

## The Design Studio Approach: Learning Design in Architecture Education

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## **The Design Studio Approach: Learning Architectural Design**

The practice of designing has common features, regardless of the domain in which it is exercised. The artifacts designed may have physical form, as in mechanical and civil engineering, graphic design, architecture and physical planning; or they may be non-physical, such as software, music, dance, or economic plans. No matter what domain, designing involves certain characteristic activities that must be learned. Surprisingly, architecture is one of the few subjects where design is the primary focus of university education; therefore architectural education offers valuable lessons for teaching design in other domains.

Traditionally, the practice of architectural design is learned through a project-based "studio" approach. In studio, designers express and explore ideas, generate and evaluate alternatives, and ultimately make decisions and take action. They make external representations (drawings and three-dimensional models) and reason with these representations to inquire, analyze, and test hypotheses about the designs they represent. Through the linked acts of drawing, looking, and inferring designers propose alternatives, and interpret and explore their consequences. In their sketches architects find visual analogies, recall relevant examples, and discover new shapes and geometric configurations. They use the representations to test their designs against a-priori performance criteria. And in the highly social environment of the design studio students learn to communicate, to critique and to respond to criticism, and to collaborate.

Architecture students also learn domain specific knowledge about buildings through class instruction. In classes in architectural programming, environmental controls, structural analysis, review of historical design precedents novice designers learn to reason about the expected behavior of designs. But in architecture, the studio is king: it is where the knowledge about buildings is applied, and it is where the act of designing—generating, evaluating, and developing alternatives—is learned and practiced. A recurring challenge of architectural education is thus to integrate domain material taught in lecture format courses into the design studio learning experience.

Architectural design education is hardly perfect. Often an emphasis on original and 'creative' designs outweighs designs that work (serve functional requirements, are buildable, etc.) Students imitate the style of fashionable architects without understanding the implications for users or the appropriateness for local context. And less experienced

students view architectural design as an opportunity to express their inner creative urges, rather than as a challenge to resolve a complex set of technical and social issues. The lack of formal methods in architectural design puzzles each generation of students entering studio; they learn the 'how to' skills through imitation of their teachers and more senior classmates. Indeed a strong belief in the studio culture asserts that every student must independently develop her own process or method of design. It is the rare teacher indeed who shows students how to follow a systematic method.

As members of a laboratory located in a school of architecture whose mission focuses on computing in design and planning, we are working on various projects aimed at integrating technology support with design and design education. Some of these are outlined below:

- **Design Theory & Methods.** Ironically, despite the studio time devoted to practicing design, in the curriculum relatively little explicit attention is given to the study of process and method. To address this deficit we have offered a (required) lecture course (60-70 students) that focuses attention on the 'how to' questions of design. A survey of writings on design (Simon, Alexander, Rittel, Schön, Habraken) is combined with collaborative exercises (cardboard furniture design, observation of design process, simple engineering design).
- **Back of an Envelope:** an architecture for knowledge based design environments. Designers employ freehand drawing, diagrams, and sketches to think and communicate during the conceptual phases of design. This project aims to develop pen-based human-computer interfaces that render existing computational design tools (case libraries, expert systems, simulation tools) more accessible in early design.
- **Multi-User Urban Design:** most (if not all) designs affect multiple stakeholders who judge designs by different values. Yet this multi-criteria, multiple stakeholder view of design proves a difficult lesson for students. Our Multi-user Urban Design (MUD) is a computational environment where stakeholders describe preferences using a simple urban design language, and designers test designs against various stakeholders' preference schemes.
- **Web Teaching Toolkit:** We have constructed a simple and general scheme that allows instructors to assemble web based teaching materials (e.g., class materials posting, student assignment submissions, discussion group) with no technical expertise. We have tested the approach in a lecture format class, and are encouraging teachers in the school to employ it in regular classroom instruction. We also aim to use the toolkit to support a highly interactive and graphical web site for a design studio that emphasizes collaborative work.