

USER ENGAGEMENT AND QUALITY IN THE DESIGN OF UK SCHOOLS

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For over fifty years, dating back to the Simon report (1944), commentators on the UK construction industry have been lamenting the design-construct divorce and advocating earlier contractor involvement to produce, *inter alia*, better quality buildings. Since 2003 a substantial part of the addition to the value of UK new building stock has been in the form of schools. Most have been delivered through the Building Schools for the Future (BSF) programme and the majority of projects within BSF have been procured under a modified PFI (PPP) system. This of course means that early contractor involvement is a 'given'. Despite this, in 2006 a CABE report on new schools was still critical of their quality. The paper explores whether other factors – in particular the degree and timing of user-engagement – have had an influence on the quality of the end product, and presents a method for testing this.

Keywords: building schools for the future, design process, design quality indicator, user engagement.

INTRODUCTION

In the UK, a large proportion of major projects are now delivered using integrated design: that is, with the lead designer working under sub-contract to the constructor, whose early involvement in the project has become more the rule than the exception (Greenwood *et al.* 2008; Walker *et al.* 2009). This is most obvious in the case of buildings procured under influential public-sector frameworks, such as Building Schools for the Future (BSF) in Education, and ProCure21, in the Health Service. This is precisely the type of approach encouraged by Egan's Rethinking Construction report (Construction Task Force 1998) which, amongst other things, targeted problems that were believed to be the result of the industry's long standing design-construct divides. The change has been enabled by the UK Public Sector's adoption, from the early 1990s, of the Private Finance Initiative (PFI) and its derivatives for funding construction (Saxon 2002; Brady *et al.* 2005; Cardellino *et al.* 2009).

At the same time there has been criticism of the lack of concern for design quality in the 'Egan agenda', and this is well documented by the likes of Gann *et al.* (2003), Saxon (2005), and Macmillan (2006). Indeed, in the case of school-building, the Audit Commission (2003) maintained that the quality of traditionally-procured school buildings was, on average, better to-date than that of PFI schools; with no clear-cut difference between PFI and traditional schools in terms of either their construction or

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running costs. Further criticisms of PFI quality, not specific to schools, have been made by the National Audit Office (2001) and cited in Dewulf and Meel (2004).

This background has formed the basis for a doctoral research project that is investigating the design quality of BSF schools. An earlier publication in which the authors have been involved (Walker *et al.* 2009) started from the hypothesis that the early integration of the contractor into a project's design process results in a better quality project. Subsequently, the study moved away from contractor-integration (which, as already discussed, had clearly become the norm in school building) towards more subtle variations in the early project phases that might account for variations in quality.

This paper presents current findings from the study, which has continued to explore some of these variations, especially different forms and degrees of user-engagement in the early phases of design, and its association with the quality of the end product.

SCHOOL DESIGN AND THE BSF INITIATIVE

In 2003 the Government launched the BSF programme with the aim of renewing all 3,500 English secondary schools during the period from 2005 to 2020 under a programme of 'educational transformation' that will entail an estimated public spend of £52 to £55 billion (National Audit Office 2009: 9). The Government's declared strategy is 'to move from patch and mend spending on individual schools to strategic investment on whole Local Education Authorities estates, and across local authority boundaries' (Number10.gov.uk 2004).

With such a sizeable investment, it is hardly surprising that the quality of completed schools has come under scrutiny. The National Audit Office has produced reports on the BSF Programme itself (e.g. National Audit Office 2009) and individual schools are subjected to a mandatory application of a version of the Design Quality Indicator (DQI) tool that is promoted by the Construction Industry Council, with the support of the Commission for Architecture and the Built Environment (CABE), the Office of Government Commerce and the Strategic Forum for Construction (see Cardellino *et al.* 2009). There has also been a series of design guides and 'Building Bulletins' from the Department for Education and Skills (DfES) and the Department for Children, Schools and Families (DCFS) which replaced it in 2007. These relate to the design of various aspects of the building, including spatial allowances, heating, lighting, floor finishes, toilets and playgrounds.

Attention has also been directed towards the design process under BSF, as opposed to its design content. Regarding the process of building design in general, it is clear that the RIBA Outline Plan of Work, even as recently amended to encompass less traditional approaches (RIBA 2009) insufficiently represents current practice in general (Austin *et al.* 2007) and in particular, the BSF process (Walker *et al.* 2009).

The array of construction and engineering design process models compared in Macmillan *et al.* (1999) are a reminder of the approaches on offer to represent the early phases of the design process. This work fed into the development of a generic framework intended for use by interdisciplinary design teams (Macmillan *et al.* 2001), but Lawson (2006) criticizes this work for its assumption that improving design process efficiency will improve design itself, and that all participants will stick to, rather than detour from the prescribed process more or less at will.

Returning to the BSF design process, published BSF guidance is available for clients (CABE 2002; CABE 2007), school governors (CABE 2003), and stakeholders generally (CABE 2004).

In a study by Cardellino *et al.*, (2009) concerns were raised about the benefits of user participation being regularly lost in BSF projects and doubts were expressed as to how achievable this was. Support in principle for user involvement in design also comes from Woolner *et al.* (2007) who stress that for these good intentions to succeed there should be further research into the management of the BSF design process.

The BSF model

BSF is not a procurement route in itself, as a variety of approaches (including PFI and Design-and-Build) can be used within BSF. Projects and groups of projects are frequently (though not always) commissioned by public-private consortia under a 'LEP' or Local Education Partnership (National Audit Office 2009).

The LEP is an initiative introduced by the government for BSF which Local Authorities are expected to use. It is a "joint venture company", a public private partnership bringing together the local authority, a private sector partner (usually a consortium of private companies including the Main Contractor) and various Limited Liability Partnership Funders (DCSF 2008). This consortium, having been selected through a bidding process which involves engagement with school users (amongst other key stakeholders) in the early phases of design, are selected to produce numerous schemes, usually over a ten year period.

In an industry that has been criticized for many years for discontinuity between its design and construction, the current BSF school-building programme, with its ubiquitous contractor-led design provides an interesting opportunity to examine the impacts of changing the traditional process.

RESEARCH AIM, OBJECTIVES AND METHOD

Based on the above reasoning the present study aims to identify, examine, and analyse key variables in the BSF Schools design process and to seek project-by-project associations between these variables and the quality of the product (as measured by DQI evaluation). Of particular interest is the engagement of users and clients in the early phases of design.

In essence, the research questions are:

1. what is currently going on within the BSF design process?
2. what variables can be observed within different examples of the process?
3. how, if at all, is design quality subsequently affected?

In order to satisfy the first two questions (that is, to build up a meaningful framework of design process variables) a pilot data collection phase was used. Six semi-structured pilot interviews were conducted with key design participants: a Local Authority Architect (LAA); a Project Architect (PA) (i.e. the design leader of the delivery team); a Local Authority Representative (LAR); two Head Teachers (HTs); and a Main Contractor (MC). The perceived importance of user participation was reflected in the desire to include head teachers at the pilot interview stage.

The semi-structured interviews involved the following enquiries relevant to the research:

- Identification of the general "project context" i.e. procurement type, design method used and project complexity;

- Discussion of the specifications / guidelines imposed – how did they work on the project?
- Perceptions of team working: whether the team worked well together and participants were involved at the right time?
- Description of the method and process used to develop the brief / design and whether this worked.
- Consideration was given to the possibility of any bias being introduced into the research as a result of data being collected from projects with a vastly differing dynamic. Thus respondents were selected from (a) Schools only; (b) Secondary Schools only; and (c) only projects where the MC acted in the Design Management role (as apposed to a traditional approach which would drastically alter the organization of the design process).

The findings, discussed later, have provided the basis for six future case studies. The unit of analysis will be individual school projects (6). In each, four key design participants (HT, LAR, MC and PA) will be interviewed; giving 24 interviews in total, and pertinent project documents will be reviewed, as required.

DQI use in the study

The building quality of the six school projects (future cases) will already have been independently assessed using the DQI and this information made available to the researcher. Table 1 highlights the broad conceptual framework, as presented by Gann *et al.* (2003), used to assess building quality and the sub sections within the framework which form the basis for gathering data which indicates building priorities as identified by stakeholders (i.e. clients, users, architects, facilities management etc.). Data is gathered at the briefing stage to gauge aspirations (this is deemed as the tools most useful application), at mid design allowing for measurement against aspirations, at “ready for occupation” (to check original intent achievement) and “in-use” to aid learning on future projects.

Table 1: The DQI data gathering tool sections

Conceptual framework area	Sections within the data gathering tool
Functionality	Use, access, space
Building quality	Performance, engineering systems, construction
Impact	Character and innovation, form and materials, internal environment, urban and social integration.

Figure 1 offers a typical example of DQI data. This is extracted from the cases at the varying points in the process (as discussed above) and compared thus enabling the researcher to execute cross-case comparison of design quality achieved.

Such a ready-made measure of design quality, albeit imperfect, permits the aim of the third of the above research questions, namely whether any of the design process variables identified in the case study projects has had an impact on the building’s design quality.

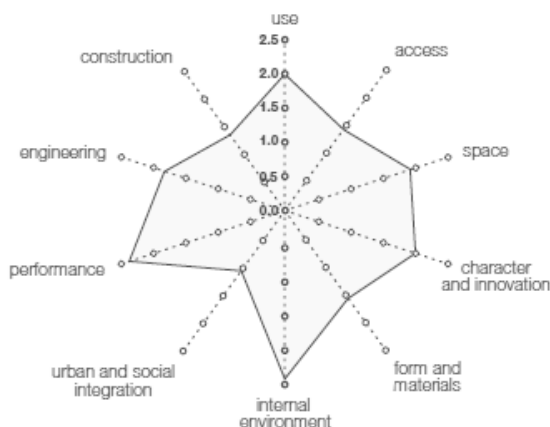


Figure 1: DQI data: Parliament Hill School, Camden London (CIC, 2005).

By bringing together the identified design process variables and the available DQI results for each of the six future case study projects, a model indicating the predicted associate of one with the other can be proposed. The

model will then be tested using information from a larger sample of other BSF schools projects where DQI data are available.

PILOT STUDY FINDINGS AND REFLECTIONS

To begin the data collection, six semi-structured pilot interviews have been conducted with a Local Authority Architect (LAA) and a Local Authority Representative (LAR), a Project Architect (PA) and Main Contractor (MC) from the Project Team, and two Head Teachers (HTs). The semi-structured pilot interviews were directed along the four enquiries described above, and from this standard framework a number of themes emerged. These are dealt with in turn in the following sections.

Procurement type

Respondents typical to those used in these pilot interviews should be able to identify procurement type in future cases. All of those interviewed seemed comfortable in identifying the procurement route used on their specific projects. The Local Authority Representative did advise caution if talking to other individuals on the project; 'We've got some schools within that umbrella [BSF] which are PFI schools, others are Design and Build; there are still people that don't understand what that difference is'.

Language of the process and design methods used

All interviewees (except for the Head Teachers) used language derived from the RIBA Plan of Work to describe the design process: for example, the Project Architect commented that 'On PFI and DandB the foundations might be going in when the Architects are still at Stage D'. However the clumsiness and inadequacy of such classification was occasionally evident, and alternative terminologies have evolved for the BSF process: the Main Contractor referred to a 'Stage 1' (containing a scheme and a cost planning activities) and a 'Stage 2', where the design is developed further – 'a process of building up the design and preparing to enter into contract'. The Local Authority Representative stated 'We tend to talk about outline proposals and final proposals; that's the language we use more in the City [sc. the Local Authority]'. It is feasible that differing participant design language within a project could cause communication barriers and affect process efficiency – the affect of this upon the quality of the buildings is, as discussed earlier, open to debate.

Design standardization

It was evident, from responses of the Local Authority Representative (LAR), Main Contractor (MC) and Project Architect (PA) that, for reasons of efficiency, standard specifications / briefs were common when projects involved more than one school. The Local Authority Architect (LAA) complained that 'one size fits all' BSF solutions had been 'forced' on schools, though both the MC and LAR contested the fairness of such criticism; there was common sense in using standard details but also a big effort in engaging with users and their requirements.

Interestingly, Head Teachers (HTs) from multiple-school PFI projects seemed less concerned than the LAA on this matter. One HT thought that 'lots of things were the same from the contract point of view but once it got down to design then that was done on an individual school basis'. The responses highlight the usefulness of the DQI which can incorporate these varying perspectives that quality has been judged from.

The LAR referred to difficulties when, in a multiple-school project, an individual school ends up with a design or bidder that was not its preferred one. However, one HT was unconcerned at this, saying that in his project 'one school felt their design wasn't as good as the rest of us felt... they preferred the design from another

consortium, but at that stage [prior to selecting bidder] you could go back to all three and say well actually this isn't quite what we are wanting'. One can assume that in this scenario extra effort is required by all participants in the project in order to deliver a building that is perceived to be of suitable quality.

Specification / brief flexibility

The Local Authority Representative (LAR) referred to PfS (Partnerships for Schools) output specifications which the council could imbue with a 'specific flavour'; bringing to bear their own experience of school building. At a school level, flexibility was also evident in the PFI work, both Head Teachers made reference to specifications / standards flexibility which gave them the ability to develop briefs and designs they felt suitable. It will be interesting to discover, after the analysis of DQI data, whether this actually translates into a better design.

A specific reference was made to the use of DCSF Building Bulletins indicating a knowledge of the existence of these documents. The Local Authority Architect's view was that 'teaching staff always want a bigger space than the budget or government will allow' and the LAR commented that some current BSF schools may not be entirely happy due to the 'spatial constraints of Building Bulletins'. Actions which mitigate this issue could be explored should the scenario arise in future cases.

Achieving and maintaining design quality

The Local Authority Architect commented '[in BSF] being able to actually incorporate and design for the usability of particular individuals is going to be very difficult to achieve. For example, a certain type of carpet may work well for various schools and you save money on selection at each school but if it doesn't work well you have magnified the issue'. The Main Contractor (MC) alluded to increased standardization on future schemes: 'I think architects would buy into that [standard detailing]...and said "oh yeah, odd details; funny little windows not really of any benefit"'.⁴

The Project Architect (PA) complained that design quality issues were often 'out of our hands' and referred to proposals for more sustainable building materials being overlooked by the MC. 'Even though the design is for 25 years the capital cost is still the key [and] this is absolute madness!'. Interestingly the PAs ability to affect Design Quality may be compromised.

The capture of design requirements

The Head Teachers (HTs) and the Local Authority Representative (LAR) referred to the input of an independent design consultant to help develop the brief and to vet designs coming back during the bidding stage. The LAR was very positive about the use of a CABE Enabler who worked with schools and assisted in the appointment of a Client Design Advisor (a design consultant endorsed by CABE).

The Main Contractor (MC) confirmed that Client Design Advisors, CABE, Partnerships for Schools (PfS) and PfS Design Advisors all reviewed designs but their involvement changed from Phase 1 to Phase 2 (being less influential in Phase 2).

Both HTs made reference to themselves and the Chair of School Governors as being heavily involved in the briefing process. The LAR also alluded to others in the school, including pupils, taking part in the briefing process. However, pupil input was referred to as 'paying lip service' by the Project Architect (PA) who stated that 'the School or the LEP prevails' [when making briefing / design decisions].

Most interviewees commented on the MC's involvement at design meetings. The PA commented that 'they [the MC] want to see it [i.e. the design proposal] before it is presented to make sure they are not landed with something they can't afford [to deliver]'.

Of particular interest was the use of educationalists in some of the BSF projects, and both the MC and LAR expressed positive views about their inclusion. For example, according to the MC 'we expect the designer or normally an architect at that stage [at the start of design when there is a 'blank canvas'] to lead the process or even an educationalist'. This mandate for specific participants to lead the design process at this point suggests educationalists or designers are best placed to carry out the task. Variants of this scenario and any design quality impact will be of future interest.

All interviewees reported the use of face-to-face meetings when developing the brief or in the subsequent development of the design. When asked what the briefing process entailed one HT commented 'I think my input was probably very important there and it was basically through lots and lots and lots of meetings'.

There was consensus on the reliance upon traditional methods of conveying design information: e.g. marked-up drawings. The LAR commented that 'old fashioned ... drawing information has been very important and we have had to, during the bidding stage, be mindful that some of the wonderful fly throughs that we are shown are there to sell us a product rather than necessarily explain to us what it's actually going to be like'.

This concern was shared by both HTs, one of whom referred to bidders 'selling themselves with the fancy stuff' [3D technology].

The Local Authority Architect (LAA) commented that "the last school I worked on, the head teacher and her staff actually produced a floor plan them selves; a "stylized" floor plan, but it was extremely useful in that it ... gave me the chance to see which relationship between spaces they considered important'. This may suggest an increasing sophistication that has perhaps been the result of the volume and longevity of the BSF programme itself. However, such sophistication (and involvement) comes at a cost to the individual, namely the considerable investment of diverted staff time referred-to by respondents (discussed in the next section).

Most of those interviewed (LAA, HT, LAR) mentioned the value of user groups visiting other schools to see what works well and what may not.

Some useful information, discussed in this section, has been gathered on how user design requirements are typically captured. Face-to-face meetings and traditional drawings predominate but the value of other methods, for example visualizations and site visits will also be investigated in the future case studies. Some typical participants in the BSF design process have been identified and case-to-case variances have begun to emerge; a further understanding of participant involvement and, in particular the mode, timing and intensity of engagement can form part of the ongoing study. Also some prejudices have been supported: including the perceived approach to design by contractors, who have a commercial focus, and of non-expert clients (and other stakeholders) who are suspicious of bidders' motivation behind the use of 3D technology.

Objectives and key success factors

When discussing overall objectives and key success factors a Head Teacher (HT) commented that this was 'the consistency of what we were saying, our sort of vision –

and that everyone had that, everyone connected to the school had that to a certain extent'. This was confirmed by a Main Contractor (MC) who referred to 'everyone [project participants] understanding the School's vision' as the ultimate briefing objective. Perhaps such a 'cohesive vision' provides a better quality product.

The Local Authority Representative (LAR) commented on the improvement he had seen in brief development by schools; 'the modern school's vision talks a lot more about education and what it is they're trying to achieve and they leave it to the Architect to design'. As well as brief content nature, the precise role of the Project Architect (PA) is of interest here. It deviates from the issue discussed earlier relating to the PAs ability to affect Design Quality potentially being limited.

An omnipresent briefing key success factor was the time afforded to users. The Local Authority Architect (LAA) commented that 'the extra workload on top of a normal head teacher's job is quite considerable, so there is a tendency among the parties to say "look we have discussed that – just get on with it please and don't bother me"'.

Both HTs alluded to their secondment away from their normal roles and made reference to the large amount of time required to get the best out of the process. One commented, 'I don't think people appreciate the time it takes, it was very time consuming'. Categorizing and tracking HT time afforded for input into the design process will be a potentially interesting area of examination in future cases.

As revealed by the LAA and one of the HTs, this commitment did not end with the briefing process, 'the ending point was when the building was built'. Though interestingly the LAR and MC alluded to the brief being fixed at a certain point in the process: as the LAR put it, '[the briefing] almost ended at Financial Close for the Phase 1 schools because they had identified what it was that they wanted to see'. The definition of a 'Briefing Freeze' and examination of the presence of this in future cases might be useful here.

CONCLUSIONS AND FURTHER WORK

The study will seek to understand whether the packaging of schemes by an authority has any negative or beneficial impact on deliverables. From the pilot interviews there are clearly advantages and disadvantages in the opportunities for standardization that this affords a chosen consortium. The effect on design quality of 'bundling' projects remains to be seen.

Two other key variables have emerged, and these warrant further investigation at the next stage of data collection. These are (i) variations in the level, mode, and timing of end-user involvement and participant understanding of the process; and (ii) the availability, level, mode and timing of support offered by independent consultants (for example CABE Enabler, Client Design Advisor and CABE and Partnership for Schools Design Advisors). The is in line with Lawson's (2004) view that designers come up with the best solutions only if users are able to articulate a problem properly and with Zeisel's earlier (1984) contention that users and designers rarely succeed in communicating effectively.

The next phase of the study will involve the synthesis of these findings into a model of the BSF design process that captures the key variables as far as they can be identified. Following this will be the identification and selection of six case study BSF School projects. The criteria for selection are that each must afford access to a range of key respondents (typically those identified for the pilot study reported here) and DQI data must be available for each to enable the future investigation of association between

design process variables and design quality. It is hoped that this will form the basis of a further paper in this series.

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