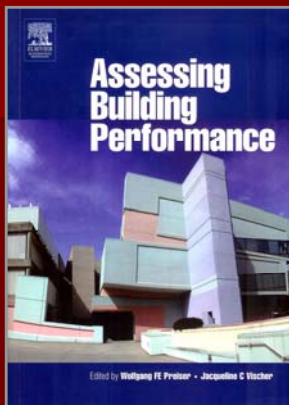




PLAN 548I
Lecture 4:
Building Performance Evaluation
and Post-Occupancy Evaluation
Lineage, Approaches,
Uses and Benefits



- conceptual basis for building performance evaluation
- case studies from Japan, Hong Kong, Netherlands, Germany, UK, Canada, Brazil

Aims of this Lecture

- Basic introduction to concepts of POE and BPE
- Explain how field has developed and current emphasis
- How POEs are used in evaluation of housing and other contexts
- Prepare students to use more detailed materials to design a POE study for this course and ... to do future evaluations without necessarily having to hire a POE consultant
- Promote class discussion about POE approaches for research projects associated with this course
- To prepare students be astute clients of POE consultants

Contents of this Lecture

1. Evolution of POEs
2. BPE: widening the discourse
3. Cases here and there
4. Three types of POEs
5. POE phases or steps
6. Benefits of POEs
7. Good and bad POEs
8. Research methods
9. Management of a POE
10. Products of POEs
11. When to use
12. Lessons
13. Training and what is next?

The Evolution of Post-Occupancy Evaluation 1

- **Late 1960s:** one-off case study evaluations of university dormitories
- **Mid-70's:** first publications with term "POE" in title: *AIA Journal*, 1975
- **1970s and 1980s:** progressed to system-wide and cross-sectional evaluations
- **1980s:** POE activity in UK, Canada, New Zealand, Australia, and US:
 - public works projects
 - government buildings
 - airports
- **Result:** sizeable and significant POE studies

First POE Textbook

- Preiser, Rabinowitz & White (1988), *Post-Occupancy Evaluation*
- companion volume, *Building Evaluation*, published 1989 (Preiser, 1989):
 - case studies from around the world

The Evolution of Post-Occupancy Evaluation 2

- **Early POEs** focussed on residential environments and housing for disenfranchised groups
- Led to systematic assessment of physical environments (how people were using them)
- since targeted:
 - hospitals
 - prisons
 - other public buildings
 - commercial buildings
 - offices

Preiser and Vischer, eds., 2005: 8

Recent US Government Initiatives

- **2001**: National Academy of Sciences revisited topic of POE in symposium, dealing primarily with POE in US Government agencies
- **Book**: *Learning From Our Buildings: A State-of-the-Practice Summary of Post-Occupancy Evaluation* (National Academies Press, 2001).

The early POE framework (Preiser, Rabinowitz and White, 1988)

- 3 levels of effort, degrees of sophistication and data-gathering techniques, cost, staffing:
 - Indicative
 - investigative
 - diagnostic POEs

Building Performance Evaluation (BPE)

- Performance evaluation framework
- Systematically relates buildings and settings to users and their environmental needs
- Represents a conceptual, process-oriented approach
- Accommodates relational concepts
- Can be applied to any type of building or environment
- Framework can be transformed to permit phased handling of information concerning person-environment relationships

Preiser and Vischer, eds., 2005: 7

Evolution of POE towards BPE

- Emphasises holistic, process-oriented approach
- Takes into account:
 - Facilities
 - Forces that shape them
 - Organisational
 - Political
 - Economic
 - Social

Preiser and Vischer, eds., 2005: 8-9

Widening of framework: BPE

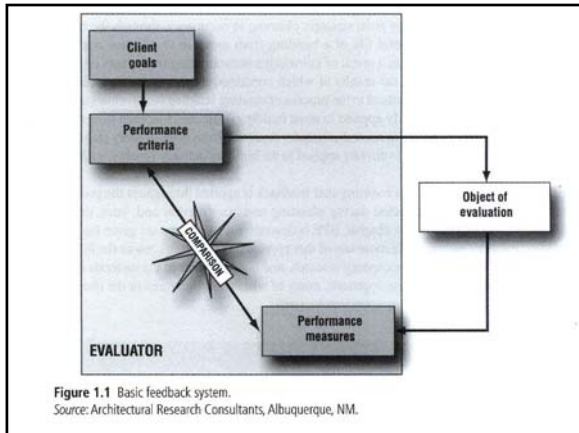
- Include wider range of stakeholders and decision-makers who influence buildings
 - POEs then relevant earlier in design process
- and
- Applied throughout building delivery and life cycle

Widening of framework: BPE

DO NOT WAIT FOR BUILDING TO BE OCCUPIED:

- early intervention helps avoid common mistakes caused by:
 - insufficient information
 - inadequate communication among building professionals at different stages

Preiser and Vischer, eds., 2005: 8



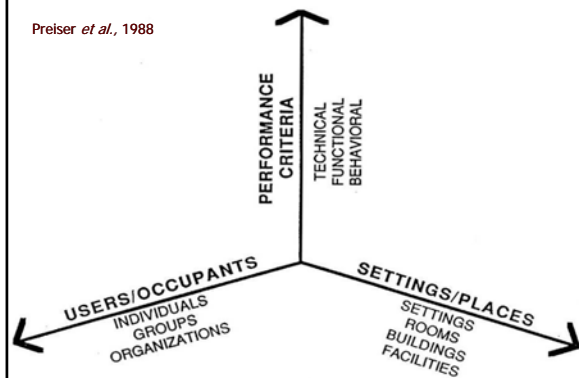
POE as a useful tool

- Applied in a variety of situations
- **Sometimes** results widely disseminated
- **Other times:** uniquely available to client
- Many problems found after occupancy: **systemic**

Preiser and Vischer, eds., 2005: 8

Elements of building performance

Preiser *et al.*, 1988



Cases

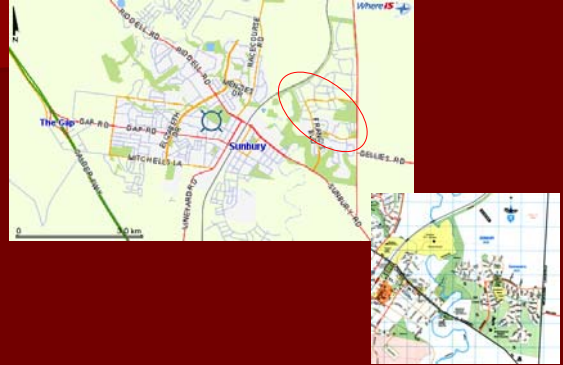


Illustrations of observed behavior patterns



Preiser *et al.*, 1988

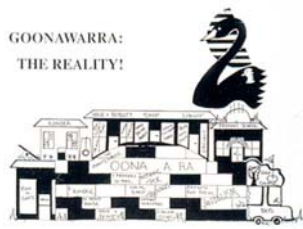
Goonawarra



Broken dreams; one resident's perception
GOONAWARRA:
THE DREAM?

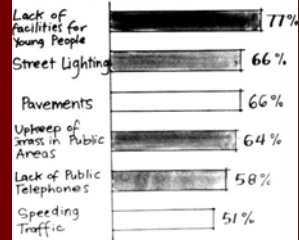


GOONAWARRA:
THE REALITY!



The Politics of Neglect

PROBLEMS IN GOONAWARRA



Life In Goonawarra

Satisfaction



Suitable Marriage Partner for Children



CONTRIBUTORS

- | | |
|---|---|
| GOOD THINGS | WARNINGS |
| <ul style="list-style-type: none"> ⊙ Quiet country living ⊙ Friendly neighbours ⊙ Trees ⊙ Open areas ⊙ Close to shops & Malls ⊙ Golf course ⊙ Space ⊙ Reasonable land values ⊙ Clean Air | <ul style="list-style-type: none"> ⊙ Wind ⊙ Water Quality ⊙ Need-A-Car ⊙ Poor Public Transport ⊙ Poor Maintenance of Drives & Footpaths ⊙ No Recreation Facilities ⊙ Nothing for Teenagers ⊙ Lower Land Value than 'real' ⊙ Smokers from 'old country' |

Minto POE 1983

Housing Issues

2

LIVING IN PUBLIC HOUSING



A report on a Tenants' Evaluation of Medium Density Public Housing in Suburban Sydney

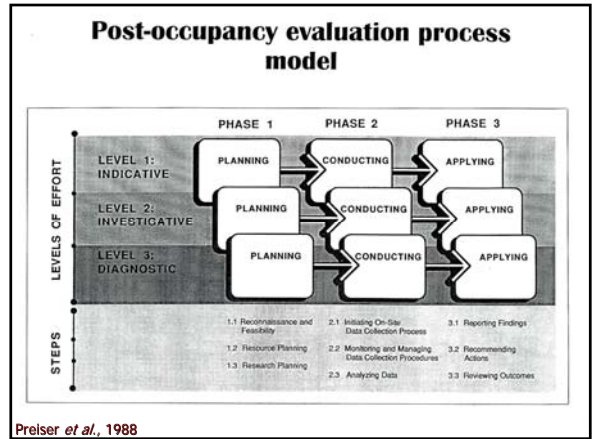
Wendy Sattison and Terry Doherty





Table 11.1: COMPARISON OF HOUSING COMMISSION STAFF OPINIONS AND TENANT RESPONSES, 1982

Category	PERCENTAGE OF TENANTS IN EACH CATEGORY (%)									
	1	2	3	4	5	6	7	8	9	10
1. GENERAL SERVICE	100	0	0	0	0	0	0	0	0	0
2. USE OF COMMON AREAS	100	0	0	0	0	0	0	0	0	0
3. USE OF COMMON OPEN SPACES	100	0	0	0	0	0	0	0	0	0
4. BACK YARD PROVISION	100	0	0	0	0	0	0	0	0	0
5. FRONT PORCH	100	0	0	0	0	0	0	0	0	0
6. SIDE PORCH	100	0	0	0	0	0	0	0	0	0
7. BALCONY	100	0	0	0	0	0	0	0	0	0
8. TERRACE	100	0	0	0	0	0	0	0	0	0
9. STAIRS	100	0	0	0	0	0	0	0	0	0
10. ELEVATOR	100	0	0	0	0	0	0	0	0	0
11. PARKING	100	0	0	0	0	0	0	0	0	0
12. SECURITY	100	0	0	0	0	0	0	0	0	0
13. MAINTENANCE	100	0	0	0	0	0	0	0	0	0
14. CLEANLINESS	100	0	0	0	0	0	0	0	0	0
15. NOISE	100	0	0	0	0	0	0	0	0	0
16. AIR QUALITY	100	0	0	0	0	0	0	0	0	0
17. LIGHTING	100	0	0	0	0	0	0	0	0	0
18. SOUND BARRIER	100	0	0	0	0	0	0	0	0	0
19. VIBRATION	100	0	0	0	0	0	0	0	0	0
20. TEMPERATURE	100	0	0	0	0	0	0	0	0	0
21. HUMIDITY	100	0	0	0	0	0	0	0	0	0
22. AIR CONDITIONING	100	0	0	0	0	0	0	0	0	0
23. HEATING	100	0	0	0	0	0	0	0	0	0
24. WATER SUPPLY	100	0	0	0	0	0	0	0	0	0
25. SEWERAGE	100	0	0	0	0	0	0	0	0	0
26. GAS SUPPLY	100	0	0	0	0	0	0	0	0	0
27. ELECTRICAL	100	0	0	0	0	0	0	0	0	0
28. TELEPHONE	100	0	0	0	0	0	0	0	0	0
29. CABLE TV	100	0	0	0	0	0	0	0	0	0
30. SATELLITE TV	100	0	0	0	0	0	0	0	0	0
31. INTERNET	100	0	0	0	0	0	0	0	0	0
32. SECURITY SYSTEM	100	0	0	0	0	0	0	0	0	0
33. FIRE ALARM	100	0	0	0	0	0	0	0	0	0
34. SMOKE DETECTOR	100	0	0	0	0	0	0	0	0	0
35. CARBON MONOXIDE DETECTOR	100	0	0	0	0	0	0	0	0	0
36. FIRST AID KIT	100	0	0	0	0	0	0	0	0	0
37. FIRE EXTINGUISHER	100	0	0	0	0	0	0	0	0	0
38. EMERGENCY EXIT	100	0	0	0	0	0	0	0	0	0
39. EMERGENCY LIGHTING	100	0	0	0	0	0	0	0	0	0
40. EMERGENCY SHUT-OFF	100	0	0	0	0	0	0	0	0	0
41. EMERGENCY CONTACT	100	0	0	0	0	0	0	0	0	0
42. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
43. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
44. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
45. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
46. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
47. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
48. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
49. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
50. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
51. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
52. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
53. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
54. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
55. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
56. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
57. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
58. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
59. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
60. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
61. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
62. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
63. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
64. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
65. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
66. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
67. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
68. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
69. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
70. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
71. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
72. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
73. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
74. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
75. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
76. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
77. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
78. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
79. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
80. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
81. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
82. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
83. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
84. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
85. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
86. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
87. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
88. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
89. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
90. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
91. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
92. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0
93. EMERGENCY DRILLS	100	0	0	0	0	0	0	0	0	0
94. EMERGENCY EVACUATION	100	0	0	0	0	0	0	0	0	0
95. EMERGENCY ASSEMBLY	100	0	0	0	0	0	0	0	0	0
96. EMERGENCY ACCOUNTS	100	0	0	0	0	0	0	0	0	0
97. EMERGENCY CONTACTS	100	0	0	0	0	0	0	0	0	0
98. EMERGENCY INFORMATION	100	0	0	0	0	0	0	0	0	0
99. EMERGENCY PROCEDURES	100	0	0	0	0	0	0	0	0	0
100. EMERGENCY TRAINING	100	0	0	0	0	0	0	0	0	0



Types of post-occupancy evaluations

Selecting the Appropriate Level of Effort

Indicative POE

- quick
- responsive
- few issues
- good results

Investigative POE

- examined scope
- more depth
- substantive approach

Diagnostic POE

- basic research
- scientific standards
- much cost
- high effort

Determining the POE scope involves choosing one of the three POE levels of effort.

1. Indicative

- indication of major successes & failures
- lasts only a short time
- methods:
 - archives & documents
 - basic performance issues
 - walk-through
 - selected interviews

2. Investigative

- more time-consuming
- often a follow-up in a more detailed & reliable manner
- assessment of literature required
- more sophisticated data collection & analysis techniques
- 160-240 staff hours - plus administrative support



3. Diagnostic

- most rigorous
- multi-method strategy
- several months or years (\$!)
- recommendations long-term, not building-specific
- methodology:
 - involves many variables
 - examine correlation among physical, environmental & behavioural performance
 - can lead to improvements in guidelines and design criteria (such as programs or briefs)

Preiser et al., 1988



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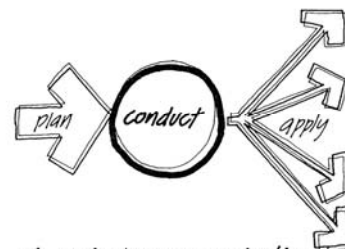
POE Phases or Steps

- 1.Planning:** reconnaissance and feasibility, resource planning, research planning
- 2.Conducting:** initiating on-site data collection process, monitoring and managing data collection procedures, analyzing data
- 3.Applying:** reporting findings, recommending actions, reviewing outcomes.

1. Planning Phase

- **Reconnaissance/feasibility**
 - establish realistic parameters
 - determine scope & cost of study
 - obtain contractual agreement
- **Resource planning**
 - organise resources
 - develop support & cooperation
- **Research planning**
 - develop research plan =>credible & appropriate results
 - establish performance criteria
 - define methods/instruments
 - allocate responsibilities
 - develop quality control procedures

Phase 2: Conducting the POE



The main tasks in conducting the POE are the collection and analysis of data.

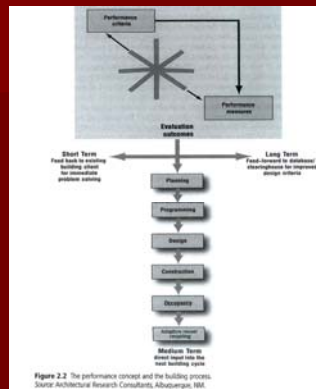
2. Conducting Phase

- **Initiate on-site data collection**
 - prepare evaluation team
 - coordinate timing & location
- **Monitor & manage data collection**
 - analyse data
 - monitor to ensure reliable results
 - develop useful and insightful results

3. Applying Phase

- **Report findings**
 - report results: suitable to client's needs
 - provide clear accurate data
- **Recommend actions**
 - implement feedback/feedforward mechanisms
 - stimulate action
- **Review**
 - monitor life-cycle implications of recommendations

Preiser et al., 1988.



Preiser and Vischer, eds., 2005: 20

Short-term Benefits

- Identification of and solutions to problems
- Proactive facility management responsive to building user values
- Improved space utilisation and feedback on building performance
- Improved attitude of building occupants through active involvement in evaluation process
- Understanding performance implications of changes dictated by budget cuts
- Informed decision making and better understanding of consequences of design

Medium-term Benefits

- Built-in capability for facility adaptation to organizational change and growth over time, including recycling of facilities into new uses
- Significant cost savings in building process and throughout building life cycle
- Accountability for building performance by design professionals and owners

Preiser et al., 1988

Long-term benefits

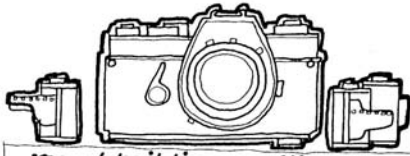
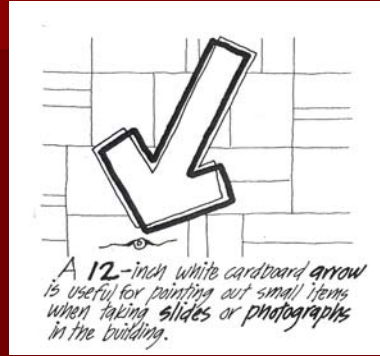
- Long-term improvements in building performance
- Improvement of design databases, standards, criteria, and guidance literature
- Improved measurement of building performance through quantification

Preiser et al., 1988

Another Case



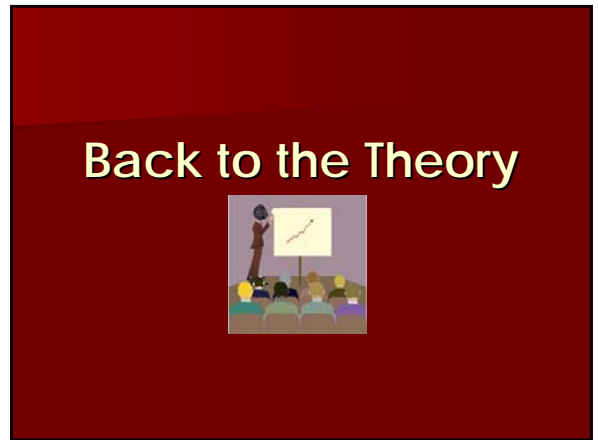
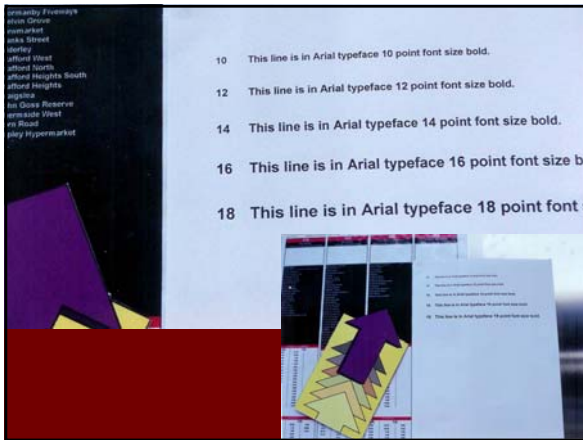
South Brisbane Bus Interchange



- record building conditions and occupant activities
- reexamine building conditions later
- collect behavioral and functional data

Photography is an inexpensive, data-collection tool that provides a number of benefits.





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What makes a good POE?

- appropriate objectives (targeted)
- appropriate scale/scope
- supported/understood by client body/users
- generates directly relevant information: value readily apparent
- 'value for the money'
- findings presented in useful format
- builds on research & contributes to it
- is adopted and acted on (in our dreams...)
- becomes part of the corporate culture

2. What makes a bad POE?

- **Opposite of the above:**
 - *Expensive*
 - *Irrelevant*
 - *Time-consuming*
 - *No impact...*
 - *Not seen as 'best practice'*

3. POE vs. market survey?

- **POE:**
 - assesses environment in use
 - studies the fit or congruence between users' needs and environment
- **market survey:**
 - could include POE component
 - but does not focus on environmental factors exclusively
 - non-users/potential uses also included
- **both approaches are valuable:**
 - POE used more in architecture for redesign & new buildings for same client (e.g. a chain of restaurants)
 - each study generates different information re: demand, patterns of use
 - market survey: value of explaining nonuse

Organisation of a POE 1

1. TIME (%)

	(%)
■ study design	15
■ develop methodology	60
■ conduct study	1
■ analyse data	5
■ write up	15
■ try to get someone to listen	4-15

inexplicable delays 100 *****

Organisation of a POE 2

2. mix of methodologies/sampling
3. context
4. respect for respondents
5. instrument testing
6. interviewers
7. preliminary feedback
8. clear findings --> **ACTION**

Products/Outcomes of POEs in Public Housing

- Guidelines
- Checklists
 - Planning
 - Design
 - Management
 - Briefing/programming
 - Staff development materials
 - Site evaluation forms
 - Tenant participation strategies
 - Data for lobbying Government
 - Public relations
 - Tenants' handbooks
 - Staff morale
 - Allocations procedures
 - Assessment of staff effectiveness & efficiency

When to Use the User-needs Approach 1

1. ***MOST RELIABLE*** IN HOUSING

- everyday use
- tangible requirements

2. ***SOMEWHAT RELIABLE*** IN PUBLIC OPEN SPACE

- ... but ... observations tell only part of the story

When to Use the User-needs Approach 2

3. ***LEAST RELIABLE*** IN LARGE (NON-LOCAL) PARK DESIGN

- infrequent use
- conflicting demands

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Summary of POE Lessons 1

1. attempt only if sincere
2. ensure corporate-level support at highest level
3. locate trustworthy senior-level 'helper'
4. take time to gain trust at all levels
5. select most appropriate method(s)
6. train interviewers thoroughly

Summary of POE Lessons 2

7. involve management staff and residents
8. (or respondents)
9. contact local police and other authorities to reduce local events which could introduce bias
10. undertake survey in the least possible time
11. write questionnaire in plain language
12. pilot-test all materials

Summary of POE Lessons 3

13. translate in relevant languages, as necessary
14. provide 'practical' help to interviewers
15. debrief interviewers thoroughly
16. report back to participants/respondents
17. be prepared for difficulties
18. allocate enough time

3-day POE Training Workshop Format

- Empowers participants to do evaluations of their own facilities without POE consultant
- **Day 1:** POE instruction on methodology and case study examples
- **Day 2:**
 - field data gathering using quick surveys (for larger facilities: administer surveys and analyse before site visit)
 - interviews
 - observation
 - plan annotation
 - photography
- **Day 3:**
 - Draft executive summary report
 - present to senior management

Thorny questions about what's next

- Advocate more investment in knowledge and data base building?
- Is litigation an unwanted but likely consequence of critical scrutiny of building performance?
- Move closer to facilities management?
- Is design-build the answer?
- Who is in control of the building delivery process?
- Should architects take the lead?

(Preiser, 2005)

