Conceptualizing, Modeling, and Visualizing Space
Using form•Z in Design Curriculum

by Abimbola O. Asojo and Adam Lanman

Introduction

We present a pedagogical approach which utilizes **form•Z** in conceptualizing, modeling, and visualizing space in the architecture and interior design programs at the University of Oklahoma. Through several years of teaching **form•Z** in studio and lecture format, we found the program to facilitate student design exploration in three-dimension, visualization, and teaching of lighting design techniques.

Architecture Studio

form•Z utilization is entirely integrated into the studio sequence in architecture. The third year digital studio set out to introduce and explore a series of concepts within the physical and conceptual frame of digital architecture. In the studio taught during 2005-06 academic year, each of the three projects throughout the semester emphasized specific theoretical and practical issues while building towards an end product that realized the totality of the studio intent. Each project challenged the students to work far outside the box, so to speak, however practical concerns of building function and structure were continually being emphasized within the digital context of three-dimensionally sculpting a building.

With an introduction of specific modeling techniques, the students began to think and sketch using quick volumetric assemblies directly in **form•Z**. The challenge to the studio was to understand these new tools in a more sophisticated way than as simply new sets of forms and shapes.

The first project involved digitization of physical forms into computer models. This was achieved by first scanning cut segments from a fiberglass model and then transforming the polygon images into vector shapes. Finally the vector shapes were meshed together as a three-dimensional form using **form•Z** (Figure 1).

The second project emphasized issues of interface design and digital presentation through linking QTVR environments created in **form•Z** together and creating an experiential digital environment (no figures included).

The 'Lever House' project engaged all the ideas and methods from the previous two in the studio. The project takes on the challenge of ubiquitous computing in the context of responsive environments: spreading and integrating computation into the environment in order to enable people to move around and interact with computers more naturally than they currently do and achieve invisibility in use and embodied interaction. The studio took on the mantra of Weiser: "*The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.*" The project took an urban site currently home to the modern icon, the Lever house in New York City. The results show a series of buildings for living that derive from both building function and the idea of the building as a living interface working for its inhabitants. Figure 2. shows an exampleray project. More examples of student work from this project can be found on the accompanying DVD.
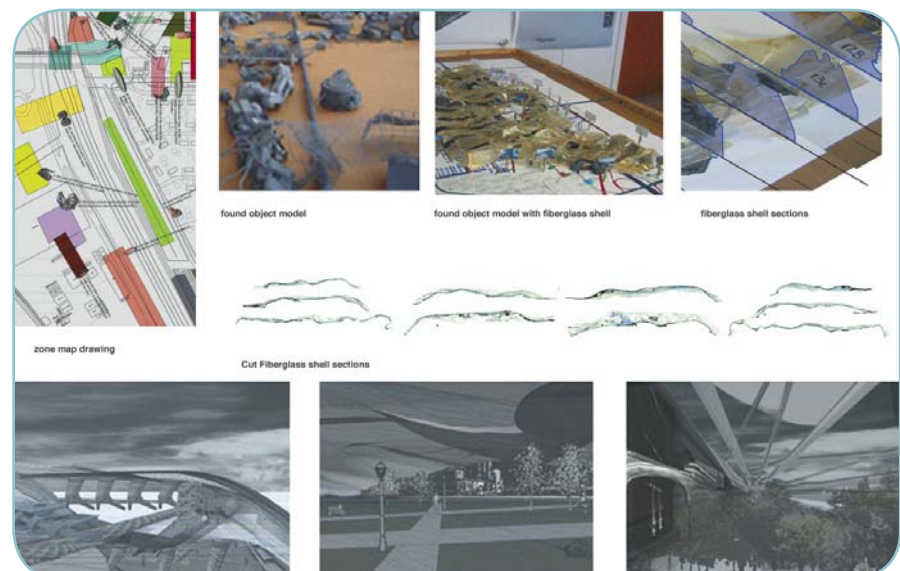

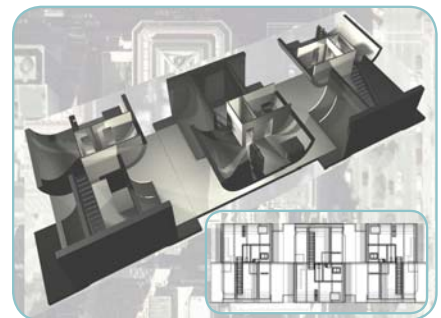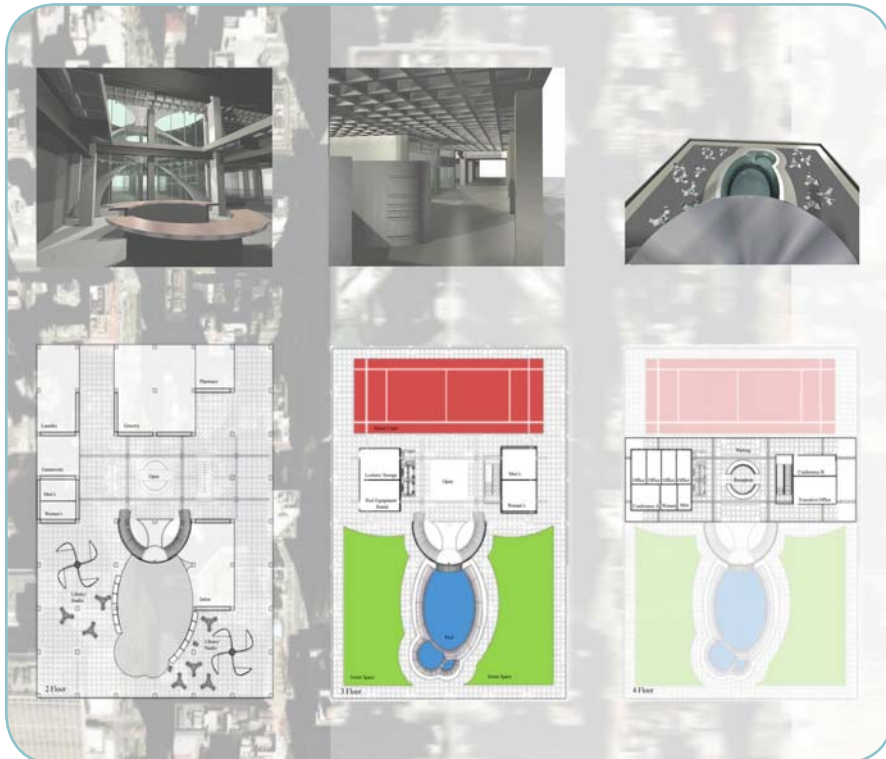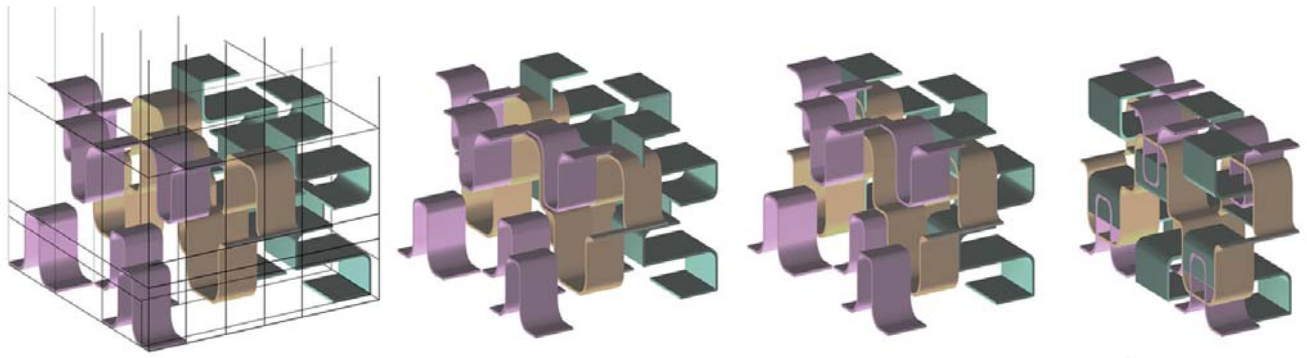Figure 1: **Introductory project: digitization of physical forms into computer models.**

Figure 2:
Lever House by Stephen Chaffin.

Interior Design Studio

The process of utilizing **form•Z** takes two approaches in Interior design. First, in their second year graphics media course, students use it to learn about three-dimensional modeling along with other software including Autocad, Autodesk Viz, etc. Secondly, they used it in upper level courses such as lighting design and fourth year studio. The underlying principle in both approaches is that design entities and configurations are better created and visualized in 3D rather than in 2D. **form•Z** enhances the design process effectively and efficiently more than physical modeling because the interface allows student to quickly model and visualize space, as well as the opportunity to make quick modifications. **form•Z**'s support for dimensionally accurate input, versatile support for grids, facilitates student understanding of scale in three-dimensional space.

Lighting techniques in computing are usually challenging at the lower level studios because students do not yet understand the types of light and lighting concepts, particularly in relationship to interiors. One of the objectives of the third year lighting design studio is to teach aspects of lighting through computer visualization. The light palette is utilized to teach and facilitate student understanding of ambient and directional light sources in lighting. The point and distant light types are used to teach the concept of ambient lighting. The cone light is used to teach techniques of wallwashing, grazing, silhouetting, and directional lighting. The projector light is used to illustrate image projection techniques from an LCD in a conference room.

In the fourth year, their final year, students have the opportunity to present their capstone final year projects using computational techniques. In this project, students bring together the knowledge gained in their second and third years in modeling, lighting techniques, and material application through integrating these techniques in their final projects. Figures 3 and 4 illustrate rendering from fourth year interior design studio projects.

Conclusion

In both the Architecture and Interior Design programs **form•Z**'s unique interface continues to foster the ability to design volumetrically; explore form; model interior and exterior spaces; and simulate photorealistic renderings. In the Architecture program, computer modeling is integrated directly and taught in studio along with the other studio objectives. By contrast, in the Interior Design program separate courses are offered which focus on teaching computer modeling in a lecture lab format and students build on the concepts learned and implement the techniques in studio projects. Both programs are successful in encouraging students to engage **form•Z** for conceptual design.

References

Asojo, Abimbola. "Digital Trends: Visualizing, Designing, and Communicating in Architecture Representation." *Journal of Design Communication* (2000): p. 32-43.

Weiser, Mark. "The Computer for the 21st Century," *Scientific American 265*, No, 3, p. 94-104, September 1991.

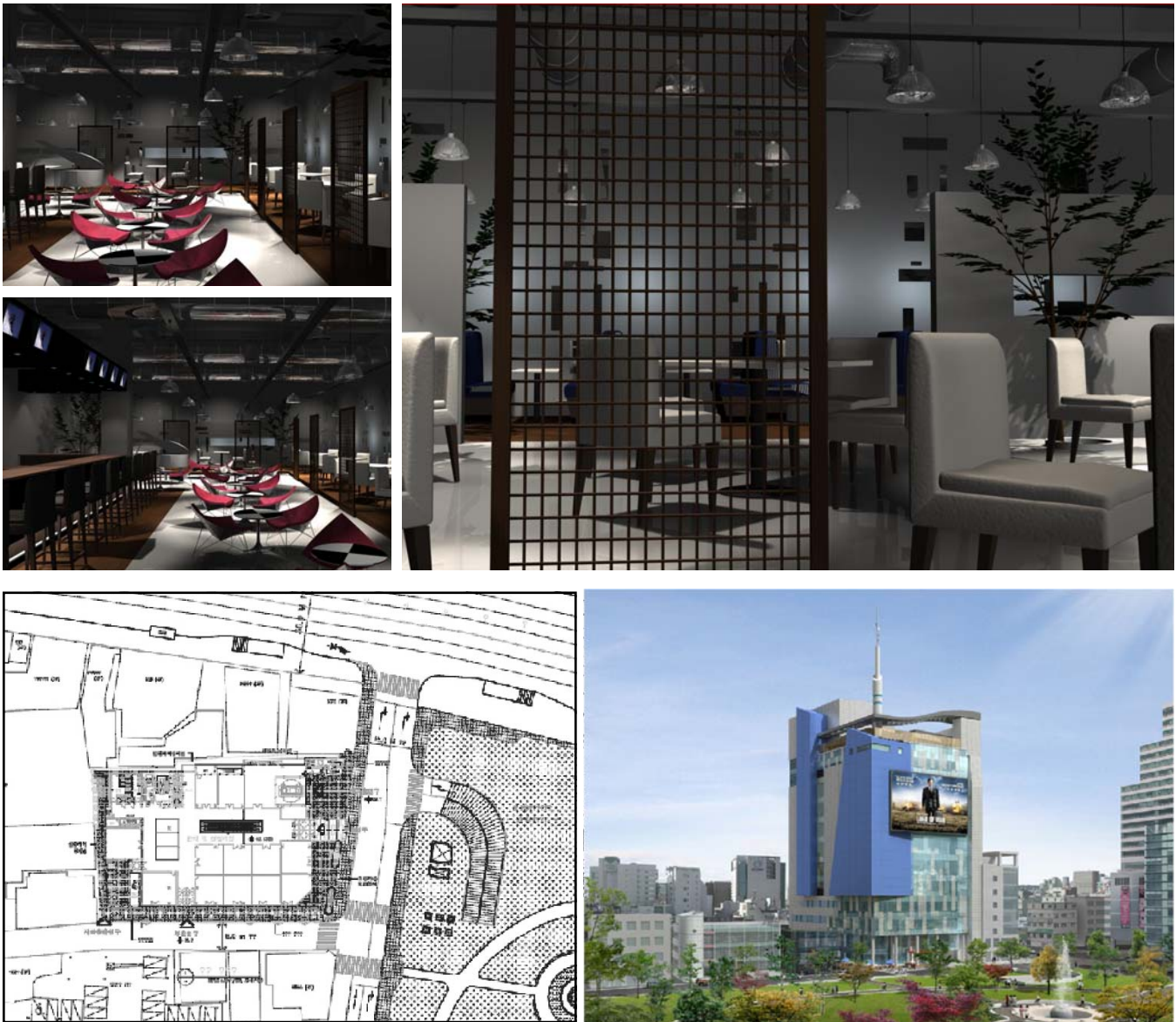Figure 3: **Adaptive reuse project in Oklahoma City by Monika Karriker**

Figure 4: **Multiplex design project in Korea by Kyunju Kim.**

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