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THE NEW DEMAND-DRIVEN POST-OCCUPANCY EVALUATION

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Post-Occupancy Evaluation (POE) has become increasingly accepted and influential among client organizations responsible for large building management and construction programs. Managers and administrators look to POE to provide answers to important facilities questions. This increased focus on decision-making has resulted in a number of changes to the way in which POEs are conducted, including changes in the relationship between evaluator and client, the range of issues addressed, and the salience of certain methodological concerns. These issues are considered in light of current uses for POE information and some strategic choices faced by evaluators and clients.

INTRODUCTION

Post-occupancy evaluation (POE) is no longer cloistered in the ivory towers of academia but has emerged as a part of the business of many large organizations. Rather than investigating issues primarily of interest to evaluators, these new studies strive to supply answers to the day-to-day questions facing managers and administrators of building management and construction programs.

Post-occupancy evaluation, or more broadly, systematic evaluation of completed designed settings, had its origins in academically-based studies in the 1960's and 1970's. Evaluators were curious about how "users" behaved in and reacted to buildings and often had the desire to empower "nonpaying clients" by making their needs and perspectives clear (Zeisel, 1975). Many of the early studies focused on low power, vulnerable groups such as poor or institutionalized people, in an effort to give them a voice in the design process (see Bechtel and Srivastava, 1978 for a review of housing evaluations). In addition, there was a desire to make the design process self-improving so that systematic feedback about the effectiveness of buildings and designs would help make subsequent buildings better (Friedmann, Zimring and Zube, 1978; Zimring and Reizenstein, 1981). This was part of a larger effort to define the design process in terms of rational models derived from information processing and operations research.

Ironically, as POE enters its third decade it has become increasingly accepted and influential, yet not among the group for whom it was initially targeted: architects. Rather, POE is being performed and sponsored by client organizations, and particularly by those who are responsible for large building management and construction programs, such as Health and Welfare Canada, the U.S. General Services Administration, the New Zealand Ministry of Works and Development, the California Department of Corrections, and A. T. and T. A few architecture firms perform POE on a routine basis, but in general clients seem to be the ones doing, or at least paying for, POE.

This new wave of POE sponsorship is largely spearheaded by persons holding management and administrative positions and responsible for making key decisions concerning facility management and development. These decision-makers are constantly faced with choices: to upgrade existing facilities or build new ones, to invest more heavily in the current building program to off-

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set life-cycle costs or delay expenditures until some time in the future, to decide about specific characteristics of a new or retrofit design, and so forth. It is to obtain answers to these important questions that managers and administrators look to POE.

The purpose of this paper is to consider some changes in POE that have come about as a result of the shift in emphasis from studies that reflect the interests of evaluators to studies reflecting the needs of building program managers, facility managers, facility programmers, architects, and others.

RELATIONSHIP WITH THE CLIENT

The increasing emphasis on influencing decision making has caused the conventional wisdom about the relationship between clients and evaluators to be reconsidered. Rather than evaluators acting as detached observers, a more collaborative association has emerged. Evaluators are now working closely with clients to identify and clarify issues of concern, to determine how the POE can be most effective, and to overcome potential obstacles to the implementation of results.

ISSUES ADDRESSED

The increased decision-making focus of POEs has also tended to both broaden and refine the range of issues addressed. For example, the program of POEs conducted by Public Works Canada reflects the responsibility of that agency for all aspects of buildings, as well as the concerns of white-collar unions and other building users. Their POEs address user responses to buildings -- the traditional focus of post-occupancy evaluation -- but also include extensive monitoring and analysis of energy usage, thermal performance, ventilation, illumination and other factors (Public Works Canada, 1983). Clients may also want evaluators to focus on a specific issue such as the effectiveness of an innovative lighting system in an office setting (Wineman, 1981) or wayfinding and orientation in health care facilities (Carpman, Grant, and Simmons, 1984). Significance of the issues to be investigated has come from the perceptions of people making decisions about information systems and building designs rather than from theoretical interests of evaluators: issue-definition is "demand-driven" rather than "theory-driven".

METHODS

The quality of POE research (and of all applied research) can be assessed on the basis of two general categories: **utility** and **validity**. These are interrelated but separable. Utility is related to the fit between research questions and research output and the needs of information users. It is involved with questions such as: Are the issues addressed the ones that information users perceive to be most important? Are results presented in a useful way? Are the format, language, level of detail, and the like appropriate? As we have suggested above, evaluators have attempted to address utility problems, in part, by including the client in the research process. Evaluators face a dilemma however, when attempting to increase validity.

The Role Of Participation In Increasing Validity

Methodologically, many POE studies borrow from participatory methods used in organizational development in addition to the more traditional emphasis on methods from environmental psychology and survey research. For example, the evaluation program initiated at the New Zealand Ministry of Works and Development is based on a series of touring interviews and workshops with building users rather than on observation of occupant behavior, questionnaires or exhaustive physical measurements (Shibley, 1985). A major benefit of the program is thought to be in enabling users to confront the different perspectives on building performance held by their fellow users and to achieve consensus on future decisions (Shibley, 1985).

Another successful participatory method is the involvement of an advisory task force. A task force is an appointed group of persons with a vested interest in the evaluation being conducted, including members of the client organization, the architect or design team, building occupants (if different from the client organization), and even, in the case of Federal/State owned property, appropriate government officials. At the outset of the POE project a series of workshops is held with task force members to identify and clarify their particular needs with respect to the evaluation. The task force then serves an advisory role throughout the project, providing structured feedback to the evaluation team at key points in the process.

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There appear to be several motivations for the use of participatory methods in POE. Participation by decision-makers, users and others helps to ensure that their greatest concerns are addressed in the POE and assists evaluators in checking their preliminary conclusions with people who are familiar with the setting being evaluated. Such participation serves both as input to and output from the project and leads the client to feel a real sense of involvement in the process. However, some writers, such as Shibley and Schneekloth (this issue), go beyond the immediate instrumental value of participation and suggest that participation is valuable for its own sake since it increases the knowledge and power of participants.

A Methodological Dilemma In Approaching Validity

The second aspect of research quality, validity, has a long and complex history in the social sciences. This discussion is particularly influenced by the work of Campbell and his colleagues (see, for example, Cook and Campbell, 1979; Webb, et al., 1981) and of McGrath (McGrath, 1981; McGrath, Martin and Kulka, 1981). Although terminology varies, most discussions of validity discriminate between three general goals for research: 1) The desire to make the study as applicable as possible to a given setting, with all of the complexities of that system -- called **contextual realism;** 2) The desire to make the study as broadly applicable as possible to different users, settings or situations -- called **generality;** and 3) The desire to establish relationships between two variables that are as well defined as possible by reducing randomness and eliminating alternative explanations -- called **precision.**

McGrath (1981) suggests that these three goals are, in fact, mutually exclusive and that by maximizing validity on one goal you must minimize it for the other two. The strategy most common to POE, field studies, tends to maximize contextual realism yet minimize the other two because field studies are open to all of the unique influences in a given setting. By contrast, in a controlled POE of different work station designs one may want to hold the task performed constant or have workers perform a standard range of tasks. The problem is that control necessarily limits the contextual realism of a study (one attempts intentionally to limit the impact of unique problems faced in the setting) and reduces generality (that is, through control, one is consciously limiting the users or situations to which one can generalize). McGrath (1981) refers to this problem as the "three-horned dilemma": by avoiding one horn one inevitably impales oneself on the other two.

DESIGNING POES TO PROVIDE USEFUL INFORMATION

This discussion suggests there is no "best" solution for POE, only the com-promise that fits the intended information use. In POE there appear to be five primary intended uses of research results:

- 1. **Fitting out and fine-tuning.** An evaluation of a setting shortly after occupancy or after organizational change may point out correctable aspects of the **physical setting** such as an unbalanced heating, ventilating and air conditioning (HVAC) system or confusing signage; it may reveal addressable **management** issues such as communications problems caused by departments being physically split; and it may suggest changes in **maintenance procedures.**

- 2. **Planning,Programming, and Design.** Many POEs are primarily con-cerned with providing information as input into a specific, known project. For example, Davis and Szigeti (1986), in discussions of their 20 years of programming experience, report that they always begin a programming process by conducting an evaluation. Carpman, Grant and Simmons (1986) used a variety of simulation techniques in their environ-ment-behavior research work for the University of Michigan Replace-ment Hospital Program.

- 3. **Concept generation.** POEs may be intended to identify the key con-cepts and issues that are important in a setting as input into future set-tings of the same type. For example two of the authors (Zimring and Wineman) are working with the California Department of Corrections and the capital expenditure management firm Kitchell CEM to develop an evaluation program to study prototype building elements such as standard housing units that are expected to be used in a series of prisons over the next ten years. This work has pointed out the importance of facilitating communication between officers and inmates.

- 4. **Codes, standards, guidelines.** Some POEs are concerned with developing information that will eventually affect codes, standards and guidelines. For example, Kitchell CEM is also concerned with questions that will effect the New Prison Policy Standards, such as the maximum temperature that should be allowed in prisons. Answers to this question

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may come, in fact, from POEs that examine the impact of varying temperatures on prison violence, operating procedures and operating costs.

- 5. **Basic environment-behavior information.** POEs may be used to answer basic environment-behavior questions such as "What is the role of personal control in the workplace?" or "What are the concerns of occupants of HUD-assisted housing?" These studies may have further practical implications, but their primary objective is to address an environment-behavior question for its own sake, rather than for the specific uses described above.

Whereas POEs may address more than one of the above uses -- and in fact Shibley (1985) has suggested that studies should intentionally address multiple uses to make them more cost- effective and useful to sponsors -- different validity goals are paramount for different uses. Figure 1 illustrates this point. Fine tuning and programming studies usually attempt to maximize their contextual reality, because they tend to be focused on a single setting. Evaluators performing fine tuning studies are typically less concerned with precision (that is, unambiguous cause-effect relationships) because they often deal with fairly specific problems rather than more general problems or ones of cause and effect. In contrast, studies directed at refining codes, standards and guidelines attempt to maximize generality but are typically less concerned with capturing all of the contextual complexity of a given setting.

The discussion above has a number of implications for the decisions an evaluator and client must make about a POE. Several decisions seem particularly important:

- 1. **The role of the client in the POE.** Participation by the client and openness of the evaluator to the needs of the client, all things being equal, tend to increase the utility of a POE. They may also introduce bias into the study by increasing pressure on the researcher or by making study participants aware of possible alternative outcomes before data are collected and analyzed.

- 2. **Research strategy to be employed.** In situations where choice is possible between field studies, simulations, field surveys, and the like, the choice should be made so as to maximize the validity goal most important for information use: a fine-tuning POE should be a field study; a code-oriented study may utilize sample surveys.

- 3. **Research designs and plans to be used in carrying out studies.** Choices about numbers of settings and participants, what variables to control and other related questions should also reflect validity goals. For example, studies where "precision" is important typically attempt to maximize the number of observations in a single "cell" (settings, groups, etc., that are considered similar for the purposes of the study), and reduce the number of variables addressed. Studies high on "contextual realism" attempt to maximize the number of variables in order to capture the complexity of a given setting.

- 4. **Methods or research techniques.** Since much has been said about POE methods elsewhere (see for example Michelson, Bechtel and Marans, 1986; Zimring, 1986), it is perhaps sufficient to reiterate that validity goals need to be considered in choice and design of methods. Methods where the evaluator controls categories for participants and responses (such as a standardized questionnaire with fixed choices) tend to support "precision" goals; other methods such as touring interviews tend to better support "contextual realism" goals. However, because of inherent problems no single method is perfect or even adequate; most evaluators use multiple methods to gain "convergent validity" where the strengths of one technique compensate for the weaknesses of others.

- 5. **Cost.** Regardless of evaluators' desires for careful research designs and large samples, the client's available budget may be the most critical factor in shaping a POE, and in determining whether it is commissioned at all. Evaluators may need to present clients with several POE options, each with its associated price tag and implications for utility and validity.

SUMMARY

Post-occupancy evaluation is undergoing a major shift. Whereas until recently this methodological area has been dominated by questions and approaches directly adopted from the social sciences, the evaluators are increas-

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ingly focusing on satisfying the needs of evaluation clients, and especially decision-makers within large organizations. This change has caused evaluators to re-examine the fit between research questions and methods and the client's information uses.

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