The Lore of Building Experience: Deconstructing Design-Build

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The Lore of Building Experience: Deconstructing Design-Build

Abstract
Architects do things. One of the most unquestioned mandates of architectural education is that of ‘doing’: building, acting, making, fabricating. Captured in Le Corbusier’s famous maxim: ‘architecture or revolution’, building is often considered not only the best solution to a problem, but one that gives urgency and legitimacy to architecture and architectural education. Yet the increasing awareness of intimate relations between capitalism and architecture, labor injustices and construction, environmental havoc and urban planning, corporate power and racial violence and much more has put architects in the uncomfortable position of having to confront the consequences of ‘doing’.

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**Introduction**

Architects do things. One of the most unquestioned mandates of architectural education is that of ‘doing’: building, acting, making, fabricating. Captured in Le Corbusier’s famous maxim: ‘architecture or revolution’, building is often considered not only the best solution to a problem, but one that gives urgency and legitimacy to architecture and architectural education. Yet the increasing awareness of intimate relations between capitalism and architecture, labor injustices and construction, environmental havoc and urban planning, corporate power and racial violence and much more has put architects in the uncomfortable position of having to confront the consequences of ‘doing’.

Design-build studios inherit a legacy of ‘doing’ that ranges from John Dewey’s theories of experiential learning (1938) to Alexandra Aravena’s Venice Biennale call to ‘make room for action’ (2016). A lore has developed about how design-build activities can simultaneously serve students, the community, and be an effective panacea for teaching ‘real-world’ lessons to beginning architecture students. Although hands-on learning has proven educational benefits for retention and visualization under certain circumstances, edification doesn’t inevitably follow every act of construction. Simply favoring the act of ‘building’ as a uniquely educational experience in its own right, and accepting the amorphous manner of lessons contained within these acts risk allowing certain undesirable educational circumstances to fester: design-build lore or myths.

**MYTH #1: Learning by Building is Enough**

Susan Sontag writes in *On Photography*: “The person who intervenes cannot record; the person who is recording cannot intervene.” This is the conundrum of design-build: ‘doing’ re-inscribes familiar values of production. Can design-build studios ‘do’ and ‘critique’ simultaneously? If left unchallenged or unaddressed, these underlying issues contribute to missed opportunities for student learning and hinder the ability to develop a critical stance about the role of design-build in contemporary education and practice. If design-build courses are not intended to emulate ‘real-world’ experiences in design or construction, are the intended lessons still evident within these simulations? This paper presents cogent aspects of these claims while also presenting alternative methods for discussion.

Specifically, this paper is a reflection upon the Iowa State University design-build courses as they seek to transition into a more research-based curriculum. This paper is not a survey of common design-build approaches done by other programs and people, and it will not describe a unique process or project that others can use as a template for their programs. Rather, the project described here, the Urbandale Pavilion, is common in many ways—and by examining the common nature of this project, we hope to deconstruct lingering traditions (myths) of design-build pedagogy and speculate upon the future of design-build education at Iowa State’s Department of Architecture and beyond.

**Design-Build Challenges**

The deeply rooted challenges of design-build education are well documented. Vincent Canizaro offers a broad overview of these issues: collegial opposition, administrative and institutional friction, student resistance, limited equipment and facilities, and the quality of resulting work. Criticism of design-build programs is primary directed toward: the lack of clear learning outcomes, the deficit of disseminated scholarly research, and the high use of institutional resources.

This recently completed project (Summer 2016), the Urbandale Pavilion, began with intentions to create a unique and instructive design project and educational experience. But it ultimately became mired in the inherent challenges of time, inexperienced labor, and unexpected difficulties to the degree that the project (and the design-build course activities) devolved...
into a competent and relatively conventional design-build project. This is not a reflection on the quality of the project, but rather it is a different result than what was intended.

The process of designing a building, any building, no matter its scale, is complex and messy. In many ways, these common complications are not only related to the physical act of building, but they are microcosms of problems embedded in contemporary pedagogies, practices, and construction. It is not an easy situation for beginning designers—particularly when these process-based complications are not directly addressed as part of the coursework and become invisibilities.

The studio generally enrolls 8-15 students each year—a small crew for any design-build project. As a result, the course offers the opportunity for each student, no matter their skill level, to participate. Perhaps naively (or perhaps as a result of institutional budget shortfalls) this course was established without any specific plan for soliciting funding or projects—it has been a yearly ad-hoc scramble initiated by the instructor(s). As a rule, the studio aspires to partner with local non-profits and towns; these groups have an interest in the type of work that is provided, they appreciate the ‘free’ labor of students and instructors (which they could otherwise not afford), and they sometimes have an ability to help with labor and material or financial resources.

None of the partnerships have lasted for more than a few years at a time—not because of dissatisfaction—but rather funding limitations or lack of demand for yearly projects that align with the teaching calendar. Until recently, there have been no dedicated facilities for tool storage or construction (e.g., the author’s truck and tools were used one year), and because it is a summer school class, the students have only eight weeks to complete their work (time they share with another summer studio).

The tactics for teaching this course are not uncommon. Students are presented with a project scope, introduced to the client and the site, then asked to develop and test their proposals. Eventually a final proposal is selected, prototyped and the built by the students and instructors. Students develop budgets, drawings, and work schedule and then build the design. The end goal has always been a built-artifact produced, to a certain degree, by students.

With the compressed time schedule (fewer than twenty-five required meeting days) and an impending deadline of construction completion, little time remains for original experimentation or meaningful community engagement. Design and technology lessons start at the remedial level and advance across the two months, but the focus is on acumen, not innovation and research. Unfortunately, the tight schedule and student inexperience also tends to diminish community engagement. The students meet with the clients and smaller user groups but the amount of time spent with community members is usually low. Instead of explicating teaching Service Learning tactics, instructors simply model the behavior of a project manager and mentor in a practice. Unsurprisingly, an effort that appears to be student-led must be led by experienced practitioners. It is a simple matter of professional and academic ethics and obligations to do so.

Despite these challenges, some well executed, and impactful, projects have emerged (e.g., a BMX track, a soap box derby starting gate, fishing docks, pavilions, and outdoor stages). As necessitated by the course, these projects have typically been
lightweight construction with conventional materials and methods, primarily wood. Experiments in the prototyping phase do occur but are rarely implemented into the project unless fully tested (e.g., rammed earth benches). Student evaluations have remained high and student experiences have seemed overwhelmingly positive. From nearly any perspective it is a model design-build program for beginning design students.

However, it is less clear what new information is being learned about architecture beyond the act of building. Based on some concerns that the process and products were languishing a bit, and failing to keep up with new digital design and fabrication methods, the authors were challenged with bringing in a project of a larger scale, with a higher profile—even though much of our systemic circumstances (class size, facilities, student expertise, etc.) remained the same. The intent was to scale up the program and to apply existing tactics to a larger project.

**Urbandale Pavilion**

**MYTH #3: Design-Build is a Good Match for Service Learning**

Iowa State is a land grant institution and the first state to adopt the Morrill Act. Therefore, there is an ingrained expectation that the design-build studios “support the mission of sharing knowledge beyond the campus borders” and “actively transfer research and expertise to the public.”

At first glance Urbandale Pavilion was to be an ideal design-build project for scaling-up the program. It was a well-funded, high-profile 16’ x 40’ park shelter, in a well-used arboretum. The client, Urbandale Parks & Recreation is a public entity, the site, the 12-acre Jackaline Baldwin Duniap Park and Arboretum, is publicly-accessible and made possible by a land donation, the program serves the public (Urbandale Population 41,776 and Des Moines Metro Population 599,789, 2013), and it was funded through a donation by ISU alum Chuck Bishop (BS 1980 Engineering), president of Bishop Engineering in Des Moines, in honor of his mother. Additionally, the client’s schedule aligned with the academic calendar.

However, the logistical and institutional pressures upon the studio eroded the original intention to pursue a research-based agenda. The following unpacks the challenges as a method for offering alternatives. The first contact was made in October, six months before the studio began, but the work for the authors began immediately. The project was too large and complicated for eight beginning architecture students to design and build (from foundations through steel fabrication) in such a short class schedule. The instructors had two choices: take on the project and attempt to scale up the existing program or turn down a well-funded project.

The project was accepted along with the large amount of work to be done ahead of time to define the scope, solicit consultant participation, secure permitting, and soliciting bids for specialized construction methods unfit for beginning students (foundations, steel fabrication, steel erection, site grading, etc.). As a result, both authors took on the role of an unpaid architectural consultant to the client AND academic administrators in charge of soliciting and securing funding while negotiating issues of liability and contract requirements with university staff. Needless to say, an enormous amount of time, energy, and expertise went into the logistical set up of the project to make sure that the students would be able to ‘build’ and complete the ‘building’ in time. None of this work was paid or recognized as official teaching activities. By favoring the end
result over the process, the process skewed away from its original intentions.

Despite the known challenges, the project started with abundant aspirations. As the authors specialize in structural design, digital design and fabrication, the first research proposal was to create a lamella dome which connected digital modeling with construction sequencing. Lamella is an efficient structural form that looks difficult to construct, but is not if the connections and dimensions are well-defined. These details provide learning opportunities from parametric connection methods to designing for construction. Designing, documenting, and constructing the structure was intended to be an act of experimentation and research. How light would the structure be? How a construction system with movable bracing be employed? How could parametric modeling be used to anticipate the dimensions of each diagonal lamella so that a building skin could be cut to fit?

**Fig. 4 Early sketches of the Urbandale Pavilion as a lamella structure by authors.**

**MYTH #4: Design-Build Tactics Scale Up**

However, in the spring, as the summer semester neared, two things occurred that shifted the project’s direction. One, the design for the lamella was too ‘complete’ as proposed and the students would end up building the authors proposal, thereby missing out on the ‘design’ portion of the class and perhaps seeing the class as ‘only building’ or manual labor. Next, upon learning that among the eight incoming students, only two students had any construction experience and that there were relatively serious interpersonal conflicts between several of the students already.

It became clear project was too big for this specific team and that existing teaching tactics may not be adequate without the inclusion of team-building exercises and more remedial construction training. At this point, as educators, the anticipated outcomes for the course should have been adjusted. But this is not always possible with a design-build studio. There was a contractual obligation to the client and a pedagogical obligation to the curriculum to produce a built project. Additionally, as students are not qualified architects, any instructor who is also a licensed architect has an obligation to the NCARB Rules of Conduct. The only available option was to adjust the scope of work from the students to the instructors as a way to keep moving forward. The project had to be viable. Walking away was not a realistic option. Although there would perhaps be profound lessons to be found by not finishing the project or having it fall down, these were not available or feasible options.

**Fig. 5 Phasing of the construction sequence. Photo and diagram by authors.**

**Fig. 6 A selection of models and renderings constructed by students and presented to the Urbandale community during an open house on the site of the eventual pavilion construction. Urbandale, IA 2016. Model and renderings by students.**
The Lore of Building Experience

By selecting a difficult project that had to be compliant with health, safety, and welfare standards the project aimed to expand the potential of the program but simultaneously exceeded student capabilities. A decision was made that to benefit student learning that the instructors would design a simple structural frame and then ask the students to design the things people ‘touched’: screens, benches, shelves, and tables. The structural frame itself had to be designed, permitted, and partially fabricated by the time the semester started (to keep on schedule) so it was done without student involvement or feedback (as the course had not begun yet). Further, due to time and expertise constraints specialty contractors were hired to do the site grading, concrete, and structural framing. For each contractor, students joined on-site to observe and ask questions as they were working; but they also had expectations for their schedule that the course needed to meet (i.e., The contractors would not be on site for longer than they had budgeted to train students – that fell to the instructors). They were very professional and gracious with their time with students, but everyone knew the contractors had to do all the heavy lifting quickly. This was not ideal and it was not the originally intended process.

There were a few immediate consequences: it affected student commitment with the project and it limited student engagement with the community and enthusiasm for the design process. On the first day of class when the instructors presented the ‘completed’ frame design to the students, many expressed frustrations that they would not be giving input on the structure (some even commented upon this in student evaluations). Most students did join in with the construction crews, but only for a limited time—perhaps because they felt self-conscious of their limited skills.

As a group, they understood the schedule demands that required others to help build the heavy, specialized portions of the project, but by limiting their activity, it seems to have limited their engagement—a common side-effect in design-build when input is not seen as equitable or valued. When their work is seen as free manual labor, the other lessons about design and technical acumen are more obscured. Also, and quite unintended, this limited their design meetings with the client to a smaller scope of issues. The site location, project orientation, size, materials, and overall form were mostly established already—and although they were in charge of developing the design details for the screens and seating, there were fewer conversations with clients and user groups than usual. The students did meet with the clients and community members as part of the course, but not to the degree anticipated.

Once the students received tacit approval from the client for their design ideas, the class split into forewarned cliques. Although the instructors did not witness conflicts first-hand, there certain groups that did not talk to others at all. Their initial efforts to produce options for the screens, benches, shelves, and picnic tables reflected this lack of coordination and comradery. Eventually, a more focused teaching effort to encourage collaborative thinking and a shared language of materials and expression yielded a fine result.

Ultimately, the project turned out well. The project’s location on the site, the simple form of the cedar and galvanized steel structure, and the refined level of detail in the benches, shelves, and tables reflects a purposeful approach to design that sees elegance in the interplay of these basic and profound elements. The project was thoughtful, legible, competently assembled,
and accommodating. According to any official standard, the project was on-time and on-budget. It had a successful ground-breaking ceremony that was well-attended by praiseful community residents, and the project was featured on the local news and College of Design media.

This being said, the project was not finished when the semester ended. When the landscaping was not installed as intended, when the roof leaked, when the electrical lighting panels were installed in the wrong locations, and when the student-installed screen failed to meet the client’s expectation, it was not the students that were asked to fix the project. The semester was over and their educational obligations ended. As instructors and architects, the authors remained tied to finishing the build. The project was finally finished, by the authors, in a torrential downpour weeks later with the addition of rabbit-proof fencing along the back side of the screening to protect from the threat of someone climbing up the back of the screen before the landscaping grew to an adequate height.

This is the problem with design-build courses that favor the final product as the reflection of the relative success of the course. Questions like: Does it look good? Is it doing what it intended? are discussed. But what about measuring growth in the learning process? Did students learn what we intended? Did they do more than just ‘build’ something?

After years of trying to fit so many learning objectives into such a short amount of time (and mental ‘space’ for student learning), the authors have grown convinced that ‘building is not enough’. When a product or ‘a building’ is the goal for the class, then the means are altered as needed to meet the end. Certainly, this expectation can favor the larger project or more visible project, but this looks overlooks other types of ‘building’ activities that might not have such a visible final presence. Perhaps projects that challenge the typical perspective of design build, or ones that see design-build as a tool to explore other research questions. As a small design-build program is ISU doomed to pavilions and demountable low-risk structures? Perhaps, if the challenges of Urbandale are any indication.

It is a question of intent. Are those projects selected because that is what is needed or are they selected as projects because that is what students can safely build? If a studio begins with the assumption that it must be a building—or a viable occupied structure, then subsequent choices about the process and production may not align with intended learning outcomes.
Moving Forward

MYTH #6: Design-build is Practice-Lite

In its most ideal form design-build combines the strengths of the academy (critique, innovation, speculation) with the strengths of the profession (expertise, construction, public engagement). At its most compromised design-build combines the limitations of the academy (insular, self-referential, siloed) with the limitations of the profession (client-driven, conservative, underfunded).

When examined in this light Urbandale is not a success. It was neither a political practice, a critique of academia, nor a reconsideration of practice. It was a construction project. It was neither pure teaching nor pure research. It achieved the end goal of ‘building’ and ‘doing’ but fell short of other ambitions. There was a great deal of effort that went into this endeavor, and to have the final result miss its mark prompted a re-evaluation of the future of our design-build.

Re-tooling Academic Recognition

The first strategy is the re-valuing of design-build as a form or research. If design-build is going achieve academic recognition, then it must also establish the methods of acknowledgment. Projects must also be innovative or experimental rather than ‘just building’. Much of the work that goes into cultivating design-build projects is not acknowledged as part of the pedagogical or tenure and promotion process. It falls outside the scope of what beginning students can and should provide.

In recent years, design-build history, theory, and pedagogy has sought academic recognition through the development of a series of groups, colloquia, conferences, and symposia. Among these are networks such as the Design Build Exchange portal 14, the Design Build Exchange Europe 15, and the Live Projects Network 16 as well as a series of conferences such as the Association of Collegiate Schools of Architecture 2014 Fall Conference | WORKING OUT: Thinking While Building 17 and Architecture ‘Live Projects’ Pedagogy International Symposium 2012. 18 Research-driven design-build studios provide impact beyond a single project by addressing questions significant to the discipline rather than to a single client. When the work of design-build is measured by an expanded understanding of scholarship and research (e.g. Boyer 19) then institutions of higher education can better recognize faculty for fostering design-build projects. 20

Re-employing History

A second strategy is that design-build more boldly recalls its history of radicalism and political action. From the Bauhaus workshops of the early 20th century to Buckminster Fuller’s geodesic domes to the Yale Building Project, to the 1990s resurgence of design-build with the Rural Studio, the Jersey Devils, and Studio 804. 21 Each project is part of an intellectual and conceptual legacy of architecture’s relationship to building as a social and political project. As global challenges are intrinsically linked with construction’s modes of production design-build is a valuable tool for re-evaluating architecture’s relationship to its social project.

Rather than rely or resuscitating the modes and frameworks of the Modernist social project design-build searches for new characterizations of what it means to be ‘social’ in the twenty-first century. Positioned within its history, design-build becomes a meaningful vehicle for enacting a contemporary social project. To an extent this work is already underway at Iowa State in an upper level studio called ‘Structures in Service (Design for Disaster Relief)’ taught by one of the authors (Whitehead). Large-scale prototypes are created to test out new ideas for enclosures and assemblies used in relief and recovery efforts.

Figure 10: Prototypes for hay bale loft construction intended for remote Mongolian school design. R. Whitehead studio, Spring 2015.

Re-defining Design-Build

“The academy is not paradise. But learning is a place where paradise can be created. The classroom [studio], with all its limitations, remains a location of possibility. In that field of possibility, we have the opportunity to labor for freedom, to demand of ourselves and our comrades, an openness of mind and heart that allows us to face reality even as we collectively
imagine ways to move beyond boundaries, to transgress. This is education as the practice of freedom.”

While the academy is not paradise, it is inspiring and energizing to pursue educational agendas that move beyond the constraints of architectural practice. The work presented here is not intended to discourage or dismiss the importance of design-build, rather it is a call to clarify what specifically makes these studios valuable. Canzaro offers a useful list: to gain construction experience, as a form of community service, for a larger vision of professional practice, as a critique of academia, for enhanced awareness of place, to enhance collaborative skills, to explore new methods of project delivery, and to explore materials and materiality.23

![Figure 11: Fabricating Potentials Studio. S. Doyle studio, Spring 2016.](image)

In education, design-build is a pedagogical alternative to the theoretical, desk-based, and media-driven (drawings, models, digital models) design process commonly featured in design schools. Design-build studios, which have become popular in recent years at many schools, provide an excellent venue for the assimilation of technical knowledge. Architecture has always been a service profession, but it has traditionally served only those who can afford it. By working for clients who do not normally have access to architects, students are exposed to community outreach and to the notion of society as our real client. Alternatively, working in pursuit of research and on behalf of the discipline is a viable model of design-build.

As Iowa State develops a way forward, the goal is to create a research-based program which focuses on construction methods, fabrication technologies, and material practice. The first step in this re-tooling was to create an institutional and conceptual space for this work: the ISU Computation + Construction Lab (CCL) which aims to create from the existing framework of design-build a new framework of computation and construction. By linking computation to construction this pedagogic shift harnesses advances in computation as tools of improving construction (robotics, CNC) rather than as tools of representation (renderings, models). By freeing the design-build from the scope of site and client the studios are able to conduct research and focus more rigorously upon material and structural innovation and developing technologies. This is not an abandonment of Service-Learning rather a reconsideration of how architecture can be serve the public, the discipline of architecture, and educational agendas, simultaneously.

The ambition of the ISU CCL is to critically engage new digital fabrication technologies in the pursuit of public engagement, an exploration termed ‘insurgent architecture’ by Corser and Gore. In *Spaces of Hope*, David Harvey describes a theoretical political actor called ‘the insurgent architect,’ who, ‘in addition to the speculative imagination which he or she necessarily employs, has available some special resources for critique, resources from which to generate alternative visions as to what might be possible.’25 The promise of the ‘insurgent architect’ is the ability to simultaneously create tools for transformative action and to develop visions of new social realities.26 The CCL harnesses the energy of ‘insurgence’ though not all of its methods. As a research agenda, it advances and expands the possibility of public engagement, critique, and ‘doing’ through architecture at Iowa State.

The goal is to present architectural possibilities: not a retrenchment of existing conditions, but fragments of potential futures. Within these futures ‘not doing’ or new modes of ‘doing’ must remain viable options and equally powerful alternatives for design-build pedagogies.

**Acknowledgments**

Students: Shawn Barron, Noel Gonzalez, Cynthia McCall, T.J. Hammersland, Mark Moeckl, Saranya Panchaseelan, Kimya Salari, Sai Mohan Ranga Rao Ummadisetty

Project Team: Structural Engineer: Raker Rhodes Engineering, LLC, Concrete: Concrete Technology Inc, Framing: Hildreth Construction, Lighting: A&W Electric Incorporated

Funding: The project was funded through a donation by Chuck Bishop (BS 1980 Engineering), president of Bishop Engineering in Des Moines, in honor of his mother. Additional support was provided by the Stan G. Thurston Professorship in Design Build; the College of Design; the Department of
Architecture; Institute for Design Research and Outreach and the City of Urbandale Parks and Recreation.

Notes

6 Canizaro, 2012.
21 Canizaro, 2012.
22 bell hooks, Teaching to Transgress: Education as a Practice of Freedom (New York: Routledge, 1994, p. 207)