

# Occupancy Research and Evidence-Based Design

By Steven J. Orfield

In the field of designing medical facilities, clients are increasingly looking for results that are outcome-based. The former model of the hospital as a production facility has not been lost, but the evaluation of patient outcome and staff retention has created an era of greater focus on the patient and staff environment. Overall design is going upstream, but problems persist. It is true that the vast majority of medical facilities are designed and built without performance standards. They may have prescriptive design standards that are thought to represent good practice, and they may have energy and sustainability standards. But they have no building performance standards for those issues that elicit the vast majority of complaints in a facility (i.e., acoustics, lighting, daylighting, thermal comfort, indoor air quality).

Additionally, while the designs are often perceived as higher in quality, there is no real patient or staff measurement of a proposed design or of the results of its application, with the exception of the notorious opinion surveys and focus groups and design charrettes that have been known for more than 30 years to be invalid tools for predicting behavioral response. Thus, in the 2000s, we are still designing facilities based on intuition and repetition and in which more than 50 percent of what will be produced in plans and specifications is already on the hard drive before the project is undertaken. We continue to be very good at production but not so good at design.

## Why Research?

While it has been clear for some time that the principal cost of a workplace operation is the cost of employees (up to 95 percent), there has been very little in design that focuses on that fact. It is clear that a 5 percent savings on occupants, based on either HR values or other productivity indicators, will often pay the entire nontechnology cost of a medical facility,

but the facilities community is still focused on other issues, such as energy and sustainability, as well as cost savings. There is still no clear perception that the focus of design must be the occupant and that occupancy research offers the most fertile field for real and significant savings in the organizational equation of a medical project. And it is often not clear to the client/design team that occupancy research is about human comfort and about human preference, both of which cannot be measured by self-report or surveys. Thus, we need to more fully understand building performance, design research and occupancy research.

## Building Performance

One of the premises of occupancy research is that a good building can be built within a reasonable budget and with high-quality performance if the intention is clear. This movement toward defining building performance on projects and insisting on its attainment has a long history, but it is not often employed on modern buildings, because facilities groups don't understand how to execute it and design teams generally don't want to be bound by performance standards. As a result, most new and renovated medical buildings have no significant building performance standards and have measurably poorer performance than their costs would justify. Increasingly, executives and facility departments are becoming disenchanted with their relationships with non-performance-based architects and designers, and as a result, they are calling in their own experts for second opinions.

We have had a number of experiences in the past few years in which executives called at groundbreaking to ask for a second look at the design. In their phone calls, they generally express skepticism regarding recommendations they are receiving from design teams and they want to correct approaches they consider unclear and possibly erroneous. These clients

are beginning to view design decisions in terms of measurable targets and results and are looking increasingly at the potential for performance failure and other design errors. And errors are what they are finding. Stressing design over performance is no longer an acceptable option.

## Occupancy Research

Clients who are concerned about building performance also are beginning to recognize that the people-based costs in the company equation are up to 20 times the facilities costs and that they need to start evaluating the responses of occupants to environments to better control these costs. It has long been thought that design affects behavior, but very little good research has been done on specific aspects of design until quite recently. As the facilities team begins to look at occupant response, they must begin to understand that measuring occupant responses is different from the gathering of opinions about environments. They must have baseline studies on the population prior to new project occupancy, they must gather baseline data on building performance, and they must develop a hypothesis for change and benefit.

Many facilities groups and their design teams have experienced the distribution of a questionnaire about facility quality, but few understand that opinion-based research does not predict behavior and is often useless in understanding what is going on within a given population. It is far more important to use quantitative subjective test instruments that assess the quality of the facility, the work area, the organization, the work task and the level of compensation. This begins to provide a basis for understanding employee motivation and the probability of being influenced by specific types of benefits. There are a number of tools currently in place that provide simple and direct methods for addressing building performance standards and occupancy research.

## The Medical Facilities Working Group

Orfield Laboratories founded the Medical Facilities Working Group as part of the Open Plan Working Group in 2001, in conjunction with a series of sponsors, as a collaborative research consortium. The model of the group was to work with facility managers, designers and architects, researchers, executives, and suppliers to the field. Its focus is on moving the workplace field from a model of facilities as an expense to a model of facilities as a profit center. This is being done by developing substantive research on the worker as the focus of profitability. We have been involved in a number of medical projects, providing research to support these efforts.

## Certified Building Performance Measurement

Pre- and post-occupancy studies, when combined with a design hypothesis and performance goals, can serve to verify the success or failure of specific design strategies. These studies must include the physical measurement of building performance variables, including daylighting, lighting, acoustics, thermal environment, and human factors and ergonomics. They also must include the use of subjective survey instruments that assess occupant satisfaction with the work task, the work environment, the organization and the compensation structure of the job under evaluation.

One of the major problems of even well-done occupancy studies is the failure to standardize either objective or subjective information (data gathering). On the objective side, there are no standardized measurement systems that can accommodate the needed set of multimodal measurements. Orfield Labs has developed a custom system for this purpose. On the subjective side, most surveys are not comparable to each other and thus cannot be combined into database programs. Orfield Labs has developed a broadly based program of occupancy surveys, which has been validated in research.

## Visual Quality Measurement

Visual Quality jury testing is undertaken during the schematic and design development phases to predict the response of occupants to the design alternatives being offered by the design team. Normally, the occupants are invited into a programming discussion and opinions are requested. However, opinions are an unreliable indicator of future response. Instead, the Perceptual Occupant Programming measurement is an extremely reliable indicator of future response to the proposed environment. POP will test occupants on these types of issues:

- The overall building interior concepts
- The interior workstation concepts
- The public area and facade design concepts

This testing, which can include the public in part three, ensures that the building will provide a suitable space for occupant satisfaction.

## Summary

Unknown to most of the healthcare facilities community, there are both tools and methods in place to:

- Benchmark existing buildings and populations via subjective and objective measurement.
- Set standards for a new or renovated building based on state-of-the-art perceptually-based building performance standards.
- Measure potential designs with occupants to determine, prior to execution, if the design can be verified as a successful design.
- Ensure that the design process has representatives in the building performance and occupancy research fields.
- Verify that the final performance of the building complies with standards.
- Verify the satisfaction with occupants when compared to the prior facility.

We must take on these tools and practices so that we can move healthcare facilities into the forefront of the performance movement with its occupancy and economic benefits.



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## SELF-TEST — TRUE OR FALSE

QUIZ BOX

- 1 Occupancy research offers the most fertile field for real and significant savings on healthcare projects.
- 2 People-based costs in the company equation are up to 15 times the facilities costs.
- 3 One of the major problems of even well-done occupancy studies is the failure to standardize either objective or subjective information.
- 4 Visual Quality jury testing is undertaken during the schematic and design development phases of a project.
- 5 No tools exist to verify the satisfaction of occupants with a new facility.

Answers: 1. True 2. False 3. True 4. True 5. False

## HEALTH CARE COUNCIL OF IFMA

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