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EDITORIAL:

Appropriate research methods in architectural research: a survey of quantitative techniques

In the last issue, we considered three widely different research designs appropriate for architectural research: Qualitative, action and theoretical research. We analysed the characteristics of each of these designs from a standpoint of their utility to technology research in architecture. In this issue, we return to the last of the research methods applicable to architectural research, one that is widely abused: quantitative techniques. Our attention is devoted to three such techniques: experimental, quasi-experimental and survey research methods.

One of the greatest strengths of experimental and quasi-experimental research methods is their attempt to establish causal relationships. Experimental research design seeks to establish a cause and effect relationship between a predetermined set of variables by introducing a "treatment" and measuring its effect before and after. Causal relationships are established by making sure that the "subjects" receiving "treatment" are randomly assigned (cf. Cook and Campbell, 1979). Such randomized assignment of "treatment" is said to reduce the possibilities of any biases on the part of the researcher (has no willful control over who gets what "treatment"). As can be expected, the pre-and post-treatment scenarios are quantitatively measured (involves some numbers) and any changes in these measurements are attributed to the "treatment." One of the basic assumptions of this research design is that all "subjects" involved in the study are equal in every respect other than the "treatment" received by some. Thus, it is assumed that any subject in the study receiving "treatment" would have behaved exactly as the ones who actually received it.

A modification of true experimental research method is the so-called "quasi-experimental research" method. Here, the subjects receiving treatment and those not receiving it are acknowledged to be non-equivalent. Measurements are made of two groups of "subjects", one receives a "treatment", and measurements are made of both groups ("pre-test, post- test non equivalent control group design" [Marans and Ahrentzen, 1987]) and comparisons are made accordingly. The research may also be carried out using just one group of "subjects" receiving "treatment" at various points in time ("Interrupted time series design" [Marans and Ahrentzen, 1987]). The "treatment" is introduced, withdrawn, and re-introduced at various points in time, to make sure that any effect manifested in the "subjects" are indeed due to the "treatment" administered.

The above description makes it clear that a linear, causal relationship between a phenomenon and certain tangible objects (people, building materials, etc.) is the primary concern of experimental research. Such relationships are studied with a view to be able to manipulate the causes so as to effect *desirable* changes. Such an endeavor can be of immense help to the practitioners of architecture in helping them understand the costs of their design decisions.

If we define the meaningfulness of causes in terms of their ability to create testable, dependable and planned changes, then the most meaningful causes are those which can be deliberately manipulated. Such a concept of cause mirrors the unique feature of experimentation - the manipulation of putative causes. (Cook and Campbell, 1979: 36)

However, these findings must be incorporated into relatively self-contained and independently implementable design strategies for effective design use. For, such causal findings by themselves can only advice designers as to the cost/s of their design decisions, and not help *formulate* those decisions in the first place.

Survey Research

Survey research involves a systematic collection of information from a given population about itself and the environment it occupies. This information is collected either from the whole population or from a sample, by way of face-to-face interviews, telephone, or self-administered questionnaires (cf. Marans, 1987: 41ff). Surveys may be conducted at one point in time only ("Cross-Sectional Survey") or, repeated over time ("Longitudinal Survey"). Longitudinal surveys may employ different groups of people every time a survey is carried out ("Trend Studies") or, use the same group over and over again ("Panel Design") (cf. Marans and Ahrentzen, 1987, Marans, 1987).

Survey research particularly suits those studies that tend to be relatively objective. They usually involve quantifiable attributes that are replicable. The assumption is that the results of a survey are also generalizable. (Marans, 1987: 42) While theories and models conjure reality, surveys produce current information from the horse's mouth so to speak. In terms of architectural design, information generated by a survey can either be helpful in formulating design parameters or help identify problems in existing designs (some form of post-occupancy survey).

In its pure form, survey research generates information that is not particularly helpful in establishing causal relationships. Survey combined with other research designs however, can establish such relationships and

therefore be of immense practical value to designers. Marans (1987) calls such a combined method as "contrasting sample design", where a "treatment" is introduced in the research design. Two groups of populations are first surveyed about some aspect of their environment, a "treatment" is introduced to one group and both are surveyed again. In this way, survey becomes more of a research instrument rather than a research method.

Such a combination can be effectively used in architectural research. For example, although there are "objective" instrumentation now available to researchers in thermal comfort studies, the field still employs subjective judgments on certain attributes of the thermal environment. While Fanger (1970) showed that all things being equal, humans respond to thermal environment much the same way irrespective of geographical and cultural differences, the fact however is that all things are not equal. Thus clothing, life patterns etc., which varies from culture to culture and place to place, can prevent mechanical instrument from making effective measurements of thermal comfort preferences. A contrasting sample design can be of great practical value in such situations. Same goes for acoustical studies, where there are no true "objective" measurement scales (for example, the decibels and other sound intensity values are measured as ratios related to the threshold of audibility and this threshold, needless to say, is a function of age, culture, lifestyle preferences, etc.). In such circumstances, survey research combined with an experimental design can eliminate the need for complex recreation of reality and tight control of numerous variables.

Architectural research, if it is to make meaningful contributions to the way architecture is practiced today, must be prepared to benefit from a combination of more than one method of inquiry. While experimental design still remain the mode of choice of all researchers, it can be argued that a richer and more fundamental kind of findings that can help in architectural conjecture-making requires such combinations.

In this age of financial and ecological constraints, architects need to make their design decisions explicit and be able to defend them on the basis of scientific knowledge. The proposition here is that such a knowledge base can be built by experimental mode of research inquiry coupled with other research designs. Survey research can be a potent candidate.

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