

Urban Dwelling in a Nutshell; A Crash Course to Multiple Issues of Living in the City

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Our architecture program follows the common Bauhaus method in our first year to provide students with the fundamental principles of architectural design. During the first semester, several design majors are combined together in the studios so projects are therefore kept generic and applicable to all. In the second semester, they spend the first half on an in-depth analysis of a famous work of architecture and then spend the second half designing a companion building incorporating concepts of the original design. Therefore, when the students start their second year they are getting their first architecture design studio with typical program/site driven projects. This where we “throw them into the deep end” with 3 increasingly complex design projects based on urban dwelling. The vast majority of our students come from suburban settings so have little experience with issues living in the city, much less the design process, so there is a steep learning curve to overcome. To help bring them up to speed quickly, the first project in their design studio is geared to introduce multiple issues of residential design in the city within a short 3-week project. While none of these topics is intended to be studied in depth, they acquaint the students with issues that will reappear many times in the semester and future years.

The vehicle for exploration is the design of a row house utilizing a proscribed methodology intended to free up design thought. Students new to design often default to standard typologies of the row house; what I refer to as the “stack of pancakes in a box” approach whereby continuous floor plates are spaced evenly apart only connected vertically by a stairwell. To break them out of this “box” and get them to explore different spatial variations, they design in physical model form only, without sketching, and create space exclusively through a cutting and folding process of one sheet of corrugated cardboard. We ask them to study examples of commercial package design where a single flat scored sheet of cardboard is folded to create 3-dimensional space. The technique results in a house designed using only a 3-dimensional process (rather than flat, orthographic plans) that possesses a rich variety of ceiling heights and a range of degrees of openness and enclosure. By limiting the process to just cutting and folding, the students are not slowed down by trying to come up with an abstract “concept”. Their idea can only develop from the physical process of making as the intentionally limiting rules of the folding process prevent arbitrary ideas from taking over. A favorite quote of Renzo Piano I tell my students is “One move to do many things”. So, to make this more than just a formal exercise, we also incorporate multiple programmatic issues an architect must consider when designing an urban dwelling; including legal, budgetary, construction and societal concerns.



Lesson 1 - Economy of Means

The only materials allowed for the project are a piece of 12" x 36" corrugated cardboard and a utility knife. No tape or glue are allowed and the entire sheet must be used without waste. In this way an iterative stream-of-consciousness process of folding, failing and refolding allows students to focus on the properties of the cardboard material itself and how to use the folding process to "stretch" and manipulate it to enclose space. The material dimensions are specifically sized so that there is just enough to enclose a two-level house so the students must be creative in making efficient use of the material. Students are tempted to cut off any leftover pieces that they don't know what to do with but we stress the sustainable impact of using an entire sheet of material while producing minimal waste by-products.

Fig 1

Lesson 2 – Balancing Openness vs. Privacy



Fig 2

Since our students are mostly from the suburbs and small towns, they are not familiar with the issues of dwelling in a dense urban context. But they soon discover how small row houses, set close together right up to the street, create a substantial lack of space, daylight and privacy. A major challenge for them is how to increase openness and light in a house in the dense city while maximizing personal privacy. They learn how the front, back and especially the roof, as a kind of third façade, are all critical for bringing in light. They realize that levels of desired privacy differ between the functions of the space and discover that the larger the window, the greater the loss of privacy. As they explore their material through folding they must constantly consider how to strike this delicate balance.

Lesson 3 - Structure vs. Envelope

While they are creating spaces through folding, they also must ensure that the form is structural sound and laterally braced in both directions. They learn how the process of folding a plane of material creates structural stiffness and how to lock pieces together with slot and tab connections to maintain the integrity. After the folding process is complete, the second phase of the project transforms the cardboard shell into an enclosed building by defining the limits of the glazed envelope. Using basswood sticks to represent window mullions, frameworks of glazed window walls are constructed in the remaining openings to indicate the planes of the enclosure. This helps students understand and distinguish between load-bearing structure (cardboard) vs. non-load bearing envelope (basswood) construction.

Lesson 4 - Building Codes

Although legal issues are typically not architectural curriculum, this project introduces building codes as another aspect of the architects must consider. Students are given a 25' wide cardboard lot on which they must locate their cardboard house. The amount of cardboard needed to produce a 2-story house that averages about 20' wide so they have leftover to work with. But they must follow the building fire code which requires any glass windows on the sides be set back at least 3' from the neighboring property. If they locate their structure directly on the side property line they must add a solid fire-rated wall which throws another variable into the equation.



Fig 3

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Lesson 5 - Zoning Codes

Another legal consideration we address is how zoning code setbacks and height limits affect the urban design of the overall street and neighborhood public spaces. At some point during the design process, we arrange all the models into a street organization with all house fronts aligned flush up to the sidewalk. This demonstrates how buildings of different designs, can create a sense of urban continuity by using zoning codes that regulate their setbacks, height, width and, in this case, material type. They learn how the urban wall created by the line of the house front facades can define the limits of an urban space and maintain a sense of cohesion as a public institution.



Fig 4

Lesson 6 - Being a Good Neighbor

Lining the houses up as a street raises another urban issue of contextualism. A street consisting entirely of unique one-off house designs (I nick-named Ego Avenue) demonstrates what could happen if every house design was screaming for attention and trying to be stand out. Even though zoning codes create some cohesion by use of a similar material, scale and rhythm, it is clear how the street does not hold together as cohesive urban space. Students learn why row houses all can't be object buildings since some must play background roles as a member of the social institution of the city. Students consider the ethical value of creating buildings that respect the neighborhood context by fitting in and when it may be better to check the architect's ego for the greater benefit of the whole.

Lesson 7 – Assembly Instructions

Since architects usually do not construct their own design, they must produce clear concise drawings to explain the construction process. Folding a building can be an exceptionally complex procedure so for the final project requirement, students are asked to create a set of step-by-step assembly instructions to describe how their flat piece of cardboard is folded into 3-D form. During the 2 weeks they are creating the model, they are learning the Rhino CAD program in a concurrent visualization course. They transfer this new knowledge into a diagrammatic set of instruction drawings similar to those used in origami. Mullions and accurate envelope material thicknesses are added to the final folded digital model which is cut open in section/perspective to more closely reveal how the house would look built using actual construction materials.

This two-and-a-half-week project does not allow enough time for any of the above seven lessons to be investigated in great depth. But the project provides a solid introduction to many issues of urban dwelling, as well as an opportunity to apply each to a design very early in the architecture curriculum. And it helps them comprehend the breadth of urban issues that forms a base for what they will discover in future studio projects and support courses.

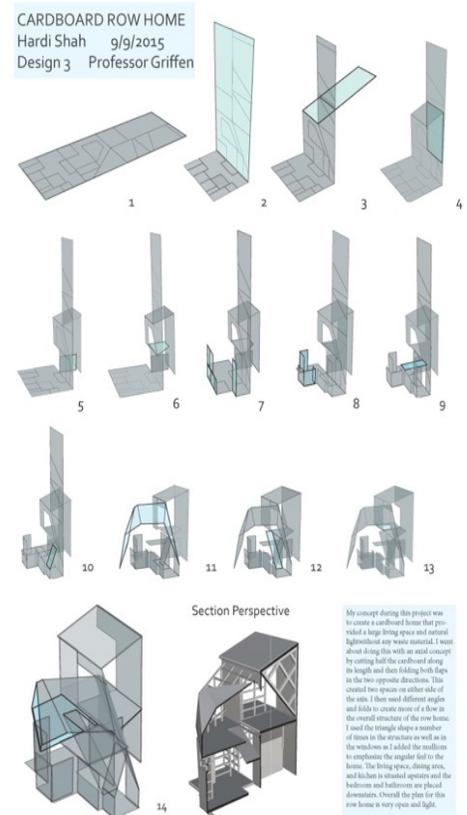


Fig 5