

## **THE ENGINEER IN THE MUSEUM: Helping Engineering Students Experience Technology as an Art**

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In *Getting Sued and Other Tales of the Engineering Life*, Richard Meehan describes the process of design and the satisfactions of being a designer: “I learned the pleasure in ... design, the satisfaction in making a clay bowl or a painting or writing a sentence or a symphony. ... I was able to experience technology not as the stepchild of science (which is, after all, impotent) but as an art.” Although many scholars have joined Meehan in identifying the artistic dimensions of engineering, many engineering students have no experience or awareness of these dimensions. The problem, then, is not to establish the common ground shared by art and engineering, but rather to overcome the cultural biases and pressures within engineering education that lead students to overlook the aesthetic dimension of engineering.

This paper describes a set of experiences designed to help engineering students experience technology as an art. The heart of the strategy is an innovative approach to using art museums as a context for exploring the aesthetic dimensions of engineering. Two interactive tours of an art museum are combined with preparatory and follow-up activities to help students experience and appreciate the aesthetic dimensions of engineering. The tours and related activities form the core of a study entitled “The Engineer as Designer” and are part of a required senior engineering course entitled “The Engineer in Society.”

### **CONCEPTUAL FOUNDATION: Blurring the Distinction Between Engineering and Art**

The guiding strategy blurs the distinction between engineering and the fine arts by increasing the students’ awareness of design as common ground shared by the two. Specifically, the students are asked to:

1. Lump all products of design into the category of “artifacts” (literally, things made by art or skill) and think of all design as the process of turning ideas into reality. In this view, both the *Mona Lisa* and an advanced microprocessor are products of a series of design decisions in which nature, culture, and the designer furnished resources, imperatives, and constraints.
2. Think of ENGINEERING in terms of art to bring out aesthetic and creative elements. This move emphasizes the creativity required to solve complex problems; the absence of formulaic approaches to design; and the role of intuition and vision in the evaluation of engineering designs. The role of intuition is expressed in phrases such as “that looks about right.”
3. Think of ART in terms of engineering to emphasize the constraints materials impose on artists; the knowledge of technique and physical processes that artists must possess; the role of institutional and financial support; and the results artists hope to achieve through their work.
4. Use the hierarchy of invention, design, and routine application to distinguish various levels of creativity and freedom within the two general categories of technology and art. Analysis using this hierarchy reveals the varying levels of creativity, skill, and social status within each category.

## THE VISITS TO THE MUSEUM

Both visits to the museum require students to recognize the design decisions made by artists. The first visit emphasizes aesthetic responses to designed objects, while the second focuses on the ways design decisions, reflect the designer and the culture from which the artifact originated. Interactivity is a crucial feature of the tours, which stress inquisitive looking and dealing with the material reality of the artifact. The students' immersion in the museum environment also helps develop fully articulated aesthetic responses to technological artifacts.

## KEYS TO SUCCESS

**Museum Personnel.** The most important prerequisite for success is museum personnel who teach by inquiry as a mode of teaching and who see themselves as “working to *enable* the students to participate in learning for themselves by beginning to understand visual information found in art.”<sup>2</sup>

**Collaboration.** The instructor organizing these experiences needs a reasonably complete grasp of both the technical and artistic aspects of a few artifacts that can be used as illustrative examples and points of departure. It is also essential to draw on the expertise of museum personnel and engineering students.

**Recognition of Important Differences Between Engineering and Art.** Many proponents of the common culture of creativity minimize or ignore the differences between art and engineering. Since many of the differences between art and engineering matter a great deal to engineering students, the differences must be dealt with directly in order for students to be able to validate the similarities that exist in the two fields.

## THE PAYOFF

The tours and related activities are designed to provide students with a perception-altering experience, not a body of information. A number of factors must come together for the experience to occur as intended. Still, it seems reasonable to suggest that engineering students who experience technology as an art should possess a richer view of technology, an expanded capacity to learn by looking, and a greater awareness of the factors involved in successful engineering design. They should also be better able to appreciate the pleasures engineering design offers.

<sup>1</sup> Meehan, Richard. *Getting Sued and Other Tales of the Engineering Life*. Cambridge, Massachusetts: MIT Press, 1981, pp. 170-172.

<sup>2</sup> Young, Jane Anne. (Director of Education, Bayly Museum, University of Virginia) Private communication. March 11, 1996. The author gratefully acknowledges the assistance of Young and her staff in developing and executing the tours described in this paper.

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