

# IMPROVING THE VALUE OF DESIGN: A QUALITY/COST APPROACH

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The last decade has seen an increased emphasis on quality issues. A renewal of media interest in design issues reinforces the assumption that the inclusion of opinions and attitudes of lay public in the design process can enhance the overall quality of the built environment. Yet it is not enough for designers to investigate public opinions of design quality, they should equally observe their own ideas and perceptions of design quality, explaining why they are advocating particular design solutions.

On the other hand, clients of the construction industry want a commitment to financial targets from all the participants in the construction process. Effectively, all design decisions have cost implications and most of the defects arise through decisions or actions in the design stages. Besides, when completed and in use, its design will have a significant effect on maintenance costs.

This research intends to investigate how designers arrive at a proper balance between quality and costs, in early building design, to reach an integrated solution that constitutes the best value for the client. A questionnaire was used for data collection and analysis, to get a better understanding of the processes involved in achieving good quality building within acceptable cost margins.

Keywords: design, quality, cost, best value

## INTRODUCTION

Connaughton and Meikle (1991) argue that the philosophy of adding value to the client's business raises questions of quality which have been moving up the construction agenda. The Royal Institute of British Architects (RIBA, 1992) promoted, in response to the poor public profile and criticism of the products of the design process, the Strategic Study of the Architectural Profession. In the RIBA study, two main areas of concern are identified: the deficient understanding of user needs and the poor delivery of the design process implementation. Sir Michael Latham (1994), in a report for the UK construction industry, expresses the view that every client has the right to expect high quality from the project it has commissioned. He also argues that every client/user has the right to expect high quality from the project it has commissioned. Furthermore, NEDO (1987) and Connaughton and Green (1996) also defend that value for money cannot be achieved only through cost-effectiveness, as problems can occur at the onset of the design process, if during the briefing proper consideration is not given to the quality that is to be achieved.

On the other hand, Gray (1996) claims that the vital time to influence project cost is during concept and scheme development. Baya and Leifer (1996) also stress that decisions taken during the conceptual design phase of a project have broad and significant effects on both cost and performance. Moreover, Peng (1999) points out

that the problem for every design team is how to achieve a successful synthesis of built form, a balanced solution that relates quality and cost.

The aim of this research is to produce a reliable strategy, for use at an early stage of the design process, which will enable the evaluation of a proper balance between cost and quality, in order to achieve the best value for the client.

## THE DESIGN/QUALITY RELATIONSHIP

People attribute different meanings to the word quality, in distinct contexts. Atkin and Potheary (1994) argue that quality can be differentiated from other parameters by the ambiguity of its definition and the difficulty in its measurement. Seymour and Low (1990) highlight two conflicting trends in the quality debate, depending upon the extent to which quality can be reduced to the level of calculable fact as opposed to its being a matter of judgement and interpretation. Essentially, there are two distinct aspects to consider in quality. Quality can be used to describe characteristics that can be specified and quantified, meaning 'conformance to requirements' for the purpose of providing a rigorous way of controlling the conformance of the product against predetermined goals. On the other hand, quality also means the subjective response to built form, people perception of space, scale, texture, colour and light, the meanings and associations attached by people to places, the way in which people assign aesthetic qualities to their surroundings. This kind of quality is very difficult to deal with, it is essentially a question of perception and consequently a question of characteristics.

Referring to quality in UK buildings, Gray *et al* (1994) contend that the visual and physical quality of many buildings is the result of careful attention to detail by the designers, as the design team is fully involved throughout each stage of the design process. Gray and Hughes (2000) also allude to this unique characteristic of Britain design practice, adding that in the USA, Japan and other European Countries 'much of the resolution of the final detail is left to technical staff and specialist contractors'.

Quality in building design can be defined in very different ways:

The totality of the attributes of a building that enables it to satisfy need, including the way in which individual attributes (external, performance, aesthetic and amenity attributes) are related, balanced and integrated in the whole building and its surroundings (Burt, 1978)

Quality is simply the end-product of properly qualified people taking care (Ferry, 1984)

Quality in building design will embrace all the aspects by which a building is judged including spatial arrangement, circulation, efficiency, aesthetics, flexibility as well as its functional ability as a climate modifier and as a suitable structure (Brandon, 1984)

The totality of features and characteristics of a product, service or process, which bear on its ability to satisfy a given need, from the customers' viewpoint (British Standard: BS 4778, 1987)

Quality is an optimum balance between cost, efficient functioning and aesthetics (Holgate, 1992)

Quality is the attention to detail that produces a crafted product with manufactured components (Gray, 1996)

Some of these definitions are connected with quality assessment and some don't. Some authors seem also to suggest that if people take care, then you do not need to measure the quality of the output. Some define the input and others define the output. The definition of quality is actually a very difficult and ambiguous issue. Seymour and Low (1990) argue that there are intrinsic difficulties in defining quality, as there is no absolute definition of quality. The term quality might be used in association with words and concepts as varied as appearance, fitness, merit, reliability, utility and value (Powell, 1987).

## QUALITY AND VALUE IN BUILDING DESIGN

There is no clear consensus on the meaning of value and how to measure it. Fischhoff *et al* (1980) used the word labile to describe the difficulty we have in specifying our values. The Oxford Dictionary (Thomson, 1996) defines labile as 'subject to change'. The concept of value is prone to argument, as there is no clear consensus of what value actually means or even how it can be measured. Value has a complex and multifaceted meaning, with intricate interrelations.

In the commercial world, value is usually perceived as the relationship between function and price, between project product cost and customer satisfaction. The value of a product may be considered in terms of its functional utility. Value must be measurable and the product must offer value for money, when compared with its alternatives or alternative uses for the resource spent in its provision. In relation to buildings, Broadbent *et al* (1980) argues that "meaning of buildings are all those things which relate to buildings beyond the face value of their physical properties, to all those things in life which people attach significance and value, including purposes, conceptions, ideas and beliefs".

Burt (1978) produced a report on the understanding of quality and value in building, defining value as "quality in relation to cost" and maximum value as an "optimum compromise" between quality and cost. He recognises the difficulty in quantifying the attributes of quality due to its subjectivity, consequently in obtaining an optimum "compromise" between quality and cost. Harrington (1987) relates quality and value, when he describes quality as meeting or exceeding customers' expectations at a price that represents value to them. Moreover, Allinson (1993) points out the 'value-laden' character of the quality concept.

## THE RESEARCH METHODOLOGY

The exploratory nature of this research involved the development of two distinct research methods.

The first phase of this research (Galha, 1998, 1999a and 1999b) involved two stages: an exploratory survey was undertaken, to understand what were the most important quality characteristics of a classroom design, from the users' point of view,

A version of Kelly's repertory grid (Kelly, 1955) was used to elucidate the quality attributes perceived by classroom users, students and staff, in a range of nine different university classrooms. Through Generalised Procrustes Analysis (GPA), a statistical procedure, common dimensions of perception and experience across groups of subjects, were identified. Repertory grid technique allied with GPA is proposed as a flexible tool for the study of proposed architectural environments

Next, to further investigate the relationship between design quality and building costs, a research study was undertaken using Primary Schools as case studies (Galha, 1999c). Hampshire County Council Primary Schools were used for data collection for two main reasons:

Hampshire County's Policy is the achievement of a positive balance between quality and cost.

Users, the public and construction professionals regard Hampshire Schools as excellent, in a quality scale of poor to excellent.

In this phase of the research study, a questionnaire was supplied to Hampshire architects to further investigate whether quality in design of buildings and costs are actually related.

## QUESTIONNAIRE RESULTS

A summary of the architects' answers to some of the questions are outlined below:

### **How do you define quality in design?**

*A good design incorporates creativity, good form, composition and proportion. This applies not only to scheme design, but extends as far as detailing. It must also function well.*

*In detail.*

*It may be considered as turning the dreams and aspirations of a Client into reality and beyond. I once heard of a Client, who responded to the Architect's design solution, by saying that 'he had achieved something that the Client had not believed was ever possible'.*

*Quality in design can be defined as: (1) fulfilment of the requirements within a stimulating environment which offers opportunities to the users, (2) environmental issues integrated into the design, (3) Cost effective and (4) integration of services.*

*The achievement of a totality which is more than the sum of the parts.*

*Simple/elegant use of space. At a smaller scale, well resolved details.*

*A rational response to brief and intuitive response to site that combines tectonic + spatial qualities, thus creating a memorable place for living.*

### **How do you choose between the range of possible building design solutions and arrive at the best one? How do you achieve at an optimum compromise between quality and costs?**

*The decision may be cost driven or it may be evident which design is best. The architect must decide which items to let go of and which to hold on to, in terms of quality, materials, and also which are those items, which matter aesthetically. It is a subjective exercise.*

*Prioritise building elements, compare performances, cost and develop a scheme in close consultation with the Quantity Surveyor.*

*When there is a budget it is necessary to control the building costs. The quality might change in the finishes, but the type of finishes can be accommodated in the costs. You are making a decision fairly early on cost, to design for the lower possible cost. When you are designing, you are looking for the best product for the job, you*

*design for the requirements, underneath there is an understanding, you are designing with a minimum resource cost.*

*The adoption of a final design solution, which may be perceived as the optimum compromise between quality and cost, is only achieved after a very complex programme of considerations, compromises and decisions. The basis on which the design decisions are made can be many and varied and are often a combination of several influences, which need to be brought into equilibrium.*

*By looking at a range of possible solutions, from capital intensive to revenue intensive, and discussing the various trade-offs in the Project Steering Group. The Project Steering Group as a whole will agree the optimum.*

*The architect usually goes for a design that is appropriate to the context + functional while keeping in mind costs (both in terms of short + long, i.e., life cycle costing/maintenance).*

**In your opinion, there is a relationship between quality and costs? Do you think that it is possible to produce quality work and not expensive?**

*Yes, quality usually costs more, as materials that last longer, cost more and to detail well takes longer in terms of design time. However, it is possible to produce quality work, that is not expensive but it requires great skill and probably experience to know what can be used and to put those materials together.*

*Yes, you can make the most raw and inexpensive material beautiful by simply respecting its inherent quality.*

*I think it is true to say that there can be a relationship between quality and cost, in that if more funding is available, it makes for a greater range of options to be available to the designer. However, that is not to say that quality cannot be achieved at low cost. Indeed, amongst my personal list of favourite buildings is a wooden beach hut, which although it only cost a few pounds to construct, was in my opinion a masterpiece of quality design.*

*Cost/quality: experience is a key factor in the achievement of quality within a constrained budget.*

*There is not necessarily a direct connection between quality and cost (you can have high quality at low cost as low quality at high cost). The key is the quality of the design process.*

*Yes, there is a relationship. It is possible to produce quality work which is not expensive through good design and enlightened clients.*

**How do you predict that a design will be high quality and low cost? How do you measure quality and economy of a design?**

*Usually from the materials that are used. All Hampshire schemes are economical since being a public body, we are accountable for every penny spent. Measurement of quality comes from the architect's own sense of aesthetics and from client/end user comments.*

*From experience and first principles you can predict that a design will be high quality and low cost. Quality and economy of a design can be measured through space efficiency and simplicity in its detail.*

*Having determined the desired quality that is expected from the building under consideration, the quality standards can be rigorously prescribed in the contract specification and supporting document. The final assessment as to whether quality has been achieved is largely in the mind of the beholder.*

*By using excellent designers who perceive the importance who perceive the importance of the different client stakeholders' contributing to the design process, and insisting in value for money solutions to all aspects of the project.*

*If the client is open minded and trusting of the architect. It is a start, however it is too hard to predict.*

## CONCLUSIONS

The elusiveness and complexity of the quality concept is well expressed in the distinct definitions of design quality. Architects seem to arrive at an optimum compromise between quality and cost by looking at several distinct solutions and discussing the various trade-offs with the clients and the other members of the design team. It is a process that involves compromises and trade-offs to arrive at an 'equilibrium', at the best solution.

Skilled and experienced designers seem also to be a key asset in the achievement of quality in design. All architects think that it is possible to produce quality work, which is not expensive through good design and a quality design process.

## ACKNOWLEDGEMENTS

This work is supervised by Dr Will Hughes and Prof. Hans Haenlein, at the University of Reading. It is supported by the 'Comissão Invotan - Instituto de Cooperação Científica e Tecnológica Internacional' under Grant OTAN (ref. 6/A/95/PO), for which the author is very grateful.

## REFERENCES

- Allinson, K. (1993) The wild card of design: a perspective on architecture in a project management environment. Butterworth, Oxford.
- Atkin, B. L. and Potheary, E. (1994) Building futures: a report on the future organisation of the building process. Research Paper, Department of Construction Management & Engineering, University of Reading.
- Baya, V. and Leifer, L. J. (1996) Understanding information management in conceptual design. In Analysing design activity, N. Cross, H. Christiaans and K. Dorst (eds), Wiley, Chichester, 151-168.
- Brandon, P.S. (1984) Cost versus quality: a zero game? Construction Management and Economics, 2: 111-126.
- Broadbent, G. H., Bunt, R. and Llorens, T. (1980) Meaning and behaviour in the built environment. Wiley, Chichester.
- Burt, M.E. (1978) BRE report: A survey of quality and value in building. BRE Publications, Watford.
- Connaughton, J. and Green, S.D. (1996) Value management in Construction: a client's guide, Construction Industry Research and Information Association, London.
- Connaughton, J. and Meikle, J. (1991) Quantity surveying 2000 - the future role of the chartered quantity surveyor. RICS, London.

- Ferry, D.J.O. (1984) The role of the building professions in the achieving of quality. In Quality and profit in building design, P.S.Brandon and J.A.Powell (eds.), E & FN SPON, London, 92-8.
- Fischhoff, B., Slovic, P. and Lichtenstein, S. (1980) Kowing what you want: measuring labile values. In Cognitive processes in choice and decision behaviour, Wallsten, T.S. (ed). Erlbaum, Hillsdale, NJ.
- Galha, H.M. (1998) Quality in building design: a case study. In Hughes, W.P. (ed), Procs 14<sup>th</sup> ARCOM Conference, University of Reading, September. Reading: Association of Researchers in Construction Management, **1**: 310-19.
- Galha, H.M.(1999a) Users' quality perceptions in building design: a case study. In Scheer, J.W. (ed), The person in society: challenges to a constructivist theory, Psychosozial-Verlag, Gießen, 239-50.
- Galha, H.M.(1999b) A perceptual appraisal of design quality. In Bowen, P.A.and Hindle, R.D (eds), Procs CIB W65 & W55 International Symposium, Customer satisfaction: a focus for research and practice in construction, Cape Town, September, **2**: 470-80.
- Galha, H.M.(1999c) Economic quality design. In Hughes, W.P. (ed), Procs 15<sup>th</sup> ARCOM Conference, University of Liverpool, September. Reading: Association of Researchers in Construction Management, **1**: 345-54
- Gray, C., Hughes, W. and Bennett, J. (1994) The successful management of design. Centre for Strategies Studies in Construction, University of Reading, Reading.
- Gray, C. (1996) Value for money - helping the UK afford the building it likes. Reading Construction Forum, University of Reading, Reading.
- Gray, C. and Hughes, W. P. (2000) Building design management. Arnold, London, (in press).
- Harrington, H.J. (1987). The Improvement Process. Quality Press, Milwaukee.
- Latham, M. (1994) Constructing the team: final report of the government/industry review of the procurement and contractual arrangements in the UK construction industry. HMSO, London.
- NEDO (1987) Achieving quality on building sites. Building and Economic Development Committee. HMSO, London.
- Peng, C. (1999) Flexible generic frameworks and multidisciplinary synthesis of built form. Design Studies, **20**(6): 537-51.
- Seymour, D. and Low, S. (1990) The quality debate. Construction Management and Economics, **8** (1): 13-29.
- Thompson, D. (1996) The Concise Oxford Dictionary of current English, 9th edn. BCA, London.