

A TOOLKIT FOR HEALTHCARE FACILITY DESIGN EVALUATION – SOME CASE STUDIES

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ABSTRACT:

Service delivery in the healthcare sector is profoundly affected by the built infrastructure provided to support it. In order for a hospital environment to function optimally, a key question is, is the infrastructure “fit for purpose”? This is notoriously difficult to evaluate but, this paper argues, there would be much to be gained from a systematic, reliable and replicable framework for doing so. Internationally, some design evaluation toolkits specifically for healthcare facilities have been developed in an attempt to do just this. Are these methods appropriate in the South African context? Could such a toolkit play a role in enhancing hospital architecture?

After a broad literature review, the AEDET, Qind and NSW HFG Post-occupancy Evaluation contemporary evaluation methods (British, Dutch and Australian respectively) were applied to a selected public healthcare facility in Limpopo Province, Mokopane Hospital. A comparison between the different toolkits reveals some differences, and some common themes in approach. Further study is indicated, but preliminary research shows that, whilst these toolkits can be applied to the South African context, there are compelling reasons for them to be adapted. This paper briefly outlines these three case studies, some preliminary conclusions about which aspects are most promising, and identifies areas for further research and development.

KEYWORDS

hospital, architecture, healthcare, facilities, design, evaluation, South Africa, management, social infrastructure, delivery, building, assessment, GIAMA, fit for purpose, toolkits

INTRODUCTION:

"The basic requirements in healthcare design are that physical environments must be part of a healing process and promote health outcomes."¹

Service delivery in the healthcare sector is profoundly affected by the built infrastructure provided to support it. In order for a hospital environment to function optimally, a key question is, is the infrastructure "fit for purpose"? This is notoriously difficult to evaluate but, this paper argues, there would be much to be gained from a systematic, reliable and replicable framework for doing so.

DEFINITION:

The UK DHSS Health buildings Evaluation Manual of 1985 defines evaluation as "a process of measurement, comparison and interpretation which should influence the planning and design of new buildings through its impact upon briefing and building guidance. It should also improve the functioning of existing buildings."

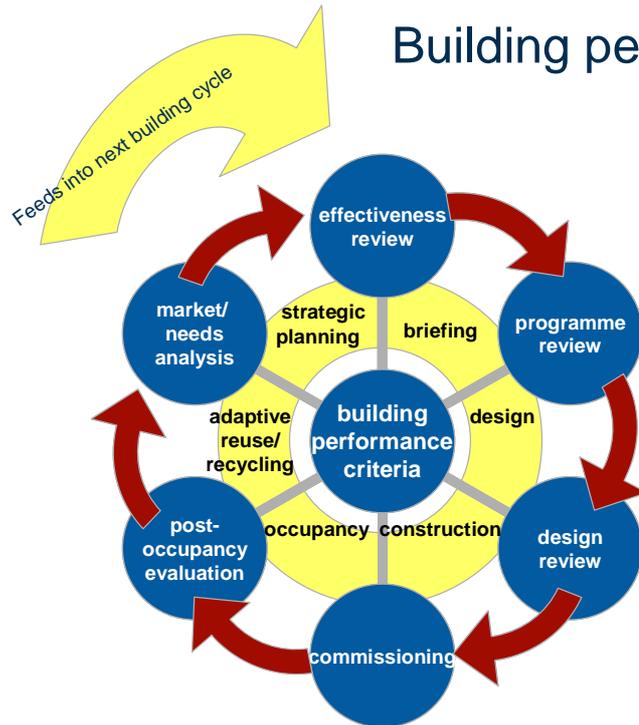
The evaluation methods under consideration in this paper share the characteristic of being systematic, process-orientated approaches to design assessment that can best be conceptualized as part of a data-collection stream, which contributes to a living body of knowledge about local facilities, and which forms an integral part of a feedback system aimed at continuous improvement of physical environments, infrastructure delivery and procurement methods in the healthcare sector.

Methods can target one or more phases of the six phases of a building life cycle (ie strategic planning, briefing, design, construction, occupancy and adaptive reuse / recycling) and can focus on any of a number of particular aspects, for example:

- Service delivery issues,
- Facility functionality,
- Health, safety and security
- Functional efficiency
- Work-flow performance
- Psychological, social, cultural and aesthetic performance
- Condition assessments,
- Procurement processes,
- Compliance with regulations,
- Issues around evidence-based design
- Healing or patient centered environments
- Sustainability issues
- Environmental impact studies

¹ Dilani, A (2001) Psychosocially Supportive Design in Design and Health Swedish Building Council, Stockholm

Building performance evaluation process model



Source: Jay Yocis, University of Cincinnati

- Indicative POE
- Investigative POE
- Diagnostic POE

OBJECTIVES:

- To conduct a desktop enquiry into contemporary work undertaken in the field of building design evaluation.
- To identify opportunities and advantages as well as objections and challenges to implementing an evaluation method for infrastructure in the public healthcare sector in South Africa
- To identify some evaluation methods applicable to healthcare environments for detailed study and testing.
- To apply the models and provide feedback on the potential for use (in modified or unmodified form) for public sector health facilities in the South African context
- To identify areas for further research and development.

OBJECTIONS AND CHALLENGES:

1. Buildings are procured, designed, built and operated each under a unique set of conditions. Furthermore the relationships between buildings, the functions they perform, and the people who use them change over time. Generalized assessment methods are therefore inappropriate and unlikely to succeed. Alternatively, their application may have a sterilizing or impoverishing effect on the design process.
2. Built infrastructure tends to be enduring (adaptation is typically disruptive and expensive to achieve) therefore assessments are unlikely to benefit the buildings under investigation.
3. Who should pay for building performance assessments?
4. Should an assessment reveal that a building is unsatisfactory in some way does this expose the professional(s) concerned to criminal and/ or civil prosecution?
5. Measurements tend to be quantitative, experience is qualitative.

OPPORTUNITIES AND ADVANTAGES:

1. Systematic assessments and feedback loops are potentially a very powerful mechanism for learning from our buildings, avoiding repeating mistakes, and using information to improve the quality of the built environment
2. The Constitution of South Africa, the Health Act, and pending GIAMA legislation entrench values of non-harmful environments, accessible and equitable social

services infrastructure performance monitoring. Objectives such as “achieving value for money”, “providing equality of service” and “improving sustainability” are not meaningfully achievable unless they are defined, measured, benchmarked and refined. These processes arguably require building performance assessment protocols.

3. If assessment processes are standardized and are applied across the board, then these can provide useful data for analytical and comparative work required for strategic planning and managing large estates, such as the health estate.
4. Quantitative assessments can be “calibrated” with qualitative ones so that relationships between measurement and experience can be better understood. Since many factors (culture, and climate for example) have bearing on the built environment it is appropriate that “local” data is collected, analyzed, understood, disseminated and applied.
5. Contemporary technology enables information collection, analysis and dissemination more easily than ever before.

SELECTION OF DESIGN EVALUATION TOOLS FOR TESTING:

The Government Immovable Asset Management Bill (GIAMA) is pending and due for implementation in the near future. It will require that all state-owned immovable assets be aligned with service delivery objectives, and that an asset management plan, complete with performance and condition assessments of immovable assets be compiled.

	Development status			Publication status			Practical details			Prepare	Design	Implement	Finish	Use					
	Well established?	Continuing development?	Technique accredited?	Technique published?	Results published?	Benchmarks available?	Software available?	Easy to do yourself?	Effort level and cost	Verify need	Strategic brief	Option appraisal	Develop design	Prepare to implement	Implement	Complete	Initial operation	Routine operation	Change
BRE Design Quality Method																			
BREEAM (partial)																			
BUS Occupant Survey (partial)	H	H	M	M	H	H	M	M	Var	M	M						H	H	H
CIBSE TM22 energy survey	M	H	no	M	H	H	M	M	Var		M	M		M	M	M	H	H	
HEDQF POE forum	M	L	M	M	L	n/a	n/a	M	H									H	
Learning from experience	L	no	no	H	L	n/a	n/a	M	M	M	H	M	M	H	M	L	H	L	H
AEDET																			
NEAT																			
Probe (partial)	H	H	no	M	H	H	H	L	M								M	H	H
UoD Healthcare POE method Qind	2006	yes		LIC		yes	yes	no	n/a	H	H	M					M		H
NSWHFG POE	2007																		

Source: <http://www.usablebuildings.co.uk/>

Since there are a few relatively mature condition assessment toolkits for healthcare infrastructure available locally², the focus of inquiry targeted methods favoring service delivery issues, and facility functionality. Furthermore, this influenced the favoring of post-occupancy evaluation methods (as opposed to other phases of the building life-cycle).

Three Post-occupancy Evaluation toolkits AEDET Evolution, QIND and NSW HFG POE (post-occupancy evaluation)(British, Dutch and Australian respectively) were selected for testing in the South African context, as they represented relatively established methods, could be easily obtained and were developed specifically for use in health-care environments

² PREMIS, et al

All three methodologies recommend that, depending on the complexity and size of project, the method of data collection could be by questionnaire, interview, by workshop, or a combination of methods.

AEDET Evolution

An attractive and easy to use toolkit, this Excel-based program, developed for voluntary use for NHS building stock in Britain, provides three key areas: functionality, impact, and build standard under which ten aspects are examined in fair detail.



QIND (was translated from Dutch by the author)

This toolkit, not in extensive use, was based on the AEDET toolkit. The resulting radar diagram is legible, and the test can be conducted by anyone.

NSW Health Facility Guidelines Post Occupancy Evaluation

This toolkit, developed for use throughout Australasia, as a part of a comprehensive and constantly updated system of asset management and policy documents. Envisaged as a compulsory process, the POE is to be conducted a minimum of 12 months after completion of a project, and is to be funded from the Capital Works Budget. More asset management focused, this toolkit lacks some of the "softer" patient-centered concerns of the previous two methods.

ASPECTS INCLUDED IN THE METHODOLOGY:

Methods selected made use of techniques that involved interviewing hospital staff. This approach has several advantages and disadvantages:

In utilizing hospital staff, advantage is taken of extensive experience and perceptions that are developed over time, and may provide valuable insight not readily accessible in a brief visit (for example surge capacities). Disadvantages include the subjectivity, inconsistency and reliability of data. This can be compensated for through use of large sample groups, but this may prove onerous on an already stretched staffing body. For this reason, I foresee the evaluation methods developed from here being supplementary to other data collection systems.

ASPECTS OMITTED BY THE METHODOLOGY:

- Condition assessments,
- Procurement processes,
- Compliance with regulations,
- Issues around evidence-based design
- Healing or patient centered environments
- Sustainability issues
- Environmental impact studies

SELECTION OF CASE STUDY:

A level 2 public-sector facility, Mokopane Hospital in Limpopo province³ was chosen as a case study, and each of the selected toolkits were applied to the facility.



METHOD:

A site inspection was undertaken by a team of researchers. The Mokopane Hospital CEO, and a registered nurse were interviewed. The interviewer questionnaires were conducted (in English) first in as close to the original form as possible. Some modification was unavoidable, such as altering “NHS” to read Department of Health. Where necessary, wording of the interview was altered to assist respondents, whose first language was not English. Following the interview process, respondents were informally encouraged to discuss their hospital infrastructure. Respondents were friendly and co-operative, and each interview lasted just under one hour.

After data was collected, it was consolidated into the toolkits, and reports were generated in accordance with respective instructions. The limited sample size and scope of the pilot investigation means that the conclusions offered are preliminary, and require further and more detailed research.

FINDINGS:

Respondents were generally enthusiastic and positive about their work environments. Language and jargon used in the sample evaluation methods made it difficult for respondents to understand a few of the questions. As South Africa has a diverse population and eleven official languages, it may be necessary for any method engaging response of hospital staff to be available in several languages, or it may be appropriate to favor assessment methods which do not rely on feedback (eg observation by trained fieldworkers).

The most striking aspect of the application of these assessment tools was that in certain respects they did not resonate well with the South African situation, or reflect local

³ Thank you to the Limpopo Department of Health and Social Development (F.Faul, and M. Mogadime) for granting permission for this research

concerns and priorities. For example, QIND, (a Dutch tool, in use where the population is shrinking) places quite a bit of emphasis on the adaptability of buildings, their potential for transformation into other functions and flexibility for reuse.

This does not seem to be a priority in our situation.

Conversely, some aspects which can be highly problematic in our hospitals, such as the consistency of adequacy of space provision at Mokopane, for instance, do not become apparent through use of QIND and AEDET Evolution (where data collection assimilates all hospital information). At Mokopane, many of the spaces are quite adequate, but some (notably the ICU) are not easy to use as intended, and are unable to support service delivery. The NSW HFG POE tool, because of its fine grain of data collection (data is collected at planning unit level) is the only tested tool where this becomes explicit. This level of information, in light of our historical inequity and inconsistency in infrastructure delivery may be the most appropriate to attain. The tendency, without this grain of data is for the "good parts" and the "bad parts" to moderate each other so that neither are reflected in the final report.

However, many of the concerns that are common to all assessment methods, accessibility, legibility, space provision, comfort are relevant here. Furthermore, both the QIND and AEDET tools have provision for allocating different weightings or priority levels to different aspects of the tool.

The NSW HFG POE tool will be developed to include procurement (of infrastructure) data – and will thus presumably enable development of area norms. This NSW HFG post-occupancy evaluation has provision to automatically compare areas and constraints to the guideline figures and make explicit excess and shortfalls. This tool is especially impressive in its integration with other asset management strategies, policies, guidelines and processes. It describes its role thus:

“ The process of evaluation is part of a policy of continuous improvement that will continue to ensure the efficiency and effectiveness of current and future health facilities in supporting clinical work practices, provision of physical facilities for an appropriate standard for patient care, and the achievement of best value for money from the associated procurement processes.”⁴

Should a design evaluation toolkit be appropriated for use in the South African context, and particularly if it includes private sector case studies, which are inclined to sometimes be experimental and innovative in nature, it could provide valuable information for establishing benchmarks and where appropriate norms, standards and variances.

POTENTIAL AREAS FOR FURTHER RESEARCH AND DEVELOPMENT:

- Roll out of a selected evaluation method across a range of facilities (various sizes and complexities)
- Deriving benchmarks across a range of indicators (example service delivery)
- Design appraisal, building process appraisal, procurement appraisal
- Development of a South African healthcare design evaluation toolkit
- Development of an integrated evaluation toolkit incorporating some or all issues listed under "aspects omitted by the methodology" above.
- Development of an integrated "clearing house" for collection, co-ordination, analysis of data, and development and dissemination of domain-specific knowledge

CONCLUSION:

⁴ (2007) NSW Health Facility Guidelines, Post Occupancy Evaluation Guideline, Sydney, p1

It seems that whilst the three design evaluation methods tested have strong common approaches, and provide some valuable insight into whether healthcare facilities are indeed fit for purpose, none are directly applicable to the South African context. Whilst it could be argued that a data-collector could do a design evaluation based on a site visit, or that a researcher could use as-built drawings to evaluate a facilities' performance, I submit that there are significant advantages to be gained from asking those "on the ground", including that formulating the built environment becomes a participatory process, at least as one part of data collection.

I believe that with minimal adaptation, the evaluation techniques examined in this study, could form the basis of a highly informative, locally relevant tool.

This study has revealed that the perception of delivery of building as a linear process – strategic planning, briefing, design, construction, next project - is outdated. Modern information systems, environmental consciousness, and systems thinking are pointing the way to a conceptual approach to the infrastructure delivery which is cyclical, holistic and integrated. Whilst there remain obvious challenges and obstacles to incorporating feedback loops in the process of social infrastructure delivery, (such as instilling a no-blame ethos), the advantages of collecting and harnessing information in a systematic, reliable and replicable framework are already being implemented in impressive ways internationally.

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