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Making feedback and post-occupancy evaluation routine 1: A portfolio of feedback techniques

Bill Bordass and Adrian Leaman

Usable Buildings Trust, 10 Princess Road, London NW1 8JJ, UK
E-mails: bilbordass@aol.com and adrianleaman@usablebuildings.co.uk

Over forty years ago, the Royal Institute of British Architects (RIBA) published its *Plan of Work for Design Team Operation* (1963), which included Stage M – Feedback. In spite of this, designers, builders and sometimes even procuring clients do not engage closely with the performance of the buildings they have created. Hence, low-level, chronic problems tend to persist, innovations miss their targets, and true successes may be overlooked – even in some of the best buildings, as the Probe series of post-occupancy surveys revealed. This paper discusses how feedback, follow through from design and construction into occupancy, and post-occupancy evaluation could become a natural part of project delivery, and how this could improve the quality and sustainability of our buildings. It describes progress made since the Probe series of post-occupancy ended in encouraging the use of feedback, including a portfolio of established techniques, development of the Soft Landings technique, and setting up a charity to promote and support feedback. The results of tests with a user group are also discussed.

Keywords: building performance, continuous improvement, feedback, follow-through, learning, post-occupancy evaluation, Probe, project delivery, quality control, user surveys

Il y a plus de 40 ans, en 1963, le Royal Institute of British Architects (RIBA) a publié son *Plan of Work for Design Team Operation*, qui incluait *Stage M – Feedback*. Malgré cela, les concepteurs, les constructeurs et parfois même les acheteurs ne s'engagent pas de façon sérieuse vis à vis des performances des bâtiments qu'ils ont créés. D'où, des problèmes chroniques, mineurs mais qui tendent à persister, des innovations qui n'atteignent pas leurs cibles et de vraies réussites qui risquent d'être ignorées, même en ce qui concerne les meilleurs bâtiments comme l'a révélé la série Probe d'études après emménagement. Cet article examine comment le retour d'information, le suivi de la conception et de la construction jusqu'à l'occupation et l'évaluation après emménagement pourraient devenir une composante naturelle de la fourniture d'un projet et comment cela pourrait améliorer la qualité et la durabilité de nos bâtiments. L'auteur poursuit en décrivant les progrès réalisés depuis la série Probe d'évaluation après emménagement et termine en encourageant l'utilisation du retour d'information, y compris d'un catalogue de techniques établies, le développement de techniques 'd'atterrissages en douceur' et la création d'une institution caritative pour promouvoir et apporter un soutien au retour d'information. Il examine également les résultats de tests conduits sur un groupe d'utilisateurs.

Mots clés: performances des bâtiments, amélioration continue, retour d'information, suivi, enseignement, évaluation après emménagement, Probe, fourniture d'un projet, contrôle de la qualité, enquêtes auprès des utilisateurs

Introduction

In spite of an increasing interest globally in building performance assessment and post-occupancy evaluation (POE), results of such assessments are not routinely available, and such assessments are not undertaken or used widely by most design and building

teams. In the UK, in its *Plan of Work for Design Team Operation*, the Royal Institute of British Architects (RIBA) (1963) introduced a Stage M – Feedback where the architect returned to the building to review the success of what had been done. Sadly, however, in spite of some excellent building performance assessment work in the 1960s, Stage M was withdrawn from RIBA's *Architect's Appointment* (1972). While still present in principle, experience had shown that clients would seldom pay for such feedback and the RIBA did not wish to create the impression that clients would get it for nothing. Ironically, in the same year, the seminal UK book on building performance was published (Markus *et al.*, 1972) – the result of close collaboration between researchers, designers and publishers. POE has of course continued as a research activity, but for the most part designers, constructors – and often their clients – have not been very closely involved.

In recent years there have been renewed attempts to make building performance assessment and POE routine, as reviewed for example by Baird *et al.* (1995), Federal Facilities Council (2001), Macmillan (2004) and Preiser and Vischer (2005). In the present journal, a special issue (Lorch, 2001) reviewed POE; and in particular the Post-occupancy Review of Buildings and their Engineering (Probe) series of POEs of recently completed buildings which had been published in *Building Services Journal* – the monthly journal of the Chartered Institution of Building Services Engineers (CIBSE), from 1995 onwards. However, in spite of the growing interest in building performance assessment around the world, the UK government funding programme that supported Probe and other building performance studies in the UK has now ceased.

What next? Can such feedback develop from a rare event – usually somewhat detached from design and construction – to a routine part of project delivery? In the UK, the Latham Report (1994) emphasized the importance of client leadership. This was reinforced by the Egan Report (1998); and in 2000, the Confederation of Construction Clients (CCC) was formed. In 2001, the CCC published its Client's Charter, which included requirements for clients to undertake feedback on the performance of their products, their suppliers and themselves.

In 2001, the authors started work with CCC on a research project (co-funded by the UK Department of Trade and Industry) to develop a feedback system that could help clients obtain information on the performance of their completed projects. CCC's steering group widened the remit from POE to feedback throughout the life cycle of a building and of a project. The present paper concentrates on the results of this project and outlines the portfolio approach to feedback techniques that it developed. Case studies of

their use are reported in a companion paper (Bordass and Leaman, 2005).

One specific technique, Soft Landings, is reported in more detail in the following paper (Way and Bordass, 2005). It was developed over the same period by one of the authors (M.W.) with the support of the University of Cambridge and a steering group of consultants and contractors. Soft Landings investigated how to extend the commitment of the design and construction team beyond the point of handover of a building, feeding forward into improving the building in operation and feeding back the experience to its creators. It offers an important vehicle for incorporating feedback into normal procurement processes.

Client attitudes

A questionnaire, telephone interviews and a series of lively workshops with CCC members and other clients revealed the following:

- A general interest in feedback: many clients had undertaken feedback exercises of some kind, though seldom systematically.

- Considerable uncertainty about what feedback techniques were available, how they should best be used, what they should cost and what value they would add.

- A concern that the name 'POE' did the activity no favours: POE was seen as too academic, and too late to benefit the project concerned.

- Clients did not see why they should pay designers to undertake POEs on recently completed buildings as this would benefit future clients more than themselves.

- Procurement wings of major clients often behaved in much the same way as designers and builders, moving on to the next project as soon at the building was handed over. Many seemed more interested in procedures and tick-lists to say that they had done a good job according to predetermined criteria than in closer engagement with the building and its occupants.

- Knowledge management systems tended to be poor, even for many leading clients and certainly in most of the construction industry. Clients feared that feedback information would stay on the shelf and never get used.

There was some suspicion about Key Performance Indicators (KPIs), which have been burgeoning in the UK over recent years, particularly for government

procurement. Many felt that KPIs did not get close enough to the things experienced clients really wanted to improve. Some thought they had been designed more to satisfy bureaucrats than to add value on the ground, and involved clients in form-filling when they could have been doing more useful things. The team was advised to avoid this trap and seek techniques that could trigger specific, meaningful improvements.

Clients also talked about the business benefits of facilities and encouraged the team to make the business case for feedback to their senior management. This proved difficult. While POEs often reveal major opportunities to reduce capital and running costs and raise occupant satisfaction and productivity, senior management did not see why it should be called upon to tackle the problems of the construction industry. It also proved difficult to separate building-, organization- and facilities management-related influences. The team eventually decided to concentrate on building-related aspects (e.g. design feedback) to start with, and in particular to help get rid of the problems that routinely occur and subtract value.

Highlights from the literature review for the project have already been published (Bordass, 2004). This concluded that the construction industry was slow to learn from its completed products, particularly once they were in the hands of their users. Indeed, Blyth (2000) observed that most designers only noticed that something was wrong when they were asked to investigate a failure. Feedback needed to become routine: as a way of quality control in the more repetitive projects; as a necessary part of hypothesis testing in innovative ones; as a means of increasing awareness of chronic problems, changing requirements and emerging properties; and as a way of promoting fine-tuning and team learning. Clients who had outsourced their building experts and facilities management services could be particularly vulnerable if effective feedback systems were not in place (Federal Facilities Council, 2001).

In spite of the many good reasons for closing the feedback loop, there were many barriers and not enough driving forces. Many clients and writers advocated a broadly based, comprehensive approach to feedback, but the present authors found that in practice most organizations were unable to cope with this and could not (or thought they could not) afford it. It was better to start small, simply and practically.

Following the initial investigations, it was agreed to do the following:

- Change the emphasis from POE to the use of feedback at all stages throughout the life cycle of a building and of each construction and alteration project.

- Review and classify available feedback techniques and put them on a website that could help people identify what techniques they might need, what they did, how to use them and where to turn for help. This Feedback Portfolio is described in more detail below.

- Test the above in case studies with selected clients and designers.

- Develop a business plan to continue after government funding for the research ceased.

Feedback user group

At the end of 2002, the CCC ran into funding difficulties and was unable to continue its support.[1] The project therefore continued into the case study phase with the help of a User Group of designers and clients. The case study results are reported in another paper in this issue (Bordass and Leaman, 2005).

As clients and government become more interested in building performance, leading design firms are realizing that a better understanding of how their buildings actually perform is no longer an option but essential to their survival. Tying feedback and POE into project delivery would automatically engage the supply side and provide the better follow-through and customer service the team had been seeking. In North America, the Federal Facilities Council (2001) had reached a similar conclusion after finding that if POEs were done at all, they usually took place within a year or two of handover.

The organizations on the user group were as follows:

- multidisciplinary practices (Arup, Atkins and RMJM)

- architects (Broadway Malyan, Edward Cullinan Associates, Feilden Clegg Bradley and Reid Architecture)

- engineers (Buro Happold and John Packer Associates)

- clients (the Department of Health and Oxford and Cambridge Universities) provided case studies

- other private and public sector clients were involved as partners in the case studies and came to some User Group meetings, but did not provide material directly

Feedback portfolio of techniques

To achieve the greatest uptake, the ideal feedback technique would be simple to use; widely applicable; robust

but comprehensive; and cheap, and quick and easy to operate. The technique would give useful results speedily, but preferably in a form that can satisfy a range of users, from researchers testing hypotheses to designers and managers wanting to know the key issues on which they should act now. Where possible, benchmarks should be freely available, though in practice this has proved difficult because steady funding for data management can seldom be found, which helps to account for the lack of continuity in many POE activities. However, the Internet is beginning to make things easier.

In North America, the Federal Facilities Council (2001) hoped it might be able to recommend a single preferred method of POE, but eventually it decided against it because contexts, needs and resources could vary greatly. Organizations often like the idea of a comprehensive review. In practice, however, most cannot find the time and money to do very much, so they are usually better off starting small and with a few things that they are really interested in.

Consequently, the website (www.usablebuildings.co.uk) contains the prototype pick-and-mix Portfolio of Techniques that people can choose from. All the material is accessible through a simple-but-powerful user interface, with every item clickable. Although the portfolio can be extended almost indefinitely, for the feedback trials it contained only ten general-purpose and largely well-established UK techniques. User Group members had asked for the portfolio to be kept small because choice would have been confusing and would also have reduced the opportunity to compare their experiences and results directly.

The techniques currently fall into five categories – further categories will be added as the portfolio expands:

- Audit category: includes quantitative technical assessments, at present the CIBSE TM22 *Energy Assessment and Reporting Methodology* (1999), which was used in the Probe studies.

- Discussion category: includes techniques that get people together to discuss what they are about to do (foresight), what they are doing (insight) or what they have done (hindsight). It includes the Learning from Experience workshops and/or interviews,[2] and the post-project (hindsight) review workshops devised by the Higher Education Design Quality Forum (HEDQF),[3] initially for university buildings but now being used more widely.

- Questionnaire category: includes the BUS Occupant Survey as used in Probe and elsewhere, the CIC Design Quality indicators (Gann and Whyte,

2003) and the Overall Liking Score, a rapid survey of occupant satisfaction (Levermore, 1994).

- Process category: includes techniques – currently Soft Landings and the Building Research Establishment Checklist (Jaunzens *et al.*, 2003) – that are used to adapt the procurement process to incorporate feedback in an organized manner. Soft Landings is discussed in more detail by Way and Bordass (2005).

- Packages category: currently includes the Probe package (which itself contains CIBSE TM22 and the BUS Occupant Survey discussed by Bordass, 2001) and the AMA Workware package, which incorporates an occupant questionnaire and tools to study the use of space and time is most frequently used before and after making organizational and space planning changes.

Figure 1 shows where the techniques are most appropriately used throughout the life cycle. The titles of the stages were chosen after examining a wide range of published plans of work.[4]

The mapping of the techniques gives some useful insights. For example:

- Probe package was a method of POE, so it is only directly relevant once the building is completed and best once it has settled into routine operation. However, constituents of Probe have wider application, for example:

  - BUS Occupant Survey is commonly used to find out what occupants think about a building before alterations, relocation or new construction is planned.

  - CIBSE TM22 method was developed for energy surveys of buildings in operation. However, to provide greater transparency between expectations and outcomes, the method has also been used when developing design targets to review the design and check what is installed and commissioned on site. This will be of immediate relevance for energy performance, where implementation of the European Union Directive (European Community, 2003) proposes that energy performance certificates should make use of both Design Ratings (based on theoretical calculations) and Operational Ratings (based on actual fuel consumption by the building in use).

- Soft Landings focuses on aftercare and feedback in the first few months and years of occupancy, but for the process to work well, preparation is required long beforehand.

	Prepare		Design		Implement		Finish		Use	
	Verify need	Strategic brief	Option Appraisal	Develop design	Prepare to implement	Implement	Complete	Initial operation	Routine operation	Change
AUDITS (technical and environmental)										
CIBSE TM22 Energy Assessment		M	M	M		M	M	M	H	
DISCUSSIONS										
HEDQF POE Forum								H		
Learning from Experience	M	H	M	M		M	M	H	L	
QUESTIONNAIRES										
BUS Occupant Survey	M	M						M	H	H
CIC Design Quality Indicators	M	M	H	H				M	H	H
Overall Liking Score	M	M						M	H	H
PACKAGES										
AMA Workware	H	H	M					M	H	H
Probe								M	H	H
PROCESS CHANGES										
POE in the first year of occupancy					P		P	H	L	
Soft Landings		P	P	P	P	P	H	H	M	

KEY TO SHADING OF CELLS:

High relevance or activity ■ Low relevance or activity ⦀

Medium relevance or activity ▨ Important preparation stage ▭

Figure 1

Future developments

New techniques can be added to expand the portfolio and to fill gaps, e.g. on cost, sustainability and specific aspects of technical performance. The classification can also evolve, perhaps including a portfolio of core techniques preferred by the User Group, and supplements showing emerging, specialized, sector-specific and international techniques. Discussions are also planned on improving compatibility between some techniques (e.g. encouraging common protocols for data scales, definitions, categories, means of presentation and data analysis frameworks); and eventually some techniques may even merge.

The CCC had intended to progress the feedback initiative and maintain and develop the portfolio after the research funding stopped. When this proved impossible, various options were considered and eventually a not-for-profit organization was chosen: the Usable Buildings Trust. The Trust has kept the portfolio of techniques live on http://www.usablebuildings. co.uk/fp/index.html and is now developing a portfolio of feedback results. Funding is being sought to maintain and expand both portfolios, to develop education, training and research programmes, and to organize feedback user groups in a range of building sectors.

Moving forward

After many false dawns, it now seems possible that feedback and POE will become more routine – promising better, nicer, more productive, more cost-effective and more sustainable buildings that are better suited to the needs of their users. It will be a long haul, but clients, designers and government are becoming more interested in building performance and some are already requiring or offering aftercare services.

Feedback systems must not just be imposed from above, but be useful to those actually working on projects. Effective techniques are already available, some with good track records. Information technology and the Internet are making them faster, more powerful, more economical, easier to use, and are providing more reliable statistics and benchmarks.

Good use of the results must also be made. Feedback data need to be managed in order to lead to effective learning. But data and knowledge management tends to be relatively weak in most building-related organizations. Consequently, the project finally decided to concentrate on project teams and their immediate clients, as they would be able to put their experience and new understanding into action immediately – both using individual survey and discussion techniques and in process changes (including Soft Landings). But much effort is now going into developing knowledge-management systems as well.

To promote and support feedback in the public interest can be difficult for government, institutions and industry. Initiatives come and go and there are always vested interests and budget cuts to watch out for. The team, steering group and government's project officers

concluded that a non-profit charity was a very appropriate source of information and advice – but of course, this will also need to gain support from a range of public, institutional, commercial, professional and individual sources.

Acknowledgements

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Endnotes

[1] A new organization, the Construction Clients Group, has subsequently emerged.

[2] See http://www.constructingexcellence.org.uk/resourcecentre/publications/toolkit.jsp?toolkitID = 1

[3] See http://www.architecture.com/go/Architecture/Debate/Forums_2676.html

[4] For more details, see http://www.usablebuildings.co.uk/fp/index.html