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The Impact of the Computer on a High School Architectural Design Class

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The architecture program at The Dalton School began 26 years ago, inspired by my own interest in sculpture and architecture, and with the encouragement of Dalton's administration. The architecture curriculum was added to an already rich program in the visual arts. In 1979 I started an introductory course at the high school level in architectural drawing and design. Today the Dalton program has evolved into three levels of architecture (beginning, advanced, and senior project) and includes computer modeling, using **form·Z**, as a primary way to explore the study of architectural design.

When I look back on the early, pre-computer, phases of this course, I realize that the focus of trying to foster creativity, self exploration, and problem solving were issues very similar to those in the class today. What have changed dramatically are the method of exploration and expression as well as some of the preparation it takes to ready students for the more technological approach to design. Since 1992, the Dalton students have been using computers and **form·Z** to produce much of their work and, while there is an important place for drawing, drafting, and physical model building, the computer allows beginning students to express their ideas in a more competent and flexible fashion. Students can conceptualize and comprehend their designs more readily when using a computer. They can enter their building and view it in perspective, or understand the interactions between interior and exterior spaces. These abilities help students visualize architecture as no other tool has before.

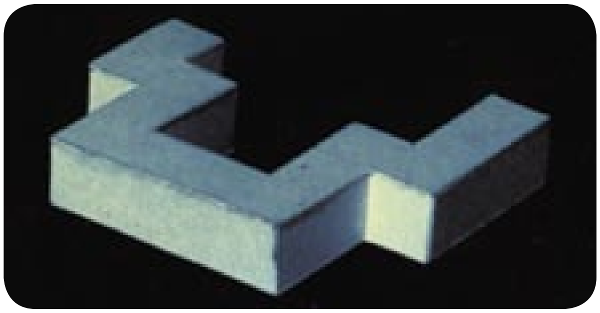


FIGURE 1: ASTRID PERLBINDRER
MODULE AND MODULAR SYSTEM, 1983

To trace the impact the computer has had on my course, I only have to look at an introductory assignment I have offered to my beginning students for the past 26 seasons. In this project students are asked to invent a modular system by first designing a building block, the module, which can interconnect in multiple ways with other identical modules to create a range of final system configurations. Originally in the pre-computer days, I asked my students to construct this project by beginning with sketches, mechanical drawings and completing the project with 12 identical physical models in chipboard (figure 1). They would then assemble and demonstrate the systems at a final critique.

FIGURE 2: NICK SLAVIN,
MODULAR SYSTEM , 2003

While the project provided a valuable learning experience on many levels, the tedium of constructing 12 identical elements was sometimes trying. Additionally, students would not always understand the potential in their design until they had the opportunity to build with a few physical models. Today, I still offer this assignment, but now the beginning students construct their modules on the computer using **form·Z**. They can more fully experiment with the range of possibilities and while the minimum number they may use to construct a system is still 12; they often build complex constructions involving additional modules (figure 2). This transition from the traditional working methods of drawing, drafting and model making to a computer represents a tremendous shift in architectural education. Architecture programs across the country have struggled with this transformation in one form or another for the past two decades.

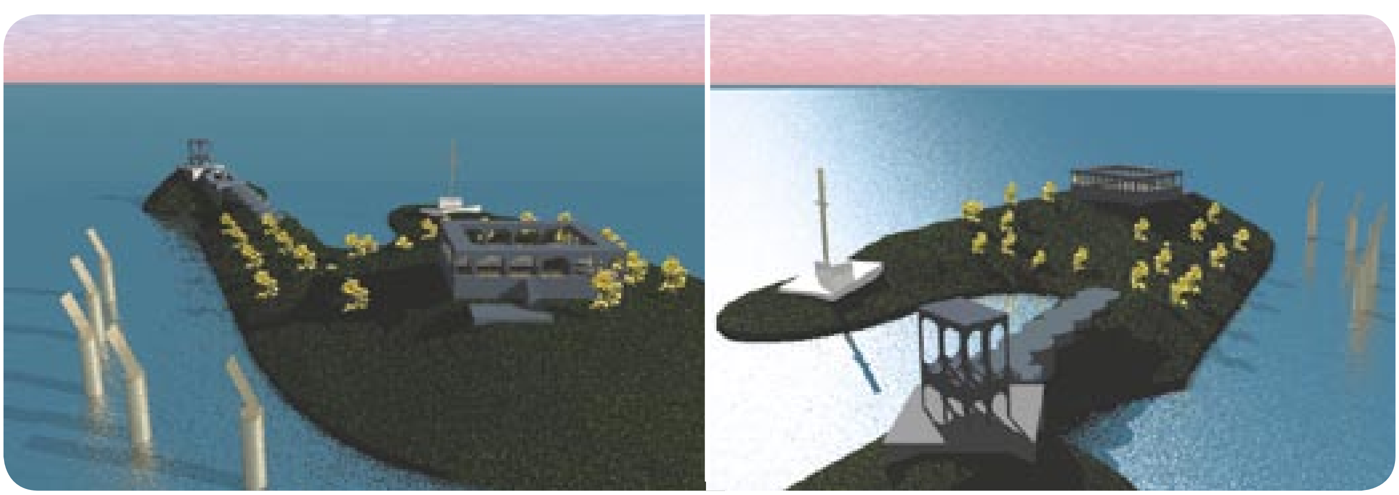
FIGURE 3: DAVIS BRODY, COMPUTER RENDERING OF ASTRID PERLBINDRER'S MODULAR SYSTEM, 1983

The early stages of computer modeling were in fact very crude by today's standards. In 1983, a Dalton parent, Lewis Davis of the firm Davis Brody, invited my students to visit his office in order to show them his new comprehensive computer facility, one of the most advanced at the time for its modeling capabilities. Two technicians maintained the system and were responsible for inputting information. They were pleased to demonstrate the software's power and potential by showing a current project, upon which they could assign any vantage point in the city to look at in a perfect perspective rendering. At that time we were amazed at the remarkable results. Students were also asked to bring some of their own modular systems to the Davis Brody office and over the course of a week, the technicians had modeled the student projects and made prints. Today these models (figure 3) look rather crude, monochromatic and pixilated in comparison to those created by my students today using **form·Z**.

Using the computer doesn't automatically make everything easier. It presents the teacher and student with new challenges. With **form·Z**, students have a substantial learning curve at the beginning of the course and it takes them a while to feel competent in their modeling skills. I find that those who have previous experience with technology adapt more quickly than those who do not. Frequently students are so interested in the potential for the realism **form·Z** can simulate, that they focus their energy on producing photorealistic results instead of concentrating on making good architecture. Another concern regarding this technology is the male to female ratio in my classroom. Are more boys attracted to this type of technology than girls? Before I began using the computer to teach this course, my classes where almost always balanced between girls and boys. Today that self-selecting ratio has shifted to a more boy dominant class. This year from my two beginning classes of 20 students I have 8 girls, the highest enrollment I have had in years. However, in my advanced section, in a class of 13 students, they are all young men. I constantly question whether the game playing technology so seductive to boys is in some way attracting them to 3D modeling in disproportional numbers to the girls. And if so, how do we attract girls and women to this technology?

One other effect the ubiquitous computer has brought to the study of high school architecture has to do with the extent of some of my assignments. I seem to be able to implement more conceptually demanding assignments. In recent years I have created a number of new projects exploring ideas I would not have tackled years ago. One example is when my students study the Japanese concept of Ma, the relationship between space and time. In the Ma assignment (figures 4 & 5), students must create three architectural components for a specific terrain. They must then interconnect them with some linking device whether it is a path, road, or waterway. One encounters the architectural components over a period of time, with a specific beginning, middle, and end. Space, and its connection to time, is encountered on many parallel layers. In this assignment, students explore terrain modeling and its relationship to architectural elements placed upon it, as well as the connection between the natural and the fabricated. All these possibilities grow from the facility of the computer as a tool for exploring.

It is a constant challenge to get my students to tackle complex ideas, pushing past initial solutions and flashy renderings. They must balance the substantive against the superficial. Hopefully the assignments demand students to dig below that visual surface so easily achieved with computers, while at the same time keeping the essential question of what makes good architecture in the forefront.



FIGURES 4 & 5: JON-MARC BALINT, MA ASSIGNMENT, 2004