ADVANCES IN POE METHODS

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ABSTRACT

Design research should now be differentiated into Pre-Design Research (PDR) and Post Occupancy Evaluations (POEs). While most methods overlap, the different purposes of these two types of research influence selection of methods and analyses and modify methods to suit each. Simulation is the only method peculiar just to PDR and is rapidly advancing to a micro stage through electronic advances. The self-report controversy continues for all methods that use self-report forms of answers. The newest field, the transactional approach, also stirs controversy. Industry and government clients are preferring expert and focussed groups and these may be in danger of crowding out the more tried methods of social science.

PURPOSE

This paper will review the most recent methodological advances in environment and behavior research but first makes a distinction between POE and Pre Design Research (PDR). Methods are reviewed from this new point of view.

PRE DESIGN RESEARCH

When Bechtel and Srivastava (1978) reviewed POEs done on housing, it became evident that POEs constitute the bulk of work done in the entire field of E & B research. They discovered over 1,300 published studies on housing alone and many more have been done since then. Furthermore, the survey did not include POEs done on other buildings such as schools, hospitals, etc.

Another type of research has been confused with POEs and this is better called Pre Design Research or PDR. The purpose of this kind of research is to collect new information so that a new entity such as a building, park or city can be designed. While POEs focus on design as it exists in a standing building, PDR has a broader range of information to collect in order to pursue the many hypotheses of a future design or to go beyond hypotheses to collect information on the broadest scope of user needs. PDRs are information gathering operations more than the evaluating or testing operation of a POE.

FURTHER DISTINCTIONS

In POEs the design decisions have already been made. In PDR the information is needed in order to make those decisions. POEs are retrospective, PDR is prospective. While most of the methods used in E & B research will overlap, at least one method, simulation, is almost exclusively used for PDR.

The statistics used to analyse POE and PDR data greatly influence the methods chosen. Because PDR is broad gauge and inclusive the statistics tend to be more those of association, while those of the POE, because they are testing and looking for significance of differences, tend to be those of statistical tests of significance. The PDR will use more correlations, factor analyses and similar tests and the POE will use more t tests, ANOVAs and other tests of significant differences.

A POE evaluates the behavioral response of a building's occupants to the building as they experience it. As such, it is a performance measure because it measures whether the building performs as intended. A deeper significance is applied to POEs, however, as over time they become an instrument of quality control. This means that in much the same fashion as quality control in manufacturing influences the design and construction of products, so the POE becomes the measure of quality in building design.

A PDR, by contrast, measures the needs and requirements for people who will occupy a future building and the data become input for the programming process of design. This is where confusion arises since POE information on past designs is also used in programming. In fact, any good designer will borrow from both POEs and PDR as part of programming. Also, PDR is in many ways a performance measure, but only a suggested performance measure for the future, which must await a POE for confirmation as a tested performance standard.

In another ideal sense the PDR is a pre measure, while a POE is a post measure, for the experiment which is a building. Unfortunately, this ideal situation is seldom realized. The most obvious reason is the design fee process which is more favorable to PDR than it is to POEs. Seldom does a client feel the need for evaluating a building after construction when funds have already been stretched to make a building the best possible.

Two sources of additional conflict also arise from this circumstance. The first is the

understandable reluctance of a client to evaluate a considerable investment where the chance is it could have been done better. The second is an ethical and scientific question of whether the people performing the PDR should be the same who do the POE. This is both an ethical and scientific issue because if the same people do both they may influence the POE outcome favorably. The PDR performers will always be suspect if they obtain favorable results doing a POE. The pressures toward favorable results are often very subtle, and therefore, it is best to avoid suspicion by having an entirely new team do the evaluation.

In my own experience, however, I sometimes find that the team doing the POE does not know enough about the events of programming to do an adequate job. This becomes the PDR-POE dilemma: how do the PDR performers do their job well enough so that the information helps programming in such a way that the programming decisions are clear enough for the POE? The only answer is meticulous documentation of procedures and decisions.

PDR TECHNICAL ADVANCES

As mentioned previously, simulation is the one method that seems to be used almost exclusively for PDR. An excellent example of innovation in this method was the Reizenstein Carpman, Grant and Simmons (1985) study. The problem addressed was whether a hospital should place a parking entrance near a patient drop-off point as a convenience for the people bringing patients. A potential problem could develop because other people coming to the hospital might see the entrance and choose it rather than the regular parking entrance, causing traffic congestion. The study simulated automobile trips by moving a fish-eye camera around a model with the new entrance and then a model without the entrance. Subjects were asked which entrance they would pick as the video paused at decision points. Even though signs were clearly visible in both models, subjects chose the new entrance enough times to produce a fair certainty of congestion. The new entrance was not built.

This study took only a few weeks and only a little over two hundred dollars to complete. It provided a clear and efficient PDR method for making an important decision and it provided an example of how modern electronic methods can make PDR information more available at this micro level. No longer must an entire building be contemplated before PDR is justified, it can now be applied to smaller units like entrances.

Having said that simulation is almost exclusively for PDR, it is now necessary to mention the one known instance in which it is definitely a post event (although not POE) and that is the use of photographing models via TV tape to reconstruct accidents (Severson, 1988). This is a useful device for court cases as evidence for either the defense or prosecution.

CONTROVERSIES OVER POE AND PDR METHODS

1. Focus Groups

A method that has been around for some time and has been borrowed from marketing research is the use of "focus" groups. This method is similar to the charette and earlier participatory design methods from the sixties (See Daish and Kernouhan, 1985 and Icafano, 1985). The only reason for including this as a recent "advance" is that it has been rediscovered and is becoming increasingly popular.

Focus groups are a collection of people brought together to answer questions about a building that exists or about a proposed design, hence these groups can be used for either POEs or PDR. Usually the group is considered to have expertise in some area such as maintenance or management but it could also be a group of housing residents. Usually these groups are non-randomly selected so there are problems of representativeness (See Marans in Bechtel, Marans and Michelson, 1987). The controversial aspect of focus groups comes from their use in government and industry.

The bulk of POE work has shifted from academic settings, which peaked in 1973 (Bechtel and Srivastava, 1978), to government agencies and private industry. More and more government agencies are requiring POEs and PDR on their buildings (e.g., Vischer, 1985; Picasso, 1985). In this regard, the work of the General Services Administration (GSA), the Veteran's Administration, the Air Force and the US Army Corps of Engineers have already been cited (see National Academy Press Report, 1987). The US Postal Service (Kantrowitz et al., 1986) is a recent addition to the list of government agencies.

Sweden, with its Building Research Institute and New Zealand (Daish, 1980) have also experimented with institutionalizing POEs in the building process and Sweden regularly incorporates POE findings in code reviews.

Eichinger (1985) reports how the VA uses expert panels, selected from personnel who are veterans of previous design changes, who are brought to the site of a new hospital and given a set of pretested questionnaires to evaluate significant new designs. The same method is reported by Taylor et al (1987) as the mainstay for evaluation of scenic outdoor environments.

Daish (1980) reported a method that has yet to be tested in the US, the "most knowledgeable person" technique. This is a variant of the expert panel. In this case the most knowledgeable person in a given area, e.g., Maintenance, is chosen by an expert panel to be the most knowledgeable person in their field. This method has yet to be compared with more traditional methods including the expert panel

but it has the saving of time and money as its largest recommendation.

2. Standardized Questionnaires

A search of PDR and POE literature shows that most of the work continues to be eclectic and continuing to use more than one method as a matter of course. An exception to this observation is the new and revised social climate scales developed by Rudolph Moos and his colleagues at Stanford University (Moos and Trickett, 1986; Moos and Moos, 1986; Moos and Spinard, 1986). Usually the scales are composed of 90 or so items and divided into six to ten subscales which measure different environmental qualities and they have been used in a variety of settings such as classrooms, homes, offices, nursing homes and mental hospitals. Although the main point of these scales is the global assessment of social climate, they have been used to point out issues relating to job stress, environmental support and others.

Moos has always had a strong environmental interest (Moos, 1985) but the social climate scales have not been very widely used in either PDR or POEs. The reasons for this neglect are not apparent.

3. Transactional Research

The transactional model of research is producing a new method for both POE and PDR work (Oxley et al., 1986) but it is not without controversy (Kaplan, 1987; Altman et al., 1987). Essentially, the transactional approach is to recapture the wholistic quality of the environment by collecting data through extensive observation. It seeks comprehensiveness while recognizing the unique qualities of every setting. This method is somewhat reminiscent of Barker's (1968) behavior setting survey, but is less quantified and less arduous. Criticism (Kaplan, 1987) states that it does not provide the traditional controls found in hypothesis-testing research. Proponents of the work (Altman et al, 1987) assert that traditional methods leave too much information out of the data collection and do not permit a truly contextual picture of behavior.

So far, too few studies have been done to evaluate the usefulness of the transactional model (for it is more a model of method use than a new method), but usually these more comprehensive methods of data collection have proven useful to PDR and POEs, especially PDR where the emphasis is on more global behavior.

4. The Subjective Report Controversy

Over time some instruments and methods of data collection have gained favor. Chief among these has been subjective self-report measures like the semantic differential (See Bechtel, 1975; 1987). The controversy over self-report measures is now entering its thirteenth year. It continues to be discovered by new researchers and uncomfortably avoided by some older ones. Daniel and Ittelson (1981) have pointed out that self-report measures can often confound the verbal response with (what should be) an environmental response. In their classic study Starr and Danford (1979) showed that the words "lawyer's office" produced the same semantic profile of responses from subjects as did the actual environment of a lawyer's office. Thus, there was no difference in self-reports from those who were looking at words that labelled an environment from those who were actually responding to a specific environment labelled by those words. If self-report measures like the semantic differential are to be used for measuring attributes of the physical environment, there must be some assurance that it is the physical environment that is being measured and not a verbal label of that environment. In short, there can be no assurance it is the environment being measured unless the instrument used has been shown to discriminate between the verbal and the distal world and between generically similar environments. This is the requirement for discriminant validity first raised by Campbell and Fiske in 1956 (see also Fiske, 1982 and the exigesis in Bechtel, Marans and Michelson, 1987).

Much misunderstanding still exists concerning this controversy. Some still feel it demands no self-report measures should ever be used to measure environmental attributes. On the contrary, this would only eliminate one class of possible confoundings. The fact is, all measures which do not discriminate between verbal and non verbal responses should be pre tested for discriminant power before being used to measure any environmental attribute. This certainly does not mean that one can never use semantic differentials or adjective check lists but it may mean that certain adjectives which do not discriminate between verbal and environmental stimuli can never be used.

The Scenic Beauty Estimate (SBE) (Daniel and Boster, 1976; Brown and Daniel, 1984) continues to be used on outdoor POEs and avoids this confusion by using a non-verbal numerical scale and pretests for discriminant validity in addition. The SBE produces mathematical modeling for management decisions in parks and forests.

CONCLUSIONS

It may yet be too early to call it a trend, but time and budget demands of industry are creating pressures against the use of the more costly and time consuming methods which are the stock in trade of social scientists. There seems to be a preference on the part of many clients in these agencies and industries for the quicker and more prestigious expert panel. The expert

panel enables the client to rub elbows with the best experts in a given field. This has a tendency to boost the client's ego and to produce unchallenged statements from the experts. A relatively anonymous social scientist has some difficulty sounding expert among the luminaries and challenging the elite.

Yet the validity of this method must be challenged. Can it be demonstrated that experts can provide better and more economic information than more conventional methods for PDR and POEs? Perhaps there are circumstances where one is used more effectively than the other or where both need to be used simultaneously. At present there is no basis for making judgments about the viability of traditional social science over the panel of experts.

The only solution to this problem is a carefully crafted experiment comparing and contrasting these methods with standard social science techniques. Does the expert panel produce more useful information than a survey of user needs? Does the expert panel cost compare favorably with such a survey? The larger issue is whether the social scientists will have the courage to gather the resources and make such a test. If not, I see the pressures toward more frequent use of ad hoc groups forcing out the use of the only methods known so far to test validity and reliability of results.

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