

# **Post-Occupancy Review of Buildings**

## **Foreword**

A completed building project is the culmination of years of investment of time and energy by a large number of different people. Everybody involved will have learnt along the way and would do some things differently the next time round.

All too often, this learning is either dispersed or lost as people head off to new projects or employment. For some years, the Higher Education Design Quality Forum (HEDQF) has felt that this was an unfortunate waste, and that learning from previous projects represented one of the great opportunities to improve design within the sector.

At the same time, the Higher Education Funding Council for England (HEFCE) concluded that this was an opportunity for the sector to demonstrate to external stakeholders its commitment to effective management of a learning culture. It has the additional benefit of helping institutions to get the most from the investment of their scarce resources. Therefore the HEFCE supported the HEDQF efforts and this report is the result of that collaboration.

In commissioning this report from De Montfort University, the HEDQF has been keen to emphasise the positive benefits of post-occupancy reviews, and to devise a system where the primary objective is to improve design quality. We believe we have produced a proposal that should gain wide acceptance within the sector and progressively build up information of real benefit to the next generation of projects.

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## **Contents**

<b>1</b>	<b>Summary</b>	<b>page 5</b>
<b>2</b>	<b>Introduction</b>	<b>6</b>
<b>3</b>	<b>Background to building evaluation</b>	<b>7</b>
<b>4</b>	<b>Methodology</b>	<b>8</b>
<b>5</b>	<b>Design quality</b>	<b>9</b>
<b>6</b>	<b>Project outlines</b>	<b>10</b>
<b>7</b>	<b>Post-occupancy forums</b>	<b>11</b>
<b>8</b>	<b>Facilitating and reporting</b>	<b>14</b>
<b>9</b>	<b>Confidentiality and ownership</b>	<b>16</b>
<b>10</b>	<b>Dissemination</b>	<b>18</b>
<b>11</b>	<b>Cost</b>	<b>19</b>
<b>12</b>	<b>Review</b>	<b>20</b>
<b>13</b>	<b>Recommendations</b>	<b>21</b>
<b>14</b>	<b>Action plan</b>	<b>23</b>
<b>15</b>	<b>Postscript</b>	<b>24</b>
<b>16</b>	<b>Acknowledgements</b>	<b>25</b>
 <b>Appendices</b>		
	<b>Forum Guidelines</b>	<b>27</b>
	<b>Sample Forum Report</b>	<b>35</b>

# 1 Summary

- 1.1 This report concludes a one-year study undertaken by the Higher Education Design Quality Forum (HEDQF) to develop and pilot a system of post-occupancy evaluation of higher education buildings. It recommends that every substantial project funded by the Higher Education Funding Council for England (HEFCE) should publish a project outline on the web within three months of completion and conduct a post-occupancy forum about one year after occupation. The forums should be strategic and non-recriminatory following broadly the forum guidelines developed. After approval by the host institution, forum reports should be sent to HEDQF and published on the web. HEDQF will develop training and registration of facilitators and reporters, design and manage a web-site, analyse reports, publish project analyses and good practice guides, monitor the system continuously, and review its impact with HEFCE every three years.
- 1.2 Recommendations appear within the text in bold type and are repeated together at the end of the report followed by an action plan.

## 2 Introduction

- 2.1 The higher education sector undertakes over 200 building projects annually. The Higher Education Design Quality Forum (HEDQF) is a multi-disciplinary group of professionals and clients committed to the promotion of design quality. HEDQF realised that the sector needed mechanisms for feedback, an information database, ways to identify good practice, and means of sharing expertise if it was to capitalise more effectively on the quality that was being achieved in many higher education projects. HEDQF began actively exploring post-occupancy evaluation (POE) as a promising mechanism in 1996.
- 2.2 During 1998, the Higher Education Funding Council for England (HEFCE), which financially supports a proportion of these building projects to varying degrees, was also looking for similar mechanisms to fulfil its responsibility to monitor public spending and to justify its investment.
- 2.3 De Montfort University was working with HEDQF on the development of POEs and was commissioned by HEFCE through HEDQF to expand these explorations into a system of evaluation that could be applied nationally. The emphasis was to remain on promoting design quality, and the challenge was for the HE sector to develop a system for itself that would command sector support and respect. It was decided to concentrate in this first stage on new-build, moving on to refurbishment in a second stage.
- 2.4 The objective of this one-year project was therefore to develop a POE system for higher education building projects that would fulfil the needs and aspirations of three groups:
- estate directors in universities and colleges and all concerned with HE buildings
  - the HEDQF
  - the HEFCE.

### **3 Background to building evaluation**

- 3.1 Post-occupancy evaluations have been conducted for half a century and their enormous potential for providing feedback is acknowledged. Early studies concentrated on assessing the building and its operation but not the design and construction process. Few were disseminated beyond the immediate organisation.
- 3.2 Two notable exceptions in the UK have been work at Strathclyde University and the more recent 'PROBE' studies conducted by Building Use Studies. This latter group has undertaken over 100 studies, collecting and publishing comparable data on a range of quantifiable parameters such as area, cost, energy, and user satisfaction.
- 3.3 The Health Service requires a POE to be conducted after all its projects but it appears that only about 10% actually take place. Analysis of findings is lagging behind and results are unpublished; data not released is of little use
- 3.4 Higher education is committed to the advancement of knowledge. The challenge in this study is to find a different approach that will provide feedback to help HE institutions; inform designers; give greater confidence to managers, governors and sponsors; and be suitable for general dissemination.

## 4 Methodology

- 4.1 The research methods adopted for this one-year task were a combination of documentary study, building visits, group discussion, and consultation.
- 4.2 The project ran from mid-December 1998 to mid-December 1999 and included:
- four forums, two financed by HEDQF and two by HEFCE
  - a workshop in May 1999 with 30 participants testing a 'forum framework'
  - a symposium in November 1999 with 140 participants for wider consultation
  - regular reviews by HEDQF and its Steering Group.
- The forums covered north and south of the country, academic and residential facilities, open greenfield and confined urban sites, and ranged from £3m to £60m.
- 4.3 Previous POE studies set out to 'evaluate', as their name implies. The consensus of those involved in this work is that even grading projects on a three-point scale leads inexorably to rigid bureaucratic systems, diverts attention from design quality towards defensive documentation, and proves counter-productive. Developing from within the sector under the auspices of HEDQF and encouraged by an open-minded approach and positive brief from HEFCE, this project sought to promote quality beyond parameters that could be rigorously measured.
- 4.4 For these reasons, the investigating team explored an explicitly strategic and non-recriminatory methodology. Despite new buildings' inevitable teething problems, the studies proved surprisingly celebratory.
- 4.5 As well as dealing with designers and estate departments, it was considered important, and has proved very illuminating, to view projects also through the eyes of students, research workers, technical staff, and building managers, each of whom bring different criteria, experiences and observations.
- 4.6 Most of the recommendations made have been discussed, developed, and broadly accepted by forum participants, by a small workshop and large symposium, and have been reviewed regularly by HEDQF and its Steering Group. Some recommendations are tentative because they are the subject of negotiations by various bodies or require development and monitoring. Recommendations are repeated at the end of the report.

## 5 Design quality

5.1 This work originated in the HEDQF, whose mission is to promote design quality in higher education building. The group defines quality by a number of criteria which, slightly adapted, are that a high quality building should:

- meet user needs and exceed expectations
- provide a positive environment for activities
- contribute positively to its surroundings
- promote a sense of community and interaction
- be economic in maintenance and running
- be adaptable to future needs and possible uses
- be environmentally appropriate
- incorporate current best practice
- be on time and within budget.

A workshop with estate directors suggested the following additions:

- be marketable
- enhance safety and security
- advance the institution's strategic plans
- meet performance targets.

Estate directors' priorities were:

- meeting user needs
- providing value for money.

Role-playing as students, they decided the priorities would be:

- positive environment
- sense of community and interaction.

## 6 Project outlines

- 6.1 Two separate needs became evident during the studies, the one for basic data about projects and the other for evaluation. Basic data can be collected and published as a separate exercise soon after completion; such an exercise is being actively considered by Design Quality Forum groups for Further Education and Health. This would appear to be an obvious step made easier by the internet.

### Recommendation 1:

**Subject to consultation by HEFCE with architects, estate directors, and other professionals, a project outline of every substantial HEFCE-funded building project should be published on the web within three months of completion.**

- 6.2 This outline must be brief to be effective, so a two-page document might include:
- institution, building, location, function
  - site or location plan and one photograph
  - description, areas, timing, procurement, costs, energy
  - professional and university contacts
  - cross-references to published articles and data.

- 6.3 Effective means are already in place through the Royal Institute of Chartered Surveyors (RICS) for recording and publishing consistent cost data on the web.

### Recommendation 2:

**Cost analyses of projects should be published on the web through the Royal Institute of Chartered Surveyors.**

- 6.4 Preparation of project outlines could be the responsibility of either architects or estate directors. Their main purpose would be to provide basic information and contacts for other institutions and professionals undertaking similar projects. They could be compared and analysed by HEDQF or other appropriate group, and the results published.

### Recommendation 3:

**HEDQF, or the Association of University Directors of Estates, should analyse project outlines, extract guidelines, and publish project analyses.**

## 7 Post-occupancy forums

- 7.1 Returning to the primary task of evaluation, the initial brief from HEDQF and HEFCE and consultations with estate directors emphasised that they should be non-recriminatory and strategic.
- 7.2 Evaluative data can be collected by a number of methods including working through project files, analysing drawings, interviewing participants and users, observation of the building and of its use and operation, still or time-lapse photography or video, analysing costs and energy consumption, conducting questionnaires, and compiling room data sheets. Three main criteria led the team to concentrate primarily on group discussions informed by examining readily available data and a brief building tour:
- detailed data are costly to prepare and analyse
  - discussions can make efficient use of professionals' time
  - discussions have the potential to extract strategic and positive advice.
- 7.3 The term post-occupancy rather than post-completion was preferred, to emphasise learning from the whole project, product and process, briefing, design, construction, and occupation. A year allows time for the initial teething problems to be overcome and sufficient distance to look back and learn lessons. Within a year, most of the professionals involved should still be available, and users at all levels will have had sufficient experience of the building.
- 7.4 The word 'forum' was adopted because it implies open consultation and joint ownership, is non-threatening, and distinguishes these studies from quantitative assessments.

### **Recommendation 4:**

**The evaluation system should be based on strategic non-recriminatory group discussions constituting a post-occupancy forum.**

- 7.5 Given the time constraints on the professionals involved in forums, it was decided to limit face-to-face discussions normally to within a single day. A week might be more informative but it was judged that 80% of the issues should emerge in 20% of the time. If more time were devoted, the forums might be less cost-effective, the lessons too detailed, and the whole process fall into disuse. The challenge was to see if a self-imposed one-day constraint would focus minds on strategic issues.

7.6 Forums involving various teams of people would use time efficiently, be more accurate in recalling significant issues, and be more creative in the cross-fertilisation of ideas leading to recommendations. It was decided to hold forums with four separate groups of people:

- the client and design teams
- the construction and cost teams
- users including academic, technical, and administrative staff; and undergraduate, graduate and research students
- building management staff and environmental consultants.

The exact compositions have varied slightly and groups have ranged from 3-10 people meeting from 1-2 hours each.

7.7 Agendas for each group have been developed as forum guidelines and used as semi-structured questionnaires to introduce issues and encourage wider exploration; it is the follow-up questions that can be the more interesting and relevant to particular situations.

7.8 Forums were set up through either academic or estates departments. A timetable for the day's forums was prepared as a guide for institutions and they were asked to organise the day. An introductory brochure on the whole pilot project, a notional timetable, and the forum guidelines were sent about a month in advance. All institutions sent the guidelines to participants in advance so that they came well-prepared. The current version of the Forum Guidelines are attached.

7.9 The pilot forums conducted have demonstrated that significant lessons can be learned in a single day and that only large or complex projects over about £10m require a second day; small projects might be studied in just an hour or two.

**Recommendation 5:**

**HEFCE should require all HE institutions receiving substantial HEFCE funding to specify in consultants' and contractors' contracts the submission of data and a half-day's participation in a post-occupancy forum.**

**Recommendation 6:**

**HEFCE should require all HE institutions receiving substantial HEFCE funding to organise, conduct, and document a one or two-day post-occupancy forum about 12 months after building occupation.**

- 7.10 Some institutions would prefer to conduct their own forums and a few already do so with well-refined methodologies. The system can evolve more rapidly and effectively if institutions are free to follow their own procedures. However, it is important that the broad issues identified in the guidelines are covered to ensure comprehensive and comparable studies.

**Recommendation 7:**

**Forum guidelines should be offered, but HE institutions should be free to adopt their own approach provided they cover the broad issues introduced in the guidelines.**

- 7.11 Representation by the various parties has been excellent and the exercise has been undertaken very professionally, both in relation to the projects studied and in development of the methodology. The one area of representation that requires strengthening is that of undergraduate students. They are generally the main users but have rigid timetables, are a changing population, and may lack confidence in participating. On the other hand, those who have attended have made extraordinarily perceptive comments.

**Recommendation 8:**

**HEDQF should consult with local student unions and the National Union of Students about representation at HEDQF and explore ways to encourage students to engage effectively in forums and in building briefings.**

## 8 Facilitating and reporting

- 8.1 The word 'facilitator' is proposed for the person chairing the forum to emphasise their role in encouraging effective and creative discussion.
- 8.2 The facilitator should be:
- conversant with the construction industry
  - familiar with higher education and
  - sympathetic to the concern for quality.
- 8.3 Views differ as to whether the facilitator should be internal to the institution or external. An internal person may be easier to organise and be aware of the background. An external person may bring a more objective approach with experience from elsewhere, ask questions that had been overlooked internally, and perhaps give greater credibility and authority to the exercise. The choice can be given to the institution but there will be a need to train a pool of facilitators.

### Recommendation 9:

**HE institutions should appoint a forum facilitator, from within or outside the institution, who is conversant with the building industry, familiar with higher education, and sympathetic to the concern for quality.**

- 8.4 Reporting of forums is a complex task requiring time, a range of skills, and mature judgement. Comparable organisations, such as the Visiting Boards who validate architectural schools on behalf of the Royal Institute of British Architects (RIBA) or the Commonwealth Association of Architects, have found it necessary to appoint specialist staff to ensure consistent quality. It is not easy to see how this can be circumvented without significant loss of impact and credibility. Such appointments would be best managed through HEDQF. The reporter would have to finalise the report in negotiation with the facilitator who would then 'sign it off' to the institution.

### Recommendation 10:

**HE institutions should appoint a forum reporter from within or outside the institution to collect data, record the forum, and prepare a report in consultation with the facilitator.**

**Recommendation 11:**

**HEDQF should train facilitators and reporters, maintain a register of trained and recommended people, and monitor their performance.**

8.5 The timetable and agendas of the guidelines provide a template for reporting. It is suggested that forum reports should be not more than 10 pages long in order to focus attention on strategic issues. These forum reports, as well as being valuable individually, will build up experience from which more general guidelines may be deduced.

**Recommendation 12:**

**HEDQF should analyse forum reports and publish good practice guides.**

## 9 Confidentiality and ownership

- 9.1 The effectiveness of forums depends largely on openness and upon building a non-recriminatory culture. There has been enthusiastic support for the principle but an understandable reluctance to have results publicly exposed to institutional employers, peers, consultants, clients, insurance companies and the general public.
- 9.2 On the other hand, no previous studies have asked, 'what did you do right?', and it is clear from the pilots conducted that there is far more to be gained from positive feedback than from negative inquisition. The pilots have established that higher quality as well as significant cost savings could be achieved through positive and creative feedback, providing guidance to future projects at a strategic level. Having established the basic positive premise, participants have all been more than willing also to share many pitfalls; in each case, the emphasis has been to focus on recommending remedies.
- 9.3 The emphasis of the forum is upon drawing out from the participants the expertise they have acquired, often sub-consciously, and recording this firstly for their own institution, and secondly for others. They must have every encouragement to speak frankly with confidence and to engender a new culture of openness within the industry. This is possible only if institutions retain editorial rights, responsibility, and copyright of their reports, even when an external facilitator and reporter are involved in the drafting.

### Recommendation 13:

**HE institutions should retain editorial rights, responsibility, and copyright of their reports. Reports may, exceptionally, exclude detail identifying their institution or building. When complete, institutions should send forum reports to HEDQF for publication.**

- 9.4 Professionals involved in POEs are concerned about insurance, indemnity, and litigation at three levels:
- that their period of liability will begin again from the POE date
  - that they will be held negligent for any acknowledged shortcomings
  - that their insurance will be invalidated.

9.5 These matters have been reviewed by a group of organisations including the RIBA Insurance Agency. On the question of litigation, the RIBA Insurance Agency is not aware of any case brought to court against a professional based on disclosures made at a POE. However, this might be because few have been conducted, professionals have been careful not to admit shortcomings, and reports generally have not been published.

9.6 Asked to consider the forum approach and its implications, the Managing Director of RIBA Insurance Agency Ltd wrote in February 2000:

'RIBA Insurance Agency Ltd welcomes the HEDQF/HEFCE initiative concerning the post-occupancy study of recently completed HE buildings. The proposals contained in the De Montfort University document, "Forum and Strategic Study", provide for a constructive assessment to be made which, by focusing on the positive elements, will be welcomed by insurers specialising in professional indemnity insurance for architects and will make an important contribution to good practice and enhanced standards. The approach is to be welcomed.'

**Recommendation 14:**

**Continuing support of insurance companies should be maintained by HEDQF.**

9.6 A number of other initiatives are underway to examine this issue, including:

- the matter has been raised by the RIBA with Sir John Egan
- the Building Research Establishment is seeking funds to investigate 'no fault' POEs
- advantages of conducting a POE under separate contract are being reviewed.

## **10 Dissemination**

- 10.1 HEDQF is committed to encouraging a cultural shift towards openness across the construction industry in order to raise design quality, and published POE studies are a crucial component in this initiative.
- 10.2 Project outlines, project analyses, forum reports and good practice guides might be disseminated on the web, by newsletter, reports, conferences, workshops, training courses, and possibly by video-conferencing, an advice line, or a consultancy group. No clear preference has emerged except that web-based systems should be included and that different formats might be needed to reach the wide range of interested parties.
- 10.3 On the web, ease of access, attractiveness, relevance of material, helpful indexing and keywording, and clear follow-up advice will all be vital.

### **Recommendation 15:**

**Project outlines, project analyses, forum reports and good practice guidelines should be published on the web.**

### **Recommendation 16:**

**Information should be disseminated by various methods and the effectiveness of the methods should be monitored.**

## 11 Cost

11.1 The cost of conducting and reporting a one-day forum is approximately as follows:

Facilitator @ £400 and reporter @ £300	£ 700
Documentation (3 days @ £300, 1 day @ £400)	£1,300
Total cost of a one-day forum and report	£2,000

11.2 For a £4m project: 0.05%  
For a two-day forum @ £4,000 on a £20m project: 0.02%  
Compared with design costs which, including specialist consultant fees, are around 10-15% of project costs, this is a modest first step.

11.3 Given the innovative nature of these studies, it might be suggested to professional institutes that time devoted can be credited as a part of an individual's continuing professional development. The subject has recently been introduced into the curriculum of the RIBA professional stage.

11.4 The additional costs will be a considerable commitment that will require careful planning. They include:

- establishing and training a pool of facilitators and reporters
- maintaining a register
- dealing with enquiries
- setting up and maintaining a web site
- analysing data and publishing good practice guides
- monitoring the whole process.

### Recommendation 17:

**HEDQF should appoint a small working group to prepare a business plan and implement these proposals.**

## **12 Review**

- 12.1 There will be a need to review the effectiveness of the forum methods, the reporting, analyses, dissemination, and impact. It is hoped that there will be a cultural shift and perhaps the sector itself will wish evaluation to become more rigorous and quantitative as methodology, expertise, trust, and relevance develop.

### **Recommendation 18:**

**HEFCE and HEDQF should monitor the forum system continuously and review it formally on a three-year cycle.**

## **13 Recommendations**

13.1 The following recommendations have been made within the text of the report:

- 1 Subject to consultation by HEFCE with architects, estate directors, and other professionals, a project outline of every substantial HEFCE-funded building project should be published on the web within three months of completion.**
- 2 Cost analyses of projects should be published on the web through the Royal Institute of Chartered Surveyors.**
- 3 HEDQF, or the Association of University Directors of Estates, should analyse project outlines, extract guidelines, and publish project analyses.**
- 4 The evaluation system should be based on strategic non-recriminatory group discussions constituting a post-occupancy forum.**
- 5 HEFCE should require all HE institutions receiving substantial HEFCE funding to specify in consultants' and contractors' contracts the submission of data and a half-day's participation in a post-occupancy forum.**
- 6 HEFCE should require all HE institutions receiving substantial HEFCE funding to organise, conduct, and document a one or two-day post-occupancy forum about 12 months after building occupation.**
- 7 Forum guidelines should be offered, but HE institutions should be free to adopt their own approach provided they cover the broad issues introduced in the guidelines.**
- 8 HEDQF should consult with local student unions and the National Union of Students about representation at HEDQF and explore ways to encourage students to engage more effectively in forums and in building briefings.**
- 9 HE institutions should appoint a forum facilitator, from within or outside the institution, who is conversant with the building industry, familiar with higher education, and sympathetic to the concern for quality.**

- 10 **HE institutions should appoint a forum reporter from within or outside the institution to collect data, record the forum, and prepare a report in consultation with facilitators.**
- 11 **HEDQF should train facilitators and reporters, maintain a register of recommended people, and monitor their performance.**
- 12 **HEDQF should analyse forum reports and publish good practice guides.**
- 13 **HE institutions should retain editorial rights, responsibility, and copyright of their reports. Reports may, exceptionally, exclude detail identifying institutions or buildings. When satisfied, institutions should send forum reports to HEDQF for publication.**
- 14 **Continuing support of insurance companies should be maintained by HEDQF.**
- 15 **Project outlines, project analyses, forum reports and good practice guidelines should be published on the web.**
- 16 **Information should be disseminated by various other methods and the effectiveness of the methods should be monitored.**
- 17 **HEDQF should appoint a small working group to prepare a business plan and implement these proposals.**
- 18 **HEDQF and HEFCE should monitor the forum system continuously and review it formally on a three-year cycle.**

## 14 Action plan

Assuming that the recommendations are accepted in principle, it is proposed that the following action would be required by the various parties.

### **Higher education institutions:**

- make participation in a forum a contractual condition for all professionals and contractors
- send project outlines to HEDQF within 3 months of completion for publication on the web
- send cost analyses to the Royal Institution of Chartered Surveyors within 3 months of completion for publication on the web
- appoint a facilitator and a reporter from within the institution or from the HEDQF register, and conduct a forum about one year after occupation covering the issues in the forum guidelines
- send forum reports to HEDQF for web publication.

### **HEDQF:**

- prepare a business plan
- train of a pool of facilitators and reporters and maintain a register
- design, maintain, and monitor a web-site for forum reports
- analyse reports, extract lessons, and publish good practice guides
- involve the National Union of Students in HEDQF and in the forum and building briefing processes
- monitor any insurance implications with insurance companies
- monitor with HEFCE feedback on the forums and the impact on quality
- develop the forum methodology for refurbishment projects
- refine methodologies in the light of feedback.

### **HEFCE:**

- consult architects, estate directors, and other professionals on the project outline recommendations
- require the conduct of a forum as a condition of future grants
- instigate with HEDQF a review of the whole process every three years.

## 15 Postscript

- 15.1 This report concludes a one-year exercise. It has involved a wide range of parties in participation and consultation. It proposes a methodology that is non-recriminatory and strategic, seeking to promote a more open and creative culture based on forums.
- 15.2 The recommendations outline an initial approach only. The De Montfort team, commissioned by HEFCE through HEDQF to develop a system, had to chart a route that would be practicable as a first stage, acceptable in principle to the diverse parties involved, economical on time, and succinct in dissemination.
- 15.3 The approach proposed is more akin to that of the boards that visit schools of architecture than to the current academic inspections of schools, university departments, or research activities. It is argued that a quantitative evaluation of buildings would be counter-productive, while extraction and dissemination of good practice guidelines can yield rich rewards in quality and probably cost-saving. A strategic review is advocated, covering design, building process, finished building, and its operation.
- 15.4 The authors make no claims to have charted a route, only to have proposed a direction in which to set sail. After that, the recommendations include provision for improving the map and taking regular compass bearings.

## 16 Acknowledgements

16.1 The authors would like to thank:

- HEDQF and its Steering Group for initiation of these studies and steady direction through a potentially difficult area
- HEFCE for its funding and open-minded approach
- institutions who participated enthusiastically
- participants at the May workshop and November symposium who endorsed the work and made crucial observations and suggestions
- advice from Adrian Leaman and Bill Bordass of Building Use Studies; Keith Snook, RIBA Director of Practice; Mike Penton of RIBA Insurance Agencies; Greg Penoyre of the Health Sector DQF, and many others.
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Professor George Henderson, Head of The Leicester School of Architecture

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# Forum guidelines for post-occupancy evaluation of higher education buildings

Higher Education Design Quality Forum

Higher Education Funding Council for England

## Introduction

The **Higher Education Design Quality Forum (HEDQF)** seeks to promote quality in higher education (HE) buildings and brings together professionals involved in the conception, design, briefing, construction, occupation, and management. HEDQF is supported by the Association of University Directors of Estates, the Committee of Vice-Chancellors and Principals, the Royal Institute of British Architects, and the Standing Conference of Principals. Post-occupancy evaluation (POE) of recently completed buildings is one of the ways in which the HEDQF is seeking to promote better quality.

The **Higher Education Funding Council for England (HEFCE)** supports a wide range of building projects each year and is responsible for promoting value for money.

HEDQF and HEFCE are collaborating to develop POEs in order to:

- identify and record good practice
- establish a database and disseminate expertise
- evolve self-assessment methods.

## Format

Current POE techniques include observation and photographic records, interviews, examination of project and building management documentation, and completion of data sheets and questionnaires. The POE is concerned with both the design process and the resulting building and its performance. It is conducted after completion while the building process is still fresh in people's minds, and includes an evaluation of performance based mainly on users' views and experiences, ideally after about a year.

The primary method advocated is a forum; the term indicates that it is not an inquiry or inquisition but a discussion with opportunity for debate and submission of evidence.

The forum is non-recriminatory and asks 'what did you do right?' Indications are that there is far more to be gained by learning from a few good and creative practices than will ever be saved from finding fault and apportioning blame.

For these reasons, each forum is based around one or two intensive days of interviews and data collection, with teams involved in briefing, design, construction, occupation and management. It is presumed that much of this information already exists and that the task is primarily:

- observation, interviews, and data collection
- checking reliability
- evaluating comparatively in context and
- making it accessible to other institutions.

## **Reporting**

The forums are summarised in reports. A draft is made available to the institution which may ask for sections to be amended or deleted or ask for anonymity; this last option would, however, mean elimination of much of the data and so reduce the study's usefulness to others. Forum reports and data contribute to a database of information and recommendations informing future higher education projects.

## Preparatory arrangements and documentation

Institutions are asked to arrange the programme for the forum, normally one day but two days for complex projects or those over £10m.

They are also asked to provide as much of the following data as possible 2 weeks in advance:

- programme and participants
- initial building brief and main developments of it
- campus and site plans
- building plans of each floor marked or coloured to show:
  - main occupier of each area (department or equivalent)
  - main use of each area (teaching, teaching support, staff offices, administration, circulation, services etc)
- list of, or comments on, unusual features of the building
- space utilisation data or space management statistics
- initial planned costs and agreed variations
- cost breakdown and general description of building project using the one-page Concise Elemental Analysis of the Building Cost Information Service of the Royal Institute of Chartered Surveyors
- energy cost data for one year.

Other documentation relating to questions to be posed below should be brought where possible to the forums. It is appreciated that not all this information will be available.

## Forum framework

The forum covers four areas:

- context and design
- construction and cost
- space and management
- environment and sustainability.

## Proposed timetable

0900	Arrive, establish base room, tour of building
1000	Session 1
1130	Session 2
1300	Lunch
1400	Session 3
1530	Session 4
1700	Preliminary feedback to participants.

Session 1 should preferably be context, but the other sessions are interchangeable according to participants' availability. Each session requires participation of between 3 and 6 key people with expertise and with access to further information on the topics.

The questions that follow indicate broad areas of investigation but are a framework or prompts rather than definitive lists or agendas. They have been developed in collaboration with institutions' estate directors but further refinement is an integral part of the process.

## **Context and design**

Questions to explore with university staff responsible for conception and briefing, the architect etc.

1. How did the institution become aware of the need for the project and establish a business case?
2. How was the initial brief formulated, communicated, and developed?
3. How was the institution or department prepared, organised and assisted in playing its role?
4. How were requirements determined and conflicting excessive demands resolved?
5. What key institutional policies affected the brief?
6. Was a feasibility study conducted, and if so, how?
7. How was the site chosen, and were alternatives considered?
8. What statements or actions concerned quality ? How important was cost?
9. Were the quality statements appropriate, were they modified, and were they effective?
10. What was the initial design concept, how was this derived, and are sketches available?
11. Was this concept developed, adapted, or superseded?
12. What were the key dates for recognising need, initial brief, appointing consultants, starting on-site, completion, occupation, operation?
13. Does the building feature in publicity to potential applicants, in seeking research funding, or in institutional, city or regional publicity generally?
14. Is there any evidence that the design quality of the building has provided any benefits?
15. What are the major successes and what recommendations would you make in hindsight?

## **Construction and cost**

Questions to explore with the estates director, finance director, construction manager, building manager, etc.

### Procurement

1. What consultants were appointed and at what stages? How did you decide what were the issues needing consultants? What safeguards did you have on their performance?
2. Were project advisers/managers appointed and, if so, what was their role?

3. Were architects appointed, and if so, by what procedure (eg competition, price, experience, specialism, reputation, prizes, local connection, QA registered, presentation)?
4. What were the criteria for selecting the main contractor (eg price, price guarantees, speed, flexibility, quality, risk, experience)?
5. By what method was the main contractor procured (traditional bills, drawings and specification, negotiated two-stage tender, design and build, management contract, construction management)?
6. What evidence did you have of excellence in these appointees (eg design awards, competition success, published buildings)?
7. Comment on the procurement process adopted on the following criteria:  
value for money, fault minimisation, time, fitness-for-purpose, guarantees, running costs, durability, aesthetics.
8. What advice would you give on establishing good working relationships within the team?

#### Cost control

1. How was the finance available determined initially? Was it fixed, flexible, or uncertain?
2. How was it controlled during the project?
3. What factors or events altered it significantly during the project?
4. Was there any consideration of value added or value engineering?
5. How was the balance between capital and future running costs weighed?
6. How did the final cost compare with the initial estimate?
7. Is there a policy of planned maintenance (eg routine inspection, painting, window cleaning, component replacement)?
8. What significant work has been done since the building was handed over:  
-by the main contractor under the defects liability clause?  
-in response to user needs?
9. Were there any special construction considerations because this was an educational building?
10. What are the successes and what recommendations would you make in hindsight?

### **Space and management**

Questions to explore with estates director, academic, administrative and technical staff, and undergraduate and research students.

1. How were required room sizes and facilities determined and documented?
2. Were space standards used and, if so, have they proved effective tools?
3. What are the numbers of staff and students using the building?
4. What specialist equipment affects space needs and use?
5. How does the building link and interact with its site and neighbours?
6. How was the move pre-planned and moving-in organised?
7. How are timetabling and room bookings organised and does this affect building operation?
8. How is space use managed and optimised and are certain areas over or under-used?
9. How was the degree of openness of the space decided, and is there flexibility/adaptability?
10. Are teaching areas or needs changing due to changes in courses, syllabus etc?
11. How is technology affecting space use?
12. What special provisions are there for disabled users?
13. Are there dual-purpose spaces or spaces working in ways other than those planned?
14. Is space provided for social purposes and informal learning and, if so, does it work?
15. What observations demonstrate that the building is working effectively or ineffectively?
16. Are users proud to be associated with the building?
17. What are the major successes and what recommendations would you make in hindsight?

### **Environment and sustainability**

Questions to explore with the estates director, building manager, consultants, users etc.

1. How is the building heated, ventilated, cooled or air-conditioned?
2. Why was this system adopted?
3. How is heating/ventilation delivered and controlled?
4. What percentage of floor area is used regularly without artificial lighting?
5. What percentage of workplaces have external views?
6. Are blinds required and operational?

7. Are interior finishes adequate and attractive?
8. Have assessments been made of thermal comfort, and is it acceptable?
9. Are noise levels acceptable to building users?
10. Are water supplies metered and is consumption monitored and managed?
11. What are the energy costs per year? What is the energy consumption per sq m?
12. What carbon dioxide emission does this imply?
13. How was energy considered in design stages? Are there any incentives now to save energy?
14. In what ways have the surroundings been enhanced?
15. What are the major successes and what recommendations would you make in hindsight?

#### **Development of the forum**

1. What information/questions were not available, unclear, not answerable, or irrelevant?
2. What information/questions should be added and why would they be useful?
3. Can you recommend any key documents, people, studies, or institutions?

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# Sample report for a post-occupancy forum

## Higher Education Design Quality Forum

date

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### 1.0 Introduction

The Higher Education Design Quality Forum (HEDQF) is one of several groups established to study particular building types, and one of its activities is to conduct post-occupancy evaluations. HE institutions which have recently commissioned, built, and occupied buildings are invited to set up a series of forums with those involved from inception to post-completion, in order to explore why these buildings have been more successful than most.

### 1.1 The forums

The series of forums described in this report deal with:

- briefing
- design and construction
- building management
- staff users
- student users.

The forums were conducted over a single intensive day on behalf of HEDQF by two architects with experience in building-use studies and one quantity surveyor; they are referred to as the DQF Team.

The forums focused on a major science building; the building itself is not described in detail and the professionals involved are not identified in order to preserve anonymity. **The building is widely regarded as successful by all involved in the process and by users. The DQF Team endorse this view, applaud the comprehensive approach taken to the vast range of design and logistical challenges faced, and acknowledge their open and enthusiastic participation in the forums.**

The forums brought to light a wide range of good practice and a number of questions which this report seeks to make overt, leading to recommendations considered of value to HE institutions embarking on similar projects. **Key points are in bold type and the report concludes with general recommendations.**

## 2.0 Summary

The post-occupancy evaluation described in this report highlights a wide range of actions which the DQF Team consider were instrumental in leading to a quality building. These included:

- a clear management and decision-making framework
- a long-term view of flexibility in scientific laboratories
- comprehensive planning of the move and
- the importance of a building's image.

It also highlighted the need for:

- training of university client teams
- inclusion of students in the design development process
- creation of a learning environment
- training of staff to use new facilities and
- reconsideration of internal rooms and disabled access.

The study showed how easily the expertise acquired over a major project can be lost if nobody asks 'what did you do right?'

The study did not identify specific design quality factors but rather, good practices which allowed creative professionals to operate effectively.

## 3.0 Briefing

### 3.1 External parameters

Existing science accommodation was inadequate; building conservation issues were irreconcilable with health and safety requirements; and future course validation was being jeopardised.

### 3.2 Developing the brief

University staff began with a wish list and found that their needs required that the building should virtually fill its site to 6 or 7 storeys. The building was to accommodate several science departments with lecture rooms, large flexible laboratories, research facilities, and administration. Lecture rooms and laboratories were to be based on class sizes of 30 and 60. Social needs were to be catered for elsewhere on the campus.

User groups were established and there were extensive consultation meetings. One senior academic and one senior technical member of staff were given executive responsibility for liaison between university and design team, equivalent to half of their work over two years. **The trust of colleagues, their knowledge of issues across the faculty, the time allocated, and their commitment to the work, were all considered vital ingredients in the success of the project.**

Occupation was just under 4 years from initial brief. **All plans, documentation and correspondence on the project were available for inspection.**

### 3.3 Project management

**The appointment of project management consultants up to tender stage appears to have been crucial in ensuring that all participants were aware of their responsibilities and**

**particularly for information required and deadlines.** This is especially important where estates departments are small and do not have the manpower or expertise to manage large projects. Few of the participants realised at the outset how much detail was required early in the process. The university is not aware of any training for groups undertaking large projects.

**Training is needed in the HE sector to cover the whole process.** This was previously one of the functions of the Institute of Advanced Architectural Studies at York.

The work of the project managers included agreeing the programmes for initial briefing, design, and construction; agreeing a cost plan; making a value-management study; and re-programming when a complete academic department was excluded late in the process.

### 3.4 Financial management

**A realistic budget was set initially and adhered to, but freedom was given within that budget.** There were monthly reports throughout and when first designs were over budget, a complete storey was omitted and planning permission re-negotiated. Subsequent low building costs at the time probably made cost-control easier than usual. The final account was agreed by all parties on the day of completion, a rare if not virtually unprecedented event.

**Tight budgetary control is well established in the university, with budgets permitted to roll-over into the next year and without fear of top-slicing or claw back.** This encouraged staff to act responsibly and, for example, to run down consumables before the move, confident that they could purchase them in the new premises.

## 4.0 Design and construction

### 4.1 Architects

The university governors and academic board decided to launch the project as a design competition. Five practices were invited and three were subsequently paid a fee to prepare and present schemes in competition. A selection was made on the basis of the schemes and of the design attitudes reflected. The winning team chose to present three alternatives to help the university decide what it wanted.

### 4.2 Contractor

The invitation to tender was advertised in the Official Journal of the EC (OJEC). Twelve applicants were short-listed and six submitted tenders. The contractors' employees who would manage the project were asked to make presentations. The contractor was selected on the basis of the total package offered. The winning team included the mechanical and electrical contractors in their presentation.

Examination dates and ensuing restrictions on construction disturbance were written into the contract. **It is important to write as much detail as possible into the tender documents as subsequent additions or even clarifications can be time-consuming and expensive.**

A bar chart was prepared and dates for information and action agreed by all parties. **During construction, a mock-up of a finished room was constructed in order to establish acceptable standards.**

### 4.3 Environmental services

The specialist nature of the building created particular environmental problems. Over 40% of the cost was in servicing and extensive use was made of performance specifications. Components had to be flexible and robust. All services except pipe runs are concealed for cleanliness.

The building was to be comfort cooled with a controlled internal environment to deal with traffic noise, pollution, balanced air pressures required for fume extract, and levels of cleanliness and purity; windows would not be openable as this would unbalance the extractors.

### 5.0 Building management

#### 5.1 Logistics of the move

**Any move of a science building causes disruption and requires a clearly articulated and communicated plan early in the process. The logistics of the move were the responsibility, once again, of the senior academic and senior technician, who had the respect of all concerned and who planned ahead very carefully.** Secretarial support was also vital. The importance of pre-planning is illustrated by the following time-estimates of various aspects of the move:

Planning the move	2 person months
Furniture and fittings	2 person months
Signs	2 person months
Telephones and numbers	2 person weeks
Boxing-up office contents	1 day per person
The move	2 days downtime
Basic setting-up offices	1 day per person
Basic setting-up laboratories	1 week downtime
Research laboratories	6 weeks downtime
De-commissioning	3 person months

Priority was given to getting lecture rooms, teaching laboratories, and IT and audiovisual facilities operational. Research students had to plan experiments carefully in advance to take account of the disruption. Commercial estimates for moving chemicals and for de-commissioning the old building were both rejected in favour of DIY; university staff knew the various substances that had been used and might remain in stores, sinks, and pipes. Early efforts to dispose of unneeded substances were only partly successful, given people's natural hoarding instincts.

### 6.0 Staff users

#### 6.1 Flexible laboratories

**Laboratories were designed for various branches of science with island benches and potential over-provision of services, especially of fume extract.** They appeared to work with few problems but this is a matter for more detailed study; the Government has its own specialist department in this field with several decades of experience. **Flexibility now also embraces multi-media teaching facilities as well as over-servicing.**

## 6.2 Specialist services

Some specialist services took a year to adapt or fine-tune, and some extract systems may be wrongly ducted leading to fumes occasionally entering office spaces. The strategies would appear to be:

- determine early where specialist consultants are required
- closer collaboration with clients to define and design requirements
- accept that the most detailed plans will sometimes misfire.

Environmental control in such a complex building with different patterns of use may need to be more flexible and staff do miss the freedom to open windows in their own space.

## 6.3 Internal space in deep buildings

The accommodation required has resulted in a dense building with limited external views and a lack of orientation cues; staircases are colour-coded to slightly alleviate this problem.

Significant windows could have been placed at viewing level but were raised to pick up the horizontal lines of the adjacent building. Higher windows may reduce distraction during teaching but the lack of any views is frustrating and claustrophobic. **The necessity of wall-space in laboratories is unproved as the space below the high-level windows is largely unused.**

Some staff offices are entirely internal and it may be significant that none was occupied during the DQF Team's tour of the building. Some internal academic and administrative offices have windows into other internal spaces. Administrative space is particularly critical since staff occupy it for long periods. These offices raise issues about the proportion of internal to external volume in deep buildings and the possible need to provide atria or other visual relief. **The provision of totally internal offices must surely be questioned.**

Most staff would prefer individual offices, even if small, and felt shared offices did not work because of distraction and the need for confidential discussions. They also felt that the lack of space for staff to meet informally was a significant omission.

Administrative needs are difficult to predict; the promised paperless office actually means at the moment that paper and computers duplicate systems and increase space needs. There is also difficulty in dealing with students face-to-face while maintaining security.

These issues apart, most staff were very satisfied with the building.

## 7.0 Student users

### 7.1 Briefing

Students were not involved in the briefing process and did not see drawings or models; this may have contributed to more of a 'teaching factory' than a 'learning environment'. **Had they been involved in the briefing, they would have argued for better student facilities**, but are otherwise very satisfied, particularly as it is infinitely better than the previous accommodation. They might have been helpful in deciding laboratory layouts, particularly if models had been used, but are unsure whether or not they could have made a meaningful input. **Procedures need to be developed and training given for the effective inclusion of students in the design process.**

## 7.2 Impressions and image

Students were not told anything of the building in advance and found it confusing at first but this did not unduly concern them. Students loved the old building but recognised that the new one is far more suited to their needs. They like the variety of facades. Whether they had moved from the previous building, or had come directly to the new building, **they were proud to be working in a landmark building that people in the city recognised and liked.**

**The building plays an important part in recruitment, in the university's image in the city, and in attracting prestigious research.** Quality work was going on in the old premises, but the new clean scientific image encourages more appropriate research funding.

## 7.3 Lecture rooms

**The lecture room desks are too small for files and the seating does not allow space for the bags students have to carry around because there are no student lockers. IT and AV facilities are not used by in-house staff; staff development is needed in using new technologies.** Columns block some views. A number of additional smaller seminar rooms are needed.

## 7.4 Other facilities

A library was not included and would not have been appropriate because texts required are highly specialised; however, on-line connection to scientific data is needed.

Students understand that car-parking can never meet demand. However, as the city is level and compact, cycling is appropriate, and more bicycle parking facilities are needed.

**Access for disabled students has been provided but the differences in levels between the existing and new buildings make wheelchair journeys contorted and therefore impossible in the short breaks between timetabled activities.**

Laboratory equipment is always on the move and access for large items of equipment is very difficult. Some of the work surfaces are of poor quality. Twenty-four hour access would be a great help although students appreciate that it is difficult to manage.

## 7.5 Social facilities

The DQF Team felt that the building would have been more conducive to learning if local refreshment and social facilities had been provided, but acknowledge that this would have conflicted with the university's general strategy which must embrace the needs of other faculties. The team identified the following indicators:

- the university policy is to centralise social and communal academic facilities, presumably to improve efficiency and encourage interaction between students of diverse disciplines. However, these facilities are 5-10 minutes' walk away and result in largely ineffective hours between timetabled activities
- the building lacks any designed 'people-space' for use between timetabled activities
- academic and technical staff frequently eat in their offices and in other non-teaching areas
- snack items are sold from a table in a circulation space
- space-use studies at University College London in the late 1960s showed 15% utilisation of dozens of library reading spaces while the utilisation of the reading room beside the student union snack bar was over 80%.

## 8.0 General recommendations

The DQF Team made the following general conclusions and recommendations:

- training is needed for university client teams
- students should be involved in the design and development process
- universities must concentrate on creating 'learning environments' rather than just 'teaching factories'
- members of the project team need to be aware of the processes and information required at each stage, either by appointing project managers or by detailed training
- a realistic firm budget has a stabilising influence
- confidence that money allocated will not be taken away engenders responsible planning
- a senior academic and, where appropriate, a senior technician, who have the trust of staff, should mastermind client efforts
- open access to all documentation can give confidence
- the move requires realistic time and cost estimates, administrative support, and pre-planning of disruption
- flexible laboratories with island benches and additional servicing potential appear successful
- flexible over-provision must be made also of multi-media educational facilities, and staff should be trained to use them
- the need for wall-space in laboratories may not justify lack of external views
- access must be provided for constantly changing equipment
- a mock-up of critical rooms can help layouts and standards to be established
- even with extensive forward planning, some specialist services can take months to refine
- a building's image is perceived as important in recruitment, in the university's status, and in attracting research funds
- lecture rooms must be designed for students carrying files and bags
- disabled access routes must be short in tightly timetabled situations
- study is needed to determine acceptability of offices that are totally internal, or with internal windows, or with high level windows only
- study is needed of social spaces in science buildings to determine whether or not they can be justified on educational or other grounds in expensive highly-serviced space.

**All these recommendations are about creating freedom to operate effectively. Greater probing is needed to identify additional design quality factors.**