MAXIMIZING COST BENEFITS OF POST-CONSTRUCTION EVALUATION

Edward R. Ostrander, Ph.D.
Bettye Rose Connell, M.S.

Department of Design and
Environmental Analysis
New York State College of Human Ecology
Cornell University
Ithaca, New York

ABSTRACT

Every field has its catch phrases and in terms that are used though the term is ambiguous in meaning. The widespread use of the phrase post-construction evaluation is a current example in the man-environment field. This process is approached here as being most valuable when it is utilized as a means for decision-makers to learn from past experiences. Given the belief that the decision-maker's involvement is a necessary part of post-construction evaluation as applied research, three models are presented and analyzed in terms of their potential to generate beneficial feedback to decision-makers. Suggestions are given for courses of action to bridge the applicability gap.

1. INTRODUCTION

Post-construction evaluation appears to be a form of man-environment research that bridges the applicability gap. This process can best be described as a type of applied research which is an integral part of a larger decision-making process.

This paper addresses two issues. The first argues that the major value of post-construction evaluation is to utilize the research findings as a basis for learning through feedback not as an accountability index. The second is to describe and discuss three evaluation research models that generate feedback of varying degrees of applicability.

2. EVALUATION: LEARNING EXPERIENCE VS ACCOUNTABILITY

Two opposing philosophies underlie the use of evaluation. It can be used as an accountability index or as a means of learning from past experience. When evaluation is used to determine performance level or to judge quality, it is usually perceived of as a threatening activity. Evaluation in the context of the built environment normally called "post-construction evaluation", should focus on some aspect of the performance of a building in relation to a set of criteria. Too often evaluation research reports take the form of a catalogue of design mistakes without a clarifying context. Therefore, post-construction evaluation often poses a threat to the architect's and client's professional reputations because of its dollar and cent implications. In this context, it is understandable why so few professionals are interested in having their buildings evaluated. Given that reality, it is not surprising that practitioners view researcher's requests to study their buildings with caution.

If post-construction evaluation research is to be welcomed by practitioners, it must be executed in a non-threatening way and result in a product that is truly of value to the designer and client.

A realistic solution to this problem appears in the notion that Studer (1972) and Brill (1974) advanced when they equated a building with an "experiment". The scientific experiment is a means of creating a controlled situation that reveals to the researcher the relationship between the variables he has manipulated. Each time he carries out an experiment he learns something about the relationship between these variables. Through this cyclical process of alternation and replication, he gains a fuller understanding of the phenomenon under study. A single architectural experiment (or one building) when evaluated, may not tell the architect very much, but a series of experiments (involving a number of buildings) constitutes a learning system that offers both useful feedback and a sense of what direction to take next.

3. PUTTING EVALUATION IN PERSPECTIVE

If one views evaluation as having a definite end which is reached upon completion of judgment, he has rejected the more constructive use of evaluation. Brill (1974) described the two basic aspects of building evaluation to be: 1) gaining information about the usefulness of buildings and 2) using that information in the design and use of new buildings (p. 316). To paraphrase Brill, evaluation is a two-part process which involves making the assessment and transmit the findings from the assessment in a constructive form to decision-makers. An integral aspect of post-construction evaluation is this recycling or feeding back of information from the evaluation activity to the decision-makers so they can use it in future problem-solving. Post-construction evaluation offers a promising means for the design professions to systematically build upon past experience to improve their product.

To develop this perspective of evaluation as a contributor to learning, we must recognize several assumptions that underlie the rationale.

1. For post-construction evaluation to contribute to a learning system the design process is assumed to be open-ended and circular so that past experience in one project will feed into new projects of a similar nature.

2. Post-construction evaluation is an integral part of the design decision-making process, and not an independent activity.

3. For post construction evaluation to produce meaningful and useful feedback, the researcher must: 1) look at the total decision-making process; not just the results of the process and 2) utilize evaluative criteria that reflect issues which served as requirements during decision-making.

Landscape architect, Al Rutledge (1975) has expressed the relationship among these factors as follows.

...design has most often been looked upon as a linear process which expires upon execution of the construction contract. Whereas in reality, the end is not an absolute. It is only a place where the beholder has chosen to put his punctuation mark. Toward enhancing the fit between humans and their built environment, a circular process deserves consideration one without periods, only commas, a continuum of assumptions re-assessed, new assumptions made, ad infinitum. The place of post-construction evaluation in that model is self-evident. (p. 67)

4. MODELS FOR POST-CONSTRUCTION EVALUATION

If post-construction evaluation research is to provide relevant feedback that designers, researchers and clients can learn from, we must closely examine the model that guides the research. The three models presented below vary in their cost benefit potential for providing useful feedback to decision-makers. The models describe representative points on a continuum of post-construction evaluation research studies.

5. MODEL 1: NON-COLLABORATIVE EMPLOYING A CROSS SECTIONAL USER STUDY

This approach may not constitute a valid case of post-construction evaluation because, though the data is collected at some time after construction in the occupancy life of the building, the researcher uses criteria that are established independent of the design process and they do not focus on concerns that were influential during decision-making. The basic decisions governing the research focus are made by the researcher. It is identified as a cross-sectional study. In research terms this means the study does not encompass the extended period of time that preceded the occupancy of the building. Rather, it cuts across a slice of time to study the current users. This model represents a majority of the user satisfaction building evaluations that currently exist. It can be characterized as follows.

5.1 Participants

The researcher controls the decisions pertaining to research direction, focus and methods. Designers and clients are not participants in this model. Only the users are approached in the course of evaluating the building.

5.2 Site

The environmental setting or research site is selected solely by the researcher. The choice is frequently dictated by availability, accessibility to users and convenience.

5.3 Time

The cross-sectional research design involves data collection representing conditions at a point in time. This model requires that data is gathered on current user behavior and attitudes. It does not attempt to go back in time to learn what the client's and architect's understanding of user requirements were at the time the building was being designed.

5.4 Evaluation Criteria

The evaluation criteria are based on behavioral issues that the researcher selects to be the focus of the research. These criteria are established independent of the design and/or client decision-making process. They may or may not reflect the critical issues that shaped this process.

5.5 Contextual Constraints

The evaluation usually does not explore the impact of code requirements, financial constraints, client's demands, architect's experience and a host of other "given" factors that influenced the final design. Disciplinary ethnocentrism appears to be a valid criticism of this approach.

A qualitative appraisal of the potential cost benefits this model offers for feedback to designers, researchers and decision makers reveals several points. The evaluation model has very limited potential payoff when viewed in the context of the larger decision-making process that produced the space. It personifies evaluation carried out as an accountability measure. While this kind of feedback might seem useful to those who judge the performance of designers and other decision-makers, it can produce information that is both misleading and biased. It may focus the evaluation and base conclusions on issues and dimensions that were guided by a different set of priorities than the original decision makers used. In addition, it is doubtful that the findings of Model 1 research would be directed to those bodies charged with monitoring accountability unless

the researcher was hired for that purpose. Rather, the research reports are likely to be made public only through professional journals and read only by the researcher's peer group.

The researcher will be the only party to benefit directly from this research. Indirectly, the academic research community may be affected through new knowledge on theory and methods. The designers and clients responsible for creating the building are so unlikely to see the research report and any benefit that might accrue to them is so slight that it may as well be discounted altogether.

6. MODEl 2: COLLABORATIVE, EMPLOYING A CROSS-SECTIONAL USER STUDY

This model of post-construction evaluation utilizes two data collection approaches to determine decision-makers' criteria and user reactions. First, discussions with the architect and client are held to identify the major issues, goals and constraints that influenced the design decision-making. Second, a cross-sectional study with users is done to determine how the building is working relative to these decision-makers' concerns. This strategy introduces collaboration and expands the potential value of the research findings as feedback. This model may be characterized as follows.

6.1. Participants

This is a collaborative undertaking. Participation would have to involve at least the architect and the researcher. It would be desirable to also have the client involved.

6.2. Site

The site is selected by mutual agreement between the client, architect and researcher. The cost in time and money will play a role in this decision. The architect and client may select one site over another for reasons of the building's unique design features or because of similar projects they are planning.

6.3. Time

The two phase data collection permits the current users' behavior to be put in context. The approach tries to relate that behavior to the behavioral requirements (as they were understood) that guided the design. This client-designer perspective will help to generate more meaningful questions about current user behavior requirements.

6.4. Evaluative Criteria

In this model, the criteria are necessarily articulated after the decision-making process has been carried out. These criteria, however, reflect issues that were of concern to architect and client during the decision-making process. The collaborators work out the number and priorities of the issues to be covered.

6.5. Contextual Constraints

In this case the evaluation centers on user behavior in relation to design-relevant issues. The influence of codes, financial considerations, client demands, etc. are clearly taken into consideration.

The cost benefit potential for Model 2 is much greater than for Model 1. Costs in this model revolve around time needed for the participants to produce reliable information about the decisions they made at an earlier date. Experience and planning can reduce the participants' time involvement. An acknowledged weak link in this approach involves the reliability questions introduced by retrieving decision information from memory and old files. There is little that can be done to insure that retrieved information is a realistic representation of the actual decision-making process. Zeisel (1974) has noted that a problem of 'rationalizing' by decision-makers might occur.

This model has a pronounced advantage over Model 1 in that the criteria are based on the decision-makers' concerns. This situation links the evaluation process to the broader decision-making process. In addition, because the evaluative criteria reflect the decision-makers' concerns, the feedback, if presented in a format that decision-makers can understand, should be non-threatening and readily applied.

7. MODEL 3: COLLABORATIVE, EMPLOYING A LONGITUDINAL AND CROSS-SECTIONAL APPROACH

This approach to post-construction evaluation is the most comprehensive and complex. It includes a longitudinal data collecting effort and a close working relationship between the architect, client and research once the decision to build has been made. The researcher becomes a participant observer in the actual design and decision-making process. This model is characterized by:

7.1. Participants

Architect, researcher and client will all be active parties in the early stages. The researcher will be the primary figure during post-occupancy data collecting with the users as in the first two models.

7.2. Site

An appropriate project in which the parties are willing to collaborate will probably dictate the choice of sites. Available funding for the research may be another major determiner of the site choice.

7.3. Time

This approach will require considerable time on the part of the researcher in the pre-construction stages. This longitudinal monitoring can be expected to extend over a number of months as programming, schematic design and design development phases are worked through. The post-occupancy data collecting will follow building occupancy by six to eighteen months. A three to ten year time span may be involved.

7.4. Evaluative Criteria

The evaluative criteria are based on the user behavioral requirements as defined in the program.

7.5. Contextual Constraints

All of the constraints that emerged during the design process, construction and occupancy will be documented for use during the evaluation.

The appraisal of cost benefits for this model will be quite speculative. We do not have even the meager fund of experience to draw on for this "ideal" model that we had for the other two models.

The research effort demanded by Model 3 will extend over a period of years. Therefore, it will be potentially the most expensive approach. The researcher's time involvement necessary to work through this model far exceeds his commitments in the other two models though the periods of maximum intensity are few in number and of limited duration (i.e. programming, schematics design phase and evaluation). The time commitments of other participants would not be proportionately inflated because much of the architect-client exchange would have to be carried out in any case.

Some additional time would be involved as the researcher posed questions to clarify decisions or introduced user issues that otherwise might not have come up.

The benefits would seem to parallel the expanded scope of the research undertaking. Increased understanding of the process of collaboration, programming, and design decision-making would grow out of this effort. It seems not so unrealistic to anticipate increased efficiency in those matters (Ostrander and Groom 1975, Williams and Ostrander 1975). The design relevance of the user feedback should be much greater than would be produced in either of the earlier models. Finally, experience in developing and operating a learning system for design decision-making may be the major return on the application of this model.

7.6 Some Final Thoughts on Cost Benefits

Realistically, the clients and architects who stand to benefit most from systematic post-construction evaluation research as an integral part of their design decision making fall into identifiable categories. In the case of the architect it is the one who specializes in a building type (i.e. housing, offices, schools) who can feed back information into his new projects from an evaluation of an earlier one. A client that maintains a large, on-going building program (i.e. hotel chain, government agency) has the most to gain from involvement in post-construction evaluation.

At the moment, the question of who supports the research undertaking is one that has not been saitsfactorily answered. With so little tangible evidence in hand that money can be saved by learning from post-construction evaluation, both clients and architects are reluctant financial contributors. Some designers (Ostrander and Groom 1975; Williams and Ostrander 1975; Connell 1975) have found that financial and time commitments to collaborative research have enough payoff to offset the cost. Perhaps these small scale efforts will serve as first steps toward foundation or federal funding to underwrite the research activity on case studies of sufficient size to produce some meaningful conclusions.

8. PROFESSIONAL ACTION TO IMPLEMENT MODELS

Post-construction evaluation has been discussed in this paper as a type of research that holds potential for closing the applicability gap. If we have accurately appraised the current situation, there appears to be several courses of action that might be initiated by researchers, designers and clients who are interested in using research to aid in their decision-making.

8.1. Researchers

1. Develop and test conceptual models which incorporate post-construction evaluation as a learning system.

2. Develop reliable and valid data collecting tools and procedures that enable researchers to provide quick and efficient user feedback.

3. Carry out exploratory case studies at interior space planning and small building scale that allow fast turn around time and require small financial outlays to demonstrate the cost benefit potential of post-construction evaluation. (Williams and Ostrander 1975; Connell 1975).

8.2. Designers

1. Find an opportunity to collaborate with a behavioral researcher on a small scale project.

2. Make presentations describing personal collaboration with researchers to other design professionals reporting your cost benefit experiences.

3. Urge professional organizations to encourage and financially support collaborative research.

8.3. Clients, Owners and Agencies

1. Request designers and researchers to offer alternative design solutions that address user behavior patterns and concerns.

2. Support projects that use collaborative research as a basis for design-decisions.

To bridge the applicability gap it will take more than written and spoken exhortations by academicians and practitioners. The potential collaborators are going to have to seek each other out and accept the risk that working together in order to learn from each other involves. Are there any takers?

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