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Defining Sustainable Design

The following two articles provide background information on "sustainable" and "green" design and a brief look at an exemplar project. You can increase your knowledge about sustainable/green design and learn about an easy-to use sustainable design guide (Minnesota Sustainable Design Guide) that is introduced in the first article and used to analyze a commercial interior environment in the second article. Enjoy!

The first article is by Mihyun Kang, a Ph.D. student in the Department of Design, Housing, and Apparel at the University of Minnesota. She practiced interior design at Ellerbe Becket in Minneapolis before continuing her studies. Her research focuses on sustainable interior design.

The second article is by Dr. Louise Jones, a Professor of Interior Design at Eastern Michigan University, Ypsilanti, Michigan. She has served as Director of the FIDER-accredited undergraduate program and currently is Director of the Interior Design Graduate Program. She holds a doctorate from the University of Michigan's College of Architecture with an emphasis in Environment and Behavior. Her research work has explored "design educations" and "design for the lifespan" with a focus on Universal Design and Sustainable Design. Dr. Jones is the author of more than 50 publications including journal articles and book chapters. She recently completed a two-year appointment as Associate Dean of Facilities and Planning with the primary responsibility of designing the interior environment of the new academic building for the College of Health and Human Services.

Sustainable Design for the Built Environment

The Facts

Sustainable design has emerged as a guiding paradigm in the creation of a new kind of built environment: one that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987, p. 43). Sustainable design evolved from a variety of concerns, experiences, and needs:

—energy efficiency gained importance during the 1970s oil crisis;

—recycling efforts in the U.S. during the 1970s became commonplace and came to the attention of the building industry;

—in the 1980s, the "sick building syndrome" concept emerged and concern for worker health and productivity became an issue.

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The concern for toxic material emissions also became an issue that needed to be addressed; and projects in water-scarce areas began to focus on water conservation (U.S. Green Building Council, 2003).

Typical buildings consume more resources than necessary, negatively impact the environment, and generate a large amount of waste (U.S. Department of Energy, 2003). The challenge is to build intelligently, so that buildings use a minimum of nonrenewable energy, produce a minimum of pollution and wastes, and cost a minimum of energy dollars, while increasing the health, safety, and welfare of the people who live and work in them. These are the components of sustainable design.

Background

The first generation of sustainable design was based on small-scale experiments (Van Der Ryn & Cowan, 1995). Energy efficiency, alternative building materials, conservation, and recycling have been widely adopted in piecemeal fashion. The second generation of sustainable design began to realize that the integration of all the factors can produce the best results for sustainable design. This includes the synthesis of all the various ideas and strategies of past into complete and large-scale sustainable design theories and practices. The term *sustainable design for the built environment* is used interchangeably with *green design*. However, there is a subtle difference. The Green Design Education Initiative (2003) states that green design often implies an interest in design that protects people's health and well-being while sustainable design also protects the global environment and the world's ecosystems for future generations.

These two terms, often used interchangeably, reflect the concept of creating buildings that can be constructed and operated in ways that enhance the impact of the buildings on the environment and occupants. The U.S. Green Building Council (2003) defines "green design" as design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas:

—site
—water
—energy
—materials and resources
—indoor environmental quality

Opportunities for achieving this goal occur throughout the life cycle of the building. In other words, it is a cradle-to-grave approach that recognizes environmental consequences of the entire life cycle of building. The Minnesota Sustainable Design Guide (MSDG) (Center for Sustainable Building Research, 2002) provides instructions and strategies for each phase of the building life cycle. The design strategies for the MSDG fall into eight environmental topics: 1) conservation, 2) site, 3) water, 4) energy, 5) indoor environmental quality, 6) materials, 7) waste, and 8) innovation. Integration of these factors produce the best sustainable results with a high performance building for a healthy environment whether it is called green design or sustainable design.

Responsibility by Any Name

Sustainable design, green design, sustainable development, design with nature, environmentally sensitive design, environmentally responsible design, environmentally conscious design, green architecture, high performance buildings, and holistic resource management—regardless of what it is called, these terms deal with *sustainability*, the capability of environmental, economical, and social systems being continued over time.

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The benefits of dealing with sustainability are distributed in terms of environmental, economic, health and safety, and community benefits (U.S. Green Building Council, 2003). The environmental benefits derive from the reduced influence of the building's construction and operations on air, water, landfills, and non-renewable energy resources. The economic benefits come from reduced operating costs and improved occupant performance. The health and safety benefits come from the improved comfort and health of the occupants. The community benefits come from minimized strain on local infrastructure and an improved quality of life. More and more designers, builders, and building occupants are becoming interested and involved in sustainable design as they realize its benefits. Interior designers and architects are contributing as well, working on behalf of sustainable interiors.

—Mihyun Kang, Ph.D. student, University of Minnesota

References

—Green Design Education Initiative. (n.d.). Green/Sustainable design: *Frequently asked questions.* www.idec.org/greendesign/FAQ.html

—Center for Sustainable Building Research. (2002). *Minnesota Sustainable Design Guide, version 2.* www.msdg.umn.edu

—U.S. Department of Energy. (n.d.). *Green buildings.* www.sustainable.doe.gov/buildings/gbintro.shtml

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—Van Der Ryn, S., & Cowan, S. (1995). *Ecological Design.* Washington, DC: Island Press.

—World Commission on Environment and Development. (1987). *The Brundtland report: Our common future.* Oxford: Oxford University Press.

Why Design Environmentally Responsible Interior Environments?

Being Responsible

Often the terms "sustainable design" and "green design" are used interchangeably. However, green design is often used to refer to people's health, safety, and welfare, whereas sustainable design is often used to refer to the health, safety, and welfare of the planet. Either term has at its core the interest in the reciprocal relationship among design, human behavior, and environmental responsibility. In this case study, "environmentally responsible design" is used to encompass both concepts.

Buildings have a major influence on many of the environmental problems facing our society. According to the World Watch Institute (US Department of Energy, 2003), about 10% of the global economy involves the construction, operation, and equipping of buildings, thereby using between 17% to 50% of the world's natural resources and causing extensive environmental damage. Additionally, the building interiors subject the users to indoor air quality or hostile physical environments that affect people's health, safety, welfare, and performance. To respond to these issues, many interior designers are practicing environmentally responsible design.

Interior designers, who focus on environmentally responsible design, plan, specify, and execute solutions to interior environments that reflect concern for

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both the world's ecology and the inhabitants' quality of life. To do this, they identify and analyze the raw materials, manufacturing methods, transportation, use, maintenance, and disposal of all the furnishings, fixtures, and equipment (FF&E) specified for an interior. This life cycle approach provides for the analysis of products, materials, and finishes from their inception to disposal. When disposal turns into reuse, this is a closed loop process, i.e., cradle to cradle, the ultimate goal for products and materials (McDonough & Braungart, 2002).

Interior designers use the sustainable design life cycle approach for the interior environment just as the architect does for the building components. In interior design, sustainability also includes the planning and allocating of space for the users that reflect efficiency and flexibility. Together, the design practitioners on a project can make a difference in how that building affects the people who live, work, or play in it as well as the earth's ecology. There has been significant research conducted on sustainable building and construction systems, but little has been done to fully define the role the interior designer plays in the design of an environmentally responsible interior for such a building.

A Tool to Use

The Minnesota Sustainable Design Guide (MSDG, 1999) is a tool that can be used by interior designers as well as architects, landscape architects, and engineers to guide and assess the design of a building.

The MSDG is organized according to eight environmental design categories (see description this issue, p. 2). Each category contains a series of design strategies that address the related sustainable design issues. There are 90 different strategies, 38 of these are within the purview of interior designers. In addition, each strategy has performance indicators that set the minimum efforts (or benchmarks) that

MSDG accessible at www.msdg.umn.edu

must be met to obtain credit for the strategy. At each stage of the design process: pre-design, design, construction, and occupancy, quantifiable performance indicators are used whenever possible; however, less tangible, immeasurable, and even developing areas of sustainable design are also rewarded. To document a building's sustainability, resource materials and/or supporting information must be provided for each strategy.

A Sustainable Interior

The interior design of the Everett Marshall Building for the College of Health and Human Services at Eastern Michigan University was approached from an environmentally responsible design perspective to provide the most supportive environment possible for its occupants and to have the least effect on the

Exterior View of the Marshall Building

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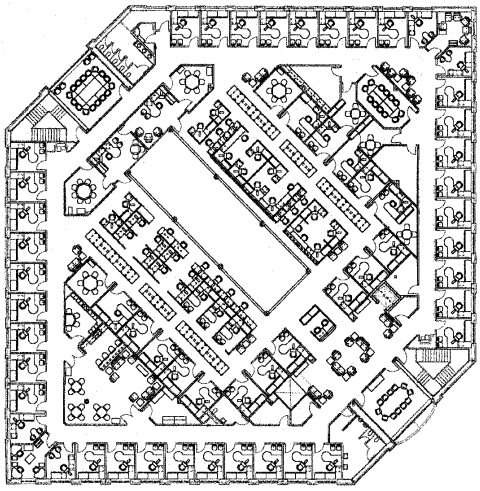
earth's natural resources. It was designed to meet four goals: sustainable design, universal design, use of technology, and development of community. The MSDG, an Internet-based rating system for sustainable design was used as a qualitative tool to analyze the method and outcome for designing an environmentally responsible interior environment. The analysis documented the complex role of the interior designer and the interior designer's ability to contribute to, and lead, the design team when faced with environmentally responsible design decisions. [A full account of this analysis can be obtained from the author.] The Marshall Building's four project goals, sustainable design, universal design, use of technology, and development of community were compatible with one another. Decisions did not have to be made that sacrificed one for another. The client's desire to



Third Floor of the Marshall Building

create a teaching and learning environment that supported all users was met through implementation of universal design. Technology was utilized to support a community of scholars. It was important to demonstrate to all the constituencies who worked and studied in the building designed for the College of Health and Human Services that environmentally responsible design was an integral component of both people's health and the health of the planet. The interior designer implemented 92% of the MSDG strategies in the interior of the Marshall Building to support environmental responsibility. The outcome was an exemplar for academic buildings in the 21st-century.

—*Louise Jones, Arch.D., Eastern Michigan University*

Dr. Louise Jones in the Marshall Building

References

—McDonough, W., & Braungart, M. (2002). *Cradle to cradle*. New York: North Point Press.

—US Department of Energy. (n.d.). *Green buildings*. www.sustainable.doe.gov/buildings/gbintro.shtml

Related Research Summaries

InformeDesign has many Research Summaries about sustainable design, green design, energy efficient design, and related, pertinent topics. We believe that this knowledge will be valuable to you as you consider your next design solution and worth sharing with your clients and collaborators.

Efficiency in Sustainable Design

"Benefits of Environmentally-Friendly Hotels"
—*Cornell Hotel and Restaurant Administration Quarterly*

"Earth-Sheltered Homes"
— *Journal of Urban Planning and Development*

"Optional Uses of Recycled Postconsumer Fibers"
— *Family and Consumer Sciences Research Journal*

Green Space

"Health Benefits of Including Nature within Hospitals" — *Journal of Environmental Psychology*

"Trees Encourage Use of Outdoor Space"
— *Environment and Behavior*

"Creating Beneficial Urban and Natural Settings"
— *Journal of Environmental Psychology*

Reusability

"Selecting Sustainable Interior Materials for Schools"— *Journal of Interior Design*

"Including Waste Disposal Sites into the Community"— *Landscape Journal*

Conservation Studies

"Urban Growth and Preservation of Natural Resources" — *Cornell Hotel and Restaurant Administration Quarterly*

"Residential Construction on Rural Sites"
—*Landscape Ecology*

"Behavior Influences Household Energy Consumption" — *Family and Consumer Sciences Research Journal*

"Factors Affecting Urban Growth"
— *Journal of Urban Affairs*

Photos Courtesy of:

Dave Hansen, Ag Experiment Station
University of Minnesota
(Grandparents and Child, p. 1)

Dick Schwarz, University Communications
Eastern Michigan University
(Dr. Jones, p. 3 & 5)

TMP Architects
(Marshall Exterior, p. 4)

Eastern Michigan University
(Marshall Floorplan, p. 5)

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The Mission

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