ADVANCES IN POST-OCCUPANCY EVALUATION APPLICATIONS

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ABSTRACT

Advances in post-occupancy evaluation (POE) applications are looked at from two points of view. First, recent developments are observed and, second, those developments that may represent advances for the field are identified. Developments in POE applications include an apparent increase in the volume and acceptance of POEs, shifts in the sponsorship of POEs, and changes in the types of POE programs that are run by some sponsors. Possible advances include the integration of behavioral and technical assessments, moving toward the application of "total building performance." Other changes due to sponsor demands include a growing awareness of "bottom line" measures of performance in POE. Possible changes due to experience with large scale POE programs which may also advance the field include the development of greater sophistication in dealing with organizational issues and the clearer discrimination of multiple levels of POE.

INTRODUCTION

First, some definitions. The term "POE applications," as used here, is meant to imply POE as it is practiced by (or for) clients who intend to, or preferably do, make use of the results to change and improve the way they program, design, build, manage, or use their environments. The title of this paper, "Advances in POE Applications," suggests not only change, but progress; not only doing things differently, but doing them better.

How can we measure the advance in POE as it is applied in real world settings? This is not a trivial question and reminds us that our knowledge of POE applications is limited in terms of how much we know about what is actually happening out there. Even more critically, our thinking about the application of POE and environment and behavior (E&B) research in general proceeds without an accepted conceptual framework which would explain the activity of applied research. That is, theory in E&B tends to be viewed as explaining phenomena, rather than describing or explaining the process of developing information and acting on the person-environment system.

Other observers have commented recently on the application of E&B research -- which is the essence of POE. Kantrowitz (1985) asked the rhetorical question "has E&B research made a difference?" and answered that it has as research has become more applied in its orientation, as clients have recognized its potential contributions, and as research programs have become more institutionalized.

Shibley (1985), in discussing building evaluation in large organizations, proposes at least two criteria for their success. First, that evaluations be in the "mainstream" — that is, embraced as the usual way of doing things — in relation to long range planning and policy decisions within an organization; in other words, that their results "count" to decision makers. Second, that they be shown cost-effective in generating this information. Zimring and Wener (1985) suggest that if the field is to advance, standards are needed to ensure the quality of information generated by even the "quickest" and "dirtiest" of POEs. This paper will suggest a number of other measures in addition to these, and will attempt to report on the movement in each of the following areas:

- Are more POEs being done?
- Are POEs being applied in "new" contexts or facility types?
- Are "new" people doing or supporting POEs?
- Are new techniques or technologies generating new POE applications (or vice versa)?
- Are POEs being done better?
- Are POEs measuring new kinds of outcomes?
- Are POE results being communicated more effectively?
- Is POE having more impact?

ARE MORE POEs BEING DONE?

Perhaps the most difficult question to answer is this quantitative one. There is no more current data on the volume or monetary value of work being done in this field since Bechtel conducted his survey of housing POEs for the United States Department of Housing and Urban Development in 1978. However, there is anecdotal evidence which can be cited on both the positive and negative sides of this issue; and conditions seem to vary greatly among countries. On the positive side, one can cite two factors. The first is the institutionalization of POE in several countries (Australia, Canada, New Zealand, and perhaps others). The second is the emergence and continuity of private firms able to subsist doing (at least in part) POE work. Some of these firms have been active for a number of years, but there seem to be more now and, with a larger number of firms, many have specialized in particular user or facility types (e.g., the Project for Public Spaces which studies plazas and airports, and other firms which specialize in offices, health care, and so forth).

On the negative side, it is possible to identify governmental agencies (particularly in the United States) which sponsored POE studies in the past, but are no longer, or have reduced their support. The National Science Foundation and National Endowment for the Arts provided money for early conceptual work on POE, but appear to be less involved at this time. This may be because they see their role diminishing as POE becomes better understood and accepted, leaving sponsorship to the agencies and organizations which can benefit directly from use of research results.

Also on the negative side is the level of sponsorship by U. S. federal agencies such as Housing and Urban Development and the Department of Energy, both of which had been major sponsors of directed POE studies and both of which appear to have greatly curtailed, if not abandoned, their programs.

While the magnitude of this reduction and the reasons why it has taken place are unclear, it may reflect shifts in priorities or perceptions which are particular to these organizations. Because, at the same time that some U. S. agencies have reduced funding for POE, many others have stepped in to fill the gap. Examples include the General Services Administration, Postal Service, Veterans' Administration, some state governments (e.g., Massachusetts) and many private clients and voluntary organizations.

It appears that POE is becoming better understood and more accepted. Staff and managers in many client organizations are familiar with the term and are more likely to see its value and include it as an integral part of the facility management cycle. POE seems to be shifting into a demand-driven mode, where clients are defining the need for research, as compared to the prior "supply side" mode, where researchers had to convince reluctant clients that they might get something of value from a POE.

ARE POEs BEING APPLIED IN "NEW" CONTEXTS OR FACILITY TYPES

Environment and behavior research largely began with studies of public sector housing and institutional facilities. More recently, POEs have been performed on private sector facilities, including office, retail, and "hospitality" (restaurants and hotels). Kantrowitz (1985) reviewed recent developments in several of these areas. Clearly, for private clients to support POE, it must prove itself useful — and apparently it is doing just that. At the same time, increasingly effective POEs (and resulting design guides) are being developed for more traditional public sector clients (e.g., Welch, Parker and Zeisel; Regnier and Byerts).

ARE "NEW" PEOPLE DOING (OR SUPPORTING) POEs?

POEs have been done in the past by environment-behavior researchers and some design professionals. In discussing the experience of their firms in conducting design research, Symes, Duffy and Ellis (1985) conclude that a new generation of design researchers whose education and experience span social science and design will be required to bring about an effective synthesis of skills needed in this field. Could it be that improvements in POE cited elsewhere in the present paper are, in part, a result of the emergence of this hybrid practitioner?

An additional emerging category, that of "facility manager" may also impact POE practice. Facility managers appear to be defining themselves as responsible for carrying out or managing tasks that span from strategic planning to janitorial and maintenance (Margulis). Somewhere in this spectrum falls POE, and facility managers recognize that evaluation and feed-back are essential to their ability to manage effectively. One sees POE results reported in facility management trade journals (e.g., Gere Picasso's recent article in *Facilities Design and Management* which briefs facility managers on how to develop an in-house POE) and discussed at their conferences (e.g., International Facility Management Association [IFMA]).

It can be argued that the existence of the discipline of facility management will have an impact on the diffusion of POE; as large organizations develop in-house skills and integrate all aspects of planning and control, evaluation will become a more obvious thing to do. And, with professionals inside of organizations whose job it is to look after the facilities, it may be easier to sell POEs.

ARE NEW TECHNIQUES OR TECHNOLOGIES GENERATING NEW POE APPLICATIONS?

The availability of new technologies may influence how POEs are applied, their cost, and the time they require for completion. Conversely, the contexts in which POEs are performed may require new techniques (not necessarily hardware). We have seen POEs which utilize such recent technologies as videotape (to record walk throughs, interviews or focus groups, and to present results), lap-top and hand-held computers (e.g., the "datamite"; for field data collection), on-line questionnaires (where the respondent can connect to the researcher's computer,

answer questions and have results processed instantaneously), and the use of electronic bulletin boards (where remote sponsors of a POE project can keep informed and trade messages). Widespread and affordable "desk top publishing" (with personal computers driving laser printers) is allowing researchers to generate more attractive, readable and effective POE reports. The development of increasingly sophisticated and realistic computer aided design (CAD) simulations and interactivity (allowing one to "walk through" an unbuilt project, change colors at will, and inexpensively simulate alternatives) will probably have an impact on the ability to do "pre-construction evaluations" of alternatives.

"New" low tech POE methods have been stimulated by the demands of applications (many from or inspired by the organization development field). An example is the "walk through" or touring interview (Shibley; Gray et al.), which entails the simultaneous, directed, in-person assessment of an environment by several parties who see the place from different perspectives.

ARE POEs BEING DONE BETTER?

Are we learning to do POE applications better (or smarter)? I would not argue that evaluation methods, *per se*, have been improved, or even that there may not be poor quality POE work being done in some instances. But, there is evidence that POE practitioners are thinking more about the information needs of their clients and of designers, how to gather that information most efficiently, and how best to present it. In this sense, POEs may be being done better: with more direct, obvious and useful payoff to the client. This is evident in several relatively recent developments which are reviewed below.

First, there is a growing awareness of the role that POE plays in organizational change (Farbstein, et al., 1988). Some observers feel that POE consultants are more sophisticated about the POE's organizational context and what characteristics may be required to get results used effectively (Richard Wener, personal communication). Craig Zimring (personal communication) points out that we can observe an increasingly better match of POE methods and products to our clients' goals and needs.

An example of this improved match, is the recognition of needs for differing *levels of POE* in what may be an ongoing research program (Shibley, 1985; Harvey, Zeisel and Schiff, 1987). The first level may be diagnostic, intended to identify the range of problems and issues which need to be looked at in more depth. Often, this stage will involve a wide range of people from within the organization, as well as a broad spectrum of expertise on the evaluation team. This approach should not be denigrated as "quick and dirty," but rather seen as laying the foundation for further research. Results of this initial stage range from immediate feedback and fine-tuning (see Kantrowitz, 1986, p. 123 for an example of fine tuning to get optimal energy performance) to problem definition, to "buy-in" of the organization.

The next level of POE may include detailed assessments of a single building or a set of similar buildings. A single building study may serve to test programmatic assumptions. If POEs are completed on a sufficient sample of similar buildings, conclusions may be drawn which are applicable to other buildings of the type and to the documentation of that knowledge as design guidelines. Thus, POE results are used in the next generation of building designs.

The final level of POE would focus in greater detail on a particular functional area or technical issue which had been identified as needing further study. This operational approach to defining levels of detail is being utilized in such POE programs as those

New Zealand Ministry of Public Works, Health and Welfare Canada, Public Works Canada, the California Department of Corrections and the U. S. Postal Service (Zimring, 1987).

ARE POEs MEASURING NEW KINDS OF OUTCOMES?

Environmental design researchers struggled for many years to get performance-based notions accepted in facility programming applications (Preiser, 1988). The notion was that POEs would measure environmental performance. The initial performance measures were largely related to such outcomes as habitability, satisfaction, and task effectiveness. More recently, new concepts and measures of performance have been integrated into POE practice.

The first is the notion that POE should measure *"bottom line performance"* which can be expressed in terms of dollar costs. Brill (1984, 1985) began use of the term in discussing office design, showing many of his findings to affect worker productivity (while also reporting other findings which were felt to be important but could not be measured in dollars). POEs of correctional facilities have pointed to such bottom line, hard dollar costs as replacement of vandalized equipment, provision of health care services, staff time lost, and public liability (Wener, et al., 1987). The U. S. Army's Construction Engineering Research Laboratory (CERL) demonstrated a return of 77-to-1 on the cost of research which lead to productivity and morale improvements in an office building. Recently the Postal Service has embarked on a program to measure productivity in relation to design, not only in terms of worker productivity, but also in terms of marketing effectiveness (USPS). These concerns demand new conceptual and methodological approaches to POE and require that environmental design researchers coordinate efforts and findings with economists and financial analysts.

Another emerging direction for POE is the concept of *total building performance* which demands the integration of behavioral and technical factors in a more comprehensive evaluation scheme. The total building performance concept is consistent with the notion of environmental systems and holistic approaches which have been with the field since its beginning.

It requires expertise from a range of disciplines in addition to environment and behavior research. The need for such an approach arose from problems which were confronted by POE researchers examining health and behavioral effects in sealed buildings (required by recent energy conservation standards). The effects could only be understood by looking simultaneously at the totality of factors (as understood at this time), including behavioral, managerial, chemical, epidemiological, technical (including lighting, HVAC, etc.), and so forth. All disciplines had to be present together to begin to discover the complex interactions that were occurring. The concept has been shown to be relevant to general situations as well, where impacts and outcomes need to be looked at broadly. Inherent limitations can be built into behaviorally oriented POEs that ignore technical or physical design issues just as much as with technically based building research which ignores user/behavioral interactions and effects.

Good examples of POE work within the total building performance paradigm include the Department of Energy sponsored studies of non-residential passive solar buildings (Burt Hill, et al.; Kantrowitz, 1986), and Public Works Canada's office studies. Other examples are cited in a publication of ASTM (Davis, 1986) which has a task group working on defining total building performance.

ARE POE RESULTS BEING COMMUNICATED MORE EFFECTIVELY?

There are many examples of POE results which are being more effectively applied to feed forward into future generations of building designs in the form of design programs, guidelines and standards. This is not necessarily better research, but better "packaging" and communication of results. While some practitioners have been working for years to make effective and readable reports, their recent work shows much more sophisticated use of typography and illustrations (compare Zeisel, 1975 [*Charlesview Housing*] to Welch, Parker and Zeisel, 1984 [*Independence Through Interdependence*]).

It is important to recognize that many designers and managers may not be very interested in research results *per se*, but rather in being shown what the research demonstrates that design should do. When Farbstein and Kantrowitz asked a convocation of very busy and results-oriented design managers from U.S. Postal Service offices around the country whether they wanted to perform POEs themselves, to read about the results, or to be given design direction based on the results, they almost unanimously asked for the latter only. They were glad that the research was being done, insisted that the design direction be well founded in that research, but did not feel that they or the architects whose work they manage had time to read research reports.

An intermediate approach is taken by Carpman, et al. (1986), who provide brief summaries of research findings juxtaposed to clear design direction. Similarly, Brill, et al. (1984 and 1985), in reporting on results from a large scale empirical study of offices, took great pains to make the data immediately imageable and understandable to lay people. More recently, they have produced a users' manual and instructional videotape to reach office users directly (Dixon, 1988).

IS POE HAVING MORE IMPACT?

There is some evidence that POE results are beginning to have a greater impact on building design, management and policy. Despite the fact that some previous sponsors of POE studies are no longer as active as they once were, the past five years or so have seen a growing number of examples of high visibility, high impact POE studies, many of which have already been mentioned. Other facts that contribute to this conclusion are the wider dissemination of findings through such client- or user-dominated outlets as the American Hospital Association, Building Owners and Managers Association, American National Standards Institute, National Institute of Corrections, Gerontological Society, and many others. Again, many articles about POE or reporting results have appeared in the design, trade and popular presses. A design research awards program sponsored by the National Endowment of the Arts in 1985 supplemented Progressive Architecture magazine's on-going annual program in giving recognition and publicity to some of the best POE work. Finally, the on-going POE programs in large governmental organizations, while only examples and not yet the dominant mode, provide a number of models for others to emulate.

THE RELATIONSHIP BETWEEN PRACTICE AND THEORY

Kurt Lewin's statement to the effect that there is nothing so practical as a good theory is often quoted at E&B conferences. And, based upon the review of research applications, researchers' experiences in the "real world" can also have a stimulating effect on theory — sometimes leading to the development of theoretical constructs, and at other times pointing out the need to explain observed phenomena or processes and

to integrate them within a new theoretical synthesis (Kantrowitz, 1985). An example of this stimulating contribution from the applied to the theoretical can be seen in the recognition of "bottom line measures" which require the identification and quantification of environment-behavior effects in terms of their economic value (dollars gained or saved). Total building performance, which in itself is a quasi-theoretical construct, required a new synthesis in relation to problems observed in the field — especially indoor air pollution and energy utilization.

FUTURE DIRECTIONS FOR POE APPLICATIONS

The purpose of this paper has been to discuss emerging trends in POE, many of which are both recent and gratifying to supporters of the field. While we would not simply extrapolate these trends into the future, among the possible scenarios which may unfold are:

- further acceptance of POE within private and government user agencies
- a greater degree of understanding about how to intervene in complex organizations
- technologies which allow more effective user participation and more efficient data gathering; and
- a greater penetration of research findings in use (as design and policy guidance).

A more controversial potential development is toward a degree of standardization of the process of rating buildings, which is a variant of POEs (Davis, 1986). This is likely to be embraced by client organizations as making POE more accessible and efficient, but may be resisted by researchers.

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