dynamic analysis of structure. Interior design also differs from architecture (and interior decoration) in its concern for every aspect of the interior environments that people use every day.

The human experience in these settings is a broad topic that includes history and culture, psychology and physiology, organization theory, and benchmark data drawn from practice—together with lighting, color theory, acoustics, and ergonomics. These subjects need to be part of the professional interior designer's education and training.

How do interior designers gain an understanding of client and user needs? "By asking them" is a reasonable answer for smaller projects, but larger ones make use of social science research methods such as participant observation, network analysis, and surveys. Exposure to these methods through coursework in anthropology and sociology is helpful, especially as strategic consulting emerges as a specialty within the profession. (Strategic consulting seeks to align a client's real estate and facilities strategies with its business plan. Typically, it helps the client define its real estate and facilities program and establish the quantitative and qualitative measures of its performance.) Business clients expect their design teams to understand the strategic context of their projects. Coursework in business and economics can begin that process; immersion in the industry, by reading its journals and participating in its organizations, is the next step. Once designers reach a certain level of responsibility, management becomes part of their job description. Coursework in business and management can make this transition easier.

A Knowledge of Sustainable Design Principles

"Building ecology," as the Europeans call it, needs to be part of interior designers' knowledge. They should know how to design to conserve nonrenewable resources, minimize waste, reduce CO_2 and SO_2 levels, and support human health and performance.[8,9]

INTERIOR DESIGNERS AND SUSTAINABLE DESIGN

In tackling the problem of indoor air pollution in the 1980s, the interior design profession led the way in raising public awareness of the value of sustainable design. As advocates for the user, interior designers have a special responsibility to understand sustainable design principles and evaluate their appropriateness for their projects. Sustainability also offers many opportunities to deliver added value for clients. As case studies by the Rocky Mountain Institute[9] have shown, the resulting gains in building and human performance provide a reasonable (and even rapid) payback on the client's investment, especially when these measures are used in combination. Here are some examples.

- ***Lockheed Building 157,*** *Sunnyvale, California*. Lockheed spent $2.0 million to add sustainable design features to this 600,000-ft^2 office building that reduced its energy consumption and provided a higher-quality work environment. Control of ambient noise was also achieved. Lower energy costs alone would have repaid Lockheed's investment in four years. Because the improved quality of the workplace reduced absenteeism by 15 percent, the investment was actually repaid in less than a year.
- ***West Bend Mutual Insurance Headquarters,*** *West Bend, Wisconsin*. West Bend used a number of sustainable design features, including energy-efficient lighting and HVAC systems, roof, wall, and window insulation, and thermal storage. Utility rebates kept its cost within a "conventional" budget. The building is 40 percent more efficient than the one it replaced. It provides an "energy-responsive workplace" that gives users direct control of thermal comfort at their workstations. A study showed that the building achieved a 16 percent productivity gain over the old one. A productivity gain of 5 percent (worth $650,000 in 1992 dollars) is attributable to the energy-responsive workplace feature alone.
- ***NMB Headquarters,*** *Amsterdam, The Netherlands*. This 538,000-ft^2 project exemplifies what Europeans call "integral planning": designing the building and its systems *holistically* to reduce operating costs and increase quality and performance. About $700,000 in extra costs were incurred to optimize the building and its systems, but this provided $2.6 million a year in energy savings–and a payback of only three months. Employee absenteeism is down by 15 percent, too.

Gensler's experience reinforces the Rocky Mountain Institute's findings. On office campus projects, they found that providing under-floor air supply and ambient lighting can reduce the cost of workplace "churn" (the need to shift workstations to accommodate changes in occupancy) from as much as $5.00/ft^2 to less than $1.00/ft^2. For an office campus in Northern California, these same features allowed them to redesign the entire workplace to accommodate a different set of users just six weeks before its opening–with no delays. By avoiding the cost of delay, the client essentially paid for the 10 percent higher cost of these features before the campus had even opened.