

Prevalence of POE in UK Higher Education Institutions

Abstract

Purpose: To identify the extent to which POE is understood and applied within higher education institutions across the UK and to identify users' perceptions of its efficacy.

Design/Methodology: A mixed methodology was applied to this research. Part one consisted of an online survey intended to generate an overview of the extent of POE use across the sector. The second phase, intended to develop greater insight and understanding of users' perceptions of POE, relied upon in-depth interviews with a smaller sample drawn from those who had completed the survey in part one.

Findings: Differing models POE are used within higher education institutions with varying degrees of complexity. Models exist that are based on standard structures and templates, whilst entirely bespoke options have been developed by some institutions. The work found that there is a clear preference for applying bespoke methods rather than standardised ones.

Research limitations/implications: The research is based on a sample of Directors of Estates from UK Universities. The conclusions relate specifically to that sector and context. The extent for broader generalisation is limited by the research sample.

Practical implications: The work shows that POE is understood to have differing purpose and effectiveness in individual Universities. This leads to the conclusion that more coherent and consistent understanding should be promoted within the sector.

Social Implications: The work has implications for the effective management of university buildings to support user satisfaction.

Originality/Value: This paper indicates that there is prevalence of applying POE processes in higher education institutions and that specific models have been developed for the sector. However, the extent to which the process is valued and understood is highly variable.

Keywords: Higher Education, Post Occupancy Evaluation,

Paper Type: Research paper

Introduction

Post-occupancy evaluation (POE) is a well-established tool for the assessment and moderation of building performance (Cooper, 2001). The rationale behind POE is to consider the extent to which a building meets the needs of its end users, and also recognise ways in which design, performance and fitness for purpose can be improved (Vischer, 2001, 2009). It is generally accepted that building performance is associated with three broad aspects; firstly, the physical or technical nature of the building or space, secondly, the functional requirements of its specific use and thirdly, the behavioural aspects of the occupants (Best and De Valence, 1999; Williams, 2003). Traditionally, the intended outcome of the POE process has been an attempt to moderate the physical environment to match perceived user needs or to provide a knowledge base for informing future designs. The historic approach to the process has been to apply it to newly constructed buildings shortly after occupation. However, in recent years POE has evolved into a tool for tailoring building performance around changing user needs in existing buildings (Vischer, 2009).

Post-occupancy evaluation sits at the boundaries of technology and psychology. As a result much of the focus of building performance assessment within facilities management has related to

environmental psychology and evaluating building performance based on human perception. This has developed as a key subject area within facilities management (Becker, 1990; Belcher, 1997) and is considered to be one of the primary underpinnings of the POE process (Hawkins, 1998; Vischer, 2009). The effect of undertaking user perception analysis as part of a POE is interesting. Through a variety of case studies the positive benefit of soliciting user opinion has been illustrated (Bordass, Leaman, and Ruyssevelt, 2001). Experience suggests that there is a clear positive impact in simply undertaking the process (Revill, 1995). As Higher Education Institutions include numerous facilities which are used for different purposes, it appears to be a fertile area for research.

This paper will establish how POE is understood and the prevalence of its use in HEIs across the UK. The paper will also explore the experiences of HEIs that have implemented POE in order to support user satisfaction.

The Role of POE in HEIs

POE has been applied to a variety of building types with varying levels of success (Preiser, 1995). The majority of documented cases relate to commercial and educational buildings although there are also many examples in the fields of housing and municipal buildings. The application of POE within HEIs has become quite well established and has in some instances been deemed successful. (Hasanain, 2012) However it has also been considered problematic due to a lack of student engagement (Ramsden, 2011).

Watson (2003) published results on POEs that had been conducted on educational buildings in New Zealand, which included specific examples from technological centres and student accommodation. Walkthroughs and observations were conducted with a group of experts. The evaluations that followed produced very favourable results. The recommendations that were made ranged from access levels, good acoustic conditions and lighting in classrooms. The Ministry of Education commented that POE helped identify “a measurable link between building quality and educational outcomes, which is notoriously difficult to show” (Watson, 2003; p. 17). This quote reiterates that the opinions of users are needed so that appropriate decisions can be made in order to design high performing buildings, especially buildings which host an array of activities. (Prieser, 2002)

It is believed that POE is most valuable, as a tool, to those who are involved in continuous development of similar construction programmes or who have large estates which are to be remodelled (Preiser, 1995). The process involves a rigorous approach to the assessment of both the technological and anthropological elements of a building in use. It is a systematic process guided by research covering human needs, building performance and facilities management (McDougall, Kelly, Hinks and Bititci, 2002).

Established vs. Bespoke Methods

When considering POE there are two primary options available. The first option is to adopt the use of an existing model which has been established and used previously. Secondly, as Turpin-Brooks and Viccars (2006) suggested, a bespoke approach could be considered using a range of supporting data gathering techniques. In this context the term ‘bespoke’ is taken to mean tailor-made for a specific instance. The Higher Education Council for England (HEFCE) and the Association of University Directors of Estates (AUDE) (2006) created a guide outlining advantages and disadvantages of using established methods or creating a new method. This can be seen in table 1.

The adoption of suitable techniques to support the POE process is dependent upon a number of factors, which were proposed by Jaunzens, Cohen, Watson and Picton (2002):

- The level of detail required in any resulting report
- The level of information available to support an evaluation

- The amount of funding available balanced against the expected payback
- The skill levels of the people who will be undertaking the tasks
- The degree to which a problem has already been identified

The various ways of conducting POE range from questionnaires, focus groups/workshops, interviews or walkthroughs and observations of the space (Horgan and Sheridan, 1996; Turpin-Brooks and Viccars, 2006; British Council for Offices, 2007).

Table 1. Advantages and disadvantages of existing and bespoke POE methods

Existing Models	
Advantages	Disadvantages
Already tested Ready to use Backed up by rigorous research May offer benchmarking with other organisations in Higher Education sector Expertise available to administrator May be able to license use if method	May be a significant cost May not be suitable for specific situations Ownership of the data may not be yours Cost of experience to back up
Bespoke Methods	
Advantages	Disadvantages
Tailor to suit specific needs May cost less than established method Under your control	Time needed to set up Expertise needed May cost more than established methods

In an earlier summary by Riley, Kokkarinen and Pitt (2010), the most common POE techniques available were detailed. Although the review specifically highlighted two techniques which were designed for HE (AUDE and HEDQF), the authors did not discount the application of the other techniques, as these could be adapted to fit the aims of the specific building being assessed. Whilst there are numerous tools and established approaches to POE available, as summarised in Riley *et al.* (2010), a general view of some observers is that ‘one size does not fit all’; therefore, it is vital that the complexity of the building and people that use them are considered carefully when deciding an appropriate POE technique and model. Turpin-Brooks and Viccars (2006) proposed combining approaches to POE, as to better enhance the understanding of a building’s performance. Methods such as Soft Landings, which operate over the whole of the procurement cycle and on into aftercare are rarely adopted. (Bordass and Leaman 2005)

Watson’s (2003) study found that the POE process was able to identify a link between building quality and educational outcomes which has generally been found to be difficult to show. POE has also been cited as a method of identifying elements, or factors, pertinent to a comfortable environment within HEIs. These include visual, thermal, and acoustic considerations, privacy, way finding, as well as layout/space utilization and fire safety (Hassanain and Mudhei, 2006).

Methodology

The insight and knowledge developed from the literature review was supplemented by data aimed at assessing the level of understanding of POE within HEIs and the extent to which it has been applied. Part one of this research was to send out an electronic ‘landscaping’ questionnaire to 114 Directors of University Estates within HEFCE funded institutions in England and Wales to gauge the extent to which they were aware of POE and, if so, whether their experience had been positive,

negative or mixed. Directors of Estates (DOEs) were identified as key stakeholders within the process as POE is identified as a feature of good practice within the HEI Estates Strategies for which they are responsible (AUDE 2013). The questionnaire was refined prior to distribution based on pilot interviews with three selected Directors of Estates from representative HEIs, one participant was selected from each of the following: pre-1992 University, post-1992 University, non-University HEI. Following minor revisions the landscaping questionnaire was distributed to the 114 DOEs electronically. The purpose of the questionnaire was to identify the extent to which POE was being utilised within HEIs and the broad level of perceived success it was achieving. The outcome of this phase of the work was used to target respondents for the second phase, which involved semi-structured interview aimed at gaining richer, qualitative data.

The second round of data collection was implemented using semi-structured interviews with a smaller sample of those who had completed the questionnaire in part one. This was done to identify the extent of knowledge and understanding on the part of potential users of the purpose and process of POE and to gather data relating to their attitudes towards the process of POE and their perceptions of its importance and efficacy. The interviews were recorded and transcribed verbatim to allow detailed analysis of the responses to each of the questions that were posed. The number of interviews that were undertaken was limited and there was no intention to attempt to draw generalised conclusions from consideration of their content. The transcripts were reviewed and analysed to identify themes and trends relating to user satisfaction using NVIVO version 10. The emphasis of this part of the work was very much upon exploring perceptions of POE users and developing understanding of their views on the POE process. Hence, a qualitative approach to this phase was considered most appropriate.

Procedure and Results

Landscaping Questionnaires

Four questions were asked, based on 'yes/no/partially' response options, to assess the level of experience and satisfaction with the POE process, supported by one supplementary question to identify any specific POE model that had been used. The questions asked were:

Are you aware of the process of POE?	Yes/No
Have you undertaken major capital projects in the last 4 years?	Yes/No
Have you used POE in relation to a capital project(s)?	Yes/No
If yes; what model did you use?	
Did the process of POE deliver what you wanted from it?	Yes/No/Partially

The responses to these questions were used to formulate an overview of the current state of knowledge and application of POE within HEIs.

Of the initial 114 institutions included within the list, responses were received from 32, indicating a response rate of around 28%.

The responses indicated that those who returned the questionnaire fell in to four categories as follows:

- 4 institutions had not utilised POE on projects that had been undertaken
- 13 institutions had partially achieved what they had intended as outcomes of the POE with limited success.
- 12 institutions had achieved what they had intended as outcomes of the POE process.
- 3 institutions had conducted POE but had not achieved successful outcomes.

These four categories of respondents were used to develop a simple quadrant that formed the basis of selection of participants for the following stage, which involved semi-structured interviews. Three

respondents were selected from each quadrant for participation in the interview stage, giving a total of 12 interviews in total.

Supplementary commentary

The landscaping questionnaire was intended to provide the participants with the opportunity to give simple yes/no/partially responses to the main questions, with the capacity to define any models of POE that they had experience of in the supplementary question. However, several of the respondents went further and provided qualitative comments relating to their experiences in using POE and the nature of the models that they had applied. These elements of commentary provided a further component of analysis within the research that provided useful insight into the perceptions of project participants regarding the use and efficacy of the POE process.

Twenty-eight institutions had applied a variety of different models or approaches with varying degrees of perceived success.

These responses were reviewed to establish the degree to which the models identified could be considered as bespoke to a given institution or project and the degree to which the AUDE model or some other standardised model was applied. This is interpreted by the authors based on the context and nature of the specific commentary. In addition the extent to which the outcomes of the process were considered to have been successful in the eyes of those applying the POE was noted. Trends in responses indicated a relatively strong tendency towards the use of custom-made models of POE rather than the use of standardised models such as the AUDE approach. Seventeen of the respondents indicated that they adopted custom-made models for POE. It also illustrates that the use of the AUDE and other standard models is subject to amendment or hybridisation, with very few examples of the model being adopted without some form of amendment.

One of the key themes was the tendency to consider fully bespoke or hybrid solutions to be better suited to the requirements of institutions and specific projects. The comments provided suggested that in those institutions that had chosen fully bespoke solutions the decision was, in part, based on the view that the AUDE model and other standard models would not suit the needs of the institution. Several commentators went further to criticise the AUDE model directly in the context of cost and perceived complexity. One respondent also put forward the view that the process was not transparent and could result in actually concealing issues rather than exposing them.

'the HEFCE model prevents honest and open dialogue; in my view it can become a mutual appreciation society with the key issues swept under the carpet. It can be expensive, the use of a good facilitator is key'

However, this was a singular comment, which was not widely voiced. In general the benefits of doing POE were recognised but cost and users' perceptions of complexity were seen as inhibitors. The apparent preference for fully bespoke or custom-made models was linked to concerns that POE could be overly complex as well as costly to deliver. Several respondents cited the issue of simplicity as a key factor in their selection and application of an appropriate model. There was a strong linkage between perceived simplicity in application and perceived success of the selected model. There were several references to suitability for individual needs and fitness for purpose of the chosen model. These suggested a linkage between fitness for purpose and the avoidance of over complex approaches to the POE process.

'We used a very simple methodology..... We just had a very 'user based' methodology - at the end of the day, we just needed to know what the users felt, whether they considered it to be a usable building, and to take some lessons (good and bad) forward to future projects.'

Respondents commented, positively, about the perceived success of the model chosen in 13 instances. There were mixed or neutral comments that contained positive elements in a further 6 instances. Within these responses there were several factors that appeared to be significant in influencing perceptions of the success of the POE process. The most common factor that was identified in this regard was the process improvement resulting from the development of knowledge on one project feeding forward to subsequent projects. None of the respondents commented upon the benefit of POE as a tool for managing building performance in real-time; all positive comments related to either feed forward processes or benefits in stakeholder engagement in the design process.

‘... it gave us a lot of information to carry forward into next project’

There were also negative comments in 5 cases relating to the potential for applying the outcomes of the POE process in such a way as to liberate tangible benefits. There was a body of opinion that suggested that, whilst POE has clear and valuable benefits, it is difficult to liberate these due to the individual nature of each project or contextual situation. This was seen as both an inhibitor to the effective application of the process and as a driver towards the use of fully bespoke solutions rather than the adoption of the AUDE or other standardised model.

‘I always hoped POE would drive continual improvement of a completed building, however, quite often the process of passing capital project to an operational team means that lessons learnt through POE are not implemented.’

Clearly, the foregoing discussion raises questions regarding the level to which such models are considered to be appropriate or fit for purpose by their potential adopters.

Interviews

Twelve institutions that completed part one were selected for interviews, based on a simple quadrant analysis (3 from each quadrant) reflecting their overall experience and satisfaction level in use of POE.. Four of the questions asked, which are pertinent to this paper, were:

Question 1: What do you understand by the term post-occupancy evaluation?

Question 2: What POE models are you familiar with (if any)?

Question 3: What POE models have you applied within your current organisation?

Question 4: How would you describe the usefulness and validity of the information liberated from the POE process?

Additional questions were also explored within the interviews; however, they are not pertinent to the core theme of this paper.

Question 1: What do you understand by the term post-occupancy evaluation?

There was a degree of consistency in the responses to this question, with all three respondents articulating that their understanding of the term post-occupancy evaluation represented certain key themes. All of those questioned referred to the term ‘audit’ in defining the process of POE. There was a common view that the process of POE represented a systematic review or audit of the processes and procedures surrounding the delivery of capital projects and that this included an element of benchmarking or assessment against defined performance indicators. The comparison of actual performance relative to ‘best practice’ was cited by all three of the interviewees. This aligns with the conclusions of previously published work in this area (Riley *et al*, 2010; Turpin-Brookes and Viccars, 2006). However, there was less consistency in the views of those interviewed relative to the notion of user satisfaction, with only one of the interviewees considering the assessment of user satisfaction to be a key component of POE.

The interpretation of the interview commentary was that the assessment and benchmarking of the auditable elements of project delivery, such as time, cost and quality were perceived as being the factors that were subject to assessment through POE. The issues surrounding user satisfaction and real-time building performance management were recognised but were not prioritised highly by those interviewed during the pilot phase.

'My understanding of the term POE is the detailed analysis of completed construction projects. Normally I would expect to see data gathered about the experience of the building occupiers – whether or not they liked the building and whether they saw any major flaws or defects in its design.'

Question 2: What POE models are you familiar with (if any)?

All interviewees indicated that they were familiar with the concept of POE and the responses to initial interview questions supported this. There was a consistent ability to articulate the basis of POE through tailor-made models, although there was not a consistent use of the term POE. Two thirds of the respondents demonstrated knowledge of defined models that are in common use both within HEIs and beyond. They were aware of the AUDE/HEFCE model, although few had direct experience of its use.

'I know about the HEFCE model because it has been fairly well publicised in HE. I also know that others exist but I'm not sure about them in any detail'

The interviewees that indicated a broad awareness of the AUDE/HEFCE model displayed a good understanding of its structure and content despite limited experience in its application.

Question 3: What POE models have you applied within your current organisation?

There was varying experience in the application of the POE process between the interview participants. All of those interviewed displayed a degree of knowledge of the various models of POE that are available and are utilised within the HE sector. However, there was limited experience of the various models that are in common usage. Several of the interviewees indicated that they had experience of bespoke or tailor-made approaches but only a small number had applied the standardised AUDE model or other accepted generalised models

'At the University we are required to undertake POE using a variant of the AUDE/HEFCE model. The full model is way too complex so we adopt a sort of variable approach'

There was a consistent theme relating to the perceived complexity and scale of these models, with all of the commentators citing this as a negative feature. Whilst acknowledging the extent to which these models gathered data to allow detailed analysis, the interviewees considered that they actually went far beyond what was necessary. The perception was not that they were ineffective or inappropriate as tools for the evaluation of project and building performance, but rather that they were misaligned to the requirements of the individual institutions. Simplicity was noted by all participants as a key requirement for POE within their own settings.

Question 4: How would you describe the usefulness and validity of the information liberated from the POE process?

The responses to this question were linked to the particular POE models with which people were familiar and to the key drivers for the process within each of the institutions. All of those interviewed expressed reservations regarding the usefulness or impact of the outcomes of POE. Their comments in this regard were not directed at the lack of validity of the process in itself but rather the alignment of the process to their own specific needs. The earlier comments regarding

perceptions of excessive complexity of the models was reiterated in responding to this question along with comments from several of the interviewees to suggest that they were too costly.

'The AUDE model I'm not sure – we don't use it as it is first too big and complex – not to mention costly'

One of the participants expressed the view that the data was limited in its usefulness as a result of the lack of technical knowledge and understanding on the part of those questioned within the POE process.

'We would like to know that the end users are happy – but they generally don't have sufficient technical knowledge to make informed judgements.'

There was consistent recognition that the process of POE was potentially valuable and that the adoption of an appropriate model could add value. This was particularly recognised in the context of feeding lessons learned in to future projects rather than addressing real time performance issues within the building. There was a feeling amongst all of the respondents that the outcomes of the POE process could be very insightful and valuable, but that there was a tendency for them to be treated as archive or audit information, rather than performance enhancement tools. There was also a strong, consistent view that the process and its outcomes could be enhanced by making application simpler and more directly relevant to specific institutional and project contexts.

Discussion

In accordance with the literature, POE is recognised within the HE sector as valid tool for facilities performance assessment (Preiser, 1995; Cooper, 2001; Watson, 2003). Although the potential for POE to act as a tool for real-time building performance enhancement is recognised it is not seen as the primary purpose of the process. Vischer (2009) was of the opinion that designers and builders should use information gained from POEs in order to improve future buildings of a similar nature. With opinions such as this one, it is clear to see how some see the application of POE as informative for future design decisions rather than correcting performance issues in already existing buildings. Riley *et al* (2010) noted that particularly in refurbishment projects, the use of soft landings approach could be used, as in this way user satisfaction could be considered before work begins. Factors which have been identified to influence user satisfaction were visual, thermal, and acoustic considerations as well as privacy, way finding, and space utilization (Hassanain and Mudhei, 2006). Although previous research has stated that the evaluation of user satisfaction is a critical factor of POE (Becker, 1990; Belcher, 1997; Hawkins, 1998; Bordass *et al.*, 2001; Vischer, 2009), results from this study did not consider it to be of primary importance within the process.

This research identified that the use of POE is prevalent within English and Welsh HEFCE funded universities although the level of success in implementing the process has been mixed. The use of bespoke models or hybridised versions of existing models appeared to be favoured over standardised models. This could be because Directors of Estates are aware of the limitations of standardised models and do not see their objectives being met, therefore they opt to choose the strongest qualities of various models (Turpin-Brooks and Viccars, 2006). As a concept, POE has the potential to be beneficial for HEIs and other sectors. However, it appears that no consensus will be reached in the near future as to what model is the best, as each one is preferred by different institutions either due to complexity, cost or the aims of the building being evaluated.

Conclusions

The questionnaires established that approximately 38% of responding institutions had achieved their intended outcomes from the POE process. It was also concluded that there was awareness regarding POE processes among Directors of Estates, with a majority of them opting to customise a model to

suit the needs of their institution. In terms of experiences implementing a POE process, results were mixed. Some respondents had successfully implemented the model whereas others did not.

The interviews were aimed at assessing the broad perceptions of the purpose, usefulness and efficacy of POE within HEIs. Analysis of the interviews suggested that the way which POE is applied, the models adopted and the focus of their data collection and analysis is variable within HE. They also allowed the degree of satisfaction to be inferred with the outcomes of the process being mixed due to a combination of factors including cost of undertaking POE and lack of definitive conclusions arising from it. Although the number of these interviews was small and as such it is impossible to generalise from them. However, an explanation as to why there was a tendency to favour custom-made solutions when applying the process of POE was because standardised models or toolkits were perceived as overly complex or unsuitable for the needs of many institutions. Reservations were also clear with regard to the nature and usability of the data that is generated, with the quantitative data that is potentially liberated being subject to a degree of criticism.

The purpose of the process of POE was subject to some variation in interpretation and application with some commentators considering the evaluation of building performance in use to be the primary function. Others referred to the development of design improvement through feed forward loops, whilst there was also a view that the process was aimed at evaluating the performance of the design and project delivery processes. Each of these clearly drives the process of POE in different directions and the models that exist tend to focus on one of these only. The AUDE model attempts to capture all three elements within its toolkit but is seen by some as cumbersome and complex, resulting in very low levels of application within the initial sample group.

Future Directions

The study has shown that there is perceived value in the POE process but that there is a potential disconnect between the needs of HEIs and the various existing POE models. Further work is intended to identify and define, in greater detail, the specific drivers for POE within HEIs and to relate these to the factors that can be measured or evaluated through the POE process. It is anticipated that this will inform discussion on how the application of POE can fulfil the varying needs of different institutions without resulting in an overly complex standardised model or the proliferation of very costly bespoke models. The work will also involve the inclusion of a larger, sector-wide data set.

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