Beyond Building: The Latent Lessons Obscured by Conventional Design-Build Pedagogy

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ABSTRACT
The practice of architecture is inherently social, weaving together the needs of patrons, users and the greater community.[1]

The processes and productions common to academic design-build programs have been well documented in books and popular media over the past twenty-five years. (reference- list of examples/books). Through these texts, we have come to know the paradigm in terms of the focus on full-scale making, collaborative learning and community engagement exemplified by the work at Yale Building Studio, Rural Studio and Studio 804. A review of the current literature on 'design-build' education reveals a bounty of images of students doing construction along with photos of the often-beautiful outcomes dominate the published material. The mytho-poetic power of aesthetic seduction overshadows the more banal minutia associated with budgeting, supply chain management, scheduling and legal contract that equally define the reality of design-build teaching and learning. The novelty of the physical, full-scale 'build' along with the resultant products is celebrated as evidence of a return to a lost tradition of making.

The same bias that privileges the initial act of construction and the end project obscures critical evaluation of the outcomes. We seldom ask if the projects succeeded beyond the scope of the academic studio just as we do not typically articulate the criteria by which we would evaluate success. Is it enough that the students learned something; or at least say they did? Is it success only evidenced by elegant photos and peer-reviewed awards?

What happens after the ribbon cutting and the awards? What are the realities of these architectural projects for the people who occupy them after the students and faculty depart? Are the projects playing a positive role in the communities they intended to serve? What are the legacies these structures built by novice, (at best), student builders?

In Architecture: the Story of Practice Dana Cuff challenges the academy by saying that, "…the nature of studio work must be revised to better prepare students for collaborative practice. Specifically, studio problems that require teams to solve them and studio problems that require negotiation with actual clients or consultants will help teach collaborative skills."[2] This paper seeks to expand the normative skill set associated with design-build to include long-term planning and assessment. Specifically, we will conduct a post-occupancy evaluation of three celebrated, (published and/or award winning), civic design-build projects from three different universities. The goal of the paper is not to reinforce or confirm the legitimacy of the individual projects or design-build education. Rather, the paper aims to foster deeper, more honest discourse on the impact(s) and the legacies these projects have on the community and environment while also addressing the challenges imposed by administrative and institutional structures within academia.

BEYOND BUILDING

Frank Gehry you are a genius!

In contrast to conventional public opinion that equates architecture with the poles of inspiration and final building as exemplified by Frank Gehry's cameo in The Simpsons, the day-to-day reality of contemporary architectural practice is primarily devoted to navigating multiple, often mutually exclusive, contingencies that define the process. External forces imposed by clients, contractors, consultants, legal concerns, material suppliers and building codes define the inherently shifting and unstable context complicate the presumption of linear project development. Conflicting demands, personality quirks, mercurial collaborators, weather patterns and budgets affected by shifting client perceptions of wants and needs add unknown and often unstable variables to the equation further complicating the contingent nature of the discipline.

Navigating the process of design and construction requires that the architect is able to make near-constant adjustments as they negotiate the ever changing and evolving context. Engaging these conflicts defines the profession of architecture.

In response practicing architects rely upon a 'soft' skillset seldom addressed or acknowledged in preparatory academic coursework. In practice, the 'hard skills' associated with technical knowledge and design fundamentals prove insufficient and require augmentation. In the design-build setting soft skills include things as seemingly banal as proper etiquette in phone conversation and e-mail communications that ensure effective

communication. Even discussions of standards related to following up on communications need to be taught.[3] For most recent graduates the internship period and early career construction administration constitutes immersive real-time training in juggling (aka multi-tasking), linguistics, and psychology that provides studio-trained designers with a set of 'soft skills' required to navigate multiple simultaneous variables in real time. These skills include learning a series of new dialects related to effective communication on the construction site and in the engineer's office as well the nuanced verbal conventions innate to the client's environment, be it domestic, institutional or corporate.

This contingent nature of practice is notoriously difficult to model in an academic curriculum and equally difficult to evaluate on the licensing exam. While we can teach a form of stress management through combination heavy workloads, short deadlines and public presentations, these examples fall short of the intense immediacy engendered by conflicts related to communicating budget overruns or change orders to a client, errors discovered when the concrete truck is on-site and ready to pour or in-the-moment decision making when inadequate soil conditions are discovered during excavation.

As a result, contingency is largely ignored in academia in favor of more discrete topics and objective knowledge. For example, the typical professional practice course required by NAAB focuses on quantifiable or measurable student performance criteria in the areas of standard stakeholder roles, business practices, legal responsibilities and professional conduct. No doubt there is a substantial body of core knowledge related to these topics, but nowhere in the criteria are students exposed to the messy realities of practice that occur in the grey zone 'between the lines' of black and white rules, codes and norms when they are applied.

CONTINGENT CURRICULA

While academia does not currently embrace the challenges posed contingency the question is not without precedent. Hands-on learning as espoused by John Dewey posits a debate between static and active learning. In Democracy and Education Dewey states that education is not an affair of 'telling' and being told but an active and constructive process.[4] Dewey's notion of active learning contained in his education for democracy model links vocational study with the goal of learning to make intelligent choices.[5] Instead of seeing vocational education as a limited, or limiting enterprise defined by repetitive completion of tasks as in myopic technical training, Dewey championed a vision for haptic education that, "…would prize freedom more than docility; initiative more than automatic skill; insight and understanding more than capacity to recite lessons or to execute tasks under the direction of others."[6] This thinking on academic integration is rooted in an accepted contextual reality that is not static and ever changing.

Advocates of academic design-build programs suggest a direct link between Dewey's "trained imagination and resourceful skill for expert action in a complex society" in the full-scale building projects[7]. In the now familiar format predicated on the completion of a relatively small pavilion, house or faculty stage an engagement with reality that foregrounds issues rarely, if ever, addressed in a typical academic design studio. Participating students face a steep learning curve that offers a vitally important component to the fragmented nature of traditional architectural education, in which drawing and construction are typically seen as separate acts[8].

A review of the current published literature on design-build education reveals abundant images of students in the act of physical construction, along with photos of the often-beautiful final results. The fixation with the 'build' portion of the experience highlights the most familiar learning outcome and facilitates knowledge that links abstract lessons from required materials and methods of construction courses with the immediate experience of gravity, resistance and material tolerance.

However, as typically practiced the academic design-build process also conceals many of the inescapable realities that influence, and perhaps define, architectural practice from the participating students. For example, lead faculty often spend hours working with the client, department administration and university lawyers to craft the memorandum of understanding, (MOU), that specifies the parameters related to project scope and decision-making. The MOU also defines the specific responsibilities borne by participating students and faculty along with the financial and legal relationship between the academic institution and the client. This work behind the scene is essential to any successful project but it typically falls to the faculty to ensure that all this prep work gets completed.

Given the disjunction between project schedules and the academic calendar many of the external contingencies such as involvement with community and financial stakeholders, university officials and lawyers as well as the banal minutia related to code review, permitting, liability, fund-raising, budget management and contracts must be negotiated before students ever enroll in a design-build course. In this way the typical practice of the academic design-build process conceals many of the inescapable realities that influence, and perhaps define, architectural practice from the participating students.

Nonetheless these 'behind the scenes' realities fundamentally affect and shape, even enable, any architectural project. As such, the ability to navigate through conflicting forces is a paramount skill in architectural practice yet traditionally they are left out of the learning process for students working on community-based, design-build projects.

This paper examines the challenges imposed by administrative and institutional structures conspiring to limit student

experience while also identifying opportunities to expand the scope of design-build pedagogy to include consideration of contingent skills linked to project preparation in advance of the design and construction phases. Specifically, the text highlights the work of schools and faculty who are attempting to expand learning outcomes either through innovative curricular changes or a reassessment of design-build projects in terms of size and scope.

BEHIND THE SCENES

In the prototypical design-build photo-op faculty and students stand proudly in front of their nearly completed creation, sporting their hard-hats and smiling faces. And there is ample reason for them to be proud. Academic design-build programs immerse students in the reciprocity of clients and sites. Introduce a material resistance, budget limitations and the reality that the language of clients and builders are very different from the familiar dialects native to the architecture schools. These experiences provide irreplaceable life lessons: that real world decisions have real life consequences.

The primary challenge to programs is the lack of integration of design/build activities into the overall curriculum. Ultimately, a lack of integration and lack of institutional support can lead to the marginalization of both the design/build program and the involved faculty.…The stresses upon faculty caused by excessive workloads, multiple roles, and expanding student numbers and project scope threaten structural collapse.[9]

Whether they happen on a campus or a remote off-the grid setting, during the normal academic year or in the summer the fact that design-build projects are completed, is in every instance a minor miracle. The outcomes conceal a narrative of unheralded initiative and sacrifice contributed by participating faculty and participating students. However, when pull back the curtain and look closer at the process we can see a number of challenges beyond the build that represent missed learning opportunities related to a holistic notion of architecture that extends beyond the binary implications of design and build. For example, the stark reality of limited budgets and project schedules defined by a 16-week semester create inherent conflicts between full-scale coursework and institutional norms.

In response design-build faculty have invented a range of alternatives that range from taking personal responsibility for the bulk of logistical preparations and liability in order to allow students to focus on some sub-set of the built reality and help insure an 'on-time' project completion. At the Colorado Building Workshop, Program Director Assoc. Professor Rick Sommerfeld reveals that, "A faculty member or team sometimes prepares and submits a skeletal drawing set in advance of the beginning of each design-built in order to secure the building permit." Prof. Sommerfeld adds, "In other projects the foundations are prepared in consultation with an external contractor in advance".[10]

In more extreme circumstances, faculty may conspire, with or without the explicit approval from their Dept. Head or Dean, to manipulate course schedules, coerce participation outside regular class times and/or beyond the formal end of the semester, create skeleton syllabi to provide participants with additional credit hours or even minimize safety concerns.[11] It is difficult to overstate the multiple forces imposed on these design-build projects and the pressure borne by participating faculty whose tenure and promotion depend on peer reviewed scholarship. The awards commonly sought by design-build faculty depend on stellar outcomes it is not difficult to understand the incentive to stray beyond conventional notions of propriety.

INCREMENTAL SOLUTIONS

Attempts to better align institutional capacity with design-build logistics often result in reducing the project scope to better conform with the academic calendar and student ability levels. In contrast to the iconic, small house projects common at the Yale Building Studio, Studio 804 and the Rural Studio, some schools have experimented with smaller projects of limited duration. Professor Mo Zell at the University of Wisconsin-Milwaukee notes that temporary constructs, small pavilions and interior installations, "…emphasize performative material characteristic and experiential activity…" and are, "On the whole… smaller, cheaper and faster than typical design-build projects."[12] The reduced scope and scale of the builds reduces construction time thereby allowing students to be more directly involved in the up-front preparations and project initiation including site/project selection, initial client interviews, code review and permitting.

SMALL AND INTEGRATED

The McEwen School of Architecture at Laurentian University developed the 'Ice Station' project as temporary installations integrated into first-year design studio to align with the challenges associated with building on frozen lake condition in a cold Northern Canadian climate (Figure 1). The project was designed to expand the range of learning outcomes related to design-build in two ways. First, both the size and complexity of the project is significantly reduced. Functioning as basic shelter from the wind the stations introduce basic building issues focused on connections between site, material and structure commensurate with the introductory nature of the first-year studio, while the temporal nature of the project is commensurate with limited skills typical of incoming 1st year students. The pedagogical intent is into introduce students to the basic skills of building, the ephemerality of the project is key because the level of craft required to build a permanent structure would be much higher than could be expected for the students to achieve.

Second, the project is part of a larger, more fundamental curricular change aimed at expanding and integrating design-build pedagogy throughout the five-year BArch curriculum. Instead of fighting to squeeze all lessons, and potential lessons,

Figure 1. Ice Station Village 2020, Sudbury, Ontario. Author.

associated with design-build into a single semester or year at the end of the degree path the school designed an iterative approach that integrates full-scale, hands-on experience into the Five-year curriculum, (Figure 2).

Smaller but more permanent design-build projects have been introduced into the following 2nd and 3rd year curriculum, building on the fundamental developed in year one and culminating in a graduate level craft studio for students who wish to continue on the design-build path that work on larger more complex and projects that can cover several semesters to fully complete. At the same time the expanded set of courses that address issues related to design-build allow more time and curricular space for faculty to introduce issues of contingency and soft skills. In addition, by introducing design-build pedagogy from the beginning and weaving it through each year level the unique curricular structure positions haptic lessons as an equal, fundamental type of knowledge. This strategy stands in marked contrast to the conventional privileging of formal design skills and book learning early course sequence with design-build segregated as an optional experience for senior students. The shift to small, temporary installations has allowed students to be more involved with the pre-project logistics including site selection and permitting as well as more engagement with clients and collaborators.

While the relatively small size and temporary nature of the installations alleviate some of the logistic hurdles associated with larger, permanent builds the project is not without challenges. Specifically, the nature of the Ice Stations with regard to a seasonally specific condition, which is to say frozen lake surfaces, challenges the conventional academic calendar in terms of the fall/spring semester format and the Christmas/New Year holiday season. In response, the project was developed with two distinct, graded components that straddle the winter break thereby allowing for the installation phase to occur early in the spring semester when the lake is still frozen during the months of January and February of the second term and then they only remain on the ice for only a few weeks. Even allowing for this flexible schedule, the projects remain on the ice for a relatively short time before the ice begins to thaw; typically, through the end of February.

In some cases, the move to temporary projects even introduces new challenges. In this example the end of the project build marks the completion of the installation but not the end

of the work. The inherent temporary nature of these seasonal projects necessitates that they be un-installed after their completion. Installations must be dismantled and removed, but once the project is complete, grades are in, and documentary photos have been added to the portfolio there is little incentive for students to help with the clean-up. As a result, the faculty member is often left to organize an additional phase of the project in which student volunteers and/or paid student laborers complete the tear down.

EXPANDED DEGREE OFFERINGS

Auburn University took a different approach in choosing to create a new degree. This new program was developed in response to the increasing complexity of the projects undertaken by 5th year 'thesis' student teams. These teams were already responsible for all aspects of the project preparation and logistics which in combination with the design and construction. Over the years the size and complexity of the thesis projects had increased substantially to the point where four-person student teams were taking on large civic commissions. Churches, community buildings, and even a fire station created a situation in which students were spending an additional one to two years working on the projects after completing their BArch requirements. In addition to the exceptional time commitment, the scenario raised difficult challenges in terms of liability.

With the new offering participating students complete their five-year BArch program and then complete coursework leading to a receive Master of Science in Architecture degree in their sixth year.

This expansion builds on an already extensive engagement with hands-on learning integrated in the Bachelor of Architecture program. In 2005 Rusty Smith and Rebecca O'Neal Dagg were recognized with an AIA Excellence in Teaching award for their (drawing [machines] drawing)[13], initiative which initiated a tradition of embedding full-scale, collaborative projects in the first-year studio. Subsequently, all Auburn undergraduates spend one semester at the Rural Studio participating in a relatively small, formally constrained project to gain experience in community engagement and basic construction. These required experiences provide foundational lessons that prepare students for the more complex, holistic engagement at the thesis level.

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In an effort to expose students to more of the process the University of Colorado-Denver created a collection of five pre- and co-requisite courses spread over three sequential semesters. For students the multi-course sequence leads to a Certificate in Design-Build, similar to a minor. At the same

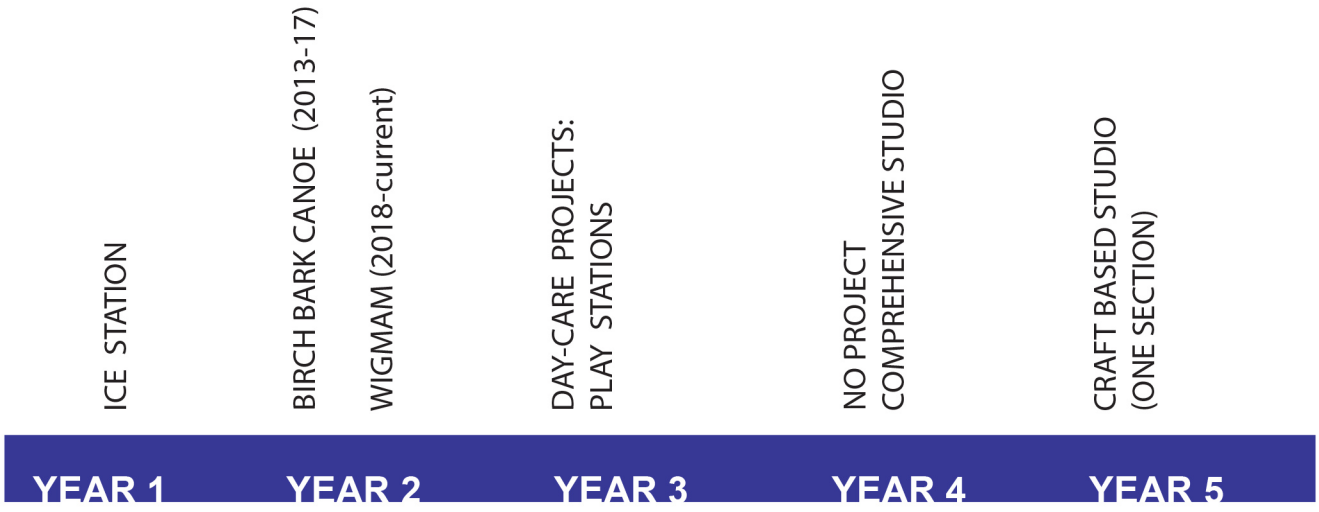

Figure 2. Design Build Curriculum at the McEwen School of Architecture at Laurentian University. Author.

time the additional courses provide an opportunity to expose students to, and engage them in, a robust pre-design phase inclusive of project generation and related logistics before they enroll in the design-build studio.

For faculty the sequence relieves extracurricular burdens on any one individual professor by allowing for the possibility of group teaching approach. Instead of a single faculty member teaching one studio the five courses can be shared between two or three faculty. Alternatively, if the courses are taught by one faculty member the co-requisite structure allows the faculty to embed project preparations within their teaching load. In either case the burdens associated with organizing a design-build studio that were once extracurricular are made more manageable.

CONCLUSION: RE-CONSTRUCTING CURRICULUM

In contrast with the conventional education of architects that privileges independent engagement with studio-based design exercises focused on scale drawings, renderings, and models, 'design-build' is often seen, primarily, as an opportunity to reunite the optic and haptic aspects of architecture through the hands-on manipulation of material and the realities of gravity, tolerance, craft, etc. In this immersive experience students confront the limitations of classroom learning and are exposed to challenges that demand collaborative practice. As a result, design-build has been widely adopted in an attempt to address perceived deficiencies in design education vis a vis the integration of building technology and construction. However, this form of active learning remains largely tangential to the core curriculum of most, if not all, schools while the focus on the act of construction tends to obscure other potential lessons latent in the pedagogical model.

The intent of this paper has been to expand upon the current discourse on academic design-build curricula by exposing inherent logistical challenges faced by participating faculty while also highlighting potential, iterative solutions currently being tested. Highlighting the inherent challenges posed by administrative and institutional structures within academia that limit the learning opportunities contained within design-build allows for new discussions aimed at aligning traditional academic norms with the opportunities embedded in the relatively new learning model.

While not nearly exhaustive the examples provided illustrate the expanding range and diversity existing within contemporary design-build education. As the novelty of 'building' wears off and the pedagogical model matures a recognition of the range of design-build work in terms of both a diversity of 'types' and also the institutional and faculty burdens needs to evolve in order to create curriculum streams that don't rely on individual faculty or singular design-build experiences. Improvements in the quality of critical assessment and critique are necessary to develop coherent operational theories, participate in ongoing debates in the field of education, and elevate the discourse such that design-build practitioners can more fully engage academic scholarship and students can be exposed to the full range of potential, or latent, lessons embedded in the design-build pedagogical model.

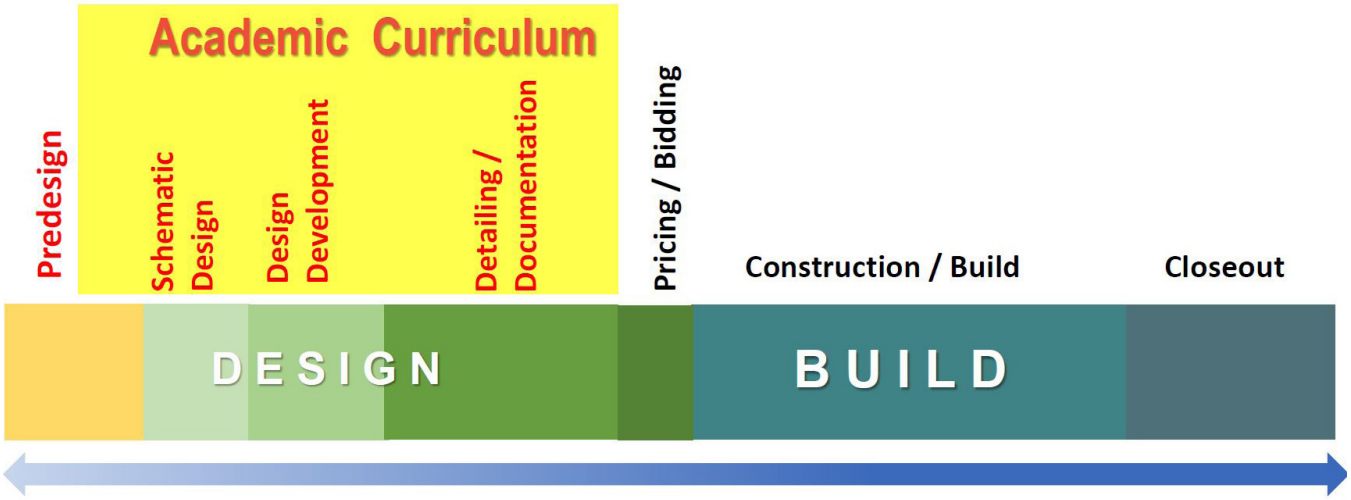

Figure 3. Architectural Project Design Timeline. Author.

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