# EXPANDING THE BOUNDARIES OF ARCHITECTURAL EDUCATION: MAKING A PATH TO SUSTAINABLE COMMUNITIES

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## ABSTRACT

Architectural education offers students practice with complex problem-solving, most often separate from the public they will eventually serve. Design education that addresses real clients and real world concerns such as renewable energy and resources, social equity and environmental justice, and economic feasibility demands the skills of coordination, communication, vision, and leadership different from conventional architectural education. This paper outlines an innovative university curriculum that moves in the direction of educating architects as community leaders based on sustainable design and the concept of community in every aspect of the teaching model. Specifically, the teaching model creates an interactive group dynamic in the design studio based on cooperation and sharing, engages students in real world experiences so they can develop as community leaders, and, identifies a knowledge base and design methodology (including computer technology) to fill the information gap created by an emerging field.

## 1.0 INTRODUCTION

Sustainability embodies the concept of "equity" and the principle that our society must develop strategies for valuing all forms of capital-- human, biotic, and economic-- and all forms of life, such that future generations will not live in a world of scarcity. Several national efforts are underway to bring sustainable design to architectural education (Rosemann, 1994; Van der Ryn, 1996) and to university education in general (Orr, 1992, 1993, 1994; Van der Ryn, 1996). Many campuses are adopting the concept of environmental stewardship in their operations and facilities (McDonald, et al, 1995), often as a result of student initiative (GW Institute, 1995; Keniry, 1995; Smith, 1993).

Sustainability is an approach to all aspects of life-- building design and operation, social interaction, lifelihood, etc.--

fundamentally rooted in the concept of "community". Communities form to sustain life through cooperation, interdependence and by their complementary nature. Therefore, a primary objective in teaching sustainable design is to help students develop a sense of community and connectedness in every aspect of their personal and professional development. The purpose of this paper is to describe the critical elements of creating and developing such a course for students and faculty who seek ways for introducing sustainable community solutions into their own design curriculum.

## 2.0 BACKGROUND

Sustainability courses were first offered at Cal Poly-SLO when Henry Hammer and Dan Panetta provided a course on community water and energy systems in 1991. The course had several unique aspects. First, it required students to track their behavior by monitoring their own resource consumption. Second, it asked students to analyze real environmental problems relating to water and energy systems in the surrounding community. And, third, it enlivened students with active debate on the obstacles and opportunities for sustainable communities. The course was a great success and continues to be well subscribed to although the instructors and topics have changed to encompass a broader community scale focus. Since that time, two other courses have been added to the curriculum: an introductory survey and a co-op, to form a sustainability sequence. In addition to these courses, all architecture students take a required building science series for three quarters. The combination of sustainability electives and building science courses prepare students for a senior thesis studio dealing with sustainable design.

## 2.1 The "Design Outlaws" Studio

In Fall 1994, a new path was charted at Cal Poly-SLO when the first "Sustainable Design Studio" was offered as a senior thesis concentration. During that time, fifteen students produced independent design projects with one common theme; sustainability. The course provided inspiration and a sense of urgency for the students and faculty members (Cooper & Haggard, 1995). In the 1995-96 academic year, the course was offered for the second time to a new group of students and the work continued by the author.

This year the studio-seminar combines community participation, research methods, analytical techniques for environmental technology and sustainability, building design, and presentation. Early on, the students in the Sustainable Lab classified themselves as "Design Outlaws" a term borrowed from Bucky Fuller in film footage recently rereleased in a video entitled Ecological Design (Zelov, 1994). The students quickly understood their role to be innovators and occasionally "outlaws" breaking with convention to produce a more sustainable world.

## 3.0 ISSUE IDENTIFICATION

The first consideration for the senior thesis course was how team efforts and group interaction within the class and with other academic disciplines could be encouraged in the current teaching model. The senior architecture thesis at Cal Poly-SLO is a year long combination studio-seminar for undergraduate students completing their first professional degree in architecture. Students traditionally develop an independent project under the tutelage of a faculty member within a particular focus area by building typology (e.g., hospital design) or special interest (e.g., adaptive re-use, interiors, urban design, or sustainability). Independent student design projects are aligned by focus area. Student expectations for independent projects at the senior thesis level required, for the present, that this opportunity continue even in the Sustainable Design Lab which is intended to break down barriers between students and disciplines.

Secondly, participation in real world projects where sustainability was an overriding concern needed to be fostered. Given the large number of opportunities to involve students in sustainable design events this year, the second consideration became how to create these opportunities for positive interaction with citizens and professionals on a continuing basis.

Finally, the last objective was to develop a sustainable design methodology and knowledge base through the use of computer technology as well as non-electronic resources that would enhance information quality and decision making. Thus, the third consideration centered on how to assist students gain familiarity with vast and emerging resources such that information could be applied to the sustainable goals of their design project early in the design process.

Details on how each of these areas contributed to the studio-seminar format (i.e., group interaction, community participation and leadership, and knowledge base and design methods development) is described in the subsequent sections.

## 3.1 Group and Interdisciplinary Interaction

To create an atmosphere of cooperation and sharing of ideas, the instructor grouped the class into "pods"; in this case, consisting of housing, community, and urban projects. The pods were used as discussion groups for assigned reading, informational kiosks for resource sharing, and small clusters for design critiques. At the second pod meeting, students were asked to post a project summary with illustrations so that the individual student, pod, and studio identities and could be established for visitors to and residents of the design lab. At first, students resisted the idea. However, after a few pod activities, they were convinced that peer discussion groups might be a valuable local consulting resource. The pod concept was utilized throughout the year although students were able to shift pods as their project focus changed. Overall, pods were an effective internal structure that supported a cooperative as well as informed class environment.

Crossing disciplinary boundaries to encourage interaction with other design professions was much more difficult to accomplish. The studio objective was to help students uncover new ways of thinking about environmental design that were in harmony with nature, discovering commonality, connections and interrelationships between their work and that of the others. Students must be made aware of the jargon of their own discipline and be prepared to draw parallels to the work of others. To this end, faculty from City and Regional Planning and Construction Management spoke to the students on the planning regulatory environment and cost estimating, respectively. The second quarter is involving Architectural Engineering and Construction Management as student projects are refined.

## 3.2 Community Participation and Leadership

Architectural education has prepared students as place-making visionaries but rarely gives them practice in developing their community leadership capabilities. Although students are frequently called upon to present design concepts, they are not always prepared to communicate their ideas to a public audience, such as a group of concerned citizens or an architectural review board. A second objective of this studio was, therefore, to increase

community participation opportunities where students would be placed in real life situations centering on making livable communities. In this way, they could use recently acquired professional skills and judgment in problem seeking and solving.

This year, students in the course could choose from one of several off-campus community events to attend: an AIA Environmental Design Charette, a community transportation workshop, or an annual retreat of a local sustainability organization. Each of the events afforded an opportunity to observe, comment, and interact with citizens and professionals concerned with livable communities.

### 3.2.1 AIA Environmental Design Charette

The Environmental Design Charette (EDC) was an opportunity afforded by a national effort of the American Institute of Architects (AIA). The instructor was part of the planning committee and a facilitator for the event held in Goleta, California on October 6-8, 1995. Eight students from the senior thesis class joined the event as active designers and scribes. The students relished the opportunity to interact with a wide range of participants interested in creating sustainable communities and recognized that there is a growing concern for design with a sense of social, economic, and environmental responsibility. An added benefit was that this experience fueled their hopes for employment and personal fulfillment in an environmental field.

### 3.2.2 Transportation Planning

For students unable to attend the EDC, a second option was to attend a community workshop on transportation planning. The event was hosted by a local community organization. A world renown speaker, David Engwicht, spoke on traffic calming. The workshop forced people from all walks of life to join interdisciplinary teams to make design proposals for our local community, based on principles from his book (Engwicht, 1993) that were covered in the first half of the workshop. The sharing of ideas, attitudes, and information was thought provoking and insightful for all participants.

### 3.2.3 The Sustainability Project Retreat

Finally, a third option for community participation was attendance at an annual retreat for a local built environment professionals sustainability forum. The organization, The Sustainability Project, is a local non-profit which has centered on inspiring change in our region that helps to preserve quality of life in balance with respect for nature. The organization has been successful at facilitating public dialogue, educating the public and professionals, fostering a sustainability network, and influencing policy change. The event focused on formation of a non-profit as well as goal setting for the upcoming year.

Students wrote an observation paper based on the people, the process, and the product of the event they attended. Discussion followed in the studio-seminar.

## 3.3 Developing a Knowledge Base and Design Methodology

Now more than ever, access to information is stifling. However, the current generation of students is increasingly capable in the use of computer networks such as the Internet and World Wide Web to conduct in-depth literature and discussion group searches. Research methods taught by universities need to reflect this change in technology to fully utilize electronic media. Moreover, instructors can greatly assist students in making sense of the volumes of information so readily available to them. In this way, the instructor becomes a facilitator or purveyor of information rather than the traditional "sage on the stage". The exchange and access to information changes how faculty relate to their students in the shared discovery experience.

In addition to on-line services, multimedia has also had a profound influence on student's information access in the emerging field of sustainability. Some of the tools used in the course include software applications for thermal performance (e.g., Energy10, Lawrence Berkeley Laboratory's Building Design Advisor) and CD-ROMs (e.g., CREST'S "Greening of the White House").

There are several excellent sources for recycled content or healthy building materials on the market for relatively low cost. These tools can be made available to students to enhance their computer literacy skills as well as provide current product literature with performance characteristics (AIA ERG, 1995; Harris Directory, 1996). Non-electronic sources were also used in the course including several videos on ecological design from the national AIA and those distributed by a local environmental publishing company (Zelov, 1994).

A traditional literature review as well as a bibliography were also used to supplement student's seminar reading (Watson, 1994) and local community resources such as the "Sustainability Indicators Project" in Santa Barbara (Zachary, 1995).

## 4.0 FUTURE DIRECTIONS

The studio-seminar at Cal Poly-SLO is a repeatable and transferable model. Many schools of architecture are

expanding environmental technology courses to be more inclusive to the broad reaching issues of sustainability. Campuses that have made a clear effort in this regard are: University of Oregon with the HOPES (Holistic Options for Planet Earth Sustainability) project and Ball State University EASE (Educating Architects for a Sustainable Environment) project. Other disciplines outside the professional schools have added components of sustainability to their programs as well including community service learning, campus environmental and energy audits, recycling programs, mass transit, ride-share and bicycling programs, and environmental curriculum (Keniry, 1995; Orr, 1994; Smith, 1993).

Also, non-governmental organizations including non-profits are responding to the need for educating future professionals in this emerging field. One group, the Ecological Design Institute (Van der Ryn, 1996), will be offering internships to students, new faculty, interns, and others, in ecological design firms. The institute, founded by Sim Van der Ryn, will have a program in place for September 1996 placing interns at sites around the nation where ecological design activity has already gained momentum. Cal Poly-SLO is exploring ways to link these non-profit entities with existing university programs to facilitate student participation through academic credit, program review, and joint intership opportunities with programs existing on the host campus.

## 5.0 CONCLUSIONS

Developing a sustainable design curriculum is a long term goal at Cal Poly-SLO driven by many forces. Students are increasing aware of environmental impacts of the design and construction fields. Students are interested in employment and a viable livelihood, many in a field that is not contradictory with their personal beliefs for social end environmental equity. Finally, students seek an outlet to be creative and to perform work with relevance in their future careers.

The Sustainable Design Lab at Cal Poly-SLO provides fertile ground for developing an in-depth opportunity for students to formulate a value-based design philosophy and personal attitude that will serve them in their future professional work. The basic ingredients-- group interaction, community participation and leadership, and knowledge base and design methodology-- are part and parcel of the teaching/learning framework.

## 6.0 ACKNOWLEDGMENTS

Thanks to Ken Haggard and Cal Poly professors Polly Cooper, Zeljka Bilbija, and Hal Johnston.

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