Advanced Technical Education in the New Millennium: The Academy of Architectural Sciences - A New Post-Graduate Virtual University

JEFFERY COOK
Arizona State University

RALPH KNOWLES
University of Southern California

MURRAY MILNE
University of California, Los Angeles

JOHN REYNOLDS
University of Oregon

OBJECTIVE

The Academy of Architectural Sciences is planned to be a kind of intra-university, a way to give architects the opportunity to work toward a doctoral level professional degree with some of the best senior faculty throughout the country, to raise their technical competency through structured learning situations, and to generate new knowledge through collaborative design research. The Internet makes this possible by allowing architects to remain at home in the context of their own professional practices while pursuing guided practice-oriented research. Our emphasis is on continuing professional contact of mutual benefit.

DILEMMAS OF THE NEW MILLENNIUM

One of the driving forces that motivates many who teach architectural sciences is the realization that every day new technical innovations improve our quality of life, yet each day we realize more clearly that the forces architects have set in motion are creating profound and potentially lethal long term consequences for future generations.

Architecture contributes greatly to the comfort and delight of humankind but it also significantly befouls the globe. Buildings use about one third of all the energy our nation consumes, and thus architects are responsible for about one third of our environmental problems. Design decisions by architects influence resource depletion, energy consumption, air pollution, and greenhouse gas production. Today's practicing architects were not educated to deal with these complex new technological responsibilities. Nor does architecture support an internally consistent method of advancing our understanding through research.

CURRENT APPROACHES TO TEACHING TECHNOLOGY

In the various schools around the country, it seems that there are at least three approaches to teaching architectural technology.
One involves bringing knowledgeable specialists/consultants as visitors to offer technical courses,to meet the requirements of accreditation and to address student's needs for the licensing exam. Technology in this case is often quite remote from the central curricular issues of the school.

In some school a number of full-time faculty pursue various research avenues and are charged with teaching the technical courses. In this case technological issues have a curricular voice, but again is often kept remote from studio instruction.

In a few schools, full-time faculty teach the technical courses as well as in the studio. In this case building science issues are often tightly integrated into the evaluation of studio production; lectures on technical topics might be given in the context of the studio or in a coordinated companion course.

But it can be argued that none of these approaches is perfect.

Today there is considerable turmoil surrounding the way the architectural educators should address technical issues. Many faculty members feel there is simply not enough time available to teach technical material at more than a basic survey level. Most also believe that the knowledge base is expanding so rapidly that it is beyond the grasp of most practicing architects. Still others observe that exploding liability issues are forcing the profession to try to transfer the responsibility for the technical performance of their buildings to other disciplines.Even more extreme are the academic critical theorists who assert that architectural technology is now an aesthetic issue, no longer subject to scientific strictures.

In the face of this turmoil, we feel there needs to be a different approach to teaching architectural technology. We propose to create a new way to offer practicing architects and recent graduates the opportunity to acquire advanced technical expertise. This is not intended to create a class of specialized consultants, which actually currently exists, but rather to create new kinds of architectural practices that can offer clients expanded services in the form of sophisticated integration of technical issues into building design. We believe that such firms will enjoy a distance competitive advantage and might lead to new forms of architectural practice in the new millennium.

THE LACK OF TECHNICAL EDUCATION

"The future belongs to the integrators." With that statement, the educator Ernest L. Boyer expressed his deep intrigue with what he saw as the architect's responsibility to harmonize aesthetic, social, and technical influences through the design act (Boyer and Mitgang, 1996). However, current trends in architectural education emphasize the aesthetic. History seminars regularly call forth imagery from Modernism through Post-Modernism to Deconstructionism. The studio more often gives emphasis to style at the expense of any rational criteria for design. The result can be, and often is, an introspective exercise of architects talking to themselves and not getting any answers (Steele, 1997).

Educators often argue that there is simply not enough time to adequately prepare students to deal with the complex technical problems of the built environment. They claim their graduates will acquire the necessary technological and environmental skill and knowledge once they get out into practice. Unfortunately,the evidence shows this rarely happens.

The only educational options for practicing professionals eager to acquire in-depth expertise in architectural science are either the typical half-day workshops offered at national conventions, or else returning to the university for a Ph.D.

For an architect in practice, it makes no sense to seek an academically-oriented Ph.D. intended to prepare people for careers in teaching. Furthermore, Ph.D. programs tend to impose many requirements unrelated to the pressing problems of a "real world" practice. Formal qualifying examinations, foreign language competency, and years of on-campus residency all can cause the abandonment of an architect's current practice.

Another problem is that most of the 120 schools of architecture in the United States have only one full-time professor teaching environmental technology. This means that scholars and researchers are widely scattered throughout the country. Add to this the fact that many of our most highly regarded senior professors are now taking early retirement. Thus,while the technical problems are becoming more complex, and society's need for solutions is more critical, the access to qualified teachers is shrinking.

THE LACK OF RESEARCH OPPORTUNITIES

Architecture is not only deficient in technical instruction but also lacks a research culture, a systematic way to advance the body of knowledge. There have been a few exemplary teachers like Victor Olgyay at Princeton dedicated to doing environmental design research in an academic setting. In the profession there have been leaders such as John Eberhard, Founder of the AIA Research Corporation in Washington, dedicated to advancing knowledge by systematically evaluating built structures. Yet although the influence of such former leaders has all but disappeared from the academic and professional scenes, newhopeful signs today include the rise of SBSE (the Society of Building Science Educators), proposals for national building energy rating systems like CHEERS and the United Kingdom's BREEM program. New periodicals now address buildings and environment, and new books on these topics appear almost weekly. Curiously however, all of this research and technical effort still seems to be on the periphery of the architecture profession's central concerns.

One important question is how to formulate an agenda for research that will reach deep within the architectural professions day-to-day activities. An excellent discussion of these issues is presented in a 1981 National Endowment for the Arts report prepared by Marguerite Villecco and Michael Brill who made the following important points:

> Architectural technology research shares paradigms with both design and science. Similar to design, environmental design research deals with sets of problems that lie in the realm of direct experience; it has a sensory base and an intimate connection to the quality of life. Yet it can be distinguished from design and the distinction is critical to those proposing,doing, using or assessing research. The distinctions can also lead to their eventual unity, where the design process encompasses the learning and evaluative components of research over time.

Environmental design research can usually be distinguished from design practice in a number of significant ways. Design is unique; its products are singular, and its methods are less important than its results. Design is product oriented; it is justified as the solution to a problem and the problem-solving method need not be replicated for evaluation. Design practice frequently welcomes intuitive leaps as it seeks to resolve the complexities of program and context into a single form. Its values are implicit in its product and its evaluation is qualitative as well as quantitative.

Environmental design research, on the other hand, is concerned with the frameworks for all the activities that affect design, allowing evaluation and design to take place within a rational context. Research is oriented to process as well as product. The process must be capable of replication and its methods documented as a basis for evaluation of each research project's internal validity.

Research takes a specialized view of the world in order to push at limits and to reach new levels of understanding. It is,in that sense, exclusive rather than inclusive by nature. And while intuitive leaps used to create knowledge are an accepted or even preferred method in design, in research, intuition must be tested for its utility against specific research objectives. Environmental/design research is not singular, but concerned with sets of cases and generic application. It must be generalized to more than a unique situation (Villecco and Brill, 1981).

Evaluation and design are not typically linked to a rational context of research in our schools of architecture. Instead, the values, norms, and attitudes conveyed by typical design exercises tend to perpetuate the myth of the architect as the aloof form-giver, delivering solutions to the problems of the less-enlightened masses. The image has a subtext of nature seen as an enemy that must be conquered, rather than the basis for all life and a milieu to which architecture can and must conform, harmoniously. Both the image and its subtext are completely unsuited to the changes that environmental imperatives are now thrusting upon the profession and must change, or architects will be negated (Steele, 1997).

To address the lack of technical instruction and environmental design research, a small group of senior academics met in Ann Arbor in 1994 to discuss creating the Academy. Sincethen we have grown to include a distinguished working group of advisors from a dozen different universities, many of whom haveagreed to offer the Academy's first courses. At a recent annualconference of the Society of Building Science Educators (SBSE) we conducted trial runs of a few of our potential offerings for local practicing architects. The evaluations showed that we are on the right track. Our web page is now informing a wider audience of prospective new students about our plans.

THE SOLUTION

Our answer to this problem is to create a distance learning consortium to offer practicing architects the opportunity to work with top scholars and researchers anywhere in the country, to pursue in-depth postgraduate work in Architectural Science while they remain within the context of their own real world practices. We can do this by creating a National Academy of Architectural Sciences.

The objective of the Academy is to offer advanced post-graduate education for those few exceptionally qualified and motivated building science students who want to go beyond the Masters Degree level, who seek to become practicing architects able to offer higher levels of specialized service to their clients, or who may want to create new kinds of architectural firms or to redirect existing firms.

Our purpose is not to duplicate existing, academically oriented Ph.D. programs but rather to create a professionally oriented Doctoral Degree designation that denotes distinct knowledge and unique capabilities. For example, instead of the Ph.D.'s traditional language requirement, students might substitute computer languages appropriate to their study topic. The difference might be analogous to an M.D. in internal medicine compared to a Ph.D. in physiology.

Nor is our purpose to create another separate free-standing institution with its own faculty and physical infrastructure. Rather, the aim is to take advantage of the most useful new technologies that make distance learning possible. People who now teach specialized building science courses at various universities across the country can thus be connected to each other and to dedicated students in the context of small seminar/working groups that produce research reportable results.

This is a major departure from current architectural education, being the first postgraduate distance learning opportunity for the 80,000 practicing architects in the United States. We recognize the potentially high risk of this venture but we believe the need is pressing enough to justify the gamble.Furthermore, we believe that for the first time, several key circumstances have conjoined to assure the ultimate longterm success of this educational experiment.

The Internet

The most critical new condition is the Internet. It is now possible instantly to assemble a world-class faculty in Architectural Science. Contrast this to the task of building anew campus-based university and trying to recruit high-quality resident staff.

The Faculty

The faculty will be drawn from senior faculty who have taught Building Science in the architecture schools of North America. They might serve as teachers of distance learning courses and technical seminars, as one-on-one consultants/critics on specific design projects, as Dissertation Committee members, or as informal mentors. The potential faculty pool is impressive,even assuming that only a tiny fraction of the approximately 300 senior people participate at any one time.

Our present core group, composed entirely of associate and full professors, is uniquely qualified to undertake this venture. The group includes experienced educators and researchers some of whom who are now taking early retirement. For them, income is not the primary concern. Instead, they view the Academy as an unprecedented opportunity to pursue their particular areas of expertise, working with a few highly motivated advanced student/practitioners for shared advantage. The Academy can reinvolve this valuable intellectual resource.

The Administration

The Academy is to be administered by a Board of Regents who are elected by the faculty. The Board, in turn, will appoint a Dean and may additionally hire an Executive Officer for day-to-day management. The Board of Regents is responsible for establishing and maintaining the highest level of academic and professional rigor.

Initially, when the Academy is still small, administrative tasks will be contracted out to one of the leading institutions in distance education such as the Fielding Institute which has over a thousand Ph.D. students around the country.

The Community of Learners

A strong faculty and an electronic network are necessary elements but are not sufficient to achieve our objectives. A strong community of learners and researchers can only be sustained by regular face-to-face contact. The Academy views it as absolutely essential to hold an Annual Conclave and frequent Regional Seminars to provide what is otherwise difficult to achieve on the Internet: A chance for spontaneous face-to-face interchanges among individuals and groups.

This Annual Conclave will be held at the beginning of the year to provide an opportunity for faculty and students to interact professionally and socially. This will be the place where all courses will be launched and the first intensive lectures will be given. The Conclave will provide a chance for new students to meet potential mentors and for advanced students who are beginning their dissertations to meet their committees and refine their proposals.

The Annual Conclave also serves as the setting for qualifying examinations which might be structured as a set of national design competitions, each testing the integration of some aspect of building science in the context of an architectural design problem. The results will be evaluated based on the fit between architectural quality and technical excellence.

Dissertations would be presented before the Board of Regents and the assembled national faculty. When work is accepted, the diploma will be signed by all of the faculty and regents who wish to add their names. Thus, as it has been throughout history, the value of the degree of this institution is established by the reputations of the faculty who confer it.

The Learning Model

The Academy presents an opportunity to explore a new kind of learning model. The unique combination of dispersed faculty expertise and dispersed postgraduate adult learners working together on complex technical practice-centered issues calls for a model with the following attributes:

Competency based and flexibly scheduled projects.
Interactive and collaborative rather than individual effort.
Holistic viewpoints with emphasis on ecological, social, and cultural contexts, with precedents.
Responsive to student initiative, compatible with individual learning styles.
Actual problems with real clients who may then evaluate the work with a stress on collective rather than singular evaluation.
Explicitly seeks new ways to integrate theory into practice.

Although no formal curriculum presently exists, some of the core faculty are already well prepared to offer distance learning courses nationally. Specific examples aimed at improving a students skills in practice might include seminars on critical environmental issues or on research protocols, for example a course in support of the qualifying design competitions. For the most part, such offerings already exist in illustrated lecture format, evolved through years of classroom teaching in various schools of architecture. They will be reformatted for presentation on the Internet.

Others of the core faculty are more interested in research, testing ideas for deeper understanding. The ideas might come from such diverse areas as public policy or design theory. They might be launched by a student or a faculty. In any case, the purpose of such tests is not to be individualistic and iconoclastic nor to make a personal statement in spite of surroundings. Rather it is to find

common threads in the fabrics of separate settings.

It is the intent of the Academy to place strong emphasis on research with a problem-solving focus, undertaken in the actual context of current and local interests. It is expected that the results of such topical studies might sometimes meet with disagreement and even active protest from those with conflicting stakes: the basis for a lively dialogue.

The Research Model

The Academy, working through the Internet, presents an opportunity to organize environmental design research, to make it internally consistent, as is science, so that for example if another researcher were given the same information, assumptions,and value set, the results should be repeatable.

The traditional, scientific hypothesis-testing approach to research is very likely to be inadequate for our purposes. The act of design needs answers to so many hypotheses at the same time that the traditional methods would take inordinately long and it is unlikely that they could be applied evenly.

Therefore, more holistic methods and more interdisciplinary procedures must be developed to test these multitudes of hypotheses. This development of methods for environmental design research is an important exploration in its own right.

Environmental design research nonetheless shares significant parts of the same paradigm with science. It may have and often does have tests for reliability, repeatability, validity, and sensitivity.

The results of research investigations will be published as a series of papers directly on the Internet. Initially it is expected that, instead of being refereed by a select peer group, papers will be put forth for all to read and ponder. Later, as the Academy offers an advanced degree at the doctoral level, peer review by the building-science community might become necessary. But for now, the hope is to stimulate broad interest and participation in an open dialogue with feedback from around the world.

FUTURE DOCTORAL-LEVEL DEGREE

We see a doctoral-level professional degree as being especially appropriate to the exploratory nature of the Academy. Many future students in the Academy will doubtless take some courses without pursuing an advanced degree. But design research is a primary goal of the Academy and is best carried out in collaboration with students whose skills and interests are lready well developed—in other words, at an advanced-degree level.

Consequently, at some point in the future it is planned thatthe Academy will offer a new postgraduate professional degree, tentatively called the Dr.Arch.Sc. The objective is not to duplicate existing Ph.D. programs, but instead to create a new kind of professional degree for architects, similar to the M.D. in medicine.

The time required to earn a doctoral degree from the Academy will be at least two years beyond the minimum required for the completion of a Masters Degree.

Precedents in Other Fields

Postgraduate-level distance learning programs are already successfully running in other disciplines. The Fielding Institute in Santa Barbara is one of the most highly respected, having over a thousand students around the country working on Ph.D. Degrees in psychology and education. Even though architecture is not within their area of expertise, Fielding has agreed to offer their help in creating the Academy.

Support from the Academic Community

The final key ingredient insuring the long-term success of the Academy is support from our colleagues. We have assembled a list of Deans of Schools of Architecture around the country who are prepared to serve as advisors. But most critical is thesupport of the SBSE, representing the people who teach these courses at colleges and universities across the country. The SBSE is acting as the financial and administrative "incubator" for the first three years of the Academy's existence.

IMPROVING EDUCATION AND PRACTICE

It is our intent that the Academy will ultimately improve both architectural education and practice. By demonstrating a new model of teaching and research through a variety of echnologically rich experiences, the Academy can improve the quality as well as the accessibility of postgraduate education.

The Academy will complement existing programs and expand their effectiveness. To be admitted to the Academy, a prospective student must already have graduated from a professional degree program in an accredited school. Applicants can ask a faculty member of their former institution to serve as their academic mentor. Thus, every school of architecture can offer its best graduates a chance to participate in a national post-graduate program while remaining affiliated with their home institutions as well as remaining in practice.

Finally, by advancing education and research, the Academy will change the way architecture is practiced. Graduates of the Academy will be equipped with technical competencies that give them a distinct competitive advantage over traditionally-trained architects. These new professionals will be able to offer to the public higher levels of expertise and more sophisticated services.

CONCLUSION

In architecture there is nothing similar to the medical profession's board certified specialists. To fill this gap, the Academy proposes to create a new kind of professional designation for architects, one that will mean for the public that the holder possesses specialized skills in the application of scientific knowledge to the most difficult problems encountered by practicing architects. We believe we have identified a critical problem in higher education, and we believe we can put in place an innovative solution that will produce long-lasting reform.

We believe that the Academy and its graduates will demonstrate that the architecture profession can indeed accept responsibility for the environmental consequences of design decisions. We believe our graduates will create the new kinds of architectural firms that are attuned to the needs and opportunities of the 21st century.

ACKNOWLEDGEMENTS

The Academy's initial Working Group consisted of Murray Milne of UCLA, Chair, Edward Arens of University of California at Berkeley, Jeffery Cook of Arizona State University, Vivian Loftness of Carnegie Mellon University, Ralph Knowles of theUniversity of Southern California, Marietta Millett of the University of Washington, Fuller Moore of Miami University, John Reynolds of the University of Oregon, Sharon Sutton of the University of Washington, and Donald Watson of Renesselaer Polytechnic University and Yale.

The Founding Institution is the Society of Building Science Educators, Margot McDonald of the California Polytechnic University, President, and Terry Meyer Boake of the University of Waterloo, Treasurer.

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This paper includes material originally presented by two of the authors at the ACSA West Regional conference in Berkeley in November 1998.