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People, places, buildings, spaces – the Design Quality Indicator tool.

Conference : Getting the measure *Baukultur* – pour un espace de vie de qualité
4th and 5th November 2019 at the Pavillon Sicli in Geneva
Parallel session 3: Systematising quality

Summary

The Design Quality Indicator (DQI) is a tool with a 20-year history of enabling stakeholders to specify the level of quality they want from a built environment project, and to safeguard delivery of that quality throughout delivery. The Construction Industry Council is leading an update of the tool in response to current built environment quality issues. This paper outlines how the DQI tool works, the principles behind it and the benefits it delivers. The second part of the paper describes how poor quality in new built environment projects is still a major problem in the UK. Even if the project enjoys good design in drawings, this is insufficient if it is not delivered through the construction and operation of a project. There is also an issue that the design strategy needs to be clear for future modifications, retrofits and refurbishment. Part three describes a current project, looking at how the DQI should be updated and modified, and what measures are needed so that the DQI is more widely used.

(Note: the term "Baukultur" does not translate to English and is not widely used in the UK. In this paper the term "quality" is used as a proxy. The DQI makes a contribution to placemaking by monitoring the "fit" of buildings into their context and can also be used for placemaking projects themselves.)

Part 1 – the current DQI tool

A little history

The Construction Industry Council, the representative forum and single voice for the UK professional bodies, research organisations and specialist business associations in the construction industry, is the custodian of the DQI and trains facilitators to run the tool through a wide range of projects. The DQI was created 20 years ago by academics, clients and built environment professionals to ensure that the quality of new developments was considered alongside the push for lower cost and higher speed of delivery. The DQI exists in three versions; a generic tool adaptable to most building types, a tailored version for health buildings and a tailored version for schools. Each follows the same principles. A version for places was also developed, this was taken under the wing of the Commission for Architecture and the Built Environment (CABE) – now part of the Design Council (UK).

Overview of the DQI tool

The heart of the DQI tool is a set of indicators covering a broad span of quality issues. A wide range of stakeholders are brought together in a workshop and a facilitator uses a series of questions based on the indicators to help stakeholders agree the quality brief for the project. In up to four further workshops the quality brief is used to check progress and monitor the quality of the project during design, delivery and operation. It is recommended that projects use all five workshops, but it is the choice of the client as to which to select.

The briefing stage

At the briefing stage, stakeholders are taken through a series of questions. Each question focuses on a different quality indicator and is written in non-technical language that is understandable to the broadest possible audience. The indicators are arranged under three broad headings:



- Functionality - the arrangement, quantity and inter-relationship of spaces, and how the building is designed to be useful.
- Build quality - how well the building is constructed: its structure, fabric, finishes and fittings, its engineering systems, the co-ordination of all these and how well they perform.
- Impact - a building's ability to delight, to intrigue, to create a sense of place and uplift the local community and environment. Also the design's contribution to the arts and science of building and architecture.

Examples of indicators relating to streetscape.

Urban & Social Integration

- 65 The building should contribute to the neighbourhood
- 67 The building should be sited well in relation to its context
- 68 The area immediately outside should be pleasant
- 69 The landscape around the building should enhance the quality of the neighbourhood
- 70 The building should be well located in relation to local facilities
- 71 The people in the neighbourhood should enjoy the building
- 72 The building should stimulate social and economic regeneration

Form & Materials

- 65 The building should be well composed
- 66 The shape of the building should be pleasing
- 67 The building should be orientated to maximise the advantages of the site
- 68 The forms and materials should be well detailed
- 69 The materials used in the building should add to its quality
- 70 The use of colour and texture should enhance the enjoyment of the building
- 71 The materials used in the external areas should be appropriate to their use and the locality

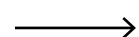
Character & Innovation

- 62 The building should lift the spirits
- 63 The building should reinforce the image of the occupier's organisation
- 64 There should be a clear vision behind the building
- 65 Visitors should want to come here
- 66 The building should be widely acclaimed for its quality
- 67 The building should have character
- 68 The building should make you think
- 69 The building's design and construction should contribute to development of new knowledge

In the briefing workshop, stakeholders are asked to decide whether each indicator is relevant to the project, and if so, whether the project should perform to "required" (compliance with regulation) "desired" (beyond the minimum) or "inspired" (outstanding) performance levels against the indicator. For each indicator they are also asked to decide how success would be measured. The independent facilitator helps to create a consensus and the decisions (often with detailed comments explaining the rationale) are recorded in a quality brief that is used throughout the project to guide design and decision making.

Example of record of the level of quality required for two different indicators and notes

Functionality	Default	Notes	Value
65 The building's layout should provide a good balance of communal and private spaces	Desired	IMPORTANT ISSUE - Many different users will pass through the building during a day with different requirements, behaviours and expectations: the layout and spaces should help to minimise conflict between different user groups	Required
66 The building should contribute to the efficiency of the organisation	Required	The library will generally be staffed by only 2 people – it should be easy to supervise and manage	Required



DQI in the design stage

After the briefing stage two workshops are available when the project is still on paper - at Outline Design (around the time of planning consent in the UK) and Developed Design (when construction commences) these start with technical and non-technical presentations about the design. Each stakeholder is invited to assess how they think the design is performing against the quality brief.

Example of stakeholder rating of indicators in the "Impact" category

Impact

For sections I to L please additionally circle the 3 statements within each section that you feel are the most important for your building

I CHARACTER & INNOVATION

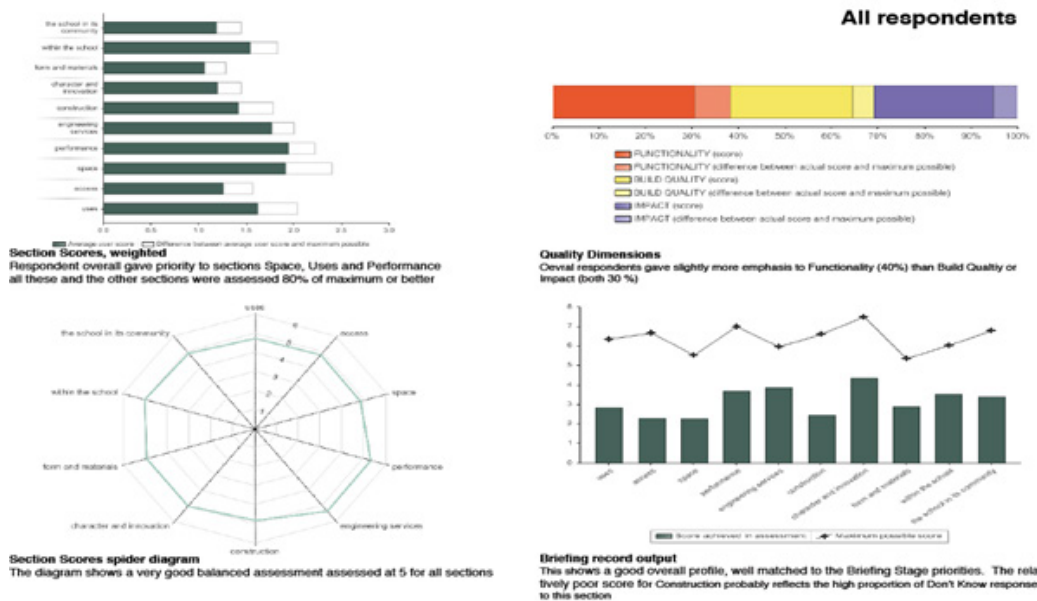
01 The building provides a sense of security	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
02 The building lifts the spirits	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
03 Visitors like coming here	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
04 The building reinforces the image of the occupier's organisation	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
05 The building is widely acclaimed for its quality	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
06 The building has character	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
07 The building makes you think	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
08 There is clear vision behind the building	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
09 The building's design and construction contributes to development of new knowledge	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strongly Disagree, Disagree, Tend to Disagree, Tend to Agree, Agree, Strongly Agree, Not Applicable

Circle the three most important statements (in each section) for your building to achieve. Each question should be scored according to personal opinion about the building/ proposed building.

The independent facilitator combines the findings and shares the results graphically. Result formats include comparing the views of different types of stakeholders, which enables the design team to assess whether and why a particular sector feels differently to other sectors, overall performance against each indicator category, and the score achieved in each category against the total available. This enables scheme strengths and weaknesses to be easily reviewed.

Example of graphically presented results of project quality assessment



DQI in delivery and occupation

Two further workshops are available when the project physically exists: Ready to Occupy (prior to the build- →

ding coming into use) and then In Use. These workshops follow the same format as the previous two, but the participants also benefit from direct experience of the project – either from accompanied tours of the built out but not necessarily completed project, or after occupation.

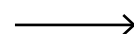
Benefits achieved by projects using DQI

Detailed case study research has not been carried out in recent years; however users and clients report the following benefits from using DQI:

- A straightforward way to assess design quality throughout the project lifecycle.
- Helps client and stakeholders take a wider perspective on quality than they had before they were involved – quote: “Takes all participants beyond what they already know”.
- Creates a better brief - multiple perspectives reduce silo thinking and give detail.
- Speeds up the design process – fewer missed elements means less reworking.
- Stakeholders have different expectations. The DQI ensures that they listen to other points of view, and there is open discussion and reconciliation of opposing perspectives at an early stage. This also helps avoid the trap of the person shouting loudest getting their way, or the design team talking to people separately and having to decide which to please.
- Produces an audit trail of decisions and the design intent – consistency through team or stakeholder changes.
- Risk reduction and assurance – gives the client’s board assurance that independent appraisal has been carried out.
- ... “Produces a better brief, better building and better outcome for users”.

Key principles of the DQI

- **The building is a product, not an output:** The DQI puts the focus on how a building will work, perform and function rather than viewing it as a purely physical outcome.
- **Quality needs to be clearly defined at the start of a project and considered alongside cost and time.** Introducing quality requirements after the budget and programme are set means it will always be subservient and easily sacrificed.
- **It is essential to track progress:** Poor or ill-informed decision making, inadvertent omission and silo working can lead to the required level of quality being missed. Checks against the quality brief at key points in the delivery and operation of a project help bring it back on track quickly and cost effectively.
- **Quality needs to be defined from multiple perspectives:** Different stakeholders have different understandings and expectations of quality in a project. It is important to ensure that the development delivers quality for owners/funders, occupiers and users, those who maintain and operate the building, neighbours and the wider planet. The DQI brings together a wide group of stakeholders to be convened to define and track quality through the project. In a recent hospital project, the stakeholders at the DQI included the Health Authority (funders), consultant cardiologist, infection control lead, ward nurse, patients’ group, receptionist, facilities manager, porter and neighbours.
- **Independent facilitation is important:** Each DQI process is run by an independent, objective facilitator who has experience in delivering built environment projects (and usually of the type of development to be delivered) but has no personal stake in the outcome. The facilitator ensures everyone has their say and provides reports back to the client and design team/contractors after each workshop detailing its conclusions.



- **We should learn from previous projects:** At a recent conference, a reasonably senior M&E engineer complained that all buildings are actually experiments as we rarely learn from projects we have been involved in before, and that no building ever performs as expected. The DQI enables the client, designer and contractor to learn lessons from the finished product as stakeholders assess the quality of the project after it is in use. Additionally, stakeholders participating in the project – from the professional or stakeholder side – learn about quality from the perspective of different groups.

Part 2: The current situation – quality in UK built environment projects

It would be great to say that having the DQI has solved the issue of poor quality built environment projects, but that is not the case. It is used extensively in some sectors (including the NHS) and is well known but the overall number of projects using the DQI is a small percentage of the overall total. There are also still evident major issues with quality in new UK projects. Some examples are given here.

Carbon: Our buildings still do not perform as they are modelled at the design stage. In one study by Van Dronkelaar (UCL) research showed an average of +34% energy consumption in commercial buildings. With the climate emergency, this needs to be tackled urgently. The UK Green Building Council estimates that 80% of buildings that will exist in 2050 are already built, so we also have to tackle retrofit to bring down the carbon emissions from the built environment sector.

Housing: In 2016-17 the National House Building Council paid out £84.8m in insurance claims for problems with new homes. A housing charity, Shelter, reported that 51% of new homeowners experienced major problems with their properties.

Schools: The problem crosses to other sectors. In 2016 a wall collapse in a school revealed significant construction defects including wall safety, roof problems and issues with fire protection in 16 other schools. The independent inquiry concluded that the defects were due to “poor workmanship”, “lack of site supervision”, “lack of proper scrutiny by the client”.

Safety: In 2017 issues with quality led to the appalling tragedy of the Grenfell Tower fire, in which 72 people lost their lives due to a rapidly spreading fire in a high-rise residential building. It followed a refurbishment project 41 years after it was constructed, and residents had complained about safety issues following the refurbishment. The first part of the public inquiry concluded that the refurbishment work did not comply with building regulations, some of the components used (windows) were poorly designed, that there had been poor maintenance of the building and that there was a lack of understanding of the design safety strategy for the building. Dame Judith Hackett was damning in her review and described:

“A cultural issue across the sector, which can be described as a ‘race to the bottom’ caused either through ignorance, indifference, or because the system does not facilitate good practice. **There is insufficient focus on delivering the best quality building possible.**”

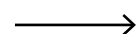
This is at the most basic level of quality/Baukultur, this is about the safety of the building and its occupiers. If we cannot get the basics right, how do we ensure high levels of quality/Baukultur?

Part 3: The Construction Industry Council reinvigoration of the DQI

Investigation and analysis stage

In 2018 the CIC decided to review the DQI to see whether it could play a greater role in delivering quality built environment projects and wanted the definition of quality to include safety. A steering group was brought together which included the NHS as client users of the DQI, the Design Council, the Construction Leadership Council, the Design Council, the DQI manager and a DQI facilitator.

This group reviewed the existing tool, used workshops to explore the issue of quality and where problems arise in the building lifecycle, and looked at other tools and measures which the industry uses to define and embed quality in projects.



Our analysis showed that the DQI is one of several tools related to overall quality, each with strengths in different parts of the building lifecycle. None are used extensively although each has strong support from its users. We found that there are areas of quality which none of the tools were fully addressing. We also looked at new technologies and techniques, which did not exist when some of the tools were developed, for example BIM and Modern Methods of Construction, which may need to be integrated into an updated quality tool.

Four workshops were held around England and were open to professionals from all parts of the built environment industry. One of the questions we asked attendees was where and why quality drains away in a project. The answers given frequently were these:

- Poor brief
- Insufficient budget for requirements
- Poor communication
- When a team changes
- Cost cutting disguised as value engineering
- Lack of knowledge (why something is important – like fire barriers)
- Lack of skill (not knowing how to design or construct or run a building properly)
- Lack of care or incentive (payment is not linked to quality/poor workmanship will not be spotted/ ‘not my problem’)

These are systemic problems and cannot be solved by one part of the industry alone, it needs a whole life-cycle approach.

Development stage

The steering group and CIC concluded that the optimal approach would be to invite the owners/custodians of existing tools to work together to combine the learning and strengths from existing tools in a new tool covering the whole building lifecycle (referred to in this paper as ‘DQI’ but it may be renamed) and to work together to fill the gaps that none of the tools are addressing.

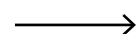
The intention is to create a single method that will work across the whole of the building lifecycle and cover a wider definition of quality. Once the method is defined we envisage that there will be several tools created under this method to suit the needs of different sectors.

The newly formed development group comprises:



Issues that the development group will need to address

In discussions it has become clear that creating a technically excellent tool will not be enough and there are other issues in the built environment system which need to be addressed.



- **Working with clients to get the brief right**

A major issue is that quality is often considered as subservient to the cost and time of the project at the earliest stages. We need to ensure it is not treated as a “nice to have” and is given the same priority as budget and timetable in the brief. It also needs to be clearly defined and responsibility for delivery assigned so that people can be held accountable.

It starts with a good brief – the quality aspirations need to be defined and preferably quantified and costed at the briefing stage. The Construction Leadership Council is developing a new tool which will help clients and their advisors to determine the cost of quality requirements, and it is thought that the DQI method could integrate with this to help inform and upskill the client. We also have to work with clients to help them understand that regulations are the lowest possible standards, not a benchmark of a good project. They are often treated as targets where they are the minimum allowable quality.

- **Broadening the definition of quality in the tool and in the minds of clients**

The scope of indicators within the DQI needs to be broadened, and is likely to include the following:

- Safety
- Climate change and carbon
- Health and wellbeing
- Technologies – SMART and otherwise – for communication and monitoring
- Quantitative monitoring of building performance in operation

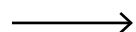
... there may be more.

However, even with an excellent set of indicators a client or stakeholder group can determine that some are not relevant to their project (or ignore poor progress even if stakeholders have included them in the brief!) so we have to look at how the DQI can encourage building owners and funders to take into account the wider quality agenda. It is encouraging that some major funds and insurers are taking steps on climate change and energy efficiency issues as they are concerned about “stranded assets” – buildings that have become undesirable to own or let due to poor quality. Discussions with these groups will help to shape the questions used in the updated DQI.

There are also some more difficult considerations that we need to tackle, including how to set a brief for a client who doesn’t yet exist, for example a homeowner. Speculative building projects without an identified end-user are another scenario we think we will need to address.

- **How people think about costs**

We also need to look at how people interpret costs. The idea that cutting corners on costs results in cost savings is a fallacy. The costs simply get pushed somewhere else into someone else’s budget. Insurers are now telling the industry this, and it is currently difficult to get insurance on some projects. One of the principles of the DQI is getting the design right at the earliest possible stage as the costs of good design to prevent issues is considerably less than the costs of correcting a design problem later in the delivery stage, which is still cheaper than paying the costs of a failure. This is well illustrated in the 1:10:100 ratio.



The indirect costs of poor design – for example blighted neighbourhoods, obesity, flooding, poor educational achievement – dwarf the cost cuttings on schemes. But this cost does not accrue to the project owner. There is work under way in the government to try to ensure that poor design in one part of the public sector does not result in additional costs for another part (e.g. severance of walking routes leading to people using their cars more with negative impacts on health) and although this is outside the scope of the DQI project there may be lessons to learn and ideas to adopt in the tool. We will also look at developments in the statutory planning system and policy as these require consideration of indirect impacts.

There is anecdotal evidence that post occupancy evaluation is not carried out as the supply chain does not wish problems to be identified that it may be liable to fix, and that insurers are wary of liabilities that may be incurred by extended post-completion aftercare. Attributing blame for problems is a legal and technical minefield and is one of the reasons that the supply chain finds it difficult to accept outcome or performance-based targets. We are interested in what we can learn from innovative forms of contract, for example Design for Performance (which by legal contract requires a level of energy efficiency in a finished building), Integrated Project Insurance (in which all parties collaborate and share the risks and incentives on a project) and other ways in which quality outcomes can be contractually obliged but appropriately incentivised and rewarded.

- **Increasing the uptake and use of the DQI**

None of the existing tools has a deep market penetration, and it seems unlikely that the UK government will require the use of a tool, although it is now taking a stronger policy position on design quality. The government has introduced a new National Design Guide to support its push for higher quality aesthetic design and sets out its own components of well-designed places and which “illustrates how well-designed places that are beautiful, enduring and successful can be achieved in practice.”

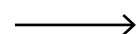


However, in the absence of regulatory compulsion to use a quality tool we have to find other ways to increase the appeal and usage of the DQI. There are a number of levers that we will examine:

- Policy and consent regimes
- External scrutiny (independent design review is already mandated for some major projects)
- Positive motivations (legacy/landmark/-prizes/rivalry)?
- A quality mark or badge award for following a quality process? This could be similar to BREEAM or LEED or WELL – but will recognise a quality process rather than performance in a particular type of quality.

- **Creating a “golden thread” of quality**

The Hackett Report after the Grenfell disaster spoke about the need to create a “golden thread” of quality which runs through the project, and which is also available in the future to inform retrofit or renovation projects. We need to think about how we can further “lock in” the quality brief into the project budget, programme, contracts, design strategies and construction plan, as well as into the operational regime. We will look at whether BIM could be useful for this. It is likely that we will look at the risk points for quality in a project – the RIBA/RICS/CIOB quality tracker has done a lot of work in this area. We will consider whether we should seek appropriate risk mitigation strategies at different points in the project lifecycle.



- **Checking compliance with quality requirements**

One of the key principles of the DQI is that a broad range of stakeholders assess the quality of projects at different phases. This principle is likely to remain, but it seems likely that there will be a need for additional technical checks, and the new tool will need to fit with existing planning and building control checks, and the post-Grenfell proposals for fire safety duty holders as they are implemented. We also need to look at maintenance and upkeep requirements, particularly in the public realm or for shared infrastructure such as district energy or SMART technologies.

- **Usability and usefulness**

We are also very aware that the tool cannot become a 'tick box' exercise, and nor should it stifle technological or design innovation – it is a truism that people prefer what they know and see risk in change. There is also a need to ensure that the tool is useable and does not unduly slow the process and delivery of the project.

- **Learning lessons from projects – continuous improvement**

Post occupancy evaluation (PoE) techniques and tools have been around for a long time but are not widely used. There is a strong argument that it is a must to learn the lessons of success and failure of projects. On a trip to the Baukultur conference I had three text messages asking me to rate my hotel before I had been there 36 hours, why does this not happen in buildings? There are likely to be transferable lessons from other industries, particularly retail.

For the built environment sector, several questions arise:

- How do we track the performance of the building over time, and particularly if changes are made so that their impact can be tracked?
- Where should the information from the POE go? How do we get it back to all the different parts of the supply chain so they can use it? If there are changes in the design team, for example in a design and build project, who is responsible for which elements?
- We have tools for buildings, how do we deal with places and spaces and which stakeholder should we ask?

Concluding thoughts

Quality/Baukultur should not be optional, it is an imperative. **Getting it wrong costs lives and blights lives.** Reliance on compliance has not achieved quality, and measures are needed to clearly define and lock quality into the project lifecycle in a systemic approach. Evidence shows providing a tool, however good, is not enough and we have to find a way so that project funders and owners (want to) use it so the supply chain follows suit.

Our analysis thus far shows we need collaboration, shared outcome/performance-focused goals, checkpoints and responsibilities, and realistic briefs and budgets. This requires us to look at contracts and insurance too.

The organisations involved in the reinvigoration of the DQI think this is a real opportunity to successfully tackle the quality issue in the UK built environment. We don't yet have all the answers, but we think we have identified the questions we need to answer.