Post Occupancy Evaluation Practices: A Procedural Model for a Successful Feedback

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Abstract

Post occupancy evaluation (POE) refers to a systematic building performance feedback procedure conducted on occupied buildings. POE is invaluable for existing as well as future projects – it ensures that completed buildings operate efficiently throughout its expected life span, and serves as a crucial lessons learned feedback cycle for future buildings. The effectiveness of POE feedback cycle depends on its key procedural components namely the processes, the participants, and the documentation and dissemination instruments and technology. This paper reviews established POE practices to derive a POE procedural model. This procedural model is then used as the basis to assess the current POE practices in Malaysia through a case study. The paper concludes with observations on the current state of POE practices in Malaysia and recommendations for improvements.

Keywords: post occupancy evaluation, procedural model, procedural component
1. Introduction

Globally there are growing efforts to undertake performance studies of occupied buildings in response to the quest for more efficient buildings to meet sustainability challenges. The potential of building performance studies extend beyond the benefits for improvement to a specific building under investigation. It probe outcomes and make recommendations that open up opportunities to enable transfer of knowledge in future projects (Lackney, 2001; Zimring, 2002; Lu Aye et.al, 2004). An effective building performance study requires adoption of a systematic procedures and techniques, whereby the most commonly known is Post-Occupancy Evaluation (POE). POE is different from other evaluation methods in that it emphasises on the needs of building occupants (Preiser, 2005). The strength of POE therefore lies on its capacity to promote the carrying forward of knowledge through lessons learned and feedback. Past studies have established the importance of POEs as determinants to crucial performance factors relating to sustainability such as resource consumption, environmental conditions, and the occupant satisfaction and operator experiences. As a result there are firm calls to make POE a mandatory step in the design and commissioning of buildings (Preiser 2005; Isaac et al. 2009).

Malaysia is a developing country with a vision to be a fully developed nation by the year 2020. In its pursuit to be a developed nation, Malaysia has undergone unprecedented change in the last five decades in terms of economic, social and environment. The drive towards socio-economic progress has results in rapid change in the natural environment which if remain uncontrolled is likely to pose severe impact in the long run. Aware of this potential consequence, Malaysia has made its commitment towards sustainable development clear since 1996 in the 7th Malaysia Plan (Government of Malaysia 1996). Several efforts have been initiated to drive further the sustainable development agenda, with the most recent move is the introduction of the Green Building Index (GBI) - the country’s own rating system for green building.

This paper seeks to establish the current state and future directions of POE in Malaysia. It reviews literature on POE practices adopted by pioneers of POE and building performance studies, namely from the USA, Canada, UK, New Zealand and Australia, focusing on identifying the people-process-tools aspects of POE.

1.1 Aspects of post occupancy evaluation

There are various approaches to POE studies, which have been classified according to the intensity of the investigation (Presier, et. al., 1988), the targeted time frame of the benefits to be gained (Isaac et. al., 2009) and the study’s emphasis (Vischer, 2001).

The degree and extend of POE studies primarily depends on the necessity and purpose of the POE to meet either the short, medium or long term benefits, and the availability of fund. (Refer to Figure 1).
1.2 People aspect: initiators, commissioners, consultants and the respondents

The formulation and implementation of POE programmes require strong support from various groups. They comprise the project initiator, client, commissioner, the experts / consultants and industry consultants.

The initiator

Based on interviews conducted with key market actors Hewitt et al. (2005) concluded that the primary initiator of POE are the owners who are in the best position to motive and drive the POE agenda.

Involvement of universities, professional bodies and the industry

POE studies have mainly been supported by scholarly research activities conducted by academicians and their institutions. For example in the case of the development of the Association of University Directors of Estates (AUDE) Guide to Post Occupancy Evaluation 2005, the key parties involved are the University of Lincoln, University of Westminster, Higher Education Funding Council for England (HEFCE) and professional bodies namely Royal Institute of British Architects (RIBA) and Royal Institutions of Chartered Surveyors (RICS).

Government-related bodies as commissioners

Significant POE programmes are usually associated with and commissioned by large, government organizations and public property owners. For example the Department of General Services (State of California, USA), the General Service Administration and Public Works Canada and the New South Wales Health Department.
1.3 Process / protocols

POE process is often referred to in the literature as ‘protocol’. POE protocols are developed through a rigorous process of consultation with various groups of people. As explained by Carthey (2006) who developed the generic POE for healthcare buildings for Australia and New Zealand, involvement of representative cross-section of industry professionals and the building operation team is crucial. Documented protocols are in the form of POE Guidelines, while the main bulk is in the form of POE reports and published past POE experiences. Most of these are from the UK, Canada and the USA. Some of the prime protocols that have evolved are as follows:

1. The protocol that was an outcome from the PROBE (Post-Occupancy Review of Buildings and their Engineering) project that started in 1995 in the UK. The protocol was developed particular to examine workplaces.

2. The protocol developed by the Center for the Built Environment (CBE), University of California, Berkeley, USA used primarily in the Federal Facilities Council funded programmes, as well as for projects funded by the Cascadia Region Green Building Council.

3. The protocol used in the Post Occupancy Evaluation Project Phase 1 prepared by Keen Engineering, Canada.


5. The protocol developed for the New South Wales Health Facility, 2006.

1.4 Technologies and tools

A good performance study uses commonly agreed set of data collection and performance assessment tools. As argued by Carthey (2006), standardization in the data collection, data analysis and in the reporting is necessary to ensure the result is consistent.

Initially researches on the subject of building performance primarily focused on the socio-environmental discipline that includes the gathering of environmental data, resources consumption and occupants’ feedback. The evaluation tools combine multiple data sources that include occupant feedback, energy usage data and actual data measurements. Key environmental criteria used in POE studies include thermal comfort, visual comfort, daylight availability, air quality and operational energy index. Nowadays the concern for building performance studies are shared by researchers from the field of facilities management – a major discipline in the procurement and management of buildings that has emerged in the last decade. It can be observed that the POE goals and approach from this view point can be different. This suggests that while it is important for POE tools to be
consistent, it is also crucial that the generic POE programme is kept flexible to be adapted for varying project nature.

The main tools used for POE can be grouped according to its purpose, as discussed in the following paragraphs:

1.4.1 Occupant survey

Occupant survey is the essence of POE. There are several occupant survey instruments that have evolved through time. Example of established POE survey instruments are:

Outcome from the PROBE project

Since its introduction, the developer of the PROBE questionnaire has simplified the questions so as to make the exercise less taxing and could be carried out in a period of 4 to 10 minutes (20 questions, in 2-page length). Respondents are required to answer according to a 7 point scale.

Survey developed by the Center for Built Environment at UC-Berkeley (CBE)

The survey seeks for information on topics that cover on – general respondent’s profile, their satisfaction on specific building features, the workstation layout, visual condition, privacy, office furnishings, thermal comfort, air quality, lighting, acoustic, cleanliness and maintenance and cleaning services. This survey form is used in Canada and for projects funded by the Cascadia Region Green Building Council.

1.4.2 Tools for benchmarking and measurement of performance

BREEAM (BRE’s Environmental Assessment Method) is an environmental assessment tool for buildings. BREEAM has been used as the benchmarking tool for recent POE studies conducted in the UK. The tool covers a wide range of environmental issues namely the management, health and well being, energy, transport, water, materials, land use and ecology, and pollution.

Another instrument introduced in POE studies in the UK is the Design Quality Method (DQM). In the past, this method has been adopted for assessment of educational buildings and is familiar amongst the auditing bodies in the UK. The results of the evaluation are produced in the form of a ‘balanced scorecard’ that measures the whole performance of building. The method combines expert opinion, professional judgement, user opinion, and scientific measurement (eg. lighting levels, air quality and acoustics etc).
2. POE practices in Malaysia: case study the ministry of health (MOH)

Initial governmental effort to implement POE programme in Malaysia can be traced back to the Ministry of Health (MOH), and this will serve as a case study in this paper.

Published literature on Malaysian based building performance studies that meets the merits of a POE programme as described earlier are few. Research by Natasha Khalil and Abdul Hadi Nawawi (2008) focuses on office buildings that observe the functional and technical aspects of the facilities, and did not cover the environmental baseline information.

2.1 Malaysian healthcare industry

The Malaysian healthcare industry has been growing at a pace comparable with the Malaysian sunrise industries such as telecommunication, biotechnology and Information Technology (IT). It also has been characterized as a strong public sector component (Barrowclough, 2000). A research report by Frost & Sullivan (2009) observed: “Malaysia healthcare industry in 2009 is expected to grow at 8 percent and is being supported by 13.7 billion budgets (RM 13 billion in 2008). There is a continuous challenge for the sector to provide better service to the public. As articulated in Thrust Four of the Ninth Malaysian Plan, the Malaysian Government maintains adopts a policy that supports continuous improvement of standard, quality and sustainability of life. Healthcare is seen as a main vehicle to achieve this objective, through provision of good service quality and facilities for the public.

Post Occupancy Evaluation in the Ministry of Health was initiated in 1997, developed in collaboration with the Medical and Health Branch of the Public Work Department (PWD). This collaboration team, called the Evaluation Unit has so far conducted 9 structured POE of MOH hospitals, one POE of rural health clinic and 3 private hospitals. The results of the evaluation were used in the mid-term review of the Seventh Malaysia Plan (1997) and preparation of the Eight Malaysia Plan (2001-2005). The last POE conducted was in 2002. The main objectives of the POE conducted by MOH then are as follows (Malaysia Health, 2002):

1. To evaluate the capacity of the completed project to meet “project specifications” with regard to scope, quality, cost and time. The specifications are described in the project brief and master plan, and include situational analysis, development control plan and design brief.
2. To evaluate the performance of the “as-built” facility in meeting current requirements
3. To establish the changes (if any) that would need to be made to the original assumptions and requirements, to meet current needs.
4. To prepare recommendations for modification, guidance in planning and developing new medical facilities and for future development of the medical facility that has been evaluated.
2.2 Methodology of MOH's post occupancy evaluation

The methodology of POE conducted by MOH was adapted from various sources namely, the Medical Architecture Research Unit (MARU) UK, POE of Frankston Hospital, Australia, the University of New South Wales, Australia, Public Work Department (PWD) Australia and Malaysia and previous POE conducted by MOH. Most POEs conducted by MOH were at indicative and investigative levels, as both approaches are comparatively inexpensive, less complicated and time consuming.

![Image of stages of POE process for MOH, Malaysia](Malaysia Health, 2002)

Figure 2: Stages of POE process for MOH, Malaysia (Malaysia Health, 2002)

3. Discussion

3.1 The state of POE practices in Malaysia

Evaluation on occupants’ satisfaction and perception on how their building performs are regarded as the cornerstones for the continuous improvement in building procurement (Baird, 2003). Performance evaluation is aimed at gaining knowledge about buildings as to whether people are satisfied with the building, and the manners that people actually respond and use them. The benefits are to those who use the buildings as well as those involved in their creation and operation. Lessons learned from these studies could be fed back to the designers.

In Malaysia POE programme initiated at MOH have not evolved since its introduction in 1997, not evolved as tin the comprehensive sense can be considered as a relatively new area that have not been significantly explored. The available programmes focus on specific area of interest that incline to
towards generating measured environmental and services performance data, or occupant responses and satisfaction.

### 3.2 Feedback elements of POE

POE offers what Bordass et al. (2006) termed as hindsight feedback, whereby a completed project is assessed in terms of how well it performs in meeting its intended purpose and objectives. However, many have observed that detailed information on building performance rarely comes back to the design and development teams (Keen Engineering, 2006) remain a theory. There are salient practices that could be learned from the literature in terms of approaches to exploit the full potential of POE implementation and feedback as follows:

#### People issue

POE development requires strong back up in terms of expertise, commitment as well as funding. The process warrants participation and feedback from members of the building industry.

#### Process issue

Ideally we should target POE to become routine for buildings of certain scale and innovative nature in the near future. It is therefore important that it is incorporated as part of the building delivery procedure – identifying who to be responsible to perform the assessment, and fund allocated for.

#### Technological and Tools issue

POE tools need to be carefully developed. At the moment there are a few occupant survey forms suggested by individual researchers. The robustness of these tools need to be tested and enhanced if need be. At the moment there is no locally derived environmental assessment method to enable a consistent benchmarking process to take place. There is therefore a need for such research. Past POEs have mainly been conducted overseas, and the tools developed are based on foreign experiences. As aspects of human satisfaction for different countries are likely to vary due to the varying cultures and people’s attitude to the various aspect of the environment (Humphrey, 2005), the POE instruments developed in a particularly country, may not apply equally well for other countries.

In the case of the MOH’s POE procedures, the following practices that are not in line with practices suggested in the literature were observed:

#### People issue

The purpose of POE needs to be clearly made known to the people who administer and manage the process for it to be effective. Based on the study interviews, there appears to be unfamiliarity amongst the core participating parties on the feedback potential of POE programmes and its mechanisms.
Protocol issue

The MOH POE protocol suggests that the baseline data were collected at the last stage rather than upfront. POE protocol needs to be established at the start of the programme which would allow adjustment of instrumentations according to each project. In the case of the MOH, its POE protocol has not been reviewed since its introduction in 1997.

Technological/tools issue

Information gathered regarding occupant satisfaction appears to be randomly captured, mainly relying on informal feedback and complaints. In addition, no database system were created and made available to maintain and disseminate the information and findings from past POE studies.

4. Conclusion

In short, several MOH’s POE practices do not correspond with procedures suggested in the literature to ensure effective flow of feedback. Review on foreign experiences indicate that implementation of an effective POE that optimizes its feedback potential requires deployment of a systematic procedure and involvement of various organizations to initiate, commission and ensure the sustenance of an effective knowledge transfer. Currently POE appears to be a relatively new subject in Malaysia, familiar only to a limited group of researchers and practitioners. This paper highlights the need to introduce POE and familiarise key stakeholders on its feedback benefits and objectives. It also reveals the need for a concerted effort and support from commissioning bodies, research expertise and communities from the building industry to device a consistent and effective POE programme for various projects implemented in the country. POE efforts for varying building type and design approaches are most desired to materialize the Malaysian Government’s sustainable development agenda. Besides MOH’s POE programme, on the local scene documented POEs are few, covering only parts of the core assessment criteria. Also, in light of the recently introduced Malaysian GBI rating system, it is suggested that the POE procedure adopts this assessment tool which would make benchmarking of building performances in the country possible.

References


