The Build/Design Workshop

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INTRODUCTION

A new course offered in at Arizona State University reversed the pedagogical approach of designibuild projects that preceded it, and caused students and instructors to encounter unforeseen issues of educational, cultural and social significance.

As design/build projects gain popularity and recognition in schools of architecture across the country, important goals are codified: integration of design and construction, direct experimentation with the properties of construction materials, involvement students in collaborative efforts, and introduction management skills. Through an alliance with a local nonprofit organization, ASU offered a related course that prioritized an additional goal of allowing the construction fieldwork and community involvement to affect the design process immediately. Students were guided through the construction of an actual dwelling, and received supplementary information along with the bodily experience before they designed a scheme for a similarly sized and sited dwelling.

The hypothesis was that the students' design processes would be altered by this sequence of events. The expectation was that the students' design work would be a result of the interaction they had with the actual users and the physical experience of constructing a house rather than the introspective exploration they tend to focus on in the studio environment.

These expectations were realized in unexpected ways. Clients of various ethnic groups revealed significantly different preferences for allocation of space, aesthetic expression, and security features. The usual perceptions of experts vs. novices were reversed when some clients showed facility with construction practices yet unknown to the college students. Gender bamers in the construction process arose due to physical limitations and had to be resolved in ways that would contribute to women students' sense of competence and empowerment. The resulting design projects, one of which will be built during the next course offering, showed both positive and negative repercussions of the build/design experience.

THE BUILD/DESIGN WORKSHOP

The Context

Hart framing hammers appear beside the Maylines, nailing blisters piggyback the drafting calluses, steel-toed boots replace the Doc Martens; signs that blue-collar capability has broadened white-collar tradition in the design studio. Design/build projects, courses, and studios are currently gaining in popularity and public recognition in schools of architecture across the country (see Reno, and Branch). Important goals, paraphrased from statements by the instructors of published design/build projects, included: integrating design and construction, experimenting directly with the properties of construction materials, involving students in collaborative efforts, and introducing management skills. Most of these projects combined a carefully developed research agenda or theoretical investigation with a design problem which was then constructed at full scale by the student authors.

Figure 1. Students put their backs into framing partition walls

An experimental course offered at theSchool of Architecture at Arizona State University during the Spring semester of 1995 reversed the pedagogical approach of design/build projects that preceded it, and caused students and instructors to encounter unforeseen issues of educational, cultural and social significance.

The Premise

The Build/Design Workshop was conceived as an illustration of the learning-from-doing cycle in architectural education described by Donald Schon ***(Educating the Reflective Practitioner***) as he studied the unique circumstances under which architects absorb the artistry of their profession. Schon has written at length about a learning cycle that involves activity, recognition, decision, and adjustment wherein continuous iteration of action and reflection-on-action allow increasingly informed inquiry . During the course of design studios that end each project at a schematic design stage, certain activities (research , problem and site documentation, formal, analytical, and theoretical design process investigations, drawing, model building, writing, oral presentation) are reiterated, reflected upon and refined. But the feedback loop is incomplete without the testing and evaluation of architectural ideas at full scale. The importance of the recent swelling of design/build course offerings therefore lies in giving students the opportunity to bring closure to design ideas and evaluate them as actual constructions. Even in these full scale laboratory environments, however, the learning-from-doing cycle is interrupted when the built work is completed and the course ends. Due to the time frame of a typical quarter or semester, moving through the design cycle even once is a challenge that demands tight management of labor and resources.

Through an alliance with the local chapter of Habitat for Humanity, ASU offered a Build/Design Workshop that allowed the construction fieldwork and community involvement to affect the design process immediately. Students were guided through the construction of an actual dwelling, and received supplementary information along with the bodily experience before they designed a scheme for a similarly sized and sited dwelling. Saturdays spent on the construction site served as an introduction to client interaction, construction materials, techniques and sequences, as well as a prelude to design. Classroom sessions provided an academic context for the experience, and presented some sidebars of information that were important to the realization of the project.

The hypothesis was that the students' design processes would be altered by this sequence of events, and certain awarenesses would be raised within them, in a kinesthetic sense that is difficult to forget. The expectation was that the students' design work would be a result of the interaction they had with the actual users and the physical experience of constructing a house rather than the introspective exploration they tend to focus on in the studio environment.

Figure 2. Students create shear walls

The Course

Students attended a seminar meeting one evening per week in order to explore issues of affordable housing and develop a context for the construction activity and eventual design problem. Research investigations, individual presentations and group discussions included topics such as:

alternative design prototypes,
housing design for populations with special needs,
cultural influences on housing design,
community scale and other community issues,
alternative housing implementation programs,
alternative finance models,
cost estimation models,
design/ build models,
alternative construction materials,
energy efficiency and resource conservation, and
computer visualization and communication tools.

The culmination of nine weeks of seminar work was a community design charrette held at the Habitat for Humanity site. Teams of students and community residents (or prospective residents) discussed and drew prototypical dwelling units that represented desires and concerns expressed during the charrette. The results of the charrette, recorded in the form of notes and drawings, were reproduced and bound for students to use as design manuals for the design problem that occupied the last four weeks of the course.

As the affordable housing seminar proceeded, students began a simultaneous education in the construction methods that would eventually be used to realize a design scheme for a single family dwelling on a site nearby. Beginning with the first Saturday of the semester, students met at the Habitat site

Figure 3. Student frames porch columns

at 7 a.m., outfitted with stiff new tool belts and bottles of Gatorade. The initial site visit and tools demonstration was followed by seven weekends of construction, resulting in the completion of a three-bedroom house. Subcontractors visited the site during the weekdays between the episodes of concentrated student labor, and were responsible for the pouring of the slab, the plumbing, the mechanical and electrical work, and the taping and floating of drywall. Students framed and roofed the house, put up the drywall and trim.

By the time the community charrette occurred, students had explored issues of affordable housing from an academic viewpoint, experienced the construction of a unit, and become familiar with the neighborhood and its inhabitants. Working individually or in teams, students then developed design schemes for a single family house for another lot at the site. Habitat for Humanity agreed to review the schemes at the end of the semester and select one or more for refinement, with the intent of building a student scheme for the next round of the Build/Design Workshop.

The Consequences

The expectations for the course (that the design process would be affected by the physical and social experience of the construction effort) were realized, but sometimes in ways that were unforeseen by the instructors and students.

That students might genuinely revel in the physical work and appropriation of new construction skills was predictable. Architecture students, with their trademark pasty complexions and flaccid muscle tone from years of studio confinement, usually do appreciate site visits and brief exertions. But these students (who had been known to complain about the cost of books and photocopies for all their classroom-bound courses) enthusiastically purchased all the hand tools they needed and arrived on site about the time studio lights usually go out. They put in eight-hour Saturdays of demanding physical work, replete with all the blisters, flesh wounds and muscle pulls that accompany the Weekend Warrior. Many of them claimed that, although they had previously traced or copied working drawing sections for residential construction , they had never before paid attention to or understood the assemblies of materials. Most of the students claimed that a true enjoyment of making tangible objects compelled them to take the course, as well as a desire to learn about construction methods and gain field experience that would lend them credibility in construction administration roles in their future careers. Several cited the opportunity for fresh air and exercise as a reason to contribute more weekends of labor than were required for course credit; a few noted the satisfaction derived from time spent in altruistic pursuits. All of the students who gave written responses on the course evaluation forms at the end of the semester claimed to have learned a great deal about how to make buildings and to have experienced a shift in design priorities that recognized the making of architecture as a consideration in the preliminary process rather than as an afterthought.

For some students, the contact with the actual users of the project proved to be the most confusing and complex aspect of the course. While framing techniques could be clarified by drawing and demonstration, clients' opinions and attitudes were often rendered opaque by differences in education and ethnicity. The students believed themselves to be in possession of rare and important architectural knowledge, imbued by their professional training and expanded by their recent collections of construction tools and jargon. (Some new terms reported by the students were: "walking plate," "nailing off," "two foot and go," sinkers, hurricane ties, nailers, OSB, nail claw, teko nails, channels, etc.) The usual perceptions of experts vs. novices were reversed when some clients showed facility with construction practices yet unknown to the college students. For example, one Saturday as students attempted to apply asphalt shingles to the roof of the project house, they were surprised to see the future owner of the house ascend with his personal set of roofing tools. A quiet man, the homeowner had worked beside the students for four weeks without revealing that he was a roofer by trade. He quickly assumed authority for the roofing of his own home and set the students to task in organized tiers, working diagonally up the roof pitch. He followed them closely, complaining about their lack of rigor when it came to achieving consistent overlaps of shingles, even spacing of nails, and straight rows. "After all," he kept exclaiming, "I don't want my own roof to leak!" The students were somewhat humbled by the day of chastisements on the roof, but still had trouble giving credence to the clients' viewpoints in matters of space configuration and aesthetics.

At the community design charrette, the instructors asked the community residents in attendance to air issues of the greatest concern to them. Security, both of possessions and personal safety, was the topic of paramount importance.

Residents spoke at length about the feelings of security engendered by the views from each house to the street and park, and by the fact that all residents know one another prior to home ownership (a phenomenon ensured by Habitat's requirement of 500 hours of labor as a sweat-equity down payment). The fear of invasion by gangs from outside the community and the desire to enclose the site with concrete block walls were reiterated by every individual resident when the large group broke into smaller charrette teams. The preoccupation with fences, burglar bars, and lockable storage frustrated the students who came prepared to discuss housing archetypes and the virtues of the free plan. Unanimous in their preference for flat-roofed over gabled houses, the students were incredulous at the residents' choice of the "most normal" elevations during the charrette. Invited to enter the homes of several residents, students were nonplused by the use of bedrooms as television rooms, and living rooms as dormitories. While their academic training had freed them from some conventions, it had never caused them to question others. The students, in their architecturally chauvinist ways, believed that every family would choose the most unique looking house, but inside every family would occupy it in the same way.

The class was predominately composed of Anglo students; the Habitat community was Mexican-American and Black. Differences in outlook that could be attributed to ethnic differences and socio-economic disparities were difficult to recognize in spite of some classroom discussion about cultural influences on design and designing for nontraditional families. The fact that a family's first home could represent entry into mainstream American culture was not obvious to middle- and upper-income university students, to whom residential design was an opportunity for artistic self-expression and distinction from "normal suburbia." Many students felt hamstrung by positive value Habitat residents placed on conventional house forms, accustomed as they were to rewards for flaunting convention in the design studio. Some students were inflexible in the face of client preferences that contradicted their own predilections. When several Mexican American community members reported that they had furnished rooms labeled as bedrooms on the floorplans to function as television rooms, students were fascinated to learn that the change was made because the family members felt like sitting closer together than the larger space allowed. Yet they persisted in creating large, wall-less, multi-purpose spaces in their own schemes, placing them in the public zones and calling them living rooms. They also clung with tenacity to the allocation of one bedroom per child, even after learning that this was not a sacrosanct formula in all Mexican-American families. (see Pader)

The second Saturday of construction work on the Build/Design Workshop house coincided with a housewarming party for a newly completed residence on an adjoining lot. Students watched with curiosity (and some with revulsion) as the homeowners and their guests brought a 200 pound pig carcass into the rear of the lot, dug a pit, skinned and roasted it. All day long people came and went, enjoying the roast, the beer and the weather, but the students could not be persuaded to socialize. The same reaction was evidenced the following weekend, when a group of residents offered students home-made *menudo* to warm them in the chilly morning. There were cultural gulfs that could not be bridged.

Gender barriers in the construction process arose due to physical limitations but were, in most cases, resolved once they were identified. The earliest and most mystifying of these instances occurred during the weekend of roof framing. As students began scaling the wall plates to position trusses and secure lateral bridging, and then to nail off plywood sheathing, it became apparent that the men were all on the roof and the women were milling about on the scaffolding, holding onto the ends of trusses as they were nailed into place or feeding plywood sheets up to the roof surface. A candid discussion between an instructor and the female students revealed that it was not a lack of nerve that kept them off the roof, but a lower center of gravity. None of the women, save one or two, could hoist themselves up from the scaffolding and onto the roof without a significant boost from behind. Embarrassed to ask for help every time they needed to climb up, they opted to remain holders and fetchers. Raising the scaffolding in one area took some time away from the roofing in process, but then enabled the whole class to proceed more efficiently. There were other instances when some female students felt less capable than their male counterparts, because they had absolutely no previous experience with tools or home improvements. Their own solution, developed over time, was to band together in groups of three or four women and "attack" a specific task, such as the intersection of plumbing walls with pipe stubs, and work it out without asking for direction or advice. With several of these episodes behind them, confidence grew. One Saturday an elderly man and his wife drove past the house, circled the block, and parked near the construction fence. They approached the site with curiosity, the man exclaiming to one female student "Just when you think you've seen everything (and I've been around a long time) you see girls building a house!" The women became accustomed to this incredulous reaction (with varying degrees of discomfort), after hearing it from subcontractors, other Habitat volunteers, the cashier at the hardware store, and the driver of the lunch wagon.

Once the house was finished and the community design charrette concluded, students worked independently or in teams to produce schemes for a house to be built in the community during the next course offering. The design projects showed both positive and negative repercussions of the build/design experience. As the Build/Design Workshop was offered as an elective seminar, the time given to design was brief in comparison to what might be expected in a required studio. There were no formal desk crits or interim reviews. Students arrived at the Habitat site for a final pin-up with substantially less on paper than would be expected in a studio course. They presented very little in terms of process documentation; apparently believing that the inves-

tigative process had been collectively experienced and reiteration of personal insights was unnecessary or redundant.

The design schemes appeared to be very modest, almost tentative. The instructors worried that the realities of the Habitat for Humanity project and its budget constraints, technological restrictions, and regulatory environment had paralyzed students who normally tend toward conspicuous acts of self expression. Indeed, some of the schemes approach the very examples of tract house convention that students railed against early in the course. Instructors are left with the question of whether heavy doses of pragmatism flatten out the wrinkles of interest usually created by the dearth of budget and structural constraints common to studio projects. Solace could be taken, however, from evidence of sensitivity to construction methods and materials dimensions, social preferences espoused by community residents, cultural traditions, security concerns, frugality of gesture, and flexibility of spaces.

Most of the student schemes offered variations of a "generic " floor plan, each of which illustrated different possibilities for the use of the assembled spaces. Some showed possibilities for converting formal dining rooms to study spaces, patios to future bedrooms, bedrooms to offices, in response to the many ways that South Ranch families used the existing homes. Others manipulated conventional arrangements slightly, in order to skirt code restrictions such as the prohibition of non fire-rated openings onto carports (which are often co-opted as secondary living rooms in some local neighborhoods.) The students' struggles with conventional perceptions of space usage seemed to lessen as they released their dependence on terms such as "Great room" and "Master bedroom suite".

The increased use of courtyards, enclosed patios and front and back porches demonstrated some new cognizance of cultural preferences and local traditions. The topics of surveillance, security, and territory demarcation discussed at the design charrette had some lasting impact. Interior spatial sequences showed fewer vestiges of the parent-child bedrooms split that is presently common in the tract home market.

The experience of building a house first was clearly responsible for the more efficient and straightforward uses of materials in the students' schemes. Much more aware of modular dimensions, the authors planned on 16-inch, 24-inch, 4-feet and 8-feet grids, composing door and window openings carefully within these parameters. Porches, overhangs, open courts were designed as integral to the roof truss system streamlining both construction cost and effort. There was, however, little evidence of consideration of interior surfaces or finishing details. Virtually none of the schemes developed a strong relationship with the ground plane or landscape elements.

Had there been a design studio attached to the build/design seminar, or immediately following it, there would have undoubtedly been stronger design results. The necessary examination of premise and process would have led to further questioning and experimentation. Students could have been encouraged through desk crits and juried reviews to expand upon individual strengths. Large scale constructions could have been employed to test details or connections. In the 1995 incarnation of the Build/Design Workshop, the Design phase certainly brought some closure to the learning-by-doing cycle. The students' espoused goals of learning about the construction trades and obtaining hands-on experience were realized, to their obvious satisfaction. Many declared their intentions to take the course again. When viewed in retrospect, however, the pedagogical goals of allowing the construction and client contact to affect the design loop were not fully accomplished. While many new awarenesses were kindled which affected the design process to a degree, the full impact of the field experience could not be exercised in the design phase due to the non-studio format and time constraints. The proposed incarnation for 1995-96 is a tandem course requirement of one semester of field work on weekends followed by a topic studio that concentrates on the design of a unit to be constructed by the next group. The point to bring home, perhaps, is that like many other forms of artistry, architectural lessons take time and practice. New competencies must be immediately reinforced and brought into use against the next challenge.

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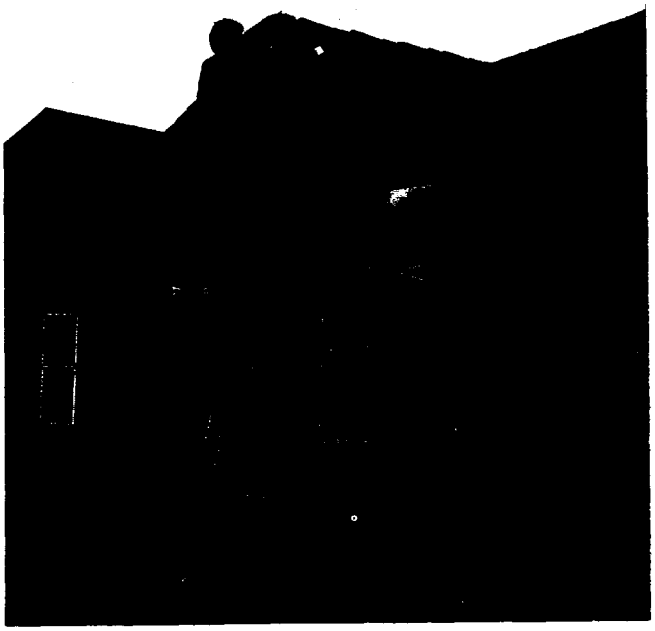

Figure 4. Owners paint stucco and trim