essay, "Critical Architecture: Between Culture and Form." Hays's essay explores the dichotomy in architectural criticism and theory, distinguishing between "Architecture as an instrument of culture" and "Architecture as an autonomous form."

The objective of this paper is to further refine and situate the catalog within the thematic lexicon and historical forces that shape architectural education. We use the book, *Architecture School: Three Centuries of Educating Architects in North America* as the initial framework for our work but recognize that, as Joan Ockman states in the introduction, it reflects the time when it was written<sup>5</sup>. Therefore, we also reference more contemporary approaches in architectural studios that are constantly redefined and influenced by current global discourse.

## BACKGROUND: CATALOG ITERATIONS

### ITERATION 01

The framework for the taxonomy matrix was established by collecting and analyzing design studio project briefs. We looked at

each brief to determine the project approach and methodology employed. We categorized the briefs into six distinct approaches with additional subcategories based on recurring themes, as seen in Fig. 1.

The categories are defined as follows:

#### 01: FORM-FINDING

Form-finding projects incorporate exercises that provide students with a series of prescribed steps to create, manipulate, iterate, explore, control, and develop three-dimensional forms. Typical architectural conditions of program, site, and context are ignored.

##### 01A: RULE-BASED ASSEMBLY

Rule-based Assembly projects engage in a prescribed process to form making, or as one of the project briefs described, to make "implied volumes."<sup>6</sup> In this approach, the project brief outlines specific rules and techniques to guide form-finding.

**01B: RULE-BASED ASSEMBLY WITH PREDETERMINED OPERATION**

Students select a verb associated with a specific operation that can yield performative spatial qualities. They then follow a series of rule-based operations to make a form that spatially articulates the predetermined intention. In this approach, the rules for form-making are outlined, derived, and constrained by the student through an investigation of the spatial-action of the verb. The meaning of the verb is typically translated into a simple three-dimensional volumetric construct where the parts of the assembly are identified, studied, and evaluated by the criteria set forth by the meaning and how the verb performs as a space-making tool.

**01C: EXPRESSION- DRIVEN ASSEMBLY**

Students are asked to develop a formal strategy through the expression or representation of a feeling or emotion. In this approach, the rules for form-making are outlined and derived by the student based on the criteria of "feels/looks like" instead of "works as."

**02: TECTONIC**

Tectonic projects focus on making a tangible object. Students are asked to design and build something that functions to bring awareness to the process of making and material properties.

**02A: FUNCTION DRIVEN**

Students are asked to focus on the study of material properties and methods of assembly as the tool for informing a design language. They consider the process of making as a design opportunity through either the treatment or manipulation of the materials being used or the expression of the method.

**02B: CONCEPT DRIVEN**

Students are asked to analyze something, ranging from an excerpt of theoretical text to a found object or machine, to derive a concept and establish a set of rules for a design language and form-making strategy. The concept then guides the making of a functional object, and the design language is continually adapted to fulfill both the functional and the conceptual premise.

**03: REPRESENTATION**

Representation projects use different prompts and mediums but the primary objective of each is for students to generate the idea first, and then to represent the idea visually and abstractly either two-dimensionally, through a collage or photomontage, or three-dimensionally through the making of a physical or digital model. Projects in this category give few guidelines for form-making but ultimately the three-dimensional expression

becomes an autonomous architectural form independent of any contextual cues directly related to the final assigned project.

**04: PERFORMATIVE**

Performative projects evaluate the environmental factors impacting a space or building, either scientifically or perceptually, and use the results of the analysis to guide the design process. In this approach, the student is responsible for identifying their own strategy for form-making, and the focus of the project remains on the response to environmental factors.

**05: PRECEDENT-BASED**

Precedent-based projects guide students in establishing conceptual, design, and/or formal strategies for their projects based on a student's understanding and analysis of a precedent building.

**06: ANALYTICAL**

Analytical projects begin by investigating something, whether it be the site, programmatic usage, or an image, and then use the results of the investigation to guide the development of the students' projects.

**06A: PROBLEM-SOLVING**

In this sub-category of projects, students analyze something directly related to the final design project, such as the site or programmatic usage, and discover a design problem based on their investigations. This category can be subdivided into:

**06A\_1.** Projects where the student is responsible for identifying a strategy for form-making.

**06A\_2.** Projects where form-making is a prescribed process outlined in the project brief and embedded as part of the analytical process.

**06B: EXPRESSION- DRIVEN**

In this sub-category projects begin with an analysis of something directly or indirectly related to the final design project and then use the results of the analysis to guide the making of a form that is both a visual and metaphorical representation of the students' conclusions. This category can be subdivided into:

**06B\_1.** Projects where the student derives a formal language and design strategy through the expression of something unrelated related to the final design project.

**06B\_2.** Projects where the student derives a formal language and design strategy through the expression of something directly related to the final design project.

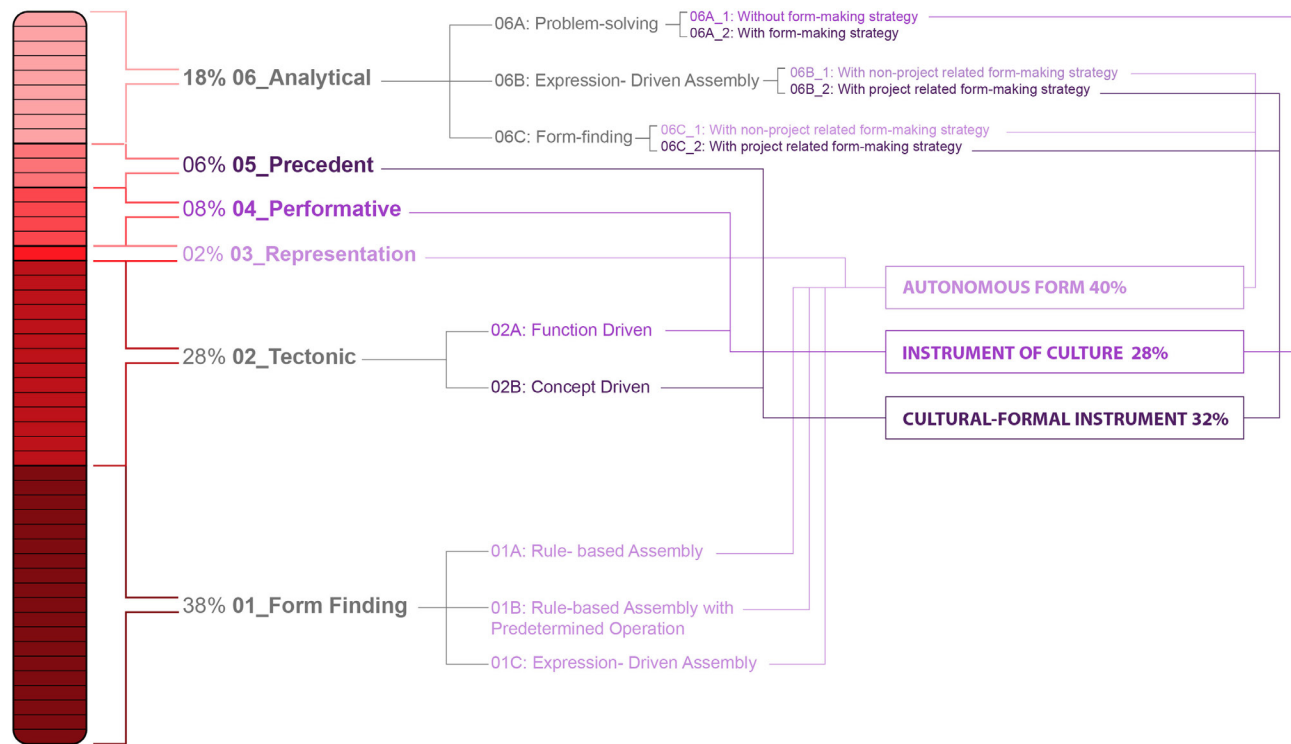


Figure 2. Catalog - Iteration 02

#### 06C: FORM-FINDING

Projects in this sub-category also analyze something directly or indirectly related to the final design project, such as a piece of art or a movie, the site, or surrounding context and abstract it based on ordering systems or hierarchical relationships, and then create and explore three-dimensional forms based on the abstractions. This category can be subdivided into:

06C\_1. Projects where a form-making process is prescribed and is unrelated to cues and/or context of the final design project.

06C\_2. Projects where the student derives a formal language and design strategy through the investigation of something directly related to the final design project.

#### ITERATION 02

The second phase of the research revisited the initial catalog and refined the systematic organization of the project taxonomies through the lens of Michael Hays's seminal essay, "Critical Architecture: Between Culture and Form," where he discusses the dichotomy in architectural criticism and theory of "Architecture as an instrument of culture" versus "Architecture as an autonomous form." Hays describes the two categories as follows:

**Architecture as autonomous form** is "...characterized by the comparative absence of historical concerns in favor of attention to the autonomous architectural object and its formal

operations-how its parts have been put together, how it is a wholly integrated and equilibrated system that can be understood without external references, and as important, how it may be reused, how its constituent parts and processes may be recombined."<sup>7</sup>

**Architecture as an instrument of culture** "...emphasizes culture as the cause and content of built form; the task of the interpreter, then, becomes the study of objects and environments as signs, symptoms, and instruments of cultural values."<sup>8</sup>

Following this criterion, we conducted a second analysis of the project briefs. The re-evaluation revealed that while design studio approaches often fell within the spectrum of these two ideologies, there was the emergence of a third category where project exercises attempt to support the oscillation between autonomous form-making strategies and the influence of cultural cues on the form-finding process. We call this approach **Architecture as a cultural-formal instrument**. The argument for the emergence of this category finds support in contemporary architectural discourse. Both Patrik Schumacher, in his essay "Formalism and Formal Research," and Farshid Moussavi's book *The Function of Style*, contend that current practices of form-making include programmatic and contextual constraints as part of the process.

The second iteration of the catalog further defined the categories and systematically organized the approaches filtered through the three definitions and criteria listed below. Refer to Fig. 2



Figure 3. Taxonomy Matrix

**[Architecture as] autonomous form:** Project briefs that establish and provide rules for form-making and deriving a design language without reference to an existing context and/or cultural cues.

**[Architecture as] instrument of culture:** Project briefs that reference contextual and/or cultural cues without providing rules for form-making or deriving a design language.

**[Architecture as] cultural-formal instrument:** Project briefs that reference existing cultural and /or contextual cues to extrapolate rules for form-making and deriving a design language.

## CURRENT ITERATION

To advance our research, we have recognized the critical importance of understanding the historical origins of the project typologies we have identified. Beginning with our second iteration of the catalog as a reference point, we examine historical reference points that have informed the development of the three distinct categories we have established: [Architecture as] autonomous form, [Architecture as] instrument of culture, and [Architecture as] cultural-formal instrument. For this exploration, we describe each category along with the project types that fall under it, while suggesting their historical underpinnings and implications on discourse and practice.

## AUTONOMOUS FORM [MAKING] (40% of Project Briefs)

A series of prescribed steps are provided or found through an analysis of a condition unrelated to the final design project, to create, manipulate, iterate, explore, control, and develop three-dimensional forms and establish a formal language.

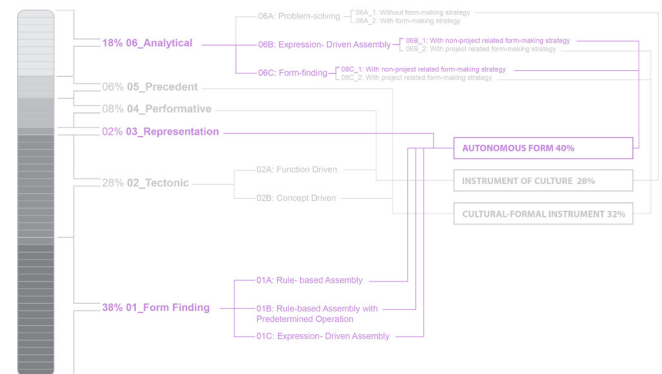


Figure 3. Autonomous Form: Recategorization of Approaches

## Description

These projects begin with the exploration of forms independent of any contextual cues specific to the final design project. They engage in rule-based form-finding exercises, that provide students with a series of prescribed steps to create, manipulate, iterate, explore, control, and develop three-dimensional forms. A common example of this approach is one that establishes a set of organizational rules, such as a grid with varying rhythms, and instructs the students to cut, fold and/or extrude in order to investigate the potential spatial and formal outcomes. By establishing an organized set of rules, a consistent design language



emerges, and proportional and sequential relationships are achieved. The intent of this type of exercise is for the students to explore and discover varying and unanticipated spatial conditions and achieve a harmonious composition while any assigned program or functional requirements are fulfilled as a response to the form. In many of the project descriptions we reviewed, it was clearly stated that one of the principal challenges experienced by students is the ability to detach themselves from preconceived notions about what makes architecture. As a response to this phenomenon, an overarching objective of the studios is to recondition the way students think about and approach the design process. By removing typical architectural constraints, such as program and site, students are liberated to explore a process of form-making that can lead to unexpected tectonic and spatial conditions.

### Context

This type of approach can be seen as early as 1900 when design approaches in the United States began to vary more widely beyond the concerns of learning the trade of architecture. In the fall of 1900 Emil Lorch, as the director of the summer school at the Art Institute of Chicago, began to use principles of Pure Design to teach architectural design.<sup>9</sup> This method was based on a way of teaching art developed by Denman W. Ross and Arthur W. Dow in the 1890s. "Pure Design focused upon the formal characteristics of art. By abstracting elements of design (dots, lines, shapes, color) and stressing universal principles (harmony, balance, and rhythm), Ross and Dow hoped to engage and encourage the creative faculties of their students without relying on copying historical examples."<sup>10</sup> In the middle of the 20th century similar teaching strategies were introduced by John Hejduk and Robert Slutsky. The nine-square grid problem exercise was introduced by Hejduk at the University of Texas, where students were given a pre-existing nine-square grid within which they could arrange and add other architectural elements to study different spatial relationships. At Cooper Union Hejduk and Slutsky implemented the nine square grid in addition to the cube and the Juan Gris problems into the curriculum. These exercises all involved formal manipulations to a given set of constraints that, "seem to be an end in itself."<sup>11</sup> As new digital technologies came into use by the end of the 20th century exercises in this category still applied to rule-based operations, but these rules were now governed by the formal deformations and transformations that designing on a computer made possible.

This approach can also be seen in architectural discourse and practice. In practice, we can reference Peter Eisenman's House IV as an example of an autonomous formal investigation, while in discourse, Colin Rowe's early essays, such as "The Mathematics of the Ideal Villa", establish rule-based formal strategies for the critical evaluation of architecture. Furthermore, in his book *Nothing Less than Literal*, Mark Linder describes how Rowe's essays became heavily influential in the highly formal teaching techniques at both the University of Texas and Cornell.<sup>12</sup> Formal

analyses like that of Rowe's and Eisenman's, and as presented in the nine-square grid problem and more current digital rule-based processes, are meaningful because they allow for a clear framework and set of rules with which to measure the composition of architecture. This strictly formal approach, however, has been criticized for overly simplifying the rationale behind architectural works.

### INSTRUMENT OF CULTURE (28% of Project Briefs)

An analysis of conditions and/or contextual cues that are directly related to the final design project is used to inform the design process. Considerations such as site, program, building performance, cultural contexts or socio-political forces influence design strategies but no guidelines for form-making are given. The student is responsible for identifying methodologies and strategies to derive a design language and form.

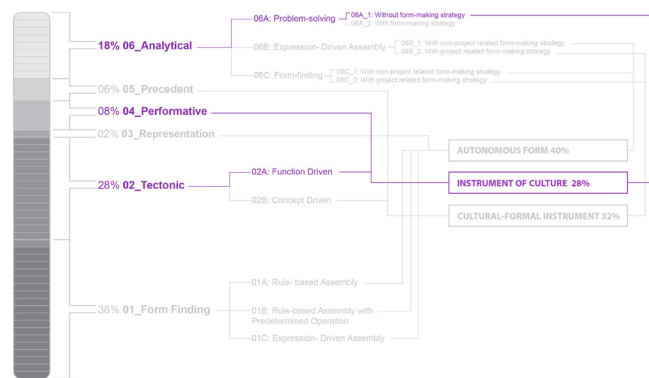


Figure 5. Instrument of Culture: Recategorization of Approaches

### Description

This approach equips students with essential analytical skills necessary for tackling complex design challenges. They can gather and assess relevant data and develop meaningful responses to the conditions of the project. This typology asks students to determine an intent for their form prior to engaging in form-making. It must be noted that a prescribed process for developing a design language is not outlined. Instead, students use their analysis to derive the criteria for their design strategies. For instance, students may analyze a project's program or site and formulate a design strategy in response to their findings. In this approach, design intention and an analysis of, and reaction to, criteria specific to the final design project are the catalyst for innovation. This process leverages the removal of arbitrary decision making and invites the student to comprehensively analyze the conditions of a project beyond aesthetic or spatial experiences. This tactic encourages the student to evaluate their

role as designers of a contextual intervention where external circumstances must be considered.

### Context

In the first half of the 20th century, American architecture schools shifted away from the Beaux-Arts model towards projects that addressed realistic concerns more in line with those encountered in architectural practice. At the University of Oregon in 1914, Ellis F. Lawrence developed the architecture program to prioritize projects that presented practical problems under conditions like those in the field, including specific site conditions, while at Cornell from 1929 onwards, students were tasked with designing entire buildings instead of focusing solely on traditional architectural elements. During this period schools were transitioning from training only draftspersons and designers to preparing professional leaders ready to work in a modern society. This marked the beginning of significant changes in architectural education, with one of the most radical shifts led by Joseph Hudnut at Columbia University, who insisted that students should only design buildings they could construct. His initiative aimed, "...to make design a creative process that developed in a natural and logical manner as the expression of an integrated approach to modern materials, scientific building techniques, and the practical requirements of contemporary life."<sup>13</sup>

After World War II, an influx of students entered architecture schools with a newfound enthusiasm to contribute to post-war society. The war had ushered in new technologies and a systematic, scientific approach to problem-solving, which influenced the pedagogy of design. Herbert McLaughlin, Jr., in "The Style of Education," emphasized that in this era, "...in which architecture is properly based on function as influenced by sociology, climatology, and other pseudo scientific determinants, each solution is unique to the conditions obtaining."<sup>14</sup> As architectural programs entered the turbulent political landscape of the 1960s, issues related to race and class disparities gained prominence. This led to the development of new studio projects that addressed these societal crises. In subsequent years, pedagogy began to pivot towards large data-driven studies within the context of urban environments. Prominent examples of this shift include Venturi and Brown's influential work, *Learning from Las Vegas* and Rem Koolhaas's studios at the Graduate School of Design (GSD) with the Project on the City. In all these approaches, there was a strong emphasis on systematically studying the conditions and context surrounding a project to inform an architectural response.

This type of approach has been examined in architectural discourse and pedagogy. In discourse Alan Colquhoun states, "At whatever stage in the design process it may occur, it seems that the designer is always faced with making voluntary decisions, and that the configurations which he/she arrives at must be the result of an intention, and not merely the result of a deterministic

process."<sup>15</sup> From a pedagogical stance, Carmen Trudell, in her essay "Begin with the City," she describes a project methodology where careful observation, documentation, and an analysis of the surrounding context sets a foundation that prioritizes our collective well-being and encourages architects to be outstanding citizens and culture-makers.<sup>16</sup> This type of contextual approach has been criticized for not fully exploiting the potential of form. In many of the faculty reflections for this project type it was noted that students often have difficulty translating their observations and ideas into a built form. As Stavros Kousoulas and Jorge Mejía Hernández write, "In other words, by reducing form to just another concept, another word, we lose the potential to examine the actual effects that form had, has, and can have in both architectural theories and practices."<sup>17</sup>

### CULTURAL-FORMAL INSTRUMENT (32% of Project Briefs)

The development of a formal architectural language is determined through a prescriptive process that is directly related to or influenced by the analysis of culture and or contextual cues. This process in nonlinear and the development of the project oscillates between compositional intentions and other influences. A formal strategy is typically established as a design language that can be adapted to fulfill and respond to project needs.

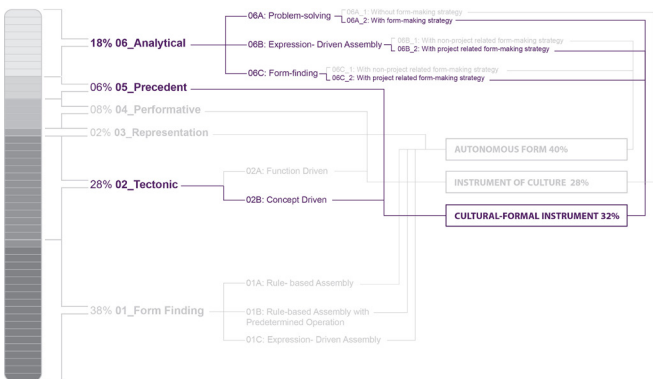


Figure 6. Cultural-Formal Instrument: Recategorization of Approaches

### Description

Projects in this category attempt to support both the analytical skills necessary to tackle more advanced design problems while also providing guidelines for form-making. Students evaluate the conditions of the final design project, to set parameters, while engaging in prescribed formal investigations. This approach asks students to oscillate between having a design intent and exploratory form-making. A technique used to bridge this gap is described in two books, *Conditional Design: An Introduction to Elemental Architecture* and *Operative Design: A Catalog of Spatial Verbs*, written by Anthony di Mari. He explains that tangible methodologies can be used in design studios to kick

start compelling spatial investigations.<sup>18</sup> Similarly to two of the briefs we reviewed, the strategies discussed in the books use verbs as a means of removing preconceived notions about the built environment and instead use the performative quality of the verb as an action that can be applied to form-making. Di Mari describes them as “portals to the abstraction of space”.<sup>19</sup> Often the verbs that are used are derived from an initial analysis of the project’s context to connect a project-specific intention with formal explorations. The selected verb is translated into a simple three-dimensional volumetric construct where the parts of the assembly are identified, studied, and evaluated, and through iterative testing, a catalog of spatial conditions is compiled. Once this taxonomy is created it can be edited and applied in a multiplicity of arrangements depending on the desired spatial relationships and environmental qualities that were established through the initial contextual analysis. Similarly, in practice, Patrick Schumacher and Farshid Moussavi explain that architecture consists of “functional problem-solving repertoires and that design choices benefit from an explicit reflection of formal possibilities... together enhancing the innovative, ultimately functionally oriented instrumentalization of forms.”<sup>20</sup>

## Context

This teaching approach finds a notable example in the early 1950s through the efforts of a group of educators known as the Texas Rangers. Their objective was to establish a novel curriculum characterized by “formally driven experimentation underpinned by a historically informed critique of mainstream practice.”<sup>21</sup> Colin Rowe, a member of this group, played a key role in shaping this understanding of the interplay between form and context. Rowe’s work continuously delved into the relationships between form and meaning, speculating on ways to intricately connect them, thus giving rise to culturally resonant buildings and urban spaces.<sup>22</sup> This approach gained prominence in the middle of the 20th century, with Princeton University being a prominent institution that consciously endeavored to relate formal explorations to broader cultural and historical currents.<sup>23</sup>

At the beginning of the 21st century, the availability of computational and digital fabrication tools, along with theories like those presented by Manuel Delanda on the flow of matter, emergence, and assemblage, introduced new possibilities of how form can be articulated and influenced by external forces. In the paper “Emergence, Causality and Realism,” Delanda states “a property of a whole is said to be emergent if it is produced by causal interactions among its component parts. Those interactions, in which the parts exercise their capacities to affect and be affected, constitute the mechanism of emergence behind the properties of the whole.”<sup>24</sup> This line of thinking has made inroads into architectural pedagogy and practice, exemplified by the work and teaching of the acclaimed firm Aranda/Lash, led by Benjamin Aranda and Chris Lash. They describe their own work as “making objects, installations, and buildings through a deep investigation of culture, materials, and algorithmic processes.”<sup>25</sup> Their work

and teaching use “computation to generate and manage design information” using “radical modularity”<sup>26</sup> to connect patterns, math, and science to historical contextualization. Their argument centers on the idea that by deconstructing architecture into a series of modular, rule-based elements, external forces can inform the design process and influence the articulation of the overall form, effectively bridging cultural cues with rules of form-making.

The emergence of this category is further substantiated by contemporary architectural discourse. Hays writes that a critical architecture, “...claims for itself a place between the efficient representation of preexisting cultural values and the wholly detached autonomy of an abstract formal system.”<sup>27</sup> Both Linder and Hays argue that even though the exploration of autonomous architectural form may be virtuous, it is almost impossible to ignore the cultural and contextual influences that will ultimately affect both the design and inhabitation of it. Hays describes Mies Van der Rohe’s work as an example of this, where the intentional abstraction of the skyscraper is a singular formal system but meaningful because it is also a reactionary stance to the overwhelming stimulus of the metropolis. Similarly, Linder also argues that this is evident in the evolution of Colin Rowe’s writing, specifically in his seminal work, *Collage City*, where Rowe moves away from distinct formal analyses to embrace a heterogeneous collage contextualism. Rowe is no longer contemplating form as an autonomous object but as something that exists relative to its circumstances. Kenneth Frampton also suggests a similar approach in his ideas about a “critical regionalism.” “He called for a greater attention to climate, topography, and construction as a means of realizing a more “authentic” form of cultural expression.”<sup>28</sup> In his essay “Empty Form (Six Observations)” Reinhold Martin provokes us to consider, however, if we, as designers, are attempting to “fill” architectural projects with too much meaning or intention to the point to where the concepts become so diluted and therefore obsolete.<sup>29</sup> Somol writes, “Finally, it is the techniques made available by formalism (e.g., the grid and collage) that continue to inform emergent architectural and urban possibilities in an increasingly problematic quest for a disciplined design that displays traits of both autonomy and heterogeneity.”<sup>30</sup>

## CONCLUSION

This third version of the catalog has underscored the historical influences that have molded the profession’s diverse approaches to design pedagogy. Subsequent iterations of this research will include a greater number of project briefs and extend our focus beyond schools within the United States to provide a more comprehensive understanding of architectural education.

As society and technology have grown increasingly complex over time, design pedagogy has had to adapt in response to these changes. This third iteration of our research has revealed that



throughout the history of architectural education, pedagogy has grappled with architecture as both a formal element and a reflection of society. Over time, the emphasis has oscillated between these two realms, but the trajectory has moved toward more complex, systematic thinking. We believe that this complexity is exemplified in the emergence of the category of [Architecture as] cultural-formal instrument. Importantly, our research to date suggests that history will continue to exert pedagogical reverberations that shape the trajectory of architectural education.

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