ARCHITECTURAL EDUCATION

My teaching philosophy and strategy has been influenced greatly by my having the pleasure to serve as Chair of Graduate Architecture Programs and our College's Director of Graduate Studies. In the process of revising our Master of Architecture curriculum, I have had to examine, along with my colleagues, four fundamental questions to education:

- What is fundamental and what is advanced to the discipline of architecture?
- What is essential about buildings and irreducible and what is not?
- How is an awareness and facility with complex knowledge learned?
- How can we honor the multiple and differing methods and perspectives that constitute the study and practice of architecture?

In the process, I have researched many resources about education and human development, as well as theories of integration and pluralism. The resulting working theory makes use of the following propositions based on turning the eye of the Integral Model on the subject of design education. It proposes that the education of good designers is found in considering multiple levels of developing complexity – in the intersecting domains of self, culture and Nature. The primary assumption of this approach is that the world is disclosed differently depending on the perspective taken and that many
perspectives are necessary to get a whole and complete understanding of the world, or even to fully grasp any particular occurrence.

The Four Foundational Perspectives

An effective design education for our times covers all of the major classes of approaches to thinking about design. We can view design from at least four fundamental perspectives:

- Behaviors Perspective (the 'what' of individual parts)
- Systems Perspective (the 'how' of complex wholes)
- Experiential Perspective (the individual 'who' that intends, thinks, and feels)
- Cultural Perspective (the 'why' of the collective 'we')

In doing so, this integral approach offers the designer the potential for a better map of the design terrain. Methodological pluralism discloses design in its many facets. Each has its inherent value.

A Developmental View

Education is human development, and development occurs in a process of increasing complexity. Humans in many domains of life grow and develop over time through a sequence of predictable sequential stages or levels of development. Once a stage is achieved, the awareness or abilities of that stage do not disappear unless the body's cognitive hardware is damaged or wears out. The implication for education is that what we teach can be organized developmentally. As simple as it sounds, educators do not always make the distinctions between what is beginning knowledge and skill and what is advanced, thus at times introducing complex ideas before their constituent concepts are engaged, or before the context that gives them meaning has been set, or in some cases, before the student has developed the cognitive and values capacities needed for the more complex knowledge.

Lines of Development

Levels are always levels along a particular line of development. People can be good at different things. We are all unevenly developed, better at some things than others. There are two dozen or more lines of development for different researched, replicable measurable human potentials, such as lines for worldview, self-conception, morals, values, cognition, mathematics, music and so on. Each line has stages or levels. These stages emerge in a predictable one-way sequence across cultures. Human development unfolds. Howard Gardner’s research on multiple intelligences is a good example of levels along multiple lines, in which he finds that people can have a musical intelligence, a kinesthetic intelligence, and emotional intelligence and so on.

Six Essential Lines of Design Awareness

It follows that a design curriculum can develop essential lines of design awareness through successive levels of accomplishment. The essential lines are those that define the emergent quality of architecture, such that if nonexistent, architecture itself also disappears.

- Form and Space [composition and order]
- Place and Context [natural, social, and cultural systems]
- Building Systems [structure, construct, condition, service]
- Use [individual/social needs, activities, + aspirations]
- Experience [aesthetics, phenomenology, mind]
MY APPROACH TO TEACHING

The Impact on My Teaching

The impact of this educational framework for design education calls me to set for students a challenge of working with at least two of the four major perspectives, while using the others as context. For example, I might give a cultural and ecological context and ask student to design a project that achieves aesthetic and performance goals. Or I might give an energy and structural performance and building construction system context and ask them to design for ecological pattern and to express their work in terms of architecture that manifests cultural meaning.

The second impact is that I can now more easily distinguish the level of complexity appropriate for the student. For example, in developing the new summer program for the entering MArch Track 3 (7-semester professional program for students without design background), our faculty workshop team distinguished between fundamental design knowledge and skills while recognizing that ‘design 101’ had to be delivered in a way that was engaging to cognitively and linguistically more developed graduate students. We also recognized that abstract composition was more advanced developmentally than more concrete design; because abstraction refers to something concrete, abstractions need to be derived from their real world correlates.

Thirdly, a framework of six relatively simultaneously developing lines of design awareness allows me to develop each course or project to emphasize one of more of these lines while advancing the others at least incrementally and always keeping them present. For example, each design project, even from the beginning, and however simple, has a cultural context, a site, inhabitants with feelings, human activities that can be supported by design, a material or building system, and design ideas. Then each of these sets of forces helps to organize patterns of form and space. A developmental view allows us to see immediately that there is a logical progression in understanding patterns of space from Traditional to Modern to Postmodern: design with organizations of discreet rooms before ‘breaking the box.’ Design a building with basic architectural passive strategies before a high performance building with green power systems and responsive high technology, and so on.

The Importance of Values

Architectural design is at its root an orchestration of value-laden decisions in the service of important ideas and purposes. It is important for designers to be conscious of the values that motivate and govern design decisions. Design, I believe, is always for a purpose, for the act of building, for the creation of real people-inhabited space in real places. When designers are aware of the consequences of their actions, they can more easily see the values involved in those decisions. When designers know the value choices, they are more likely to take responsibility for their decisions, and I believe, are more likely to choose healthy, life-affirming, place-responsive, environmentally appropriate directions.

The content of architectural design cannot be separated from the values it embodies. I like to make the value propositions present in my work and teaching, so they are explicit and can be discussed. Some of these value propositions are:
The act of designing is an act of reverence, as stewards of the Earth and as a privileged professional class in service to society.

The greatest task of an architect is to make a place that is whole and has the quality of being alive.

Within an increasingly devolving culture of specialization, architects have the responsibility to physically manifest in buildings the consciousness of interconnectedness and life processes.

Architects today are called to be aware of and accountable for the consequences of each design decision’s impacts on social, physical, and biological places.

Buildings and cities are responsible for the majority of global climate change, so designers are also responsible for the solutions.

Architectural education’s challenge is to graduate professionals capable of designing buildings and communities that accommodate human needs, represent the values of their users, and are characterized by wholeness, aliveness, reverence, integrity, and responsibility.

Living Systems Model for Sustainable Design

Rapid cultural, environmental, and technical changes are presently occurring. While most indicators of environmental quality are falling, public values are shifting strongly toward increasing responsibility for ecological health. Architectural theory and practice is rapidly evolving to address these changes. Earlier views of Sustainable Design (and current views, such as LEED) are based on a Modernist value for rationality and empiricism. Recent architectural and urban theories have grown to more closely represent the true complexity of the design and building process. Yet, architectural education has not achieved a successful philosophical integration of ecological principles with design principles. Living systems theory can serve as a theoretical framework to bring Sustainable Design issues out of its reduction to simple measure and weigh quantitative approaches and into a contextually situated complexity of social and ecological systems. Simply put, the pattern of ecological order is as important to learning Sustainable Design as its measurement.

An ecological systems view is inclusive, embracing many simultaneous points of view. It also extends contextualism to the structure and function of the natural environment, guided by a realism about natural limits. Ecology is one of the primary bases of 21st-century design. Human systems patterned on the structures of high order mature natural systems are less likely to create disorder in their environment and have a greater chance of longevity. Since natural systems are inherently the most sustainable systems, they can be used as analogs for human design, both factually and conceptually. The characteristics of mature natural systems are powerful models and metaphors for buildings and cities, yet they are not deterministic. Such generative analogs include: energy independence, finite but permeable boundaries, complexity, interrelatedness, materials cycling, similarity through varying levels of organization, organic growth, and sophisticated information management.

TEACHING IN DESIGN STUDIO

Developmental Wholeness

I see a student’s progress through design education as a cyclic, persistent engagement with the wholeness of architecture. Reduction of architecture to a narrow range of issues reinforces the fragmentation, exclusivity, and isolation of our culture. Student projects may progress in scale and complexity, but
always as the creation of wholes. The educational question is, How is the consciousness of complexity developed? Design education then is not an assemblage of fundamental concepts, nor is it a balanced integration of all the relevant issues and concerns, nor is it a sequential addition of progressive layers. It is rather, three things:

1) the process of removing the internal barriers of individual students to their perfect intrinsic perception of the quality of aliveness that characterizes wholeness

2) the sequential stage-like development of cognitive and values capacities, resulting in worldview transformations

3) the progressive increase in complexity of both number and depth of design issues and skills

Buildings and the study of architecture can be whole and complete at every level (simple wholeness to complex wholeness) of understanding and education. With regard to the student architect, the network of relationships amongst his/her capacities of different design intelligences increase with level. Similarly, artifacts produced by this increasing complexity are also imbued with more sophisticated intelligence.

Student’s Individual Inquiry

On an individual level, one of my teaching objectives in studio is to enable each student to develop intellectual skills in methods of architectural inquiry, design process, and considered philosophical approach. This requires that students be encouraged to approach design as a reflective activity, clarifying in the larger context goals and ideals, and in the studio project context, specific design intentions. In a dynamic balance with this individual idea, I ask them to set creativity within professional, ethical, and social context—in other words, to see how building is a collective as well as individual act. Students in my studio classes are encouraged to develop their own criteria for evaluation based on principle. As clarification exercises they often are asked to develop written statements of their design values/philosophy and a diagrammatic model of their own design process.

Teaching Design Methods

I encourage students to think for themselves and to take responsibility for their own education. I also teach them clear design methods and precedents. Beginning students need more guidance in their process, whereas I guide more advanced students to explore the design methods and processes that work best for them. Sensitivity to a variety of learning styles is important to keep enthusiasm for self-learning. Ideas are cheap and easy; having a means to discern good ideas is more challenging; knowing how to manifest and develop good ideas into buildings is difficult. Therefore, I believe it is my responsibility to bring clarity to the aspects of design methods that can be known.

Design Studio Injunction: Form and Process

The relation between form and process is critical to any ecologically literate design approach. Each of the four fundamental design perspectives mentioned above is ultimately targeted toward an informed architectural production, that is, toward creating patterns of form and space (one of the six lines of design awareness). Each of the other five essential lines is an understanding of patterns of process that inform the order of form.

The curricular injunction is: Find/generate form/space that reflexively orders and is ordered by process, for example, shaping form to embody ideas and meaning.
Multiple Approaches

Architecture is distinctive in that it requires a significant integration and cultivation of intention, method, and techniques in generating formal architectural pattern. I am interested in educating students in three ways:

1) as critical thinkers, working analytically;
2) as reflective humane professionals, working with insight and compassion; and
3) as creative integrators, working synthetically.

I see my role as a coach in helping students to experience and develop their creative power and to gain self-confidence in a full range of rational, intuitive, and collective intelligences. All these ways of being and engaging the activity of design are valid and necessary.

Evolving Education

I teach design studio as an exploratory activity, emphasizing process as much as product. In this view, the instructor coevolves with the students, addressing both educational and architectural theory as an open ended hypothesis. This means being open to self-exposure and criticism and having the ability to adjust the class content and methods as it progresses, adding a conscious feedback/management component to the curriculum. Ideally, students take the lead in guiding their own educational experiences in the studio.

Form and Substance

Design studio classes are broad in nature and intended to integrate knowledge from subject area courses. Design requires one to be informed and inspired by a broad range of forces, including social, aesthetic, environmental, and technological. Although I have developed subject area expertise in energy and environmental issues in design, I consciously emphasize theoretical and process issues above purely instrumental concerns. The worst sort of technique is that without a larger purpose. I especially stress the “fitness” of design to user needs and to the larger social and environmental context, as the creation of human ecosystems. This includes incorporating climate and ecological land analysis into the design process where they generate form-giving criteria or opportunity, along with programming analysis and design response that look for patterns and linkages.

Exponential Learning

I strongly believe that one’s growth is magnified by learning in interaction with others where the conscious goal is to support another’s learning and evolution, both personally and professionally. Education in the creative fields is also a process of growth toward self awareness and individual wholeness. Design students go through a profound process of personal transformation during their education. Ideally they become intrinsically motivated and self-organizing, drawing strength, value, and direction from within themselves. If this process is not nurtured, students often become extrinsically motivated, reacting to the forces of peer pressures, contemporary style, and faculty criticism, with little individual integrity.
and wholeness. I try to make students conscious of this process and provide a forum for the issues that arise. In the studio environment, I emphasize self-evaluation and noncompetitive working relationships, cooperation, and mutual support by various exercises, games, and class structures. A class structure of individual peer crits and small group pinups facilitates intra-studio discourse and interaction.

ENERGY, ENVIRONMENT, & INTEGRATION COURSES

Subject area courses are less complex, but more detailed, requiring more structure to provide knowledge and processes directly applicable to design. If design is an informed art, these courses provide the knowledge to inform it. Lecture course material should be design-oriented and ideally, integrated with the design curriculum. As an educator, I am interested in the impacts of knowledge upon design. I offer design methods that bring aspects of design knowledge to the designer in accessible ways, allowing the designer to manipulate both form and technological systems to meet design ends. I approach subject area courses by presenting design strategies, tools and concepts that illustrate the connections between the subject material and architectural design, while providing easily applicable and replicable methods.

Gray Buildings

The design of buildings and cities has a direct link to and is a contributing cause of every major environmental problem today. Buildings use 40% of the energy in the U.S.; consume vast quantities of finite, nonrenewable resources; produce one-half of the world’s CO₂ emissions, encouraging global warming; and they represent half of the world’s CFC consumption, contributing to atmospheric ozone depletion. Architectural design decisions are responsible for: 1) environmental externalities, such as the off-site effects of energy and materials production and consumption; 2) on-site effects, such as destruction of local ecosystems, habitat, and the pollution of air, water, and soil; 3) indoor pollution, caused by toxic building materials, poor construction practices, and poorly designed ventilation.

Architects, educators, and students are beginning to recognize these issues. Architectural education has a responsibility to graduate students who can design buildings that reduce these environmental impacts.

The Pedagogy of Green Buildings

To correct the ecological damage caused by today’s gray buildings, we first have to shift our perceptions. We have to learn to think ecologically. The two great strands of ecological thinking are process thinking and contextual thinking. So, underneath everything I teach are these two interlinked perceptions.

Living systems are the ultimate network of processes. In process thinking about buildings as living systems, we ask, "What form would buildings take if we understood them as a manifestation of natural process?" The central insight of the living building concept is that both human environments and landscapes are living systems. In designing buildings, we ask, "What is the relationship between form and process?" My lecture and seminar courses try to answer some aspects of these grand questions.

In living systems, structure arises from underlying processes. In buildings, we begin by identifying its underlying processes and looking for ways to shape the form to guide these dynamic flows and manifest them in our lives. As an example, I have structured entire courses around the question, "What are the relationships between building form and the climatic processes of sun, wind, and light?"

Buildings are a part of particular life-places. In contextual thinking about buildings, we ask, "What form would the building take if we understood it as part of a larger whole?" The imbedded intelligence
of bioregional thinking comes from the observation that most energy, materials, and information occur within an ecosystem’s own boundaries. Each process has a spatial dimension, each creature, its own range. In designing buildings, we ask, "What is the relationship between form and context?" My lecture and seminar courses also try to engage this perennial question. We look for ways to design for fitness of built form to the natural and cultural patterns of site and region. As an example, my classes often address climate as a context for design, giving rise to regional expression as a manifestation of local rhythms.

Design-synthesis and non-duality

Though I often teach courses which have historically been categorized as "technology courses," I rarely use the word technology. This is because I am not interested in the dualisms of meaning/utility, of ideas/instrumentalities, aesthetics/technics. So, I think that all courses can and should be design courses, whether design as activity or design as subject of study. In the same way that I do not choose to talk about technique separate from intention, I also do not choose to talk about form without purpose or form without materiality.

The way this manifests in courses is that I am always asking, "What is the pattern here?" The patterns can be a configuration of buildings and open space, a configuration of rooms and courtyards, or of walls and roofs and windows, or of rooms and machines, or of columns, beams, and pipes. Creating these patterns is what designers do. These patterns are really configurations of smaller things and ultimately this structure of things approximates the relationships of processes. To an ecologist, there is no landscape structure without landscape function; to a physician, no anatomy without physiology. To an ecological architect, there is no design without technology and no technology without design.

As an example, I teach about lighting, which is considered by many a technical topic. There is no architecture without light and no form that does not shape, direct, reflect, or diffuse light. I start with the place. What is the sky like here? Is it overcast or clear, high or low latitude, northern or southern hemisphere? These are rhythms that can be mapped and tell us how this place and even this particular site is unique. And then there are the processes of human activity and inspiration that tell us the qualities and quantity of light in each room and the pattern of progressions between rooms. Then we study different configurations of buildings, different patterns of organization—site organization and room organizations—that bring light to buildings and into each room. And these relationships have both configuration and magnitude, both that which must be drawn and that which must be measured. So too it is with the shape of ceilings, the proportions of rooms, and the size and arrangement of apertures. There are reflectivities, footcandles, Btus, and daylight factors, yes, and they have relationships to tall windows, toplight strategies, thin plan organizations and daylight zoning. And these have relationships with focus, ambience, glow, sparkle, transition, layering, vision, and the sacred.

Knowledge and Connections to Design Process

Whatever the knowledge domain engaged in a subject course, it has to be connected back to the process of designing. Ultimately, students want and need to know methods. They need to “be able to.” In this view, systems are presented as integrated with design process, with appropriately detailed methods applied at each stage. For instance, rule-of-thumb methods and graphic analysis are used for preliminary design and more detailed analytical calculation procedures are introduced as more detail of the design emerges.
F2013 TEACHING ACTIVITIES (Univ. of Tennessee, Knoxville)
Arch 480/181 (3 + 3 ch) Architectural Programming and Design (6 ch, 14 students)
March 2, professional thesis advising
• Jennifer Stewart, primary advisor

S2013 TEACHING ACTIVITIES (Univ. of Tennessee, Knoxville)
Arch 232 Intro to Architectural Technology (3 ch, 42 students)
Used SWL2 and new SWL3 material to develop an introduction to environmental technology issues using sustainable design as a vehicle. Tested Bundle-Up! game to teach about families of related sustainable design strategies. Began the shift from fixed seat lecture course to active project based learning. The course was selected for UT Summer Teaching Institute to develop further as "flipped" digitally-supported format.

Arch 490 Diploma Studio: High Thought - Low tech International Studio (6 ch, 12 students)
A collaborative design studio with students and faculty from India (full semester) and Mexico (partial semester). Students in India and Tennessee designed low-income housing in Vestal, TN and a small village in Gujarat state, India. Site information, research and designs were shared via multiple online means, including regular video conferences. An Indian professor and TA participated in our final review via video conference.

F2012 TEACHING ACTIVITIES (Univ. of Tennessee, Knoxville)
Arch 480/181 (3 + 3 ch) Architectural Programming and Design (6 ch, 14 students)
March 1, post-professional thesis advising
• Kathleen Lewis, primary advisor

S2012 TEACHING ACTIVITIES (Univ. of Tennessee, Knoxville)
Arch 425/525 Special Topics: Integral Sustainable Design (3 ch, 9 students)
The first seminar based on the new Integral sustainable Design (ISD) book. Three days a week, designed for a typical week of lecture, activity, and discussion on each of the three days. Students read the book in chapters over the semester. They did case study analyses and applied ISD concepts to studio projects.
Arch 490 Diploma Studio: Leading Edge Student Design Competition (3 ch, 11 students)
A unique design competition requiring quantitative analysis of energy performance and graphic solutions to a complex problem. Set in Merced, CA, students designed a mixed use commercial and elder co-housing residential complex to meet zero energy performance goals. Two students won a merit award.
STUDENT COMPETITION WINNERS

Several of my students have won or placed in national student design competitions. These were either as a result of independent studies for which I was the advisor or a studio which I taught. Since coming to UT, I have taught mostly in the required curriculum, and thus, have only occasionally used competitions as a studio vehicle.

**2012 Leading Edge Student Design Competition**
Justin Vaughn and Michael Linehan, Merit Award

**2001 Leading Edge Student Design Competition**
Dominik Starzycki Second Place
Iwona Czerwinska, Merit Award
Mario Piccolo, Merit Award

**1998 Leading Edge Student Design Competition**
Sarah Davis, Second Place (top prize)
Laura Dulski and Henry Mahns, Merit Award

**1996 Wood Products Council Competition**
Danny Addams, Second Place

**1995 Innovations in Housing Competition** *(professional competition!)*
(American Plywood Assn./Progressive Architecture/Builder Magazine)
Jared della Valle & Brian Vitale, Citation of Merit Award

**1994 AIA Sustainable House Competition** *(professional competition!)*
Marty Segal & Charles Lersch, First Place
National Teaching Award

2005 AIA COTE/Tides Foundation Award for Ecoliteracy in Architecture Schools

With Prof. Ted Shelton, for graduate design studio and seminar in architectural technology. Sponsored by the AIA Committee on the Environment. See excerpts from the report in Research & Creative Work: Post-Tenure

National Teaching Award

I was awarded the 1995 American Institute of Architects National Education Honor Award for the design and results of the Environment and Buildings I course at Washington University. The course was published by the AIA, along with two other winners, in the monograph, On Honoring Teaching Excellence.

Fulbright Fellowship, Council for International Exchange of Scholars

I spent July to December of 2000 on a Fulbright lecturing appointment at the Center for Environmental Planning and Technology (CEPT), in Ahmedabad, India. CEPT, now CEPT University, is considered the best architecture school in India and was founded by Balkrishna Doshi, who worked with Le Corbusier.

The Fulbright Scholar Program is a highly competitive nation US grant program that sends US faculty and professionals to 140 foreign countries for lecturing and research positions. Grantees are selected through a three stage competition. It is run by the Council for International Exchange of Scholars and is funded by the US congress. The grant provides all travel and living expenses in the host country, plus a stipend.

While in residence at CEPT, I gave two public lectures to the school and professional community, conducted a weekly lecture series to second year environmental science students, and served as a regular critic in several design studios.
TEACHING ABILITY & EFFECTIVENESS

OTHER INDICATORS OF QUALITY

D. INTERNATIONAL/INTERCULTURAL ACTIVITIES

Arch 490 Diploma Studio: High-Thought / Low-Tech International Studio (6 ch)

A collaborative design studio with students and faculty from India (full semester) and Mexico (partial semester). Students in India and Tennessee designed low-income housing in Vestal, TN and a small village in Gujarat state, India. Site information, research and designs were shared via multiple online means, including regular video conferences. An Indian professor and TA participated in our final review via video conference.
1) What did you enjoy most (or what worked best for you) about the class?
"The thing that I enjoyed most was getting to communicate with another country. I feel that learning about another country's cultures and customs is a huge privilege."
"The thing I enjoyed the most was the collaboration. Trying to communicate and collaborate with India (and Mexico) was a new and exciting experience. I also really enjoyed the collaboration found within our own studio. I have never been in a studio where such a level of collaboration has been maintained throughout the whole semester."
"I enjoyed working with a partner more than any other aspect of this studio. I had a fantastic experience and I feel as if I have been able to learn so much more than I could have by working alone.

2) What did you learn that will be the most valuable to you in your future as an architect?
"Communication, communication, communication. This semester gave us the opportunity to learn and exercise communicating with our Indian counterparts, team mates, peers, and juries. This skill goes beyond line weights and graphics. Always working on communicating clearly and effectively will only improve oneself as a leader and team mate."
"The most valuable thing I learned is how easy (yet difficult) it can be to communicate and collaborate with fellow architects/architecture students from around the world. Today's technology makes it easy to communicate with people you have never met in person. Yet at the same time, the different cultures and the fact that you do not have relationships with the people can make collaborating difficult. I learned just how important it is to take the time to develop the relationship first. Then, the collaborative effort will go much smoother."
"Although communication is a very valuable skill, which I worked with a lot this semester, I believe what you are trying to communicate is very important. I learned the value of a simple concept. Architecture does not have to live in metaphor, but can be equally as powerful when the concept is born out of need or a culture's understanding of space."

3) What contribution(s) did your instructor make to your education?
"Without question, the level of knowledge of passive systems and passive design strategies. I have never had a professor able to draw on so much personal experience and give information from first hand research. It was a pleasure to learn from you."
"The insight that you brought to the course concerning India was very helpful. Your knowledge of precedents, examples, and experience in India certainly advanced our projects. You provided a lot of material resources, which I appreciated. There always seemed to be a new article or book to be looking over for ideas. You were always willing to talk about the questions we were asking of these examples. The practical insight and general optimism you provided helped keep our projects on track."
"Outside of critiques and vast knowledge of the context and design was the great enthusiasm brought to the studio. That enthusiasm and encouragement is something very rarely seen in the college. So thank you."