Closing the Research-Design Gap

Franklin Becker, Ph.D.

Robert Sommer (1969) wrote *Personal Space: The Behavioral Basis of Design* more than 35 years ago. That book followed research he had done a decade earlier than that, beginning with his work in Saskatchewan, Canada with Humphrey Osmond and others in a psychiatric hospital. Humphrey was the hospital's director. He noticed that although the hospital had recently won a Canadian architectural design award, nothing much had changed as far as improving patients' health and well-being, including their social behavior. When Sommer, a social psychologist, applied for a position and was hired, he was asked by Osmond to try to understand why the new design didn't seem to make much difference. That early focus marks one of the beginning points of what became known as the study of "small group ecology," and then more broadly and variously as environmental psychology, environment-behavior studies, and human-environment relations.

Over the past 40 years or so, thousands of studies have followed, as well as academic journals dedicated to building the knowledge base in this field, including *Environment and Behavior*, the *Journal of Architectural and Planning Research*, and the *Journal of Environmental Psychology*, to name only a few. The Environmental Design Research Association (EDRA) was started in the 1960s to build and promote a multi-disciplinary community of academics and practitioners dedicated to helping create built environments that reflect and support the people and activities using them. It continues to grow and flourish to this day. All of this activity, and almost a half century of scholarly commitment around the world, has accomplished much. Today we can better understand through research how the planning, design, and management of the built environment influence and help shape our behavior, attitudes, health, and well-being in settings that range in scale from regions to rooms, and as diverse as offices, schools, hospitals, museums, and prisons. What it has not done, however, is eliminate the "gap" between architects and designers and social scientists; and in particular, the fear that "evidence" will limit design creativity (Hamilton, 2003).

The "Gap"

In the design community there is still widespread confusion, skepticism, and resistance to the value of what has become known as "evidence-based design." This begins very early in an architect's career. At Cornell University, where I have taught for 35 years, the Architecture Department is and has been ranked number one in the

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country for many years. There is one social scientist on Cornell's architecture faculty. She is an anthropologist who teaches about esoteric aspects of South East Asian cultures and has no studio responsibilities. No required courses focus on "environment-behavior" studies. The curriculum is so designed, in fact, that students are essentially unable to take such courses elsewhere in other colleges at Cornell, such as my own, Design & Environmental Analysis, in the College of Human Ecology. Why should we expect architects to be familiar with, let alone knowledgeable about and an advocate of, the potential for evidence-based design to contribute to great buildings when their studio instructors and advisors are disinterested and often disdainful? Cornell is not the only architecture program in the country or world, of course. But it is considered a leader, and it is by no means the odd school out.

Interior design, as a profession, has been a much stronger advocate of incorporating the social sciences into the design curriculum. CIDA (Council for Interior Design Accreditation), for example, mandates that accredited programs include defined course work related to human-environment relations, including but going beyond human factors/ergonomics. But interior designers fight their own battles with the architecture profession to avoid marginalization and to achieve recognition and acceptance. The gap continues within the design community.

There always have been, of course, exceptions to the "gap" rule, both among individual practitioners and among firms and college and university programs. Of interest to me has been how one closes the "gap" more broadly, rather than relying on a few enlightened practitioners or educators. Professional education programs are obviously important, but as the Cornell example illustrates, academics are among the most conservative of professionals when it comes to their own teaching and research profession. Often, it is firms working in the trenches of everyday professional practice faced with demanding clients who have been forced to consider new ways of working (e.g., shipping graphics work to offshore firms in India, China,

and Indonesia who do it much more quickly and at a fraction of the cost; or working as part of multi-disciplinary teams). These are changes in the profession led by economic realities. The choice is to participate in the new world order or risk losing the client. That same dynamic may be at play in the healthcare sector, to good effect, with architectural firms becoming real players in an evidence-based design process from necessity as much as choice.

Healthcare and Evidence-Based Design

The potential for the design professions to embrace research as an ally in a quest for buildings that work on many levels—economic, operational, sustainable, and aesthetic—is aided, in the case of healthcare facilities, by the culture of science that permeates the medical field. Doctors don't prescribe penicillin because they love the color pink or because no one else is doing it and the results would be novel. Funds are tighter

Testing an emergency room mock-up for Children's Hospitals and Clinics of Minnesota

and much more internal and external oversight exists in medicine than in the corporate world. Of greatest importance, mistakes in medicine are more than annoying or mildly dysfunctional. Open plan offices, for example, whose lack of auditory privacy may bother staff, are not life threatening. In the hospital environment, both patients and staff can and do suffer great pain, and patients can lose their lives as a result of design decisions that increase the likelihood of nosocomial infection, falls, medication errors, and poor communication and interaction patterns. In this context, clients increasingly expect their buildings and the teams responsible for planning and designing them to draw on available evidence to help them make more informed decisions.

Implications

Evidence-Based Design: Methodology not a Panacea

What, exactly, is "evidence-based design?" Cama (2006) defines it as "a deliberate attempt to base design decisions on quantitative and sometimes qualitative research" (p. 8). Hamilton (2003) writes "Exemplary evidence-based architecture comfortably blends the architect's rich experience and understanding of classic design principles, and creative inspiration with design decisions based on insightful interpretation of a broad range of research results" (p. 19). Like research itself, these definitions raise more questions than they answer. Does "basing" design decisions on research evidence mean that the research dictates design solutions? "Deliberate attempt" is more helpful. It implies that those planning and designing facilities will expend time and energy to try to identify relevant research and explore how it might help shape thinking about relevant factors that need to be considered in generating design solutions. But who is to engage in this exploration? What kind of expertise is required? Who decides what is the "best available" research evidence? What does one do when there is no or contradictory research evidence? Clearly, even when evidence-based design is embraced as a concept, knowing how to implement it in practice is difficult.

Rules of Thumb

One can think of "evidence-based design" as corresponding with two roles: 1) consumer of research and 2) producer of research. These facets are two sides of the same coin. While the same person or team may be able to operate effectively in both roles, the education, skills, and expertise for each are different.

Research Consumer

The research consumer, like any consumer, must be well-informed about different product categories (e.g., car versus SUV), what constitutes desirable qualities in each category product (e.g., safety ratings, miles per gallon, carrying capacity), and the extent to which the products being considered demonstrate the qualities. Typically, we have implicit or explicit criteria for performance. We want the car to get at least 30 mpg or have a minimal towing capacity. We weigh all the information available, including the need to make trade-offs (the vehicle that has the right safety features and carrying capacity may have a fuel rating lower than we want). With this information in hand, we choose from the range of available products those which, overall, we prefer. This is a highly judgmental process, but one grounded in "evidence." The evidence informs but does not dictate the decision about which product to purchase.

Research Producer

The role of research producer requires much more specialized knowledge and education. Almost anyone willing to invest significant time and energy into understanding a product can become a knowledgeable consumer. It takes an engineer to design an engine, with the years of formal education and experience that implies. The same holds true for those wanting to produce evidence-based design research. Acquiring the skills needed to develop a research design that effectively tests what one hopes it will, design a quality questionnaire or observation protocol, conduct a focused interview, analyze quantitative and qualitative data, and a myriad of other research tasks, take years. When my students finish after two years of intensive study what I believe are very high quality research Master's theses, they are now ready to begin the pursuit of a Ph.D. At the end of another three to four years of intensive study, they will become proficient researchers.

Implications for Practice

Just as there are different categories of vehicles (SUV, convertible, sedan), each with their own advantages and disadvantages, there are different categories of research (e.g., ethnography, field experiment, laboratory experiment, comparative case study), also with their own pros and cons. Within each category, there are better and worse examples of that type of research. As a research consumer, one needs to know and appreciate these differences. There is no answer to the question "Which is best?" The relevant question is "Which is best for what we are trying to do, given our resources, time, and what is available?"

Implications

There is not nor ever will be published research that addresses every design decision that must be made in planning and designing a hospital. That means one must be prepared to interpret, extrapolate, and generalize from information that is incomplete. This is where experience and diverse views become important. The production of evidence-based research requires specific technical skills, and often takes months if not years to complete. Considering how to apply such research benefits from a collaborative process involving designers, researchers, and administrators; and depending on the nature of the decision, patients and family members. Informal benchmarking of best practices, long experience planning and designing hospital facilities, and so on play an important role here, but should not be confused with generation of research.

Related to the above point, there will be times when brief studies of a problem that lack the necessary academic rigor of a formalized research project can add great insight to a problem, particularly when considered in conjunction with more formalized studies. These short, project-focused investigations benefit from applying whatever possible tenants of more formalized research one can (e.g., accepted practices in conducting an interview, or developing a short survey), even though they are unlikely to have the necessary rigor (e.g., sample size, data points) of more formalized research.

If the goal is the production of research that is of publishable quality that contributes to the body of evidence-based knowledge, then trained and quali-

fied researchers are required. Such research can be done as part of practice or academia. The key issue is not the location of the research, but the qualifications of those doing it.

The bottom line is that architecture and design firms that want to position themselves as knowledgeable practitioners of evidence-based design from the position of either research consumer or producer are going to have to commit significant time and resources to that effort.

Conclusion

The application of evidence-based research in the search for and evaluation of design solutions is a collaborative process involving many players and benefiting from different forms of expertise. This overall process is, in effect, what is meant by "evidence-based design." It involves the interpretation and application of whatever research evidence that has been brought to bear, and is likely to be supplemented by other forms of information including literature searches, benchmarking, and practice-based studies. Research is the infrastructure on which evidence-based design rests. It is more formalized than professional experience and project-based studies, and it is grounded in the specialized expertise of people trained to conduct various forms of formally structured research. Such research can be quantitative or qualitative (e.g., ethnographic studies), experiment or case study, but in all cases adheres to accepted canons of research methodology appropriate to that approach.

Good design, in the end, requires people with different experience, skills, and perspectives drawing on many forms of information in the pursuit of making creative and informed applications of knowledge as they generate and evaluate possible design solutions. Most important of all is a mindset that acknowledges that more information, including that generated through formally structured research processes, has the potential to generate plans and buildings that, as noted earlier, work synergistically on multiple levels: financially, operationally, aesthetically, and in a sustainable manner over time in the face of con-

stant change. Informed clients in a corporate culture where "evidence" is a common currency may be just the ticket for bringing "research" and "evidence" into the studio from the cold, and transforming them into just another tool in an ever-expanding tool chest.

About the author:

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InformeDesign Research Tutorials
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—*Design Issues*

"Post Occupancy Evaluation Can Improve School Design" —*Environment and Behavior*

"Background Noise in Open Offices"
—*Ergonomics*

"Effects of Children's Hospitals on Families and Staff"
—*Journal of Developmental and Behavioral Pediatrics*

"Methods for Evaluating Lighting Preferences"
— *Lighting Research Technology*

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