Studio LAB: Directed Experimentation Towards Focused Innovation
Genevieve Baudoin and Bruce A. Johnson
University of Kansas

Introduction
For nearly 20 years, a crisis has been building in American studio education by misleading the generation of ‘big ideas.’ Students that under invest in their own ideas exacerbate this crisis. Many of these students’ ‘big’ ideas actually become small, and the parts of the design used to support the idea become weak or ignored. This crisis stems from where ‘big ideas’ originate. We can view the American Academy through the lens of ‘big idea’ generation - from Wright, Kahn, Fuller and SOM using technological innovation in structure as a prime generator to Venturi, Tschumi and Eisenman, using representation/abstraction as the privileged source. More recently the American Academy has shifted the investigation to skin systems as the central focus. As part of this lineage, studio has embraced the skin not through innovation, but as a way to make architecture salient to a world seeking to locate blame for climate change. In studio, this reduces the practice of architecture to product placement and material investigation that is ‘skin’ deep. To regain currency in the world, the profession and academy must recognize that architecture is built upon experimental innovation and ‘big’ ideas. What was a synthesis of idea and structure/technology or idea and representation/abstraction is being lost. The interplay of structure and abstraction is what produces innovation, and this paper will seek to reground studio by re-introducing direct experimentation to the studio laboratory. This paper will trace the history of the Academy in America, outlining this lineage of ‘big idea’ generation and will postulate a new kind of capstone studio focusing on the Gothic idea of the ‘part-to-whole’ integration of design.

The American Academy
Through their built work, pioneers of American Architecture like H. H. Richardson, Louis Sullivan, and Frank Lloyd Wright, embedded the American Academy with a confluence of the Beaux-Arts tradition and rugged American industry. This combined influence helped generate the first ‘big ideas’ of American Architecture - the steel-frame and the skyscraper by way of the Chicago School - which would ultimately dominate a profession that was grappling with emergent materials and structural systems. These ideas reciprocally necessitated the re-scripting of American Schools of Architecture.

At the same time, the governmental regulation of architecture began its coming of age, and with it a more stringent licensure/apprenticeship procedure precipitated the need for a more disciplined training of architects by the academy. Conversely, architecture schools prepared designers for the realization that not all of the legal training to become an architect could be completed in the university setting. In the end the academy began to consider how the profession could ‘complete’ this increasingly expansive training during apprenticeship in an office. The lynchpin for connecting the profession and the academy became institutions like the National Architectural Accreditation Board, the National Council of Architectural Registration Boards, the American Institute of Architects, and the Association of Collegiate Schools of Architecture (ACSA), all working to sort out how to deliver architectural instruction in a timely and relevant manner to a profession in flux. This complex mix of institutions became simultaneously incestuous and paradoxically disjointed, in what often could be seen as un-orchestrated attempts at a unified professional and academic direction.

The ‘work in progress’ curriculums of the American Academy emerging after the Chicago School were faced with the additional dilemma/opportunity of adapting or rejecting the evolving European Academy’s approach to the interdisciplinary combination of manufacturing, art, graphic design and building technology as exemplified by the Bauhaus. There was also a directed push away from the representational methods of the Beaux-Arts. In 1930 the ACSA reported: “The analytique as a device to inculcate a realization by the student of three-dimensional forms, this type of work and the usual instruction that goes with it would in the great majority of cases seem very questionable.” In response, as historian Hyungmin Pai writes; “The study pointed to a growing number of schools that had begun to forgo the study of elements, approaching… architectural education with problems that ‘involve the totality of architecture in
simplified form rather than artificially amputated parts of a complex whole.\textsuperscript{2}

In the midst of these pedagogical debates, there were key figures that shaped a model for a modern American Architectural curriculum. Mies van der Rohe at IIT worked to create a curriculum to replace the original institutionalized Beaux-Arts program with one that better aligned with the structural prevalence of the ‘Chicago School’. His new curriculum involved delivering architectural education based on a sequence in three parts: 1) The study of the ‘crafts of drawing and construction’, 2) the honing of ‘planning skills’, and 3) the refinement of the first two segments by way of the understanding and development of the ‘theory of architecture’.\textsuperscript{3} Similarly, but with a devout interest in functionalism honed through collaboration, fellow ex-patriot Bauhaus leader Walter Gropius was helping to develop the revised curriculum at Harvard. These programs can both be seen as a new American model, embedding the discipline of architecture within the merged liberal arts and science programs developing around the country.

Because these programs were embedded within a larger university framework, the curriculums in these programs typically grew to include a broad foundation of liberal arts and sciences training – the math, physics, writing and western civilization classes included in architecture curriculums today can be seen as a byproduct of this merging. This foundation, combined with the push to separate apprenticeship from the academy due to the duration to matriculation effectively transformed the basic pedagogical method in American schools.

**Changing Emphasis**

In the history of American Architecture programs, it is difficult to place ‘blame’ or to locate the moment where things began to go awry. Choosing to embed architecture school within a broader liberal arts education has merit, because students will ultimately be working in the world and should in some measure understand that world. This took time away from the study of design and began the compartmentalization/fragmentation of the curriculum into constituent parts (a kind of you-learn-this-over-THERE attitude). Programs like those of both Mies and Gropius can be seen as a holistic re-collecting of constituent parts to generate whole design, refocusing on ‘big ideas.’ The choice to move away from representational methods specific to the Beaux-Arts such as the analytique was a response to this fragmentation, but it also devalued the experimentation in representational systems inherent and essential to design. In addition, the profession was simultaneously compartmentalizing and fragmenting the various skills to obtain licensure to more effectively test those skills. This combined with the institutionalization of Modernism ultimately confined architecture to emulation, not re-invention, replicating many of the dilemmas seen in the Beaux-Arts. As a general reaction against what would become derivative and ill-proportioned Modernism, the academy and profession ironically sought redemption from the public through a renewed interest in surface-applied Classicism. At its best, this produced the conceptually based works of Venturi. At its worst, architecture became an applied skin, i.e. Michael Graves or Robert Stern. In the end, all of this attention to the façade effectively reduced the role of the architect (to designing skins) and ushered in the era of consultants (structural, landscape, lighting, programmers, acoustics, etc.), radically compartmentalizing, fragmenting, and reassigning design to various experts. As a result, both the profession and the academy lost ground in terms of holistic design and the integration of site, structure, technology and materials, and ultimately ‘big ideas’ became confined to an iconography of the façade.

As a reaction to the lack of larger professional and academic vision beyond façade-making, the work of architects like Eisenman, Hedjuk and Libeskind can be seen as an attempt to return to ‘big ideas’ through an attention to the craft of drawing and the valuing of abstract conceptualization. This representational ‘big idea’ movement led to the rise of firms like Morphosis and to the interest in the international work of Hadid, Koolhaas, Tschumi and Coop Himmelblau. Experimental and sometimes esoteric representational systems produced an almost alchemical transformation from drawing to form and these architects’ work generally supported the belief that structure was secondary to content.

Once again this generated a reaction from the profession and the academy, returning to the aesthetics and the commercial accessibility of the Modern project, evidenced by hugely popular publications like Dwell magazine that capitalize on the commodity base of Modern Design. This reaction also reveals the trivialization of ‘big ideas’ through a carefully crafted set of sustainability add-ons that serve to validate this new re-visioning/re-packaging of Modernity. Both the academy and the
profession seem to support this return to a shallow ‘sustainable’ version of Modernism when they promote the wholesale revision of curriculums to include sustainability as a new skill set and treat it as the new ‘big idea’. The over-articulation of louvered walls or skin deep ‘green’ overlays to mask glass curtain walls, seen in so many contemporary student and professional projects, are in reality simply glorified systems components and should rightly be classified as such. The current emphasis on design-build can also be seen as a distancing from the representational experimentation of Eisenman and others, further advocating for the loss of ‘big ideas’ and advancement of ‘green’ skins. In addition to this, traditional schools of architecture have quickly moved from the once standard, five-year professional bachelor’s degree (the BArch) with the potential for a student to attain an additional professional master’s degree (the MArch), toward a single five-year professional master’s degree (again the MArch) to reduce the time to licensure, creating curriculums that resemble spreadsheet deliverables of skill sets accomplished.

Dilemmas

All of the preceding factors have culminated in the current crisis of the American Academy by creating students who are not fluent in modes of representation or the integration of structure, form, and idea, and thus they are unable to articulate or develop their ideas. Students today cannot readily move from computer drawing to the sketch, to physical models, to hand or digitally fabricated details, or to abstract notational systems of representation and back to conceptual/big ideas. Students are more often taught ‘lifelike’ super-renderings (a throwback to 1960’s-70’s architectural illustrations done to deter public opinion or to assuage clients) to illustrate only what it will ‘look’ like. Big ideas are now limited to what can be modeled in computer programs. These programs require students to literally ‘construct’ their designs, choosing from a standard set of architectural details like windows and doors that mask the fact that many students simply lack the ability to mentally project space three-dimensionally from conventional two-dimensional plans and sections.

The median American Student today also tends to think design studios are each a kind of ground zero – when they move from the completion of one studio under a specific instructor into another, they fail to bring the tactics and strategies learned previously to bear on their current work. A sample of student portfolios covering work from their first year until graduation will expose the inevitable smorgasbord – many students even realize this and will try and tailor their portfolios to introduce a common form of representation that will tend to unify the work. Students tend towards satisfying the instructor as opposed to challenging them, seeking a list of deliverables to work toward that is at odds with the creative process itself. Worse still, the Academy lacks an emphasis on the individual designer and has promoted or amplified the belief in service learning through collaboration. In this model, any and all contributions are considered equal and the healthy competition of ideas is lost or diluted. Paul Rudolph has said; “Architecture is a personal effort, and the fewer people coming between you and your work the better.... If an architect cares enough and practices architecture as an art, then he must initiate design...” 4 Collaboration must be hierarchical to judge the relative value of ideas. If architecture is to survive as an art it must also be both critical and experimental and thus be allowed to fail as much it succeeds. Experimentation is essential to the evolution of designers and to the scale, components and materials of a design.

Consider Kahn’s City Hall Project of 1953-57, where he initially experimented with a steel space frame structural system as a manifestation of his ‘big idea’ of hollow structure 5 and a system/material that he abandoned in favor of concrete. Similarly, Kahn’s 1953 visionay downtown plan for Philadelphia examined and experimented with larger traffic flow patterns and street development under the ‘big idea’ banner of the city as a ‘room’ where services (servants) were positioned to support a larger civic space (the served). This plan further revealed his interest in hollow structure (‘hollow stone’) through the cylindrical parking structure hubs that operated to relieve the ‘served’ city of cars/traffic within the larger ‘servant’ zone. These hollow garages in tandem with their required street infrastructures were a kind of ‘hollow’ conceptual structure in that they supported the larger ‘served’ civic space.6 Kahn would continue to explore this ‘big idea’ through various scale changes but it was first manifest in built form in the hollow concrete masonry unit columns of the Trenton Bath house (structural components), and later as the hollow ducting at Richard’s Medical Labs and via the interstitial floors at the Salk Institute where the structural floors (hollow structure) become service rooms and where the courtyard (a hollow/void space) frames the ‘big
idea' of directed view. In this manner Kahn’s work is exemplary in terms of part to whole and whole to part.

Without the freedom to experiment we would not as a culture collectively own, the Kimbell, the Salk, or the Yale Center for British Art. Without experimentation in his early years through his series of Glass Skyscraper projects in the 1930’s, Mies would not have produced the Seagram Building, 860-880 Lake Shore Drive, or IIT as manifestations of contemporary structure through a mature and subtle experimentation with steel and glass. Closer to our present era, Steven Holl began tinkering with the linking of housing typologies and infrastructure in such hypothetical projects as his Stitch Plan for Cleveland and his Bridge of Houses for New York, all of which clarified his spatial developments as related to his ‘big idea’ of parallax. This produced seminal works such as the Cranbrook Institute of Science, the Bloch Addition to the Nelson-Atkins Museum of Art, the Stretto House and the Chapel of St. Ignatius with its part to whole surface textures, door details, and overall building to site massing.

Design Laboratory

In a 1980 interview with James Stewart Polshek, the dean of Columbia at the time and a leading practitioner, Barbaralee Diamondstein asked: “What do you think of the current level of architectural education, not only at Columbia but in the country in general?” Polshek responded by saying: “It’s not terrific…. I find myself somewhat of a conservative in the sense that these accrediting people come to you and they tell you’ve that you got to teach handrails for the handicapped. You’ve got to have a course in that…. And you’ve got to have course in waterproofing and solar energy. By the time you get done, you don’t have any time to draw…. I think that the way we do that is to say that you learn those things later.”

Discussing the American approach to architectural training, Sibyl Moholy-Nagy explains: “The American custom of including architectural education in the humanistic-scientific framework of the university is a questionable tradition…. The new chairman at Yale [Paul Rudolph] was aware of this and ran his school like an ideal office….”

Yale’s program at the end of the 1950’s can be seen as a kind of divergent track to the typical American architectural program model that was then emerging, and as one that was more closely aligned to Wright’s Taliesin. At Yale, only a very select part of the profession actually entered the studio directly as an outgrowth of the Rudolph’s ‘ideal’ office, and the studio evolved to become a conjoined laboratory where both the academy and the profession benefited from the exchange. These benefits included not only the research generated by students relative to larger civic/programmatic needs that would have been more difficult to define in an office setting, but also what the students gained relative to focused ‘big idea’ innovation as a steady refinement of the architecture removed from the day-to-day demands of the office.

Rudolph’s vision at Yale was not however a new one. In 1946 Kenzo Tange initiated what became known as the Tange Lab. Starting life as a modest studio within Tokyo Imperial University, it ultimately formed what collectively became known as Metabolism. In a recent interview Rem Koolhaas said: “Compare Archigram [the British experimental architecture group active during the 1960s and early ‘70s] in the UK to the Metabolists in Japan: in Europe similar ideas were doomed to remain unrealized; in Asia those very ideas were implemented by an industrial culture that really believed in them.” In Japan architecture schools were attached specifically to engineering schools and professors ran their studio as an extension of their practice. Notable Tange Lab members include Kisho Kurakawa, Arata Izosaki and Fumihiko Maki. Amelia Groom and Nick Currie write about Metabolists: “Mentored by the great Modernist architect Kenzo Tange at Tange Lab… their imaginative and sometimes impossibly ambitious proposals advocated kinko tochi or ’artificial ground’ (to be built on the sea and in the sky), plug-in megastructures and prefab modular capsules.”

Many students in the Tange Lab went on to develop their own clear visions of architecture at the level of the ‘big idea’ from the detail to the whole, lending credence to the model.

In 1961 Norman Foster came to Yale to study with both Paul Rudolph and Buckminster Fuller because of the structural and experimental nature of their work and their vision of what architecture was becoming. Foster states: “During his leadership at Yale, Rudolph created a network of international talent. There were always surprise visits by distinguished architects who would give lectures, hold impromptu crits and join juries to argue and debate with staff and students alike.” At this historic juncture, Yale and the American Academy were privileging a structural presence punctuated by an interest in infrastructure that ranged from the street scale to the scale of the globe. This structural
and infrastructural presence became the trajectory upon which Foster and Partners built their career and upon which so many of their renowned works of architecture were based, all grounded in Foster’s structural and integrated systems ‘big Idea’, again giving testament to the studio approach.

**Studio LAB**

Studio LAB (LAB) proposes a reversal of the where big ideas are generated. This can also be seen as a return to earlier programs like that of Mies and Gropius by seeking a holistic attitude towards design. Historian Philip Steadman summarizes this idea of holistic design: “The qualities of wholeness, and integrity, of a unity in structure such that parts all contribute to the effect or purpose of the whole, and no part may be removed without some damage to the whole.”¹² What is needed now, however, is a kind of retraining for students in response to the compartmentalization of the typical curriculum today. The LAB proposes to accomplish this by utilizing the Gothic notion of part-to-whole ordering. Ironically, we see the potential to reformulate big ideas through the re-invention of the part, its integration into the whole, and the reciprocal design relationship to its parts.

Borrowing from the precedents set by Rudolph and Tange, the LAB is a synthetic approximation of an office, while attempting to be free from the pragmatic constraints of a typical practice. The design tenets and previous work of the directing architect(s) are directly folded into the lab for students to refine by design extension. Studio LAB would be structured over the course of a full year, taking the place of a typical capstone studio, occurring in the fourth or fifth year depending on a school’s existing curriculum. The intent of the LAB is to create an environment where students can learn to explore and articulate formative ideas – ‘big ideas’. It confers and redeems the design leadership of the architect guiding students towards innovation through a central architectural vision set by the studio. The LAB would be structured over the course of the year as semester one – part-to-whole, semester two – whole-to-part. This reciprocal relationship is key to rethinking the studio as a laboratory - testing solutions, making refinements and retesting - and to the creation of a holistic big idea where all scales are designed. Each semester would be broken down into three main segments: one-third invention, one-third fabrication, and one-third documentation and refinement.

The studio vision begins its focus on invention through a key component. In a recent interview conducted while teaching at Yale Greg Lynn stated; “I think it’s my job to get all of you... to develop your ambitions for design. And so that’s why I say that you need to develop a contemporary language, something that you would continue to pursue.... Architecture is about components.”¹³ What if a studio could simply ask what a column could be? What else could it carry? Other components could form the focus of the studio – the window, the fastener, the stair, or the duct are all potential examples – but the direction of the studio would be towards refinement and transformation. Consider the column at the scale of the building, then consider the column at the scale of the city: what is its purpose? How is it integral to both scales of the built environment? Can the column generate the building? At the 1960 Tokyo World Design Conference (WODECO), Louis Kahn expressed this potential: “We should not have to rip up the street every time a pipe goes bad and disrupts traffic. You should go inside the building and correct your pipes and let traffic go on. The street really wants to be a building; it’s come to that point.”¹⁴ The process of scaling components introduced in the LAB would promote radical prototypes grounded in conception.

These prototypes would lead to direct fabrication at a scale that could be tested for all aspects of design: proportion, feasibility, structure, economy, flexibility, constructability, and application to name a few. The projects would necessitate the output of a full-scale demonstrable amalgam – this is not to be confused with a fabricated building, but rather a portion of the design: abstracted or literal. As Siegfried Gidion writes: “Architecture when built, must create a unity from a number of different parts.”¹⁵ The process of fabrication would promote the refinement of the individual component and generate the potential aggregation or transformation into a holistic condition (either open-ended or closed in form).

The documentation and refinement of the prototype restores the potential of representational strategies to conceive and conceptualize the design as a whole. From the Bauhaus on, architects have used composite techniques to borrow meaning. For James Corner, American landscape architect and author, “Composite montage is essentially an affiliative and productive technique, aimed... toward emancipation, heterogeneity, and open-ended relations among parts.”¹⁶ While analytical, composite montage carries a multiplicity of
meaning, essentially the opposite of reductive simplification. Composite techniques of representation could be called Modern phenomena, but they are also derivative of techniques such as the Beaux-Arts analytique. The abstraction in these kinds of representation, forcing the viewer to re-read and question the nature of the drawing, is essential to conceptually building the bridge from part to whole.

The second semester reverses this process, however the aim is not to arrive in the same position. This semester encompasses the testing, refinement, and revision essential to proving the inherent value of a ‘big idea’. The LAB is not an esoteric venture for the sake of formal interests or cultural conception. It would seek to conceptually building the bridge from the component to the whole and back again. Such a hierarchy would be readily apparent at the level of structure/detail, in the plan/program, and through the concept/culture or cultural conception. It would also parallel Mies’ IIT curriculum, defined by an understanding of the craft (by way of building/drawing as a manifestation of the technological integration of structure, materials and systems), by way of space (as an appropriate attention to plan/program and thereby the creation of spatial flow/sequence), and of content (by way of the understanding of theory both historical and as personal to the designer). Studio LAB would seek to embed these criteria in students not by overvaluing specific and divided skill sets or the parsing of the discipline into knowledge silos, but through the evolution of a concept that translates (by way of representational and fabrication strategies) from scale to scale and that resists being subsumed by outside forces and thus made illegible or small. The intent is that big ideas stay BIG, but first students of design must learn to understand what constitutes a BIG idea.

Notes:


5. Kahn states: "In Gothic times, architects built in solid stones. Now we can build with hollow stones. The spaces defined by the members of a structure are as important as the members. These spaces range in scale from the voids of an insulation panel, voids for air, lighting and heat to circulate, to spaces big enough to walk through or live in." Louis I. Kahn, “Toward a Plan for Midtown Philadelphia,” in Perspecta: 2 the Yale Architectural Journal, (Cambridge: MIT Press, 1953), 23.


10. Groom and Currie, “Past Futures.”


