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CAID and Design Education

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CAID Currents

What CAID Will Mean for Design Education

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Industrial designers, engineers and all other members of product development teams typically develop and store their data in different computer systems. In order for a team to cooperate, the computers must pass data back and forth, translating it each time, squandering time and accuracy. A truly effective concurrent product deve- lopment team needs a single source of data that represents completely the current state of the product concept.

To address this problem, industry and government have collaborated to develop the international Standard for the Exchange of Product model data (STEP). (For information, see *US Product Data Association Publications Catalog*, available from US PRO c/o NCGA, 2722 Merrilee Drive, Ste. 200, Fairfax VA 22031-4499, Tel: 703-698-9600, ext. 308.)

Fundamentally, this new breed of computer system will be able to talk to any team member and help solve any specialist's problem. It will have data pertaining to everything from the product's form and manufacturing processes to sales and distribution data. A designer could determine the weight of a part before it is made, or make a photorealistic rendering of it. Dipping into the same database, an accountant could ascertain its production cost. And anything the designer did to change the part (by changing its weight or material specification, for instance) would show up in subsequent cost calculations.

Will future generations of software take the art and engineering out of design? If so, where should it go?

In the past, the database probably would have resided in a large mainframe computer's memory. But today it would be distributed among perhaps hundreds of individual workstations, some of which may be at different ends of the country or across oceans. Connected via a lightening-fast network, it would seem to individual team members that, for all practical purposes, the entire database resided inside their workstation.

Imagine the database as a large cooking pot around which all team members station themselves. The pot's ever-changing stew always represents the most up-to-date version of the product concept. Any team member can draw a ladle of data, add to it and pour it back. (It wouldn't be quite this simple, of course. Lest so many chefs spoil the stew, someone would determine whether and when to execute a change.)

Virtual Team Members

Virtual team members (in the form of special software called "agents," "daemons" or "expert" modules) will sit among the real team members. They will perform a growing number of sophisticated but routine tasks. Programmers create agents by "mining" the minds of one or more experts in a particular field. One agent might automatically and continually monitor the weight of a concept, for example, and warn the team if it approached a preset limit. Other agents would mind issues of engineering, ergonomics, cost and even aesthetics. In effect, design software already employs agents for visualizing concepts.

Theoretically, nothing but time and money stand in the way of adding indefinitely to the number of agents and continually improving them—until virtually the entire design process becomes automated. We won't accomplish that in the foreseeable future, of course. Nor would we want to. We wouldn't want to risk excluding the human touch entirely or put the personal pleasure of engaging in the design process out of reach. But the prospect, even partially realized, prompts speculation about the future practice of design and the nature of design education.

The implications for ID education are extensive. With educational institutions already struggling to cover the full nut in four years, considerable discussion among practitioners and educators is focusing on skills versus knowledge. (See "How I See It" columns and Letters to the Editor in the 1994 issues of *Innovation*.) The discussion may be solved by the development of design software that employs agents, because it will diminish the degree to which industrial

design educators need to stress drawing and rendering skills. By the same token, software that performs engineering analysis and optimization diminishes the need for teaching engineering subjects. I foresee two fundamental implications for design education.

More emphasis on design philosophy and values. Design educators will have more freedom to emphasize underlying design issues. Maybe the most important matters discussed in future design courses will not concern "How to design a product?" but "*Whether* to design it?" Courses like "Social Values and Technology" might supplant visualization courses and perhaps even "Product Design 101" itself.

Specialization will be okay. Traditionally, design educators have wanted to graduate Renaissance students who could do anything or everything in the product development process. They have especially shunned anyone who wanted only to deal with a product's superficial appearance. With software agents to mind the nitty gritty of virtually any aspect of product development, designers will be relatively free to specialize in as few areas as they want, even styling.

Whence Design Education?

Nevertheless, highly specialized art schools face a perplexing issue: When traditional visualization skills are no longer important, is an art school an appropriate home for design education? Engineering schools will lose relevance, too, once the collective wisdom of engineering design resides in expert software. Who will need courses in mechanisms, structures, material science or mold design: What will prevent *anyone* with an idea for a product from designing it if they have access to a 21st-century CAID system? Design programs could take root in unusual and unexpected places. We shouldn't be surprised to eventually see programs sprouting from departments of psychology (probably from ergonomics programs) and even business schools. ■