BEYOND SCORING: ADVANCING A NEW APPROACH TO THE DESIGN EVALUATION OF NHS BUILDINGS

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The engagement of project stakeholders in the design evaluation of National Health Service (NHS) buildings is critiqued to evaluate the current effectiveness of NHS policy which prescribes the use of quantitative, positivist survey instruments to capture stakeholder views. An alternative conceptual framework for design evaluation is presented that privileges the practice of design evaluation as the social interaction of project stakeholders. Empirical evidence from two longitudinal case studies of newly-constructed mental health facilities illustrate the success of this innovative approach in improving patient healthcare outcomes and reducing operating costs. It elucidates and enhances both the praxis and practices stimulated by current approaches to design evaluation. It raises important implications for the future development of UK Government policy to substantively improve the design quality of NHS healthcare buildings and, in turn, improve patient healthcare outcomes.

Keywords: design evaluation, design quality, NHS policy, practice, praxis, social interaction.

INTRODUCTION

UK National Health Service (NHS) organisations have historically experienced policy regimes that seek improved healthcare outcomes, typified recently by Lord Darzi's report (Department of Health, 2008). The design quality of healthcare buildings (henceforth termed 'hospitals') is recognised as an important contributor to healthcare outcomes (Ulrich, 1984; De Jager, 2007). The evaluation of hospital design quality is therefore strategically important to the NHS. It is a key component of prescribed and mandatory NHS design quality policy. Despite this, design quality evaluation has not yet been critically examined. It is argued that, whilst of merit, current approaches are insufficient and in certain aspects problematic. A gulf between the intent, theory and practice of design and design evaluation of NHS hospitals exists. The current NHS process arguably fails to recognise the importance of social interaction between stakeholders engaged in design development.

These issues suggest a need for a new design evaluation approach that seeks enhanced praxis and practice of NHS design evaluation. The new approach must augment current theory by attending to the practices of actors involved in constituting the design. In contrast to the current process, it explicitly regards the nature of the reality of design evaluation as complex, situated, social and contingent.

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CONTEXT

In 2000 the NHS embarked upon a 'once in a life-time' national programme of capital investment into new hospitals that was amongst the largest of its kind anywhere in the world. This 10-year programme has built over 110 new hospitals, 749 primary care schemes and 2848 general practitioner surgeries (Department of Health, 2007). Consistent with New Labour's manifesto, in 2004 it introduced - for the first time in NHS history - a prescribed design quality policy that remains current today. This policy mandates the participation of project stakeholders in iterative design evaluation workshops that must use prescribed design quality instruments (henceforth abbreviated to 'instruments') in an effort to improve hospital design quality.

This policy (including its instruments, published guidance and associated initiatives and directives)[1] are, for the sake of brevity, henceforth termed the NHS's 'Design Quality Project' (DQP). The DQP mandates pre-construction use of instruments (AEDET and ASPECT)[2] at key stages of design progression to iteratively elicit stakeholder 'scores' of predicted design performance-in-use against predetermined criteria derived from evidenced-based design and other notions of 'good' hospital design.

THE MERITS OF THE DQP

An understanding of the merits of the DQP provides an insight into the history of design quality evaluation within the NHS. Francis *et al.* (1999) characterise policy prior to the DQP by a narrow view of functionality that sought standardisation and systemisation of hospital construction to realise economies of scale. Little post-occupancy evaluation took place and research into design quality was limited. Active participation in the project design process by clinicians or public-patient representatives did not exist, either as a policy or as guidance. This narrow functionalist approach proliferated prescriptive design standards and codes that constrained and dictated hospital design practice. It eventually took its toll: Prasad in Macmillan (2004, p. 176) points out that this approach inevitably led to a *"condition where there is so much mediocre and worse-than-average design"* and a need to *"reach in a direct way those commissioning buildings and provide them with the means to raise the game"*. The DQP was a response to these failings. AEDET and ASPECT have been endorsed and used by CABE in nation-wide research studies (CABE, 2008) to assess design quality in particular types of procurement. Prescribed instruments have empowered stakeholders by allowing them to participate with designers at various (including early) design stages. Further aspects of the DQP have mandated 'Design Champions' and 'Design Reviews' (NHS Estates, 2001) and the sponsorship of studies aimed at improving design quality (CABE, 2011). The DQP has raised the profile and significance of hospital design to NHS investment decision makers, NHS staff, members of the public acting as patient representatives, the design community and the wider UK construction industry.

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[1]Typified by NHS Scotland's Design Quality Policy CEL (19) 2010, available at http://www.sehd.scot.nhs.uk/mels/cel2010_19.pdf*[Accessed 16th June, 2011]*

[2] Achieving Excellence Design Evaluation Tool ; A Staff and Patient Environment Calibration Toolkit

A CRITIQUE OF THE DQP'S DESIGN EVALUATION INSTRUMENTS

Despite its influence, several conceptual problems render the DQP flawed as the theoretical basis of its prescribed design evaluation methods is compromised the incommensurability of the theoretical basis of the prescribed design evaluation instruments (AEDET and ASPECT) with the practice of design.

Epistemologically, AEDET and ASPECT are similar. AEDET is theory-based. It is endowed with a theory of architecture developed by Marcus Vitruvius based on Platonic and Aristotelian ideals of beauty and symmetry contained in his architectural treatise, *De architectura libri decem* (Ten Books of Architecture) published c. 15 BC (Vitruvius, n.d.). Vitruvius' theory is conceptually based on an idealistic triad of abstractions that he considered the tenets of design for all 'good' buildings: *firmitas*, *utilitas* and *venustas* (*ibid,* p.17).

Building on the work of Gann *et al.* (2003), NHS Estates, the Construction Industry Council and the University of Sheffield enshrined the Vitruvian triad in AEDET. By therefore being based on ultimately Platonic and Aristotelian ideologies, AEDET is epistemologically universal, rationalistic, atemporal and context-independent. However, by the same token it is also epistemologically confined, narrow and problematic because its theoretical perspective ignores the significant body of literature that contests what counts as *'design knowledge'* (Simon, 1996; Schön, 1995; Rowe, 1991; Krippendorff, 2007). For example, Rowe (1991) conceptualises the form of knowledge used in design as intuitionism. AEDET makes no reference to such design knowledge. Intuitionism is considered a received source of knowledge, which is to say that integrated knowledge may be intuited - acquired - in a 'flash of insight' as a gestalt that is both complete and holistic (Duggan, 2007). This relationship between the design problem and intuition causes Rowe (1991), like Rittel and Weber (1973), to characterise design problems as complex, ill-defined or wicked and messy. This precludes their assessment by a simple, rational theoretical approach such as that of AEDET. Moreover, the narrow theoretical basis of AEDET does not acknowledge literature concerned with the actual practice of architectural design. In practice, such problems require heuristic reasoning embedded in a priori knowledge and experience (Rowe, *ibid*).

The prescribed instrument's conflation of subjectivities and values of stakeholders with notions of the 'scoring' of design quality

Notwithstanding its use to represent subjective values in the DQP, adopting the term 'Impact' as an Anglicisation for Vitruvius's venustas is problematic. The term is an adaptation rather than a translation, as evident from an exegesis of the Ten Books of Architecture (*ibid).* Vitruvius develops venustas to mean "when the appearance of the work is pleasing and in good taste, and when its members are in due proportion according to the correct principles of symmetry" (*ibid,* p.17). It solely concerns matters of visual symmetry and proportion. In a genealogical sense, Vitruvius' conception is consistent with the pervasive ocularcentric paradigm originated by the Greeks in western culture (Pallasmaa, 2005). As used in the DQP, by contrast, the term is concerned with several values and opinions. It is addressed by a total of 22 questions within AEDET, each of which elicits stakeholder scores on subjective matters such as "does this building appropriately express the values of the NHS?"

A further, more substantive fact-value problem is created by AEDET's evaluation of subjective elements when considering 'impact'. Subjective elements necessitate consideration of values, whereas the evaluation of objective elements concerns facts. Values do not lend themselves to measurement by virtue of their inherent subjectivity. This is referred to in the philosophical literature as the 'fact-value problem' (Schwartz 2009). Philosophically, values cannot be quantified objectively: they are always subjective and must be regarded as originating from the first person. When operationalising Vitruvian principles to develop the Design Quality Indicator from which AEDET is derived, Gann *et al.* (2003) acknowledged this problem several times (pp. 319, 320, 322).

Finally, subjective impact scores are simply, but erroneously, agglomerated with further scores addressing functionality and build-quality criteria. The fact-value measurement problem is thus further exacerbated by AEDET's intent to lead stakeholders through a normative 'scoring' of an emerging design solution. Gelser *et al.* (2004) expand on the detrimental consequences of such preoccupations by considering an actuality "reflecting complex social power relations" and the "priorities of the 'experts'" who produced the instrument.

The uncritical use of DQP instruments such as AEDET brings risk. Prasad (*ibid,* p183) identified the "intrinsic ossification of evidence orientated bureaucracies" which provides a good example of what Collier (1994) referred to as 'misplaced concretedness', important design abilities such as creativity; innovation; novelty; that can produce the ineffable; the surprising; the civilising; the rebellious; all risk erosion. None of these considerations are included in the Impact quality field yet they distinguish architecture from mediocre building design (Shai *et al.* 2009; Hatchuel, 2002). If used uncritically as 'quality thresholds' for approval purposes as suggested by CABE (2008), the scores provided by prescribed instruments risk reification.

TOWARDS A NEW APPROACH

Based on the critique above, the several risks stemming from the inherent determinism of the approach and this represents in essence an 'epistemic fallacy' (Bhaskar, 1978). This occurs because the positivist paradigm that sits behind the instruments fails to recognise and identify the depth of the reality (ontology) of design evaluation by effectively conflating and reducing the subjective values of the stakeholders to objective categories. This effectively distorts and flattens the ontology of design evaluation to the detriment of understanding of the nature of design evaluation by the project design evaluation stakeholders.

Towards a new approach

Taking these shortcomings into account a new approach is proposed. The primary aim of this approach is to go beyond considerations of the epistemic incommensurability of what is regarded as 'design knowledge' and problems caused by conflating values with facts with its preoccupation of 'scoring' the designs.

The new approach is grounded in the 'actuality' (Cicmil et.al. 2006) of the practice of design evaluation. In the new approach, design evaluation is viewed as a complex, situated, contingent and adaptive practice that is socially negotiated between the designers and all of the other stakeholders until consensus is reached. Thus, this approach regards the design evaluation as a manifestation of the practice of social interaction of the participants as essentially a form of distributed social accomplishment. It draws on a critical realist paradigm and method described by

Danermark *et al.* (2008, pp.73-114). The point of departure for the underlying paradigm used is that of critical realism. In application this means that design evaluation is regarded in a critical realist paradigm as a) having an objective existence (outside the minds of the design evaluation participants) but, b) such an existence is one that is always mediated by the interpretative views of such participants. Specifically, it is this mediation of theory by, in effect, the social interaction of the design evaluation participants that represents a profound and fundamental paradigmatic difference between the existing NHS process and the new approach in the pursuit of enhanced patient outcomes.

The new design evaluation approach uses a heuristic set of theories and concepts abductively (as a means of theoretical redescription) and retroductively. In the context of design evaluation, this approach amounts to applying multiple theories to serve as a framework for interpretation and as tools for retroduction (see Danermark *et al.* p. 146). This approach asks a fundamental retroductive research question: "what enabling mechanisms are fundamental for design evaluation to exist". An answer to this question led to the new approach being founded upon an investigation of the extent to which the social interaction of the participants involved in design evaluation may, as a fundamental enabling mechanism, influence design quality. This relates to the social interaction and the creation (Krippendorff, 2006) of meaning and understanding between the stakeholders involved in design evaluation and draws on sociological and anthropological literature. In particular, it includes consideration of the synthesis of complexity theory (Bryne, 1998) and theory of practice (Schatzki, *et al.* 2008) .

Three aspects of practice theory considered pertinent to design evaluation are emphasised. First is that design evaluation a situated practice increasingly constituted by information technology, in particular the use of computer assisted design (CAD), computer generated imagery (CGI), building information modelling (BIM) and other modelling, simulation and visualisation (MSV) technologies. The critical observation here is that these technologies serve to transcend the boundaries and influences of the actions of individual designers to permit and encourage the accomplishment of design evaluation as a social activity distributed amongst the participants. Second is the consideration of the role of objects: the practice of design and design evaluation by participants is entangled with the consideration of objects which may be manifest as products and artefacts such as drawings and models, mock ups and physical samples. These distinguish design and design evaluation as embodied skills from routine. The third aspect of practice theory to be emphasised is the role of knowledge in design evaluation. A practice theory perspective avoids the alternatives provided in theories that focus on individuals' *a priori* thinking, or at the level of social norms, or what goes on in language, for example. Knowledge, in theory of practice, is a social accomplishment situated in the on-going routines of bodily and mental activities (Schatzki *et al.* 2008).

Critical realism as a paradigm can be elaborated by its integration with complexity theory (Blaikie, 2009, p. 213). Emergence, a key theme within complexity theory, is most simply described as the relationship which makes it possible for a whole to be more than the sum of its parts. A key element also of critical realism, Bhaskar (1994, p.73) provides a more elaborate definition of emergence within complexity theory that takes on board the relationship between diachronic and synchronic events: this, it is suggested, resonates with the practice of design evaluation. In the practice of design evaluation synchronic events occur simultaneously between the professional designers

and the end-users within design evaluation workshops. They are also, by virtue of the iterative nature of design evaluation workshops held at different times, diachronically linked and thus considered over the design development cycle as supporting notions of emergence and complexity. As Archer (1995) strongly points out, the notion of emergence introduces a time dimension to analysis; emergence is a process. It is suggested that emergence better reflects the reality of the iterative outcome of successions of design evaluation workshops.

As Thomson (2011) points out there is an improbability about the prospect of end-users fully defining in advance their "requirements" from the outset of their participation in the design process. Such activities are rarely simply linear; they involve human beings and therefore will be mediated by human subjectivities, values and motivations. They often be complex and will necessitate involved negotiations in order to reach a consensus.

Introducing new analytical devices

All of the above considerations of complexity, emergence, practice and context that coherently sit within a critical realist paradigm are synthesised by way of introducing a pair of concepts: 'design evaluation as practice' and 'design evaluation in practice.' These analytical devices transcend some of the deterministic, reductionist and individualistic shortcomings of the current NHS design evaluation approach.

Introducing the concept of 'design evaluation as practice' interprets design evaluations as a habitual array of complex human activity distributed and constituted between the participants. As such, the nature of their reality is regarded as being emergent, adaptive, and contingent and one that comprises several elements as articulated by Reckwitz in his definition of an ideal-type of practice theory. Reckwitz defines practice as "a routinized type of behaviour which consists of several elements interconnected to one another: forms of bodily activities; forms of mental activities; 'things' and their use, a background of knowledge in the form of understanding, know how, states of emotion and motivational knowledge" (2002, p. 249).

'Design evaluation in practice' refers to the temporal and contextual aspects of design evaluation. The term acknowledges the emergent nature of design evaluation as enacted in practice. Design evaluation in practice also draws attention to improbability of there ever being a completely satisfactory design in terms of design quality. It points to the reality that when an NHS healthcare facility is built and commissioned and handed over to end-users, the work of design is still not complete. Through their everyday involvement with the design in practice, the end-users continue to be involved in constituting the evaluation of the design and thus seek new opportunities further enhancements.

APPLICATION OF THE NEW APPROACH: TWO CASE STUDIES

The Elmview and Muirview Units: description and context

The case studies comprise the design processes associated with two adjacent mental health units at NHS Fife's Stratheden Hospital near Cupar in Fife, Scotland. These are known as the Elmview and Muirview units. The Elmview Unit was opened in July 2009 and the Muirview Unit in August 2010. Both projects transferred most of the existing staff and patients from Kirkcaldy to Stratheden so for, all practical purposes, the attendant difference in healthcare was caused by the change of physical

environment from old facilities to new facilities. The cases provided an opportunity to investigate the influence of these relocations on the healthcare outcomes of patients and on their visitors and staff all as 'end-users' of these facilities.

The application of the new approach within the design development life cycle

Wotherspoon's (2001) framework for understanding temporal change was adopted and related to the familiar design development life-cycle. Within this framework, the concepts of sensemaking, seeding, negotiation and accomplishment are introduced. They serve as distinct phases through which the new design evaluation approach proceeded in practice. Space only permits an abridged summary as below:

Sensemaking:
Dervin, et. al. (2003) explain “Sense-making reconceptualizes 'factizing' (the making of facts which tap the assumed-to be-real) as one of the useful verbings humans use to make sense of their worlds." Sensemaking is a phenomenological concept focused on enactment (Weick, 2005) . Used in practice, it provided the first step of an action-oriented process that the design evaluation participants were exposed to in order to integrate their identities, tacit knowledge and experiences into the practice of design evaluation. This was achieved by a series of workshop sessions facilitated by the design champion with the design evaluation participants only at this stage. The designers were not invited to these workshops. The decision to exclude the designers at this stage was made to encourage and to allow the participants to rehearse the use of the instruments. It also provided them with an opportunity to ask elementary questions about design and design evaluation without any inhibition or possible embarrassment owing to lack of experience or training in such activities.

Seeding: In this stage, the practice concern was defining and refining the design. This entailed significant use of face to face dialogue and boundary objects (Ewenstein & Whyte, 2009; Luck, 2007) such as drawings and computer generated images to generate a diverse and shared understanding (Valkenburg, 1998) of different design ideas between the design evaluation participants. This was achieved in practice via a series of c. ten separate meetings between the design evaluation participants and the designers in which the importance of face-to-face dialogue was evident (Gorse & Emmitt, 2009), and verified Valkenburgh's (*ibid)* consideration of its role in project management and project organisation in practice as conducive to generating shared understanding. The social interaction of clinician with designers during this stage surfaced the innovative notion of "dementia does not equal inactivity" as a profound and fundamental agreed design principle that significantly influenced a hierarchy and novel provision of circulation space. This notion represented, in effect, an example of how the social interaction between the participants facilitated an exchange of values between the practice of the clinicians and those of the designers. The clinicians, as practitioners of observing and treating patients, brought their notions of how the patients actually use space within the facility. The designers, also as practitioners, brought their values of spatial expertise and of the design domain. Both of these values sets will have been internalised and independently held by the clinicians and designers prior to commencing the design evaluation. However, and as actually observed, it was during the social interaction of these participants, in the course of actually practicing design evaluation, that they were revealed and facilitated the exchange and emergence of the notion.

Negotiation: The negotiation stage focused on the detailed specification of sub-elements of the design (e.g. patient bedrooms, nurse-call stations) and their integration

into the process artefacts (such as drawings and room-data sheets) that collectively constituted the design as a whole. In practice, these artefacts acted in this stage as further, more refined boundary objects playing a key role in reaching a shared understanding of the design as it relates to each of stakeholders. It is during this stage that 'conflicts' are fully articulated and openly debated. The notion of "dementia does not equal inactivity" was refined and manifested in agreed hierarchical use of space ranging from 'private space' (e.g. bedrooms) to 'semi-private' and 'public spaces' promoting varying degrees of social interaction of the in-patients and visitors.

Accomplishment: The Royal Institution of British Architects (RIBA) design development stages 'C' and 'E' reflect formal outline planning and building warrant submissions respectively and were used as milestones for accomplishment. They represented the accomplishment of a negotiated consensus across the diverse perspectives and social worlds of the designers and the stakeholders. At these stages, AEDET workshops were held and the 'design' immediately thereafter was formally 'signed-off'. These practices were regarded as a symbolic act of documented consensus and as a means of complying with the DQP.

KEY RESULTS

For both the Elmview and Muirview units, two key results followed from the use of the new design evaluation approach. The first comprised several prestigious annual national design awards bestowed by independent bodies such as Health Facilities Scotland (an agency of the Scottish Government), the RIBA and the Better Building campaign. Second, and regarded as much more profound, was the improvement in patient outcomes measured by proxy by reductions in challenging behaviour and by feedback from post occupancy surveys and focus groups that characterised high levels of staff and visitor satisfaction. Analysis of statutory incident records in the first twelve months of operational use identified average reductions in challenging behaviour incidents in the order of almost half (46%) and 80% for the Elmview and Muirview units respectively, when compared with the averages over the previous 5 years. A notional average monetary cost of managing each such incident was projected over the anticipated building life-cycle of 50 years to derive yield a total cost avoidance revenue sum. This sum was discounted using established HM Treasury Green Book Net Present Value methods and to give an equivalent present value. Expressed as percentages of the outturn construction costs (which included build costs, fees and VAT) they amounted to savings of 8.5% and 48% respectively for the Elmview and Muirview units. Subsequent analysis after the first year of occupation shows marginally lower levels of challenging behaviour reduction (of the order of 40% and 70% respectively) but with still significant cost savings accruing; the overall reduction being attributed to higher occupancy levels in both units.

CONCLUSION

This paper has addressed shortcomings in the existing NHS design evaluation approach to augment its theory and re-orientate its practice by introducing a new approach with new analytical devices, viz., 'design evaluation as practice' and 'design evaluation in practice'. The successful use of this new approach in two case studies has been illustrated. The approach is clearly capable of providing an input into an appropriate evidence-base that can underpin tools that can show how hospitals impact on patient outcomes. As such it is consistent with the second of Fröst et. al.'s (2010) guiding principles for the development of an international best-practice framework for healthcare buildings. This paper is offered to open up a robust debate about enhancing

and elucidating current NHS design evaluation approaches pursuant to improving the design quality and of hospitals and the healthcare outcomes of the patients that use them. There are clear limitations to the approach espoused here, notably that it is based on only two case studies. Further work is required to generate more empirical insights into the social interaction of the practice of design evaluation.

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