

Teaching Structures Through Design: The Chair Project

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THE CONCEPT

Knowledge offered in advance of any attempt to apply it cannot find a conceptual schema in the student's mind in which to reside, for the required schema can only be developed while struggling with a particular problem. . . . The two sides of knowledge acquisition and application must be attacked simultaneously.

— Mark Gelernter ¹

Experience has shown that students learn technical skills more efficiently and incorporate them more readily into the building design process when the skills are acquired on an as-needed basis during ongoing design projects.

— Edward Allen ²

In his article, "Second Studio: A Model for Technical Teaching," Edward Allen describes the highly successful pedagogical strategy he developed for teaching technology to architecture students in the context of what he calls the "second studio", which is run concurrently with but independently of the students' primary design studios. The "second studio" design project is carefully formulated to draw out responses to particular technical problems while minimizing distracting issues. Technology course material is organized around the studio project and is presented at the stage in the design project where the students need the information for the continued development of the project.

APPLICATION

Allen's approach is clearly exemplary, but has practical considerations that make it difficult for some of us to implement. It requires, for example, 1) the freedom (or control) to incorporate such a class in the school's curriculum, 2) a small enough group of students that the instructor is not spread too thin (or run ragged) in an attempt to give each student sufficient individual feedback on her/his unique

response to even the programmatically simplest of architectural projects, and 3) perhaps the greatest obstacle, the explicit cooperation of all primary studio instructors, such that the students' drawing boards do not become sites of contested territoriality, be it intellectual, physical or temporal.

With these practical considerations in mind, this author's approach was to try to retain Allen's pedagogical objectives, while reducing the project assignment to a more manageable scale. This was accomplished by selecting a design project which was programmatically simpler and reduced in size, while retaining appropriate levels of structural complexity and opportunity for individual expression.

THE ASSIGNMENT

The author has had the opportunity to test this approach in two distinctly different contexts: first, at a large Midwestern state university, the University of Michigan, with a class of twenty graduate students, most of whom were in their final semester of architecture school; and second, at a small private university in the south, Tulane University, with a class of sixty students, mostly second-year, first-semester architecture undergraduates. In both cases it was possible to structure the course with a weekly schedule of two regular lectures, and a "lab" or "studio" class where the focus was on the chair project. For this to work with the class of sixty students at Tulane required scheduling three "lab" sections of twenty students each and then staggering the project review dates to spread the intensity of the load on the woodshop.

In both cases, the assignment was essentially the same: each student was required to design, construct and structurally analyze a folding or take-apart wooden chair for a specific "client". The choice of her/his own "client" was up to each student, with the suggestion that an appropriate client would be a well-known creative personality (but not an architect) who could serve as an inspiration for the design of the chair. The students created chairs for painters, sculptors, writers, poets, composers, musicians, singers, photographers, film makers, dancers, performance artists, actors and actresses.

comedians, philosophers, scientists, fictional characters and cartoon characters.

After completing the construction of the chair, each student performed a computational structural analysis of the members and joints of her/his chair, making simplifying assumptions where necessary to deal with issues of static indeterminacy. The entire process of research about the client, conceptual design of the chair, design development, construction of the final object and computational analysis was documented and assembled into a final project booklet. The folding wooden chair as a design and computational analysis project had the addition benefit in a materials-oriented structures class of being an object that the students were able to construct, analyze and load-test at full scale.

RESULTS

In both situations, the results far exceeded expectations in terms of the variety and sophistication of the designs for the chairs, the level of craftsmanship evidenced in their production, and the students' new-found interest and engagement in structural computation, a direct consequence of the requirement that each student analyze an object of her/his own making. The following figures represent eight of these projects.

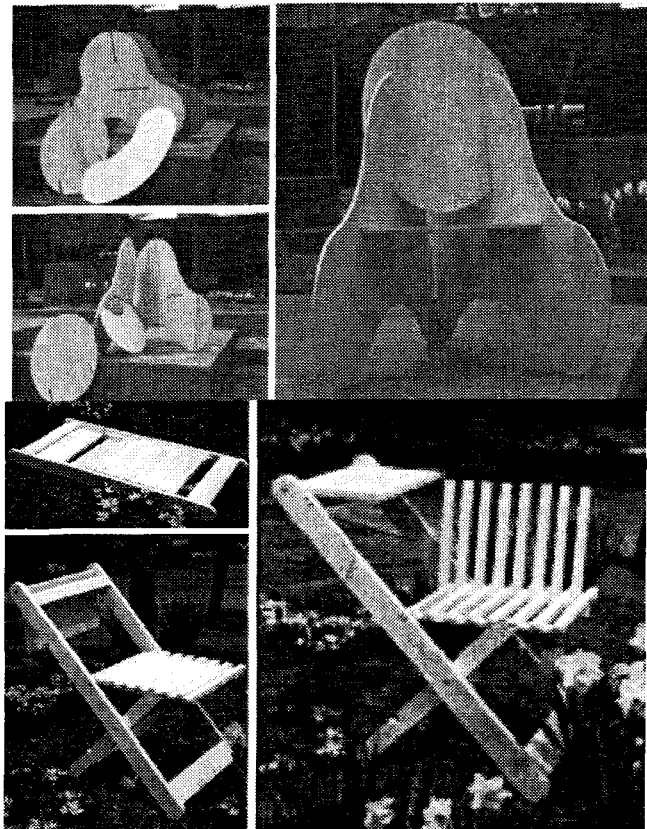


Figure 2: Ryu Kawai (Michigan), a chair for Frank Sinatra

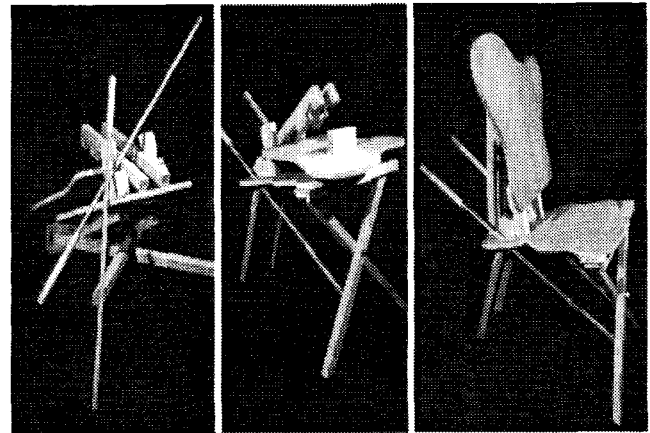


Figure 3: Moriah Kosch-Miller (Michigan), a chair for W A Mozart

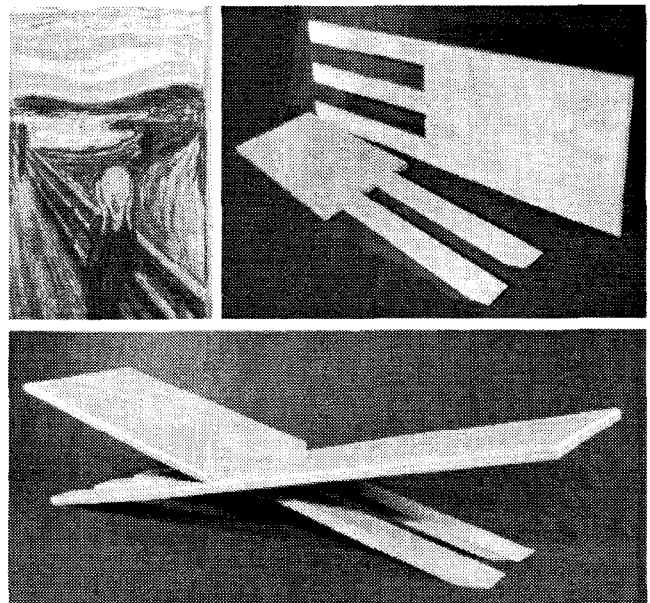


Figure 4: Dominic Willard (Tulane), a chair for Edvard Munch

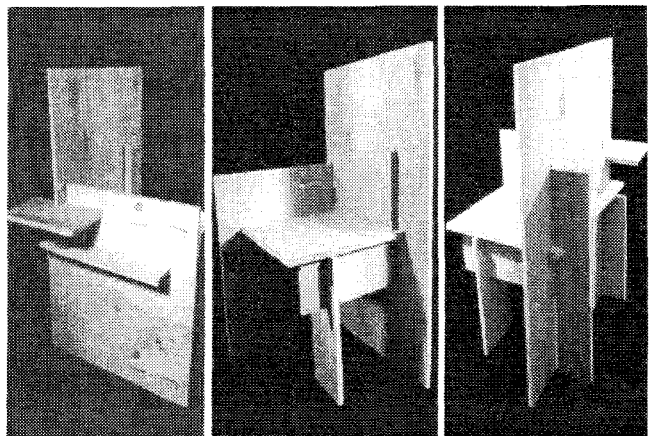


Figure 5: Kristine Kobila (Tulane), a chair for Pablo Picasso

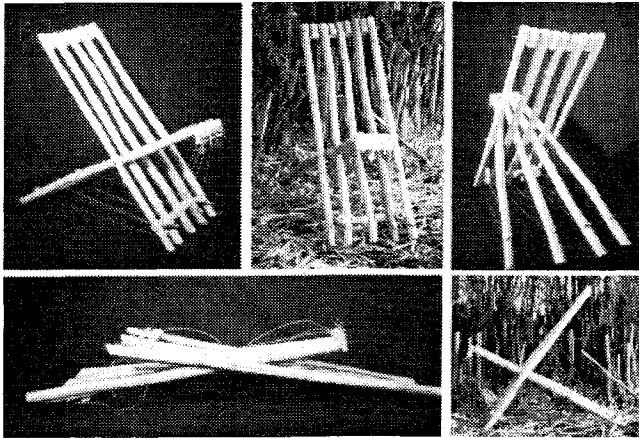


Figure 6: Quentin Ward (Tulane), a chair for Bob Marley

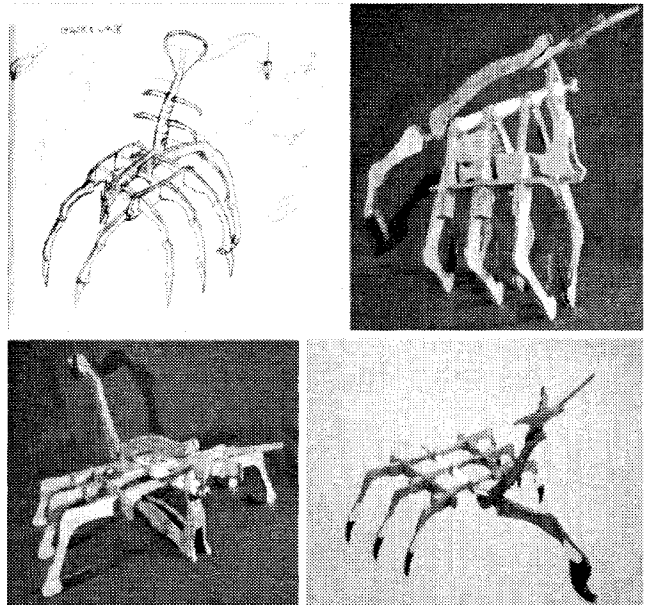


Figure 8: Justin Richards (Tulane), a chair for H R Giger (creator of "Aliens")

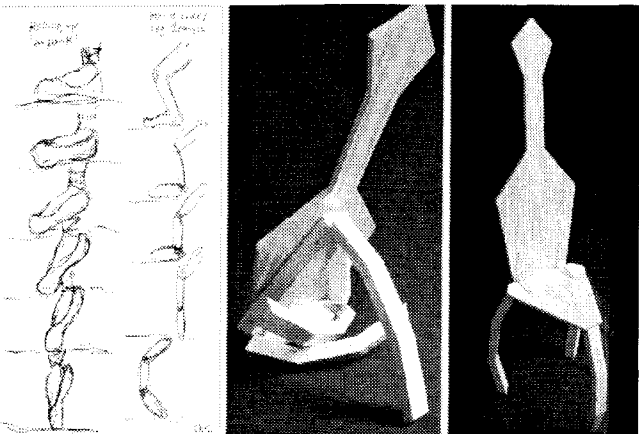


Figure 7: Dayna Castanedo (Tulane), a chair for Anna Pavlova

NOTES

¹ Mark Gelernter, "Reconciling Lectures and Studios," *JAE* (Winter 1988): 49; as quoted in Edward Allen, "Second Studio: A Model for Technical Teaching," *JAE* 51/2 (November 1997): 92.

² Edward Allen: 92.