

REQUIREMENTS CAPTURE ISSUES ON THE DESIGN OF PRIMARY HEALTHCARE FACILITIES

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ABSTRACT: Currently in the UK there is a big investment into modernising healthcare delivery. This includes the design and construction of new facilities to provide patient centred services. To allow this, a new national initiative, the NHS LIFT, was set up to provide a new procurement framework for the delivery of primary healthcare facilities. In this context, design plays a major role as the catalyst for change. This paper presents partial results of an investigation into the front-end of design for 4 primary care projects developed under one LIFT partnership. The paper describes requirements capture issues identified through 22 semi-structured interviews. The aim was to capture the way the process was developed as well as the main problem areas. Results describe problems related to the healthcare delivery system redesign, the complexity of structure and multitude of stakeholders, the poor definition of processes and the confusion with roles and responsibilities.

Key words: design; primary healthcare facilities; requirements capture

1. INTRODUCTION

In the UK, there is great concern about improving healthcare outcomes for patients. This is reflected in the healthcare modernisation programme (DOH, 1998), which aims at tackling the root causes of ill health, breaking down barriers between services and making services faster and more convenient. A renewed focus on patient-centred care is a fundamental part of the modernisation programme in the NHS¹. This focus is putting greater emphasis on the need to improve the quality of healthcare environments.

Healthcare environments, by their own nature, are supposed to be spaces for healing. The idea of the therapeutic environment has been discussed for some time and has supporters not just among architects and designers, but also among health providers (Francis, 2002). There is growing interest to support the link between the environment and health, through the proposition that the environment has an influence over the healing process and over health outcomes. As a consequence, the design of healthcare facilities has recently re-emerged to become a major focus in debates over therapy (Gesler et al., 2004). The challenge is delivering high-quality buildings that successfully accommodate clinical interventions and complex medical technology while providing a humane, therapeutic environment (Devlin and Arncill, 2003; Gesler et al., 2004).

In this way, it is believed that design can be the catalyst for change throughout the NHS, by providing appropriate environments that support better health outcomes. Such change includes the delivery of buildings focusing on health as opposed to sickness. It also includes the introduction of participatory techniques so that different perspectives are taken into account during the design of healthcare environments.

In order to allow such innovation, a new procurement framework has been put in place through a joint effort between the Department of Health and Partnerships UK. LIFTs (Local Finance Improvement Trusts) are programmes set up to allow NHS Primary Care Trusts

¹ NHS is the National Health Service in the UK

(PCTs) and their local partner organisations to develop primary care facilities through Public Private Partnerships (PPPs). The new primary care centres should include local clinics and GPs surgeries, as well as other bodies such as opticians and dentists. LIFT projects have a twofold objective, which consist of providing local healthcare buildings and also catalyse the regeneration of deprived urban areas. Therefore, requirements capture for such buildings is challenging and plays a major role in helping the achievement of the modernisation programme objectives.

The initial stages of design (i.e. its front-end) are usually unclear and fuzzy, involving the capture and translation of requirements from different stakeholders, whose cultures and objectives vary often significantly. Many problems have been related to requirements capture in construction projects, and consequently there are substantial benefits to be achieved by understanding and better managing this process.

This paper presents partial results of a research project aimed at understanding the front-end of the design process in primary healthcare projects. To do so the paper briefly presents requirements capture concepts accordingly to the literature. It then describes the research method used to identify main requirements capture problems that occurred in the development of 4 LIFT primary healthcare projects. Research results are then presented in terms of the main issues identified through different stakeholders' perspectives. Suggested improvements for future LIFT projects are also presented.

2. REQUIREMENTS CAPTURE

The origins of the study of requirements capture lie within the new product development body of knowledge. In construction, the client requirements for a building project are defined as part of the briefing process (Shen et al., 2004). Briefing has been long considered as central to a successful project, as inefficient briefs tend to greatly increase the total cost of buildings while not achieving appropriate customer satisfaction.

According to Barrett and Stanley (1999:3-4), briefing should be '*seen as the process running throughout the construction project by which means the client's requirements are progressively captured and translated into effect*'. Construction briefing can be regarded as both a product -the brief- and as a process - the briefing (Ryd et al., 2004). Requirements capture has been defined by Bruce and Cooper (2000:xii) as: '*...the iterative process by which the needs, preferences and requirements of individuals and groups – stakeholders – significant to product development are researched and identified. Requirement capture defines: customer, user and market requirements; design requirements; and technical requirements.*'

Therefore, it involves the gathering of information from specific sources identified as being significant to the development of a building design. Its objective is to create a consistent set of information that represents the composite views of all stakeholders.

Prior research has approached requirements capture from different perspectives. In the product design area, requirements capture has been expressed as a process, and tolls that could be applied during its development have been proposed (Bruce and Cooper, 2000). When applying such tools, sound decision making structures and control mechanisms need to be in place. Bruce and Cooper (2000) also emphasise the need for having one stakeholder with ownership over the requirements. Young (2002) presents a group of requirements gathering tools:

- *Interviews* to gather information. As the predisposition, experience understanding and bias of the interviewee influence the information obtained, the use of context-free questions should be sought;

- *Document analysis*, which can include business plans, vision statements, contracts, requests for proposals, etc;
- *Brainstorming* with stakeholder groups, which should include both idea generation and idea reduction. The former is used to identify as many ideas as possible, whereas the latter rank the ideas into those considered to be more useful by the group; and
- *Requirements workshops* are a powerful technique to reach consensus concerning particular requirements. Through these workshops customers, user representatives and developers can work together to produce consensual requirements specification.

Within the construction domain, traditionally the design and construction processes have been subdivided into stages, and briefing has been considered to be part of the preliminary stages of design (e.g. Suh, 1990; Cross, 1994). However, more recently, briefing started to be approached as a process that extends into the detail design and further to the construction phase (Blyth and Worthington, 2001, Ryd 2004).

Requirements capture has been widely described as problematic in its effectiveness as it is developed in an ad-hoc manner, being usually approached in construction as a static document and not as a process through which requirements and needs are better understood, registered and translated into product specifications (Barrett and Stanley, 1999). Although different research initiatives have been developed to improve the briefing process, current practice is still considered by many as inadequate and has many limitations (Shein et al., 2004).

Improvement areas for briefing have been proposed by linking it with theories of decision-making and uncertainty (Barrett and Stanley, 1999). The first proposed area is empowering the client, so that support is given for an 'effective' client throughout the process. This means supporting the clients describe into words their aspirations and their area of activity. The construction industry professionals should be responsible for understanding and interpreting those needs into a build solution. Clients will have a varying level of confidence and competence to play an active role in the process, therefore different strategies should be used to support diverse clients.

The second improvement area is 'managing the project dynamics', which is related to taking the briefing through to the construction process. It therefore considers that a joint decision making process is involved in briefing, and so the question of how early in the process decisions should be made or whether flexibility should be retained is central to how the process is managed.

Barrett and Stanley (1999) also propose that an appropriate user involvement is an essential component for an empowered client, and the use of visualisation techniques is seen as a way to support clients' decision making process. The final improvement area is team building, which is very closely related to managing the project dynamics.

Research has also been developed focusing more specifically to the requirements capture and briefing process in healthcare design. A UK initiative looking into design briefing has been commissioned by the NHS, and its results are discussed as follows.

2.1. Requirements capture in healthcare

The new generation of healthcare buildings in the UK has been informed by a number of design goals which include a new understanding of healthcare settings as therapeutic environments as well as efficient clinical spaces, and the buildings need to be integrated with their urban surroundings and be accessible to patients (Gesler et al., 2004). Within primary healthcare such goals are even more ambitious, as primary healthcare centres are supposed to be spaces that attract people and therefore promote the health of the population, as well as work as focal points for the regeneration of deprived urban areas. Given such ambitious

goals, the questions of how to better capture requirements and how to evaluate design quality play a major role.

In a partial response to such questions, the NHS has commissioned the 'design brief working group' to provide guidance to trusts in the design brief for healthcare buildings (NHS Estates, 2002). This work has resulted in a guidance document which identifies key areas that must be thought about at briefing, called *basic thinking tool*. The guidance also provides a *map for the briefing process*, and presents a *design quality briefing tool*, which is based on the 'Achieving Excellence Design Quality Evaluation Toolkit' – AEDET (NHS Estates, 2001). AEDET demonstrates the strategy proposed by the NHS to capture and represent knowledge that might be relevant for healthcare design.

The 'basic thinking tool' rightly states that healthcare briefing should take a wider perspective, from strategic inception through to the end of the building lifecycle. It also describes key strategic and design issues, include aspects such as people (or human aspects as the impact of the development at the local community), sustainability, economic (in terms of building value), place (or physical elements of the building, such as site, image and character), and performance (i.e. the effectiveness of the in-use performance of the building).

The process framework describes milestones, briefly highlights skills needs of team members, and portrays the need for control mechanisms and for accountability in terms of achieving cost, time, quality and performance objectives. It has 3 phases: (a) Strategic phase, with four milestones, i.e. service and estate strategy, strategic outline case, outline business case (initial and preferred option); (b) Project phase, including specific project realisation, development updating, project completion; and (c) Operational phase, including project start up and continuous updating until the end of the building life cycle. However, the process is set up at a very generic level and little information is given in terms of activities, responsibilities or timeframes.

More detail is provided in terms of the *design quality briefing tool*. It proposes that design briefing should be developed with a basis on the evaluation criteria proposed in the AEDET framework. As such, it describes three main headings: (a) *functionality*: use, access and space; (b) *impact*: character and innovation, citizen satisfaction, internal environment urban and social integration; and (c) *build quality*: performance, engineering, and construction. A number of detailed issues to be considered under each heading are also presented.

Nevertheless, the AEDET framework itself has been heavily criticised (see Gcsler et al., 2004). The critiques are based on difficulties in using a 1-10 scoring system to evaluate quite complex quantitative judgements about design, as well as with regards to the lack of detailed references to the theoretical and empirical basis which supporting the approach used.

Such critiques can be extended to the briefing advice document (NHS Estates, 2002). Even though the basic thinking tool presents some important considerations for both clients and professionals involved in capturing client requirements, the tool is presented as a list of issues to be considered, and how such issues should be addressed at the briefing stage is not clear. The tool also does not propose any strategy for classifying or ranking requirements. Furthermore, the proposed process is poorly defined, not presenting sufficient information to appropriately support briefing. Perhaps as a consequence of such shortcomings, the extent to which the advice for trusts has been taken on board in practice remains unclear.

3. RESEARCH METHOD

The epistemological option for this research is based on the interpretative school of thought. The research uses qualitative approaches to inductively, deductively and holistically

understand human experience in context specific settings. The research approach adopted is case study in a diagnostic action research mode (Susman and Evered, 1978).

The primary unit of analysis for this study is at the LIFT programme level, focusing on the front-end of the design process. Information about the LIFT programme and in particular the four projects under analysis were collected through 2 to 3 hour semi-structured interviews with key personnel from each stakeholder group involved in the projects. A total of 22 interviews were conducted between June and October 2004, with stakeholders from different levels of the LIFT organisation, including clients and designers. Before the interview, each interviewee received a copy of the research project brief presenting research aims and objectives. An interview protocol containing a list of indicative interview questions also accompanied the brief.

During the interview, confidentiality and anonymity were assured to the interviewees, and all interviews were audio-taped. Also, immediately after the interviews, the researchers filled in an interview summary pro-forma (Miles and Huberman, 1999). This pro-forma followed the format of the interview protocol and included the following broad questions:

- What were the main issues that struck the researchers during the interview?
- Key information on the target questions:
 - Interviewees' background (educational and work experience)
 - Story of the project (involvement of the interviewee in the design process)
 - Accuracy of the requirements
 - Issues/barriers that the interviewee wanted to emphasise
 - Possible improvement strategies suggested by the interviewee
 - Discussion on the interviewee's awareness of good practice
 - Any other issues
- Any other interesting, illuminating or important points noted in the interview.
- Any emergent issues/questions to be followed up in a next interview.

As this research involves multiple investigators, it is important that training seminars take place as the research ensues. Training seminars, according to Yin (1994), involve the constant interactive discussion between multiple investigators regarding a range of issues. Such issues include methodological perspectives of the research, data collection techniques and analytical processes. For this purpose, the interview summary forms completed by each researcher can be seen as a vital exemplar of a tool to assist the conduct of a training seminar. This was also necessary during the analysis, as debates between different researchers' perspectives ensured a more complete and holistic treatment of the research data.

Data analysis was conducted using template analysis. King (1998) noted that "template analysis is a very widely used approach in qualitative research... often referred to by terms such as 'codebook analysis' or 'thematic coding' (p. 118)". According to King, "the essence of the approach is that the researcher produces a list of codes (a 'template') representing themes identified in their textual data. Some of these will usually be defined a priori, but they will be modified and added to as the researcher reads and interprets the texts (ibid.)". It must be said here that although template analysis is a form of textual analysis as mentioned above, King pointed out "it is most often used on transcripts from individual or group interviews (1998: 133)". The next section describes the main findings according to the preliminary analysis, based on the data gathered through the interview summary pro-forma.

4. FINDINGS

Research findings suggest that the main issues in the requirements capture for the four LIFT projects analysed can be related to four main areas, as represented in Figure 1. The whole

