

Reality Check: Pedagogy at the Intersection of Practice, Education and Outreach

Though much of architectural education revolves around theoretical concepts necessary to the development of creative sensibilities, a key curricular component in 5-year undergraduate professional degree programs is the obligation to prepare students for the practice of Architecture. In this context, Design-Build is a strategy to balance theoretical underpinning with technical aptitude, not to favor one over the other.

Reality Check is a comprehensive case study of the Design-BuildLAB at VA Tech, a 2-semester 3rd year undergraduate studio integrated with required peripheral courses such as Structures, Systems, and Professional Practice. The study focuses on the development and implementation of this internationally acclaimed program in which students collaborate with local communities and industry experts to identify needs, develop concepts and realize solutions to real-world problems. This project-based experiential learning program removes the abstraction from architectural education - engaging students' initiative and encouraging them to take charge of their own learning.

THE WHOLE HOG

The single most important premise of Design-Build education is that student competence and confidence will advance exponentially by building themselves what they have conceived in abstraction; questions of scale, tectonics and materiality are easily apprehended and assimilated when experienced first-hand. Quite simply, a person will not approach design the same way once he or she acutely understands the concrete implications of a drawn line. If the goal is simply to build, Design-Build loses its educational foundation. The learning curve is relatively shallow for a group of students who only conceive a project and have little or no interaction with the builders of their design, or for a group of students who serve as neck-down labor to build (or worse, to finish building) a project, which they did not conceive. To this end, it is essential that the same students who conceived and developed a project be the ones to complete and reflect on the project.

At the Design-BuildLAB, the balance between project scope and project timeline is the key to achieving this comprehensive imperative. Further, project planning incorporates the understanding that mistakes are expected and embraced to ensure

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1

that pressure to “finish” does not short-circuit consistent student engagement at every scale, in every facet.

The design/buildLAB is structured as a 2-semester program: a fall design, a spring build, and a summer contingency. Because early departure of a student from the project would fundamentally undermine the primary goal of Design-Build education – to build the thing that you designed - a solemn pact is made on day one: no one departs before the project is complete. The Covington Farmers Market was organized and proceeded in this way. The much larger and more complex Smith Creek Park was divided into 2 consecutive academic year phases: The Masonic Amphitheatre and The Smith Creek Pedestrian Bridge. Each phase was a stand-alone project conceived and realized in its entirety by its own student team.

While each successive student team has defined for themselves what prefabrication means, the Design-BuildLAB has consistently relied on the simultaneity of site-work and off-site fabrication to minimize the hindrances of bad weather and to compress the construction schedule into a single semester. Generally this has resulted in students fabricating the intricate or atypical building elements in a controlled environment, while coordinating the work of tradesmen to realize more conventional or labor-intensive elements on site. For the Covington Farmers Market, a series of unique trusses were produced on a computer-controlled factory assembly line. The students, working at a shop on campus then built jigs and assembled the trusses into complete roof modules. Meanwhile, a steel fabricator was producing structural columns from the students’ shop drawings and a mason was pouring foundations and stem walls based on their construction documents. All prefabricated components were trucked to the site and assembled with a crane in a single week. While this method is specific to the logic of this project, innovative approaches to



2

construction sequencing are indispensable to fitting a complex project into a single academic year.

HERDING CATS

The Design-BuildLAB is not a faculty-led research initiative with student assistants, a practical internship with professional mentors or a professional apprenticeship with studio masters, nor does it profess an accepted understanding or a common way of doing. Rather, it is a learning environment where projects are led by students and faculty are simply advisors. Students react to propositions developed by their peers, and faculty positions matter as much or as little as anyone else in the room. This “laissez faire” approach is a powerful way to build student confidence

Figure 1. Smith Creek Park, *Jeff Goldberg/Esto*

Figure 2. Prefabrication of Covington Farmers Market the roof modules

and maximize their investment in learning. It allows for exploration and innovation, which can reach beyond the faculty's knowledge, and is therefore not limited by it.

Students do not know what they do not know. This is to say that a student who has never taken (or even witnessed) a project beyond schematic design thinks that the work is fully developed and ready for building, when in fact many questions remain to be asked and answered before building can commence. The role of the faculty advisor in the Design-BuildLAB is to select a project with the appropriate potentials, bring resources to the discussion, and refocus or encourage as needed. The point of limiting the faculty's leadership role is two fold: to facilitate students' individual learning, and to not circumvent the benefits of creative problem solving by prescribing solutions. While professional experience and knowledge are valued as an asset for the team to be able to draw upon, students take the lead in designing both their building and its construction process, enabling them to explore ideas and possibilities beyond the limits of how those with more "experience" may have approached the same problems. The delicate balance between helping students understand what to anticipate and not interfering with the dynamic of an often messy process facilitates a learning environment where wild propositions can translate into innovative solutions.

THE DAGWOOD SANDWICH

Collaboration may be one of the hardest things to teach: first, because it is an attitude that can only be encouraged; second, because most students and faculty have been indoctrinated through a system where individual creative talent is the primary measure of success. In the prevailing pedagogical models, one either develops a project alone, or works in a group, where most often, a few people forge a narrow focus and others provide secondary or tertiary support. In contrast, the Design-BuildLAB environment is framed to facilitate genuine collaboration.

When a group of students is faced with the daunting task of realizing their first building and failure is not an option because they have committed to a community in need, learning to respect each other's contributions becomes a necessity. Here, the role of the advisor is to encourage each student to make contributions outside of their comfort zone, and to ensure that collective ownership prevails. The two greatest pitfalls in Design-Build education are moving forward without overwhelming consensus (leading to a disenfranchised team) and allowing compromise to replace sound decision making (resulting in an incoherent project).

In the Design-BuildLAB, projects are designed and built by teams of 16 to 18 students. After studying the project's physical and cultural context, researching precedents and working with the community to develop a detailed program, all students make individual design propositions. Through a series of studio pin-ups and community presentations, strong ideas are identified. The students iteratively merge these ideas, creating larger teams and fewer, more fully developed schemes. This process allows for multiple concepts, approaches and solutions to be simultaneously explored, and for every student to contribute ideas to the discussion. It is imperative that no one scheme be "chosen". Rather, the result is a unified team who organically arrives at a single project for which there is consensus and community support [Fig. 4]. In this team environment, collective accountability prevents students from stagnating in secondary roles and ensures that each individual gains competence in the expected curricular content areas. Individual students are evaluated on measures such as aesthetic development, technical development, presentation skills, management abilities, participation and critical thinking. The aspiration of this approach is to place the education of the architect in front of the teaching of Architecture¹ and



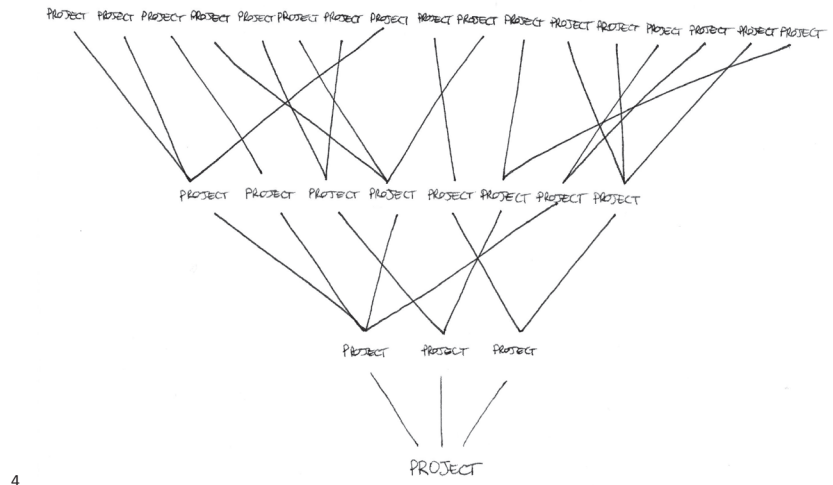
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Figure 3. Faculty and students working together at the Design-BuildLAB, *Jeff Goldberg/Esto*.

thus to empower students to do what they want to do, with excellence.

NO DISCIPLINE

The intensity of real-world project experience differs drastically from the linearity of the learning process in a typical studio environment. Rather than each subject being brought up sequentially, the multiplicity of factors involved results in a range of questions arising simultaneously [Fig. 5]. Each requires knowledge from various areas of expertise, which need to be synthesized in practical applications. In this con-



4

text, “savoir” (knowledge) and “savoir-faire” (know-how) are of equal importance. The imperative to utilize these abilities in tandem results in the forming of durable knowledge: knowledge that is deeply engrained.

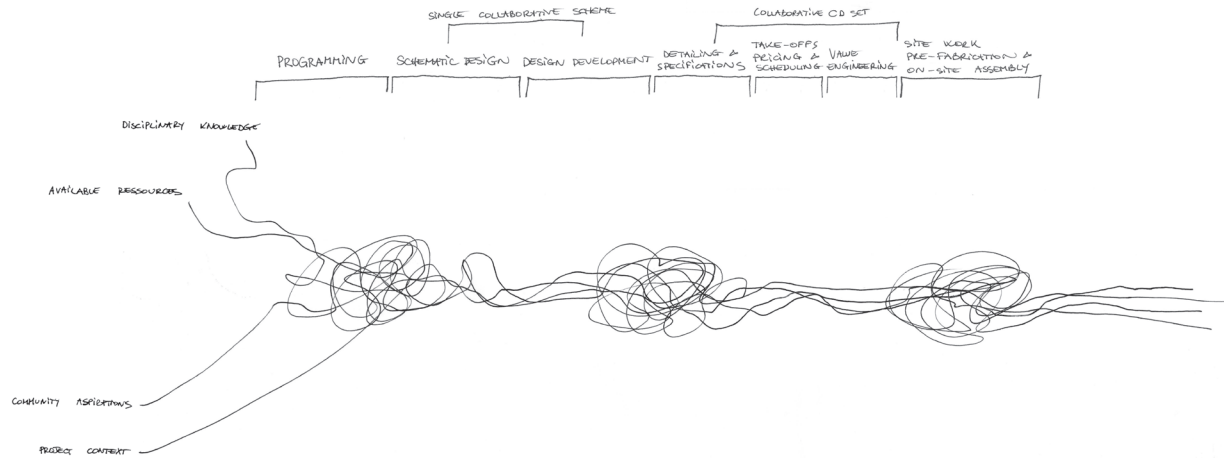
Because students realizing built work has a tangible result, discussions about Design-Build education often center on the act of building. In reality, Design-BuildLAB projects are crafted to ensure that building maintains an appropriate proportion within the overall course content and that expertise from the College’s entire interdisciplinary resource team of faculty is available.² In this way, concepts uncovered in peripheral courses such as Building Structures, Environmental Building Systems, and Professional Practice can be tested in furtherance of conceiving and realizing a work of Architecture.

In the Design-BuildLAB, students spend the majority of their time at their desks, studying, designing, managing and coordinating, in the same way that any architect would in practice - a kind of practical experience that has often remained the domain of the internship. However, opportunities for students to “practice” their profession within the framework of the academy allow for much greater control of the quantity, quality, and breadth of curricular content, while providing an environment where mistakes - teachable moments - are embraced. The complexities and imperatives of building, help students discover the architect’s role in dissolving the boundaries between discipline specific knowledge and in integrating competing interests into a coherent whole.

THE GOOD, THE BAD & THE UGLY

Students often have difficulty connecting with course content without understanding how they will deploy it in their own unique futures. To counter this issue, the

Figure 4. Diagram of the Design-BuildLAB student collaboration process



5

Design-BuildLAB offers students real world experience where education is the primary driver. The making of their project requires students to hone skills in design, construction, communication and administration and exposes them to the plurality of disciplinary concerns like social consciousness, environmental stewardship, poetics, form and craft.

This project-based pedagogy accentuates the range of proficiencies required to produce mature Architecture. Therefore, the idea of student pre-selection based on previous studio performance is incompatible with Design-Build education. Students who have previously struggled with the isolation of abstract problem solving often thrive in this setting as they discover how their unique affinities contribute to the resolution of an architectural problem.² In addition to collaborating on the design of a project, Design-BuildLAB students divide themselves into separate committees tasked with the management of responsibilities that stem from the realization of the project as a team. The Public Relations committee is in charge of project communication strategy. The Logistics committee is in charge of project coordination strategies. And the Administration committee is in charge of ensuring that budget and schedule goals are met. The students work together on many levels, shuffling groups as needed, and everyone's contribution is valued. Each Design-BuildLAB team thrives as its members identify their own strengths and begin to mentor their peers.

IF YOU BUILD IT, WILL THEY COME?

Among the many latent values of immersive real-world learning is the opportunity to equip a generation of emerging professionals who whole-heartedly believe that architects can affect positive change on a grand scale. This empowerment of high professional ethics is most robust when students directly experience the transformative outcomes of their imagination and energy.

At the Design-BuildLAB, a vital project selection metric is the tenable impact on the common good. To this end, projects are always for non-profit community foundations or civic entities, on publicly accessible sites, in communities of overwhelming need. Further, the Design-BuildLAB endeavors to identify and partner with organizations that have a demonstrated history of community leadership and success at realizing their mission.



6

Figure 5. Diagram of the creative process

Figure 6. Design-BuildLAB student



6

During the design phase of each Design-BuildLAB project, the community becomes a sounding board for the students, actively engaged in discussions about the conception of the project. These public input sessions set the tone for an open dialog between architecture students, who are valued for their skills and creativity, and community members, who are valued for their worldview and practical feedback. This discourse contributes to the making of a modern Architecture, which is grounded in the unique identity of people and place.

While Design-BuildLAB projects are funded largely by capital and material sourced from an aggregate of public, private, foundation and corporate organizations, with an equally diverse set of philanthropic, community development, marketing and research interests, the most treasured contributions come from the communities themselves. When the students move on site at the end of the spring semester to assemble their prefabricated building elements, the outpour of generosity from local families, businesses and tradesmen is always overwhelming. For all Design-BuildLAB projects, communities have organized themselves to participate in labor-intensive tasks, to store tools and materials, to lodge the students in their homes, to provide meals and even to wash students' laundry. By taking ownership of the effort to make the building, the community is vested in the independent maintenance and long-term vitality of its civic Architecture.

In a recent interview, Canadian architect Brian MacKay-Lyons recalled Italian



7

architect Giancarlo De Carlo (a proponent of participatory design) imparting the wisdom “to serve is not to be a servant”.³ Social consciousness is an integral part of the Design-BuildLAB’s teaching: the education of the public about the value of Architecture, and the education of architects about the value of the public.

CONCLUSION: IN PROCESS

Architects are creative problem solvers, designers whose medium is building.³ However, building, in and of itself, has very little value in the education of an architect. There is a fundamental difference between the teaching of a trade (building) and the teaching of a discipline (Architecture). The measure of success in architectural education cannot be limited to the quality of the work itself. While the work must strive for excellence, so too must the process of making. Since most student work is never going to be built, the prevailing pedagogical models rely on drawings and models to simulate the complex process of developing an idea from conception to realization.⁴ The Design-Build approach to the teaching of architects is simply a strategy to remove this abstraction. Design-Build is at its best: when the project is a work of Architecture, when students themselves have designed that project and when they, themselves, are directing its realization. The teaching of Architecture is, after all, the empowering of students to develop and own their process.

Figure 6 & 7. Sharon Fieldhouse, *Jeff Goldberg/Esto*

ENDNOTES

1. *The Education of An Architect: 3 Points of View-Rowe, Hedjuk and Ferrari* by Frank Weiner and Shelley Martin, 93rd ACSA Annual Meeting Proceedings, *The Art of Architecture/The Science of Architecture*, 2005
2. *A Curriculum Geared to the Times* by Charles Burchard, founding Dean of Virginia Tech College of Architecture, *AIA Journal*, May 1967
3. *Design Dialogue: Brian MacKay-Lyons* by Keith + Marie Zawistowski, *Inform Magazine*, September 2014
4. *Student Work at Columbia: A Discussion with Kenneth Frampton*, Preface to the Manuscript titled *Architecture and Body*, *The Special Project from Precis*, *Columbia Architectural Journal*, by Scott Marble, David Smiley and Marwan Al-Sayed, Rizzoli, March 1989