ARCHITECTURE RESEARCH: EDUCATING THE PROFESSION

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In architecture as in medicine research is not the primary concern of the general practitioner. However for research results to be useful, the practicing architect has the responsibility of defining the direction of architectural research and then integrating the results into design solutions.

What separates architecture from other design professions is that architects design buildings to house people. This quality ensures that whatever value the profession may derive from research the ultimate beneficiary will be the building occupants. However the architecture profession has had difficulty developing a solid research base. Most of the work on which the future of the profession depends has been generated, conducted, and evaluated by non-architects. Much of the discussion centering on the value of architectural research may be rooted in the inability of many non-design oriented researchers to take a wholistic view appreciating research in the context of applied design. For instance a non-design oriented researcher may be more apt to concentrate on exploring the frontiers of his science than obtaining results applicable to architectural design (Craik, 1968).

The need to find methods of reducing energy consumption in buildings is an important area in which architectural research could contribute directly to design. But architects have been insufficiently involved in energy conservation research. The Energy Conservation Standards recommended by the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE, 90-75, 1975) and already adopted by many states, are based on the results of engineering and building science research.

The standards are biased towards methods that require fine tuning of mechanical equipment along with a reduction of ventilation rates by more than 50%. The costs implied by the adoption of these standards on health, comfort, and aesthetic enjoyment of the environment are considered only peripherally. The possibility of careful design eliminating the need for much of the mechanical equipment altogether is only hinted at. An interesting observation here is that it is the ventilation engineer laying down constraints for architects rather than architects solving problems by more appropriate design.

The impact that buildings can have on physical health is another area in which architectural research could effect design. There is an abundance of information among health professionals, but unfortunately not among architects, that buildings entrap dangerous levels of air pollutants (see Sterling and Kobayashi, 1976).

To gain an understanding of how research linking buildings to health problems could aid in the design of non-polluted homes, the author conducted a study of carbon monoxide (CO) entrapped in ten homes with gas cooking stoves (Sterling, T. and Sterling, E., 1979). This is not a trivial concern since, after all, the kitchen is the center of the American home and it is usually the housewife who slaves over the stove. The results were alarming. CO increased rapidly and spread evenly through the house persisting for at least an hour after the stove was turned off. In a related experiment testing various methods of removing CO from the house, including an exhaust fan and various air movement patterns, cross ventilation increasing the rate of air change was found to be most effective. Increasing ventilation to remove indoor air pollution is in direct conflict with the ASHRAE Energy Conservation Standards.

The results of these experiments place a number of constraints on design that conflict with other variables. For example one might choose only electric appliances because direct combustion causes CO. But electricity is a less efficient use of fuel than direct combustion. In order to conserve energy and create a non-polluted home, a method recovering heat from exhaust air needs exploration.

The onus is on architects to assess the possible effect of research performed by and for other professions on the human environment before integrating the results into design. Unless architects, come to terms with the real problem of synthesizing the rapidly accumulating scientific information into a form useful for applied design, the responsibility will be taken on by another group and architecture may become an unnecessary discipline.

Integrating Research and Design

Research is now an essential part of the design process because of the complexity of modern buildings and building codes. However the perplexing problem of combining the results of research with design is still largely unresolved.

In 1968, a symposium on the topic of Education for Research was held at the Bartlett School of Architecture. The focus of that symposium centered on the concern that architectural research was being performed mostly by non-architects and results were not immediately applicable to design. The conclusion was that architecture schools should introduce curriculum aimed at educating architects capable and willing to perform research. If that advice were heeded architecture schools would produce architects familiar with research methods and provide a framework within which architectural research could occur in combination with design.

A model, by which the results of research could be fed directly into design might be to create a research/design group composed of ~~both~~ practicing architects and, researchers, professors, and students. The resources of the profession and the schools could be brought together and focused on research in real design situations. The group would use real design as an experimental situation, monitoring the buildings over time and feeding the results both into ongoing research and into the next design (Hillier, 1972). Furthermore, by making research a permanent component of the design process rather than simply an isolated activity, the process as well as the product can be studied and transformed.

Ongoing research within a school of architecture would benefit both the schools and the profession by strengthening the link between education and practice.

THE EDUCATIONAL SYSTEM

One reason for the apathy displayed by many architects toward research may be attributed to traditional educational patterns that do little to create an environment attractive to research oriented students. By emphasizing intuitive design methods while de-emphasizing academic thought and values, traditional design education may be encumbering research without really meaning to do so. There is a tendency in schools for architecture to be treated as an abstract problem solving activity (Manning, 1965b). An overall approach to the application of scientific knowledge and experience to design has not yet been developed.

Interest in architectural research must begin in schools of architecture because it is at the university level that most professionals integrate their identity within the characteristics of their chosen profession (Stringer, 1970). If schools of architecture continue to be practice oriented, researchers will be attracted to other disciplines. The architecture profession has historically conferred only limited recognition for academic and research pursuits. Status attaches mostly to practitioners. To attain status and recognition many teachers concentrate on building up a part time design practice instead of pursuing research interests (Manning, 1965a).

Of course schools must continue to produce architectects disciplines to solve design problems. But encouragement and credit should also be awarded to students exhibiting excellence in the analytic and scientific aspects related to architecture.

A fuller commitment to research and teaching by the profession as a whole will contribute to improvement to education, professional performance, and as a consequence will enhance respect of the community for architecture as a necessary profession.

CONCLUSION

To solve contemporary problems and remain a viable discipline architecture must develop a firm scientific base. The schools can provide the framework for ongoing research. A liason between the resources of schools of architecture and professional organizations could be the vehicle to integrate research results and accumulated scientific knowledge into architectural design.

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