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# Approaches to Affordable Housing Design: Science, Art, Communication and Strategy

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## **Abstract**

For architects the role of design and the shape of practice with regard to affordable housing can be a perplexing puzzle. Today, an architect can hardly hope to create a house that is more affordable, more acceptable, or even more sustainable than what can be produced by the market without an architect. It seems that the greatest potential role for architects in affordable housing is to fall back on one of the Enlightenment-based foundations of the profession: knowledge of what constitutes beauty in built form that gives architects value as purveyors of good taste and social position.<sup>1</sup> By using this knowledge in the service of social equity, can we bring the benefits of design, namely the experience of beauty, into the lives of those who are less fortunate? Or, can we instead move beyond this construction of the profession entirely and redefine not only what we mean by design but also how we practice it and also how it affects those for and with whom we design?

## **Disciplines**

Architecture

# THE VALUE OF DESIGN

design is at the core of what  
we teach and practice

PHOEBE CRISMAN + MARK GILLEM, EDITORS

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# Approaches to Affordable Housing Design: Science, Art, Communication and Strategy

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## INTRODUCTION

For architects the role of design and the shape of practice with regard to affordable housing can be a perplexing puzzle. Today, an architect can hardly hope to create a house that is more affordable, more acceptable, or even more sustainable than what can be produced by the market without an architect. It seems that the greatest potential role for architects in affordable housing is to fall back on one of the Enlightenment-based foundations of the profession: knowledge of what constitutes beauty in built form that gives architects value as purveyors of good taste and social position.<sup>1</sup> By using this knowledge in the service of social equity, can we bring the benefits of design, namely the experience of beauty, into the lives of those who are less fortunate? Or, can we instead move beyond this construction of the profession entirely and redefine not only what we mean by design but also how we practice it and also how it affects those for and with whom we design?

In teaching design and theory courses centered on affordable housing, I have found that this area in particular calls both the role of the architect and the object of design into question. This is a relevant issue not only for housing but also for architecture in general and, as such, affordable housing education and practice has the potential to question and rearticulate what constitutes design and thus the position of the architect in society.

Drawing from recent experience, affordable housing appears to offer at least two ways of redefining design as well as the role of the architect. The first of these involves creating systems of communication that give voice to a range of interests and thus create design as a process of collective articulation

rather than the expression of either personal vision or functional requirements alone. The second centers on creating strategy rather than form that can in turn generate multiple forms in response to changing needs over time. Both of these ideas move the architect away from a role as a purveyor of privileged knowledge, whether technical or aesthetic, and toward a role as a facilitator who assists in the realization of individual and communal needs and desires.

## SINGLE-FAMILY HOUSING

In developing a program exposing students to aspects of architectural practice not normally encountered in the design studio, I gravitated early on toward affordable housing. This work not only gets students involved with budgets, schedules, and contractors but also exposes them to the often-conflicting forces that shape housing design in the United States. It also brings them into contact very directly with the "enriched mission" of architecture, described by Boyer and Mitgang as "helping foster, through design, more wholesome neighborhoods, safer streets, more productive workplaces, a cleaner environment, and more cohesive communities."<sup>2</sup>

The single-family house also continues to be the primary path to the so-called American Dream in that home-ownership is the main economic mechanism in American society that allows the otherwise underprivileged to begin to acquire wealth through equity. According to Rohe and Watson, "the average wealth of home-owning households is ten times that of renter households" and "home equity represents approximately 45 percent of the total wealth of home-owning households."<sup>3</sup> Urban infill neighborhoods in Iowa are also primarily made up of single-family homes, most local non-profit hous-

ing developers build mostly single-family homes, and the majority of funding from the Department of Housing and Urban Development (HUD) goes to the renovation or construction of single-family homes intended for sale to qualifying low income buyers. Thus while the single-family house is much-maligned for inefficient land use practices leading to sprawl and the like, particularly in urban infill situations in the United States it is undoubtedly the primary opportunity for sustainable community rebuilding and engaging design work in areas that have been previously underserved.

Sponsored in part by the American Institute of Architects' Practice Academy Pilot Program, the Bridge Studio is constructed to serve as a bridge between education and practice for upper level undergraduate and graduate students as well as recent graduates who return to the studio from practice to act as "team mentors." This work asks students to begin to synthesize their understanding of technical, theoretical, and design issues through the lens of a real project. It also asks them to reconsider the parameters of current practice and potential new roles for architects in society.

### THE STUDIO SET-UP

In 2007, the Bridge Studio began working with the Community Housing Development Corporation (CHDC) in Des Moines, Iowa to design prototype single-family homes for the Riverbend and King Irving neighborhoods on the north side of Des Moines (Figure 1). These areas are former streetcar suburbs that were cut off from the central business district in 1967 with the construction of Interstate 235. As in so many cities, the primarily white, working-class residents of these neighborhoods gradually moved to the suburbs, replaced by poorer people of color. Many homes were divided into apartments or abandoned. The area today is a typical urban infill situation with many open lots and residents from diverse ethnic and economic backgrounds.

CHDC had two primary objectives in working with our students: 1) To generate "better" designs and move away from the repetition of building the same unit over and over; 2) To bring "sustainability" into affordable home design and, hopefully, make home-ownership more affordable by reducing utility costs. We were asked to design three-

bedroom homes of approximately 1200 square feet for a budget of around \$150,000, resulting after soft costs in a budget of about one hundred dollars per square foot. These houses would then be sold for around \$120,000 with federal HOME funds covering the gap between construction cost and sale price.



Figure 1. Typical street in the Riverbend neighborhood. Photo by author.

In the fall of 2007 and spring of 2008, students worked in three- or four-person teams, each led by an intern from a "partner firm," developing prototype projects according to these parameters. In the fall we designed for lots with east-west orientations and in the spring we worked on lots with north-south orientations. The project brought students into contact with questions about the role of the architect in society and the place of design in affordable housing.

Throughout the course of each semester, students were asked to keep on-line journals to which only the instructor had access. Each week, questions were posed as starting points for journal entries but students were free to discuss any issues relevant to the class. Student opinions expressed in this paper came either through the journals, a series of class discussions, or desk crits. Students were much more open and direct in expressing their opinions in their journals, most likely because of confidentiality, and for this reason names are not included with statements of student opinion.

When asked at the beginning of the semester which of their previous courses they believed would be most valuable for designing affordable housing, the

overwhelming response was either studio courses or technology courses. Studio courses would enable them to create more efficient and attractive houses while technology courses would enable them to be more energy efficient and buildable. The “ideological dualism” between the “culture of *taste*” and the “culture of *knowledge*” was thus clearly present for these students.<sup>4</sup>

### DESIGN AS SCIENCE

Early on, most of the students found that the roles they expected to fill in the design process were called into question. The projects were small and the students relatively adroit at reacting to the plans of CHDC’s previous projects to produce more efficient designs with less circulation, more storage, and so on. From the students’ perspective, the challenge of the project was therefore not in the organizational or space planning aspects of the project but rather in demonstrating both their technical and aesthetic expertise. In the fall of 2007, the students particularly took on the task of expanding the technical possibilities of single-family affordable housing. Our client, while interested, knew very little about this and therefore could not establish specific parameters for this part of the investigation.

The students quickly jumped into developing alternative mechanical systems, including passive systems, which would reduce heating bills and fossil fuel consumption. The studio developed a kind of machismo centered on the technical workings of these systems that revealed their exposure to and acceptance of the idea of the house as a “machine for living” as well as their belief in the role of the architect as one based in technical expertise. In other words, this studio very much embraced the “science” side of the science vs. art dichotomy surrounding the role of the architect.

Many of the student teams tried to be creative to make sustainable strategies work within a tight budget. For example, the project designed by Justin Burnham, Jesse Stephenson, Chad Walters, and Lisa Willman minimized excavation and used the money saved for a geothermal heating system. They eliminated most of the basement area, allowing only enough space for a tornado shelter and mechanical equipment, and used shallow insulated footings to reduce excavation and concrete costs. They then

ran radiant heating in the slab-on-grade and saved money on floor finishes as well (Figure 2).

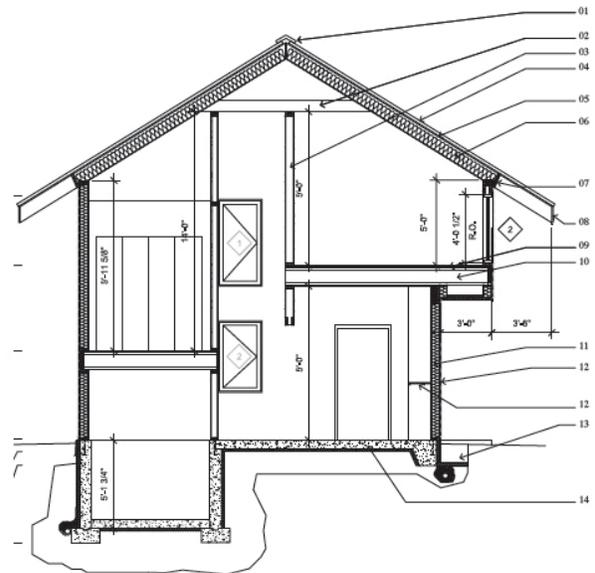


Figure 2. Section showing minimal basement, slab-on-grade, and shallow insulated footings. Student drawing by Justin Burnham, Jesse Stephenson, Chad Walters, Lisa Willman, Fall 2007.

While the clients appreciated the team’s efforts to be creative in incorporating new kinds of sustainable systems, they could not build the design for several reasons. First there was concern that concrete floors would be seen as too industrial by low income clients, causing them to feel slighted rather than empowered by the house design. Because of the importance of the slab as both a thermal mass for passive solar and as the most efficient installation for radiant heating, the students were upset that an issue like cultural perception would override a technically logical solution. They tried to sell the client on the popularity of stained concrete as a high-end finish that would add prestige to the house, but in the end they were only able to gain some areas of hardwood floor rather than carpet in the entire house.

The second issue this team faced was with the contractor. As a small operation building a few houses a year for a non-profit client, Double D Construction was operating on a tight profit margin. Because of this, they were concerned about implementing systems that they had not used previously and were not willing to risk the learning curve involved with-

out additional budget to cover potential losses. Interestingly, the students accepted this logic much more readily than the rejection of concrete floors for aesthetic reasons.

At about the midpoint in the semester, the entire studio became upset that the clients were being resistant to change and not respecting “professional” opinions. In assessing what was upsetting about this situation, it eventually became clear that the students felt an obligation to come up with something that “went beyond” what a standard builder home could deliver on a technical level, particularly with respect to sustainability. They specifically felt that active systems were more “cutting edge” and therefore said more about them as innovative designers than passive systems.

By the end of the fall semester, both the studio and CHDC had a fairly clear understanding of what we could and could not do given the parameters of budget and buyer expectations. By December we understood that the best strategy for these projects was to emphasize tight and well-insulated building envelope construction combined with wise use of building orientation.

The students also came to understand that their role as architects was not necessarily to create the most elaborate or even the best technical system possible but rather to synthesize the competing interests of a tight budget, low income buyers needing lower utility bills, and contractors needing to work within an acceptable level of risk. As a result of this process, for example, the contractor was willing to use 2x6 rather than 2x4 framing and use the money saved from reduced framing materials for higher R-Value insulation. CHDC also began investigating additional funding opportunities to enable them to implement more “green” building techniques in the future.

## DESIGN AS ART

We condemn the exhibitionist as an antisocial element in society, and we should also condemn that type of architect for whom the building of a house is merely an opportunity to parade personal formal preferences for all the street to see.<sup>5</sup>

In addition to struggling with the role of technical systems in affordable housing design, my students also struggled with the need for artistic expression

as part of the architectural design process. As with the technical issues, the students typically felt that in their role as architects it was necessary that they bring something “new and different” to the appearance of their projects. If they did not do this, they were simply copying what someone else had done and they would thus not be acting as architects.

The studios met on several occasions with representatives from the Riverbend and King Irving neighborhood associations and made design presentations at neighborhood meetings. While not designated as a historic neighborhood by the City of Des Moines, Riverbend in particular considers itself a historic area primarily because of the West Ninth Streetcar Line Historic District listed on the National Register of Historic Places.<sup>6</sup> Lined with turn-of-the-century homes, many of which have been restored, this particular street is the standard to which the neighborhood as a whole aspires.

Nearly all of the students felt that, as architects, they could not simply create an “historic style” house because this would imply copying something that already existed. In most cases, the first strategy adopted in dealing with exterior appearance was to make a house with a flat roof and minimal trim detailing that relied on massing for impact. The hope was that because the form was simpler, the cost would also be lower and this would be a convincing selling point.

Quite the opposite proved to be the case. Sloped roofs are by far the most common residential roof type in Iowa and are therefore the most inexpensive system and one that all contractors know how to build. Furthermore, because of frequent freeze-thaw cycles, trim details are essential to allow gaps for movement and prevent cracking. While the students were able to accept the contractor’s practical reasoning, the aesthetic reactions of the neighbors was another thing entirely.

During a design presentation to the Riverbend Neighborhood Association, many area residents expressed admiration for some of the more modern proposals from an artistic point-of-view (Figure 3). They were concerned, however, that the designs would appear “inappropriate” and “willful” in this neighborhood and would create an impression of a dysfunctional community rather than one in which neighbors work together for safety, well-being, and livability. This

raised the important issue that an urban house is very much more than a thing-in-itself, being also part of a larger physical and social fabric.



Figure 3. Students presenting façade design options to the Riverbend Neighborhood Association, March 10, 2008. Photo by author.

Trained to express uniqueness and individuality through design, the students were thus confronted with a challenge to their ideas about ways in which architects could work to achieve social good. Creating something that was beautiful, unusual, and new had seemed like a noble way in which to enhance the lives of the future residents by giving them both personal pleasure and social status through design. The idea that “beauty” could reside not in the thing itself but in its relationship to its surrounding physical and social contexts was not an entirely new concept – these students had designed projects before for a variety of contexts – but the configuration in which the context fundamentally outweighed the individual was generally a new situation.

These issues gave us an opportunity to consider where an architect’s energies and abilities can be best applied within the context of affordable housing. With respect to the issue of design as art or beauty, it was clear that the design of contextual relationships was at least as important as the design of the house itself.

#### DESIGN AS COMMUNICATION AND STRATEGY

In both of the examples described above, the architecture students learned how to resolve conflicts between their own objectives and those of their cli-

ents by stepping back and examining what they were actually doing in developing their projects. Through traditional desk crits, meetings with design professionals, and journal writing the students became aware of the design process involved not only in producing drawings, models, and details but also in shaping conversations, assessing priorities, and creating common ground.



Figure 4. Revised First Floor Plan, Fall 2007. Drawing by students Brigitte Bose, Angela Jax, Mike Killeen, Ryan Milburn.

In the case of the “technical experts,” the role of the architect shifted from creating the best possible energy-efficient design to creating the best possible energy-efficient design that could be achieved within the various constraints of the project. It was very difficult for the students to abandon what they had thought was a viable solution, but once they did this they could take the knowledge they had gained from this process and apply it toward developing a different system that would work within the given constraints and still benefit the future homeowners. The design of the project thus involved not only the design of the system itself but also identifying what the constraints were and how they affected their options.

To do this, the students first needed to figure out not only *what* the client could and could not do but more importantly *why* they could not do something and how this constraint functioned. The real design work in this case became the creation of synthesis between the desire to reduce energy bills and the desire to work within the given budget. Once it became apparent that most of the active systems that had been proposed would not work within these constraints, most of the teams shifted their focus to more passive approaches.

The team of Brigitte Bose, Angela Jax, Mike Killeen, and Ryan Milburn reconfigured their project to maximize southern exposure in winter in main living spaces as well as passive ventilation created by a staircase “chimney.” These are by no means new design ideas; in fact, most have been used in houses in the Midwest for decades if not centuries. The “design” occurred instead in discussing how much energy cost savings was critical for homeowners, what kinds of spatial features could contribute to passive strategies, and what elements could be developed using conventional systems that would achieve end results close to those of the costlier active systems. In doing this, they discovered new opportunities that led to a much more spatially resolved design and still achieved goals of energy efficiency (Figure 4). They achieved this by taking time to plan their conversations with clients, contractors, financial organizations, and potential homebuyers. They focused not only on what would work or not work but also why this was the case and what could be done to change it.

In the case of the “aesthetic experts,” the students had to find the right balance between form and context that would allow them to create open, livable, well-lit and ventilated interiors while also creating exteriors that would work within and even improve the neighborhood context. To do this successfully, they had to learn not only what their clients thought houses should look like but also why they had these opinions. This meant that they had to ask well-crafted questions that would not only bring forth a reaction but also give substance to the reasons for the reaction.

One of the teams in the spring of 2008 had a very open interior design that everyone agreed was very appropriate for modern living. The original modern exterior, however, met with considerable neighborhood resistance. The students took photographs of different styles of houses around the neighborhood and analyzed the corresponding types of floor plans for everything ranging from classic Victorian to Craftsman bungalow to the 60s ranch. They discovered that the bungalows from the 1920s corresponded very closely to the spatial arrangements they were considering (with a few more non-structural interior walls) and they used this as a basis for a roof form and detailing that would correspond to the scale of the neighborhood without compromising the quality of interior and exterior living spaces (Figure 5).

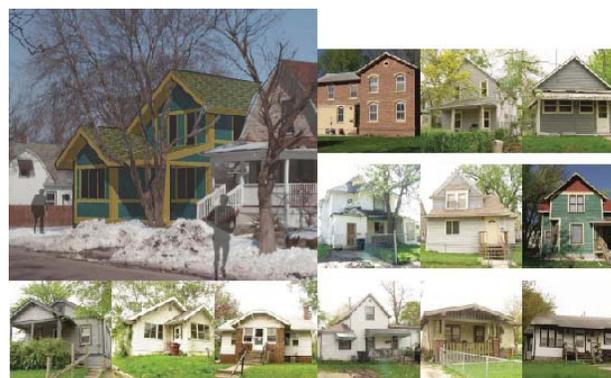


Figure 5. Contexts images used for analysis with image of student project in context.

Drawing and photos by students Chris Cummings, Jeremy Haveman, Ryan Risse, and Stephanie Wingate, Spring 2008.

Again, the primary design work was not simply creating the bungalow façade for the project but rather taking the positive reactions to open floor plans and negative reactions to correspondingly modern exteriors and delving into the reasons for these reactions. To do this required the students to ask questions about lifestyle and patterns of interaction that also helped them understand the hopes of people for themselves, their children, and their community and connect these to other historic living patterns. This kind of synthetic thinking moves affordable housing beyond a pro forma, utilitarian approach and into an arena that deals with social aspiration, lifestyle, and community. In doing so, it generates an idea of design that exists outside of formal considerations and instead is about articulating voices and lives.

Another way of redefining the role of design as a tool for achieving social equity begins by considering houses as part of a larger network rather than just as individual entities. To practice in this mode, the architect must evaluate the broader needs of the community and develop a strategy within which multiple specific articulations can occur. This in turn allows individual residents to make decisions about their own homes and configure their own spaces in ways that still contribute to broader community goals.

Many of my students considered their house designs as “seed” projects that would hopefully inspire actions elsewhere in the neighborhood to create these kinds of connections. Creating visible

systems for managing stormwater runoff was one of the most successful strategies in this regard. The students designed attractive, visible channels to move rainwater away from their houses and direct it toward rain gardens that would allow for gradual infiltration. These were typically placed in front rather than rear yards (although some projects had them in both locations) so that they would be visible throughout the neighborhood and cause interest, hopefully inspiring others to undertake similar projects in their own homes.

This strategy gives homeowners the flexibility to design rain gardens according to their own preferences for location and materials. It also contributes to broader community goals for attractive plantings and well-maintained yards and makes this easy to do with little maintenance. It furthermore makes residents aware of their roles in stormwater collection and connects them to a much broader system.

## CONCLUSIONS

Thinking about architectural practice as a proactive, strategic operation allows architects to identify where work is needed and become designers of not only better products but also better systems that identify needs and generate mechanisms for satisfying them, giving voice to working families, low income neighborhoods, diverse racial and economic groups, and so on.

To do this requires that we move away from the house itself as the object or final result of design and begin to see it as both part of a process of synthesizing diverse input and as part of a broader social and spatial strategy. The search for beauty and efficiency thus becomes associated not with the house as a thing but as a mechanism through which those who have been denied social value and equity can find and express the beauty in their own lives. Design thus becomes about a conversation between homeowners, neighborhoods, builders, and so on that can be facilitated by the architect.

Designing this kind of conversation is difficult in that it raises issues of emotion, class, status, and community. It is in this that the architect, by being able to synthesize not only the physical but also the emotional needs and aspirations of clients, can create good design. In designing affordable houses, this ability is even more critical as it has the poten-

tial to give voice and legitimacy to the wants and needs of those who have not had the opportunity to express them before, let alone see them realized. In this, the role of design in affordable housing is not about making the most efficient plan, or the most energy-efficient HVAC system, or the form that is different from everything else. Rather, it is about designing the conversations and strategies that give voice to the voiceless and make the invisible visible.

The work done by students in the Bridge Studio during the 2007-8 academic year begins to move affordable housing design in these directions. The groundbreaking for the first student-designed project was held on September 9, 2008 and the house is expected to go on the market in early 2009. Projects are currently underway for modular housing to be built in Cedar Rapids, Iowa in response to the loss of over 4000 homes as a result of floods during the summer of 2008.

## ENDNOTES

1. Anthony Ward, "The Suppression of the Social in Design" in Thomas A. Dutton and Lian Hurst Mann, eds., *Reconstructing Architecture: Critical Discourses and Social Practices* (Minneapolis: The University of Minnesota Press, 1996), 30-31.
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6. See <http://www.nationalregisterofhistoricplaces.com/ia/Polk/state4.html>. Accessed September 2008.