FABHouse Studio(s) Saga

Wherein, Two Habitat: Directors, Construction managers, and Board presidents, plus Two Knowlton School of Architecture shop directors, Three faculty members, and Ninety students (give or take a few) participate in Six design studios and One seminar over Six academic years and Two summers, write Six grant applications and finally build One sunny house for One happy family.

INTRODUCTION

Acknowledging the benefits and difficulties of many Design-Build projects in academia (such as annual attempts to define projects, each with new clients and widely varying budgetary and bureaucratic restraints) the Clark County Community Habitat for Humanity (CCCHfH) / Knowlton School of Architecture (KSA) FabHouse project was an attempt to define a new way of designing and building volunteer-constructed homes—not one-offs, but a system, to be improved with each iteration, and designed to be built not necessarily by architecture students, but by typical Habitat volunteers, among them, KSA students.

Dovetailing with the granting of HUD Neighborhood Stabilization Program funding in 2008, the initiative had the potential for resulting in the construction of a whole neighborhood of houses, and a community building. From Spring of 2007 to Winter of 2013, a total of 6 design studios and one quarter long workshop eventually produced two sets of construction drawings, one ultimately leading to the construction of one home, finally dedicated in December 2013.

The project seemed to have all the pieces it needed to be a success, but its successes are greatly overshadowed by its failures. This paper will evaluate the project on its merits, and ask what went wrong. Why were more houses not built? The process has to be deemed a failure in all aspects except for the fact that a family now happily occupies a light-filled, energy efficient home; one that will not be repeated, though it may deserve to be.

DESIGN-BUILD

Why do we try to build buildings within an architecture curriculum? Experiential education is part of every architectural program in some fashion. Drawing, model-making, experimenting with materials: to some degree every work of architectural representation and exploration is experiential and can contribute to the discussion of education for making and practicing. Questions such as: how does the detail

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relate to the whole, how long does it take, how much will it cost, what labor is needed to bring it to fruition, does it work, does it elevate or change our point of view, can be useful pedagogical tools to relate abstract exercises to the ultimate practice of designing and building buildings. Nevertheless, working to design and build projects beyond the walls of the academic institution bring types of intricacy that are not easily embedded in purely pedagogical exercises: working with clients and consultants, building officials and financing, and really seeing the consequences of decisions made in the studio when they are put out in the weather. Design-Build situations in architecture schools are not about training people to be builders, but rather introducing them to the joys, difficulties and complexities of bringing a full scale project to fruition.

DESIGN-BUILD AT KSA

As in many schools of architecture, the Knowlton School of Architecture (KSA) at The Ohio State University has a long tradition of projects in its curriculum that can be classified as "Design-Build" *(Figure 1)*. Pedagogically they position themselves as projects focused on issues of form, scale, budget, labor, and relationships between representational tools and a piece of built work. They might be at the scale of furniture, sculpture, or a room; they have been positioned near the beginning of a student's education in the discipline for all undergraduate students, with periodic elective opportunities later in the curriculum. Students are required to work in teams as a means not only to expand the scope of the projects, but also to provide opportunities for discovering where one fits among the many roles to be played. Successful and popular among students these projects provide a combination of formal exploration and development that cannot be found easily in projects that do not extend beyond representation and into experience. Freed from the constraints of much of day-to-day architectural production, they inspire both a seriousness of purpose and playful exploration.

A corresponding pedagogical issue, then, is how these works translate into and inform the design and making of buildings with the attendant additional constraints: keeping out the rain, cold, heat, wind, intruders, and providing long-term shelter, and experience of working with entities outside of architecture or academia, including consultants, clients and contractors. This and the qualities of architecture that elevate, such as quality of light and space, even in low-cost housing, is often the task of the Design-Build projects in schools.

Even before the 2008 economic crash, many of our students had begun to look for ways to engage the world on more levels than the installation projects offered. The culture of service that pervades many high schools, and, indeed, the college application process began to be felt more in the School. Students founded an organization called Servitecture, and pursued volunteer opportunities in Columbus and beyond, usually pairing volunteer work with a visit to a city of general interest beyond the volunteer opportunity.

At the same time, the environmental imperative was being felt. Design-Build as a research tool became as critical as its pedagogical potential. The school produced two Solar Decathlon projects, in 2009 and 2011 with collaborators on campus and in the local community. One of these projects has found a permanent home on campus where it can be monitored for energy usage and used for academic purposes.[1]

Thus the academic triumvirate of teaching, research and service may be engaged by Design-Build within a university. Into this setting at the KSA an opportunity presented itself that had the potential to become an ongoing project stream to allow for

Figure 1: Sophomore installation project, 2007

WORKING OUT | thinking while building

all three of these modes of work and inquiry to take root in the culture of the school, alongside the more purely formal and theoretical explorations that are more firmly embedded. The opportunity came to include a multi-year, federally funded project to design and build many houses, transforming a neighborhood in Springfield, Ohio.

THE OPPORTUNITY

A 2006 summer architecture program in Springfield offered high school students the chance to design a house that would be built by the local Habitat for Humanity chapter, Clark County Community Habitat for Humanity (CCCHfH). (Two of those students have since earned BS Arch degrees from KSA, and one has gone on to the GSD.) After reviewing the high school students' work, a KSA professor offered to have KSA students consider the design of low-cost, volunteer-built houses during the coming academic year, in the spring of 2007. It simply seemed too good to pass up.

THE STUDIOS

The studios that began with this discussion evolved, as did the potential for building from 2007 through 2012: first, elective studios were used to build trust as we studied the design of low-cost homes; by 2009, adding definition of component parts to be recombined based on site specific characteristics such as orientation to the sun and the street; to using the situation as the topic of the comprehensive design studio for all second year graduate students, leading finally to the construction of one house. Each year from 2008 until 2012, funding was applied for to support the school's part of the effort to build the project in prefabricated components. Although the proposals were often finalists for funding, none were successful. Breif notes about each of the six studios follows:

STUDIO 1: 2007

Third and fourth year undergraduates UG3/UG4): HomeEc

Not predicated on the idea that a house would come to fruition, the initial studios were treated as ideas studios, albeit where students were asked to consider modesty and sustainability, and to challenge the norms of everyday life. The Habitat director participated in design reviews as a "practice" client, open to a wide variety of ideas while always keeping her feet on the ground.

STUDIO 2: 2008

(UG3/UG4/G1) FABHouse I

In 2008, the studio included both graduates and undergraduates. There were many in both programs eager to take on the issues. While still not positioned as a studio that would necessarily lead to built work, the CCCHfH engagement and opportunities were growing. The potential for using prefabricated techniques for low-cost housing, along with digital tools for both fabrication and projective analysis of cost and performance became central to the studio.[3]

STUDIO 3: 2009

(UG3/UG4/G1). FABHouse II (Figures 2 and 3)

With Neighborhood Stabilization Program funds (NSP), the city of Springfield was considering building entire new neighborhoods on the sites of elementary schools that had been rebuilt in new locations. CCCHfH asked if we would look at planning and design of an entire new neighborhood, including the possibility of a community building, on a city block they were trying to acquire through the program.

Building on the 2008 studio's work, and inspired by the work of the contemporaneous inaugural Solar Decathlon studio, students produced ambitious projects they

hard_{core} habitat

2

Figure 2: FABHouse Studio project, 2009

HardCORE Habitat: views

wholeheartedly believed in. The studio afforded opportunities to utilize the same tools that were being exploited by the Solar Decathlon team to document and study energy modeling, cost projections, and daylighting.

The CCCHfH Board of Directors and Director were excited about the possibilities; students built large scale mockups of straw bale walls, and projected a system where prospective homeowners and volunteers would be trained in construction methods by first building the community building, whose initial use would be as a staging area and pre-fabrication factory for the construction of the remaining homes on the site.

Unfortunately, the city chose not to sell that site to CCCHfH.

STUDIO 4: 2010

(UG3/UG4) FABHouse III

Springfield's choice was to invest in the rebuilding of one existing neighborhood: Grand Avenue South. The house sites were scattered, and the rebuilding was to be shared with other not-for-profit agencies; no design guidelines or master plan existed.

Without the commitment of specific sites, the studio was again built around the idea of developing prototypes for the variety of conditions that presented themselves relative to public and private faces of the houses, and orientation to the sun and wind. Explorations of alternative modes of construction, both on site and off, were also generators. CCCHfH's normal construction limitations were taken into consideration, though not always adhered to. This Habitat group was already building very energy efficient houses, with tight envelopes, radiant floors and no air conditioning. Keeping a house cool and taking advantage of westerly breezes was an important factor. CCCHfH had not built anything taller than a single story for several years. The success of the radiant floor in slab on grade was one reason; the average age of volunteers (72 years) and the dangers of working up high was another.

STUDIO 5: 2011

(G1/G2) FABHouse IV

An enthusiastic group of G1 and G2 students chose to be in the studio in 2011. CCCHfH wanted a house this year, if not two. They were now obligated to build 17 houses by the end of 2012, and wanted not only new design, but also all the labor they could get. Unlike most Habitat houses, which have a pre-approved buyer, these were to be built on speculation. There had been staff changes: a new director, and a new construction manager. Two-story construction, with radiant heat in the framing of the second floor, had been tried and found to be a viable choice.

A house was chosen at the end of the term; development of the project drawings was to take place over the summer, with construction to begin in the fall. The house was radical mainly in its proposal to move living spaces to the shaded, breezy second floor, with bedrooms on the cooler ground level. The house was designed for one specific building lot, but with adaptations for other lots should more be built.

Design development and cost estimating were being conducted in earnest during the summer months. A new Chairman of the board, a real estate professional, determined that the resale potential of house with second floor living was not viable. The project was stopped.

STUDIO 6 + WORKSHOP: 2012

(G2) (Figures 4 and 5)

With the December 31, 2012 deadline fast approaching, CCCHfH asked again that two houses be designed, developed, and hopefully built by the KSA. It was clear that without dedicated funding to staff the effort at the KSA, this would not happen. Funding was once again sought for the additional costs of transporting parts of the building from the KSA to the building sites (about 60 miles away) as well as a staff person dedicated to supervising the construction.

Figure 3: FABHouse Studio project, 2009

HardCORE Habitat: nighttime neighborhood view

4

The 2011 site and one adjacent to it were to be used, and NSP2 money was set aside for the two houses. The school committed the comprehensive studio to the project for design and design development, and committed the use of the school's fabrication shop and the advice of the master carpenter who oversaw it, to the project. The shop director had been a primary force in the construction of the two solar decathlon projects. In addition, a spring seminar/workshop would be offered to develop the construction drawings and prepare for a summer start to construction.

The G1 students from the 2011 studio were extremely unhappy about having to spend another term doing projects they felt they had already done. Even the very real prospect of seeing one's project built this time was not enough to placate those who wanted to be doing something else.

Nevertheless, the studio moved forward. Students worked in teams with outside consultants advising on engineering, constructability, sustainability, and cost estimating. Ten projects were developed, and two were chosen by a combination of faculty, consultants, and CCCHfH staff, to be developed for construction.

Students from each of the two winning projects participated in the spring seminar to develop their buildings. Cost was not flexible; design development had to take this into account. The original projected construction costs of $77,000 (including $2500 for Construction Management and $3000 administrative costs for CCCHfH) had been raised to $105,000 for these houses, including similar fees. Modest goals were held onto: no vinyl siding (we lost); second floor porch (we won). The work spilled over into the summer again, but by early July, having combed over the cost estimates with the CCCHfH staff, two sets of construction drawings were delivered to Springfield.

The following day, CCCHfH's Director called to say that one of the houses was "too big". CCCHfH was given the choice to build or not; having looked at the project for months, this late breaking news seemed an indication that they did not want to embark on building that house. It was shelved.

Figure 4: *Barn House*, construction, 2012.

Photo: Michael Talmon, lead designer.

CONSTRUCTION

One of the initial ideas of the project for the KSA had been to take the burden of managing the construction out of the school by utilizing Habitat's infrastructure. The number of houses being built made this undesirable from Habitat's point of view, but without the funding to add someone to oversee the construction and transport prefabricated parts to the site, and without the expertise of the shop director, who had taken a new position elsewhere, it was not possible to take on any of the construction management from CCCHfH. The work would all take place in Springfield, with KSA students volunteering through Habitat to assist in construction.

Nevertheless, students who had worked on the project were excited about being on site, and visited as often as possible as observers or volunteers. Habitat had to use people where they were most needed on a particular day; it was rare that they ever got to work on this house. By autumn of 2012, there were fewer volunteers on the Habitat sites in general, except for a crew of experienced retirees who had been the core crew for several years. The KSA house that was being built largely by local firms who had offered their services at a very good price: SIP's (a first for CCCHfH), roofing, siding, dry wall: all done by professionals.

In October, the construction manager asked that representatives of the school NOT come to the site to observe without permission from him. From October of 2012 until the building dedication in December 2013, none of us saw the inside of the house.

DEDICATION

When the keys were turned over to the new owner in December of 2013, KSA participants were invited to the event. A typical Habitat single story model built on the adjacent site had not yet been sold; apparently the KSA "Barn House" made the others pale by comparison.
The interior space felt airy and bright in the winter sun. The double height volume of the living/dining/kitchen area did not feel overly tall, as we had feared it might. The spaces, though small, felt generous.
The Habitat Board members seemed thrilled with the house, as did the new owners, all of whom expressed gratitude for our role in helping to bring this new house alive.

CONCLUSION

Since the goal at the KSA was to establish an ongoing situation to enable repeated pedagogical, service and research Design-Build opportunities to be available and to inform each other, the evaluation of the failure to reach that goal requires a comparison to other ongoing programs.

Figure 5: *Barn House* dedication. December 2013

The longest running program, at Yale School of Architecture, has existed and evolved since 1967, and even then was preceded by a variety of student generated efforts in the school. Now called the Vlock Building Project, the history of the project is well documented in *The Yale Building Project: The First 40 Years*.[3] Its longevity owes itself to the level of institutional support afforded to the program, which was a top down effort initiated by Charles Moore as dean, in synch with student desires of the late 1960's and early 1970's. It has survived in large part to the dedication of a single faculty member hired in a position dedicated solely to the project, and supported by others on faculty and staff who have worked to identify the annual project to be built, funding for the work at hand, and, increasingly, to be involved in the legal and contractual issues attendant to the situation. Evolving from projects done in Appalachia in the 1960's, to mostly simple, open structures for camps and parks, to houses (since 1989) for a sequence of not for profit developers and builders (including Habitat for Humanity for four of those years), the School's commitment to the project has not been lost, and remains exemplary. The School does not impose a research component on the projects; they are seen as creative work and pedagogical projects that benefit the students and the communities in which they are built.

Another admirable institutionalized set of projects is found in ecoMOD, at the University of Virginia School of Architecture (UVA). As a move away from the Solar Decathlon's biannual competition, and towards something more sustainable in terms of local impact and presence, UVA has established an ongoing entrepreneurial venture encompassing "design, build and evaluate" aspects of making affordable, sustainable houses. Beginning as something of a guerilla operation, taking over a disused airplane hangar, ecoMOD has produced both projects for specific sites and a "plan your own" site where homeowners, builders, and affordable housing organizations can avail themselves of ecoMOD designs for a licensing fee. An attempt has been made to monitor the behavior of the building systems over time through the "evaluate" part of the ecoMOD project.

Many other commendable schemes exist in academia [4]; undoubtedly they all have weathered storms to come into and remain in existence. What they all have in common is a confluence of one or more individuals willing to commit and lead, and able to assemble the right teams and funding (in addition to students) to maintain and grow the ventures. At some point, whether at the outset or after the endeavor has gained some prominence, the institution must commit itself as well.

The FABHouse project began with some of the right parts in place: A desire on the part of students to do BOTH installation projects that allowed formal freedom AND "real" buildings; a client situation that allowed for a reconsideration of the design and construction of low cost homes; and a faculty and staff presence with much of the expertise and ambition needed to build.

Failure to produce more homes was largely circumstantial. Something that began as a dialogue about design and construction was overshadowed by the urgent need for CCCHfH to produce an overwhelming number of houses in a short period of time. Although the ideal scenario might have resulted in a factory producing affordable housing for Clark County and jobs for Springfield residents, the timing was off, and, ultimately the necessary funding, time and trust were not there. Nevertheless, the house that was built remains as an example of design resulting in a more accommodating and uplifting living space for the family that lives there. That will have to be enough.

ENDNOTES

1. See: http://oee.osu.edu/solar-house-opens-for-campus-use. html

2. The work of this studio was presented at the 2008 ACSA Northeast Fall Conference: Without a Hitch: New Directions in Prefabricated Architecture at University of Massachusetts Amherst

3. Hayes, Richard W. 2007. *The Yale Building Project: The First 40 Years*. New Haven, Conn.: Yale School of Architecture.

4. For example: Auburn University, University of Arkansas, University of Kansas, Dalhousie University, Carnegie Mellon.