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QUALITY OF DESIGN AND USABILITY: A VETRUVIAN TWIN

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Abstract
This paper explores different indicators of quality of architectural design that are used in debates and design appraisals in the Netherlands. In addition to the old Vitruvian trilogy of *utilitas*, *firmitas* and *venustas* a plea is made for a broad view on quality of architectural design. Because buildings go far beyond "free art", in particular usability and the user's point of view should be one of the issues to include in design quality indicators. The theoretical framework of quality indicators has been used to reflect on the criteria that were applied to select the architect of the new Deventer Town Hall plus library. A comparison of theory and practice shows that an integral multi-criteria quality assessment, personal preferences and interests, and practical constraints such as limited time, money and information are at odds. At the same time integrated assessments of designs (ex ante) or buildings-in-use (ex post) are essential to build up a body of knowledge on how to synthesize form, function and construction within the boundaries of project constraints.
Keywords: quality of design, usability, measurement, performance indicators

Introduction

According to Webster's English Dictionary, quality refers to a property (e.g. softness is a natural quality of wool, hardness is a natural quality of metals), nature (relatively considered; in regard to right and wrong) and virtue or particular power of producing certain effects. In the Van Dale Dutch dictionary quality is defined as the extent to which a product is suitable to a certain purpose, and also as a good characteristic. According to *ViaNorm*, a Dutch organisation specializing in assessments and certification, quality is the extent to which a product or activity meets the expectations of the client. Another widely used definition of quality is the extent to which a product fulfils the requirements set for it. Common in these definitions is the inclusion of a valuation: "good" characteristic, "suitable" to its purpose, fulfilling the "requirements", meeting "expectations". Some of them also include *who* judges quality, e.g. the client.

Definitions of design usually include a valuation as well. E.g. LUCKMAN (1967) defined design as "the translation of information in the form of requirements, constraints and experience into potential solutions, which are considered by the designer to meet required performance characteristics". According to ROOZENBURG; EEKELS (1991), both staff members of the Faculty of Industrial Design of the Delft University of Technology, designing is "a goal-oriented mental process in which problems are analysed, goals set and reset, proposed solutions developed and the properties of solutions assessed". Here, designing is perceived as a goal oriented activity and a design as a product that has to be assessed for its fit with predefined goals.

In debates and reflections on architecture however, quality of design is often primarily interpreted as architectural quality, with a focus on image and appearance (use of forms, colours and materials), spatial experiences that are evoked by looking at the building from the outside or during a walk through, building typology and a comparison of the present design with other designs of the present architect and other architects. Quite often reflections on other issues such as fulfilling the requirements of the client (partly or fully explicitly laid down in advance in a project brief or program of requirements) and the daily users get much less attention. When a good design is defined as a design that "fulfils the requirements set for it", issues such as feasibility (budget versus investment costs and running costs), usability (a good fit with the aimed purpose and use) and sustainability (with regard to people, planet and prosperity) should be taken into account as well. This paper discusses the possibilities and limitations of integral design assessment in theory and in practice.

Quality of Architectural Design

An important step in a search for the meaning of quality of architectural design is the exploration of the goals or requirements of a building. The architecture critics HILLIER; LEAMAN (1976) distinguished four main functions of a building:

a. Spatial organisation of activities
A building needs to provide optimum support for the activities desired by properly arranging the available space, for example by allocating related activities next to one another and by separating activities that are likely to conflict with one another.

b. Climate regulation
A building must provide an optimum interior climate for the user, his activities and his property. This necessitates a protective 'filter', separating the inside from the outside and efficient plant. Inside the building, the equipment of the different rooms must make it possible to adjust the interior climate of each room to suit its own particular use.

c. Symbolic function
A building can be seen as the material embodiment of the specific ideas and expectations not just of its designer but also of the client and the users. This makes it a cultural object, an object with social and symbolic significance.

d. Economic function
A building requires investment. It gives added value to raw materials. Maintenance and management form part of the exploitation cost, and must be set against income from rental or sale. It follows that a building, whether property or an investment object, has economic value and so an economic function.

Other authors discuss similar functions e.g. a territorial function, a social function, a cultural function and a protective function (NORBERG-SCHULZ, 1965; ZEEMAN, 1980). In several joint reports of the Dutch Ministry of Culture and the Ministry of Housing, Spatial Planning and Environment, three values have been continuously used: cultural value, utility value and future value. Utility value refers to the extent to which a building or space serves the desired potential uses. Cultural value refers to criteria such as originality, expressiveness, relationship with the environment, value as a piece of cultural history, design quality and experiential quality. Future value relates to value over time, including the sustainability of the building and its surroundings, its suitability for other purposes (flexibility) and – again - the building as a piece of cultural history.

In order to apply to these functions and values, architecture is often thought of as a synthesis of form, function and construction, taking into account specified conditions with regard to time, money and regulations. This tripartite synthesis goes back to Vitruvius who distinguished three components of architecture: *utilitas* (commodity i.e. functionality or utility value: the social dimension), *firmitas* (firmness i.e. strength and rigidity: the technological dimension) and *venustas* (delight: the artistic or aesthetic dimension). Summarizing, in its widest sense the quality of an architectonical design includes the following sub-qualities (VOORDT; WEGEN, 2005):

- *Functional quality*
  The usability of the building in practice: the extent to which the building is suitable for the activities that take place inside.
- *Aesthetic quality*
  The extent to which the building is perceived as beautiful, stimulating or original; the way it is experienced, whether as pleasant, cosy, spacious, homely or simply commercial; the extent to which it is seen as a piece of cultural history, e.g. whether it is representative of a particular style or period of building.
- *Technical quality*
  The extent to which the foundations, the load-bearing structure, the shell, the infill kit and the technical services satisfy technical requirements relating to such matters as strength, rigidity, stability, sustainability and limited need for maintenance.
- *Physical quality*
  The extent to which the building is capable of achieving an attractive, safe and healthy interior climate, measured in terms of temperature, humidity, illumination, natural lighting and acoustics, in an environmentally friendly and energy-saving way.
- *Economic quality*
  The extent to which financial resources are applied effectively and efficiently, i.e. the price-performance ratio. If the building is viewed as an investment object, its economic quality also depends on the level of return achieved.

Indicators of Architectural design Quality

When 100 people are asked about their opinion on a particular building it is not unusual to get 100 different answers. Partly because of people emphasize different aspects, but in particular because of personal preferences and different interests and backgrounds. With regard to aesthetic quality, its subjective assessment is readable in the well-known statement “beauty is in the eye of the beholder”. But if architectural design wants to be perceived as a discipline and a profession, more objective indicators are needed to support the design process and to discuss or assess the quality of architectural design ex ante and ex post i.e. before and after construction.

The aspects mentioned before may be used as broad performance criteria, but have to be “operationalized” more concretely. In search for more objectivity, one of the former Dutch governmental architectural supervisors defined five common components of architectural quality (DIJKSTRA, 2001):

- Utility value, the extent to which the building is suitable for the use envisaged, suggests this use and gives it an extra dimension.

- Clarity and complexity. The composition of the building should structure the way it is perceived, making it clear, comprehensible, recognisable and, in due course, familiar. At the same time the building should be stimulating, which requires a degree of complexity. Complexity exists when a composition combines a number of different themes, for example when the structure of the building derives not just from its function but also from its urban design context.
- Object and context. Internally this refers to such things as the treatment of the transition between public and private, between collective use and individual use. Externally it refers to the contribution the building makes to (and the influence it exerts on) the quality of public open space.
- The way in which use is made of architectonic resources such as size ratios, materials, texture, colour and light.
- Associative meanings.

In Dijkstra's view it is essential that the form of a building is derived from the user requirements and the possibility of achieving efficient construction with available materials and techniques and taking into account the urban design context. This should be done in a way that is both stimulating and appealing.

In stead of defining criteria, ROSSUM; WILDT (1996) raised a number of questions to steer the debate on architectonic quality. They studied the relationship between the way a commission is awarded and the architectonic quality achieved with regard to four aspects:

1. Building, function and context
What was the context in which the project had to be completed? What was the nature of the site? Did the site have special qualities? Did it impose special requirements, tacitly or not? Was there any conflict between programme and site? Does the building add quality to the site or has it damaged its original quality? Does the building as realised satisfy its intended function? Is it a faithful translation of that function? Or is it more than that, does it add something, because of its expressiveness and spatial quality? Does it elevate the required functions to a more poetic level, so creating new associations and meanings?

2. Internal consistency
How is the building's function reflected in its spatial organisation? Does it conform to a particular typology or does it raise questions about a particular typology? How is the spatial quality of the building perceived? Is the visitor 'led' through the building by a consistent spatial configuration? Is there a 'story', a 'thread' running through the development of the interior space: introduction, development, tension, gradual transition, in-between, contrast, climax, surprise? Do important rooms perform important functions?

3. Form, function and meaning
Is the form a translation or expression of the internal spatial structure? Can the internal structure be deduced from the exterior? Or does the external form live a life of its own, independent of what goes on inside? Does the form say anything about the content? Does the building as a whole display a consistent form? Is the chosen formal vocabulary worked out consistently in all its components?

What part is played by the constructional technique? Does it determine the form or serve it? Is it emphasised or hidden away? Does it use its own metaphors, based on its own logic, and if so does it evoke some relevant meaning?
Does its form give the building a meaning that is legible to all? Does the form express what it is, a house, a theatre, a church, a factory, an office, a government building? What is the meaning of the building in its context, particularly in its urban context? How does the building relate to the buildings which surround it? Does it act in this relationship as subordinate or coordinator? Does it allow itself to dominate or does it fit in discreetly? Does all this tie in with the meaning of its function in the given context? Does the building express different meanings at the same time? Does it achieve a synthesis of complex content with clear expressive form, a simple form in which complexity is nonetheless perceptible?

4. Special factors for government buildings
How does government use architecture to present itself? How does it use buildings to present itself or its services to the population at large? Should it be dominant, neutral or self-effacing, haughty, stand-offish, receptive or friendly, firm, confidence-inspiring or provisional, ephemeral? What means, what metaphors will allow a building to express these different characteristics?
How does the building relate to public space? Does it contribute to the determination, arrangement or character of public space? Does the building express a particular view of culture or society? Does it make a statement about how society works or how it ought to work? Has the building sufficient poetic quality or is it sufficiently innovative to serve as an example?

Usability

The lists of assessment criteria discussed so far all include items that are linked to functional quality or related terms such as functionality, usability or utility value. So there seems a high level of consensus on the importance of functional quality in architectonic design. In the domain of Facility Management, too, much attention is being paid to usability. According to ALEXANDER (2008) this concept includes three dimensions: effectiveness (the extent to which users can achieve what they want to do), efficiency (aiming to reduce the effort to conduct the required activities and to achieve their goals) and satisfaction (users' feelings and attitudes towards the product. In *Architecture in Use* (VOORDT; WEGEN, 2005) the authors tried to further explore the meaning and measurement of usability of a building. For this purpose nine aspects of utility value have been explored:

a. Reachability and parking facilities
b. Accessibility
c. Efficiency
d. Flexibility
e. Safety
f. Spatial orientation
g. Privacy, territoriality and social contact
h. Health and physical well-being
i. Sustainability

Aspects a - d relate mainly to the user value of the building (is it easy to use), f and g to psychological well-being, h to physical well-being and i to environmental quality. Safety embraces utilitarian, psychological and physical aspects as well. The nine aspects are to some extent interconnected. For example, accessibility and safety are preconditions for efficiency,

and comprehensibility and recognisability are preconditions for psychological accessibility. Details of the nine aspects have been discussed in a standard format: a) A description or definition of the concept; b) Thoughts about the effect of design choices on achieving the desired user value; and c) Sources for further reading. To illustrate how rather abstract quality indicators can be made more concrete and measurable, we will discuss two aspects: flexibility and spatial orientation.

Flexibility

Organisations are constantly subject to change, caused for example by expansion or contraction, the desire to organize existing activities in a different way, skipping functions that have become outdated, or adding new functions. Quality requirements change under the influence of new legislation and regulations, economic or technological developments, changes in use etc. Buildings on the other hand are relatively static. According to BRAND (1994), a building can be considered as composed of six components that vary dramatically in their longevity: site (permanent); structure (30 to 300 years); skin (20 years); services (7 to 15 years); space plan (3 to 30 years); and the buildings content. To deal with dynamism buildings must be flexible, both *internally* (within the building) and *externally* (capable of expansion and contraction), preferably without having to do much in the way of breaking down walls and without incurring high costs. This will increase the future value of the building. Not surprisingly many programmes of requirements give high priority to flexibility. The terms most frequently used are listed below:

- *Flexible*: easily adjustable to suit changing circumstances
- *Adaptable*: the same, whether or not concentrating on a particular target group. In house building ‘adaptable building' is often defined as 'not specially adapted in advance or intended for people with disabilities, but designed in such a way that later adaptation can be done easily and relatively cheaply as and when the occupier becomes handicapped'.
- *Variable*: capable of being adjusted without exorbitantly high costs by the movement, removal or addition, by a builder, of non-load-bearing architectural elements.
- *Multifunctional*: suitable or able to be made suitable for different functions without requiring changes to the structure or built-in features
- *Polyvalent*: capable of being adjusted to changes or differences in user preferences or needs by changing the relationships between different spaces without the assistance of a builder (e.g. by the use of sliding doors or folding partitions).
- *Neutral*: capable of being adjusted to changes without changing the location of the various functions and without the architectural elements required by those functions needing to be moved or removed or augmented. Examples include:
  - *Layout neutrality*: the possibility of laying out rooms in different ways
  - *Division neutrality*: the possibility of dividing up a building in different ways
  - *Functional neutrality*: the possibility of giving a building a different function
  - *Shell neutrality*: the possibility of incorporating different floor plans in the same shell or achieving different arrangements within the same shell

The cost of any measures taken to achieve flexibility must of course be carefully weighed against the benefit, i.e. savings on later adjustments. Table 1 shows a number of design techniques for incorporating flexibility (BOERMAN et al, 1992; ELDONK; FASBINDER, 1990; GERAEDTS; CUPERUS, 1999).

Table 1: Design techniques for incorporating flexibility

Arrangement neutrality	Extra floor area Generous length/breadth ratio Sufficient wall length to allow for furnishing units Extra ceiling height Extra electrical outlets Movable fittings
Arrangement flexibility	Demountable fittings
Arrangement variability	Provisions for future wiring
Polyvalent room boundaries	Sliding doors, sliding partitions, folding partitions
Flexible room boundaries	Movable or demountable partitions
Variable room boundaries	Removable partitions
Division neutrality	Division neutral spaces Neutral parapet height Wall finish to suit several functions Sound installation to suit several functions Extra wiring and services Zoning
Division flexibility	Separation of load-bearers from inbuilt features Demountable walls, elevation, roof Generous grid size for the shell Over-dimensioning of load-bearing structure
Division variability	Removable walls, elevation, roof Demountable wiring, placed accessibly Alternative methods of attaching walls/elevation Avoidance of differences in floor levels Neutral, flexible or variable shell Space or facilities for later addition of a lift

Spatial orientation

In general people feel happier when the layout of a building is understandable. An understandable layout makes it easier for people to know where they are and how to get where they want to be. In a complex building it is harder to work out one's position and the right way to go. A well-designed building, on the other hand, can make a significant contribution to one's spatial orientation.

In his classic work *The image of the city,* the urban designer Kevin LYNCH (1960) developed clear criteria for the legibility of towns and districts. He recommended the application of identity, structure and significance. *Identity* is a quality in itself, referring to the recognisability of an object as a separate unit, distinguishable from other objects. Identity plays an important role in supporting spatial orientation and can contribute to emotional and cultural values. For example, the Eiffel Tower defines the image of Paris: this distinctive feature makes the city uniquely recognisable anywhere in the world. *Structure* refers to the way objects relate to one another and the position occupied by individual objects in an

interrelated whole. Simple structures are easier to recognise, comprehend and remember than complicated structures, and so are simpler to find one's way round. *Significance* refers to the relationship, practical and psychological, between an object and its user. Here one might think of affective values (attractive or unattractive, beautiful or ugly), emotional significance (e.g. the pleasant or painful memories associated with a particular place), symbolic value (e.g. the association of a tall building with commerce or the power of big business) and cultural or historic significance. Lynch believes that spaces are particularly legible when all three ingredients are present to a sufficient extent.

Lynch used these concepts as a basis for a number of urban design principles, which can equally well be used for buildings. For instance, whereas cities have an urban structure, buildings have also a spatial structure, with corridors analogous to streets, rooms analogous to small buildings, and atria or meeting places analogous to squares. Here, too, paths create the layout, the sequence of spaces and events and the skeleton of the building. With the layout, a structure is given to the sequence of experiences, to the relationship within the building and to the relationship between building and context. Combining Lynch' principles with the insights of PASSINI (1992) and VOORDT (2001) results in the following list of attention points and criteria for developing and checking of a design:

- Clear overall shapes and easily understandable access routes
- Recognisable functional units
- Individual identities for rooms as regards function, design and layout (fittings, lighting, choice of colours and materials), avoiding the repetition of identical departments and rooms
- Clear distinction between public, semi-public and private spaces
- Differentiation by colours and materials used for floors, walls and ceilings
- Sufficient points of recognition: signposts and 'natural' elements such as conspicuous functions, street furniture or works of art
- Application of gestalt principles, e.g.:
  - Singularity: unique properties which give an element an identity of its own
  - Continuity: characteristics produced by continuation, where separate elements are perceived and visualised as a coherent whole
  - Dominance: the way one element predominates because of its size or importance
- Kinaesthetic qualities: formal properties which create a feeling of movement, e.g. a sharp turn or a right angle
- Directional clarity: spatial characteristics which show the direction in which one is going, e.g. a difference in design between the two sides of a corridor, or the use of ornamental paving to indicate direction
- Extending 'visual scope' by viewing holes and visible connections
- Extra support at important decision points (where a choice has to be made between turning right or left or going to a different floor) e.g. by hanging up a stylised floor plan with a 'you are here' mark and the most important functions shown in different colours
- Proper signing, with good colour contrast between symbols or letters and background, clearly specified names, combinations of simple recognisable symbols and texts, and repetition of information

- Consistent information, e.g. consistent use of colours and pictograms to indicate similar places, both in the rooms themselves and in information about the underground space (brochures, information panels)
- Organisational measures e.g. a reception desk or information point

Assessment tools

In order to be able to assess a certain design or building-in-use, a huge number of assessment tools and scales have been developed, such as the Building Quality Assessment (BQA) method from New Zeeland (BRUHNS; ISAACS, 1996), the Achieving Excellence Design Evaluation Toolkit (AEDET) from the UK (NHS ESTATES, 2002), the Design Quality Indicator (DQI) developed by the Construction Industry Council in the United Kingdom (GANN et al, 2003; ELEY, 2004; PRASAD, 2004) and the Healthy Building Quality (HBQ) tool from the Netherlands (BERGS, 1993). The HBQ tool builds on the building-in-use method of VISCHER (1989). Some tools focus on a particular item such as health (e.g. HBQ), or a particular building type (e.g. housing, see the VAC Quality Indicator of HILHORST 1997). Other tools have a much wider scope, (e.g. AEDET). An overview of different tools can be found in BAIRD et al (1996), and VOORDT; WEGEN (2005), whereas PREISER, VISCHER (2005) clearly link different types of assessment to the different phases of a building process. Many criteria that have been discussed above have been included in these tools. An interesting example is the AEDET toolkit. This toolkit has been developed in the United Kingdom by the NHS Estates Centre of Healthcare Architecture & Design for evaluating the design of healthcare buildings from initial proposals through to post project evaluation. Figure 1 shows the basic framework and criteria.

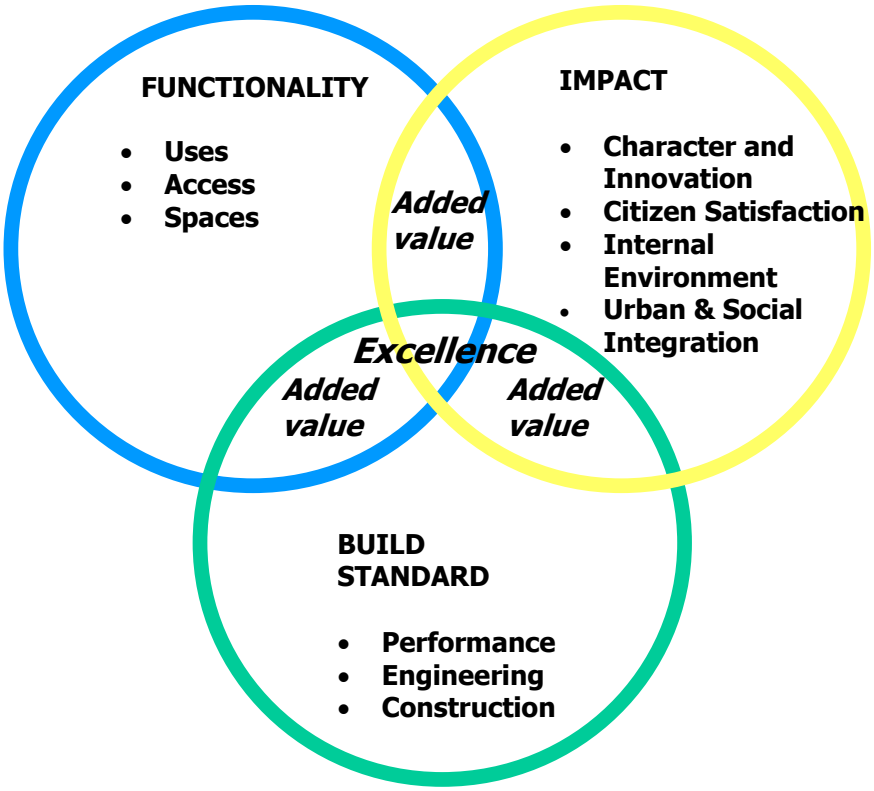

Figure 1: Ten criteria of the Design Evaluation Toolkit

The toolkit is to be used at various key stages in the design development process and to support the non-financial assessments required in business cases. The toolkit comprises a series of key questions supported by lists of related issues that need to be considered. The questions are answered by entering a numerical score (between 1 and 6) into an Excel spreadsheet. The spreadsheet automatically averages out the answers in each of the 10 sections and enters them in a table and a radar chart: the 'Design Evaluation Profile' (Figure 2).

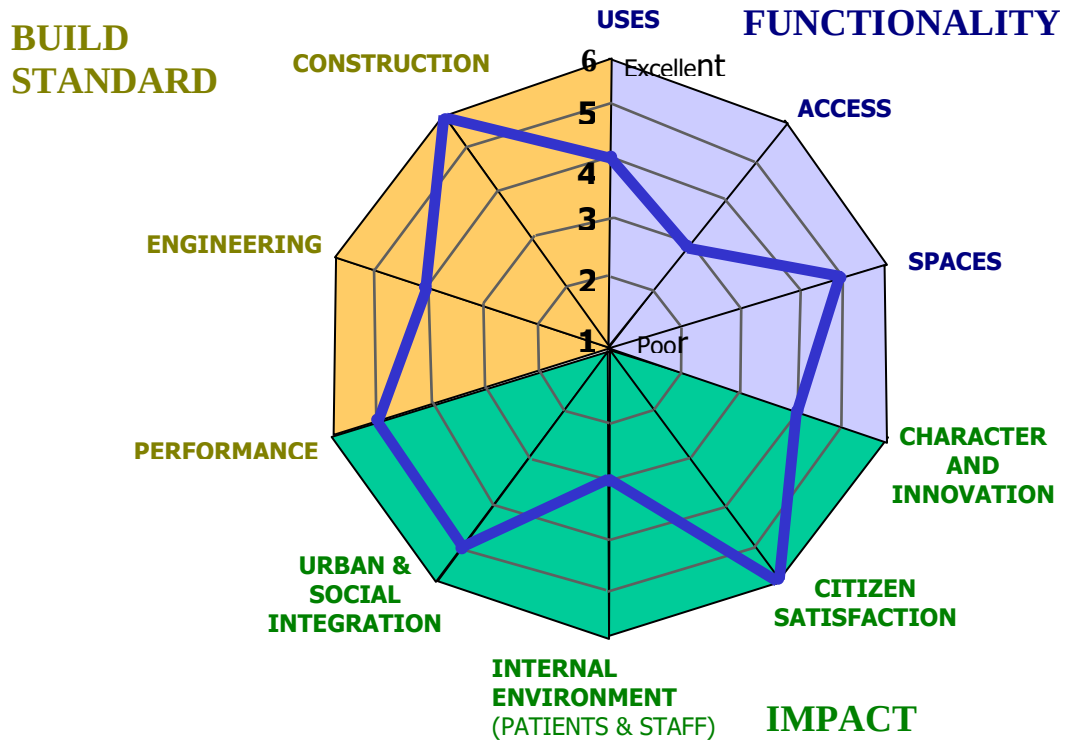

Figure 2: Example of a radar chart with a Design Evaluation Profile.
The example shows notional scores. Source: www.chad.nhsestates.gov.uk

In the Netherlands the College for Building Healthcare Facilities also uses the AEDET toolkit in cost and quality assessments of health care buildings. The AEDET questionnaires have been slightly adapted. The average value of all ten items of AEDET are included in a Quality Index (QUIND), together with a test on cost standards and policy issues, flexibility, sustainability and future value (CBZ, 2003).

Design Quality Indicators in an Architect Selection Procedure

Because of the many aspects and criteria – with most of them not measurable objectively – an assessment of design quality is a complex task. This is particularly true in case of a selection of an architect for a public building because usually the perceptions and appraisals of multiple stakeholders have to be taken into account. An interesting example is the European tendering procedure for the new Deventer Town Hall cum Library in the east of the Netherlands. After a pre-selection by a special client committee, five sketch designs were submitted in the second round. These five sketches have been judged by different user groups

(citizens, employees of the City of Deventer, library employees), experts and the selection committee (consisting of independent design professionals and administrators). The expert team committee, the project team (organizing the whole process) and the external financial check (by a cost consultancy firm) all produced separate reports of their findings. In the context of a PhD-research at the Faculty of Architecture of the Delft University of Technology, VOLKER et al (2008) analyzed the different design quality perceptions for underlying dimensions and compared lay and expert judgments.

According to the selection manual, three criteria would be weighed equally:
- The degree of flexibility of the programme concerning the synergy between library and City Hall, integration of front and back office, and technical and environmental durability.
- The intelligence and creativity of the solution in its historical context.
- The contribution to the diversity and restoration of split urban character of old and new.

Based on the structure of the Design Quality Indicator, 10 design aspects were identified in the documents relating to the three basic areas of functionality, build quality and impact. These were augmented with four categories for project constraints and personal qualities of the designer. In total 388 phrases were analysed and coded to one of the design aspects. Most phrases concerned the areas of impact (39%) and functionality (36%). The build quality was only mentioned in 4% of the phrases while the project constraints and the professional abilities and reputation of the architects were referred to in 13% and 8% of the comments.

With regard to *functionality*, use aspect phrases concerned the allocation of the activities and office concepts according to the brief, the quality of the workplaces, and the workspace climate. The potential quality of developing new activities and the flexibility of the floor areas were also mentioned. Concerning space, functionality issues were inter alia the location of the library, the recognizability of the departments, the readability and orientation within the building and the flexibility in the use of spaces. Some attention was given to security after office hours, the facility management of the building, the functionality of the materials and the recognizability of the entrance from outside.

Comparatively little attention was given to the *build quality* of the designs Although the assignment asked for a contribution to environmental friendly solutions and an outspoken choice for demolition or renovation of the current buildings, only nine phrases were identified that related to these issue. The energy sufficiency of the future building was mentioned only once. Some concerns were expressed about lighting and heating.

The *impact* element of a design concerns the effect of the future building in terms of its impact on its surroundings and the effect on users, visitors and the general public. Only seven phrases concerned the internal environment of the building, considering the atmosphere in the building and the matter of transparency. Urban and social integration of the design was one of the most important issues. The positioning, recognizability and interaction with the private and public spaces were evaluated as was the impact of the shape and size of the building on the surroundings. It was felt important that the design showed respect for the historical context but at the same time had an identity of its own. Most attention was given to the character and level of design innovation (91 phrases in total). The judgments had a lot to do with the reactions evoked by the design. The aesthetics of the winning design were judged as

being ‘striking’, ‘surprising’, ‘original’ and ‘daring’, while the other designs were described as ‘massive’, ‘unnoticeable’ or ‘old fashioned’. Appreciation was shown for clever, strong, charming and original ideas.

Analysis of the types of design aspects the stakeholders used for the judgment showed differences between the groups in the number and type of design aspect. The project team and the external financial consultant in their role as professional consultants reviewed only the aspects they were assigned, such as possible conflicts with the zoning plan or budget, and did not express a preference. The prospective building users with no professional background in architecture, the citizens and the employees, used fewer criteria than the expert committee and the selection committee. The survey of the citizens was developed beforehand and focused on the integration, materials and character of the design in the context of the city by using closed questions. The employees of the city completed the same survey with additional questions about the use and attractiveness of the offices. The user group extended these aspects with an evaluation of the air conditioning systems and the interior climate (light and heating) because of the consequences of these aspects for the quality of the workplaces. The library focused on the position of the library in relation to the other parts of the building and the recognizability and image of the library from outside. They underlined the requirements from the brief as a way to evaluate the design qualities. The expert committee considered the highest number of design aspects, focusing on feasibility and the contribution of the design vision of the quality of the city, but excluding finances, performance, and building services. The selection committee seemed to have followed the expert committee in their judgment but also stressed the financial limitations. In their debate they also stated that the current state of the design was to be developed further in dialogue between the architect and the client. In their public defense, almost all aspects of design quality were mentioned as criteria for their final decision.

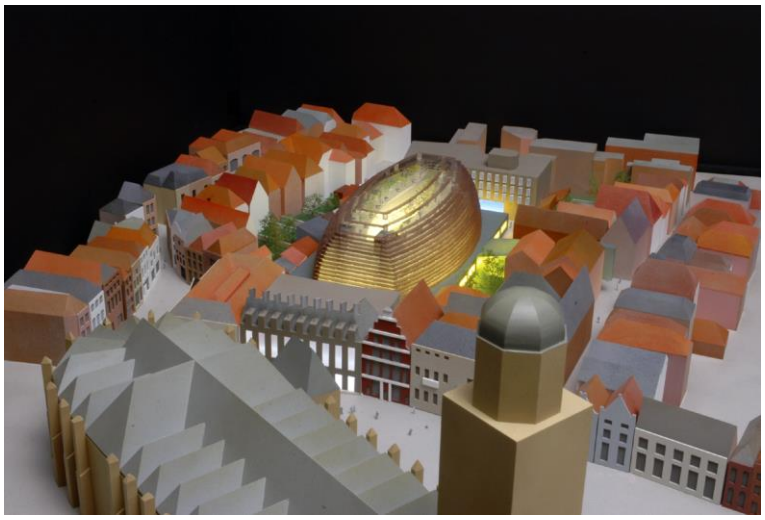

Figure 3: The winning design from Neutelings Riedijk Architecten
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Figure 4:Cross-section of the winning design
© Neutelings Riedijk Architecten



Figure 5: The design of Kraaijvanger Urbis : favorite among the Deventer citizens and also highly appreciated by other stakeholders
© Dirk Jan Postel, Kraaijvanger Urbis

Although the final judgment seemed to be supported by all decision makers, the preferred design as mentioned by the separate stakeholders in their advisory documents beforehand sometimes differed per group. The final preference of most stakeholder groups and the expert committee seemed based on the overall judgment of all separate qualities, the potential qualities and possibilities of the design, and the functionality, flexibility and originality of the design. They also looked for the cleverness of the design, the impact of the design on the public, users and urban surroundings, and emotional associations such as ‘love at first sight’ and ‘surprising and exciting concept’.

Discussion and Concluding Remarks

The literature review shows that much has been written about design quality indicators. From an academic point of view, it would be desirable to integrate all insights in an integrated analytical framework (VOORDT et al, 2007a; ZIJLSTRA, 2008). However, in practice for several reasons an agreed blueprint of how to assess a design on its quality, ex ante or ex post (after construction), will probably be one step too far. First, because apart from common issues every assignment has its own unique character, with unique site characteristics, a unique brief, and a unique project team and stakeholder groups with unique focus points, skills, knowledge and interests. Second, because an integral assessment that includes all possible performance criteria would be very time consuming. Third, many criteria are quite "soft" and difficult to be measured quantitatively and objectively. The same holds true for weighing criteria as very important versus not important at all. Weights are often implicit and based on personal preferences and interests. Besides, the interpretation of criteria seems to evolve during the process. In the Deventer selection procedure, first functionality and aspects like requirements, budgets and social skills of the designers dominated the discussion among the stakeholders. By the end the selection committee discussed the overall judgment without referring often to the 'physical boundaries'. Emotional responses to the designs came into play as well. From the interviews with participants it was concluded that the main criterion was 'most appealing design' instead of economically most advantageous bid (VOLKER et al, 2008).

At the same time we may conclude that presently available design quality indicators and assessment scales are very helpful to increase the transparency of multi criteria judgments and not to overlook aspects that may be important as well. Although a number of criteria and questions are rather normative they can help to steer a debate or assessment of design quality. Which aspects are appropriate and the extent to which aspects and criteria should be included depend of the goal of the assessment, e.g. to build up a body of knowledge (generic purpose), to stimulate a debate on design quality (generic or project based purpose), to select an architect (project based purpose) or to improve the design of a particular building (project based purpose). Second it also depends on the requirements in the brief and the phase in the design process with its different levels of concreteness: first concept, sketch design, final design, construction drawings and the building-in-use. Third, aspects and quality indicators to be included depend on constraints such as available time, money and information. For instance, after the Delft Faculty of Architecture Building burnt down in May 2008, a contest was set up to collect inspiring ideas as an input to the briefing process for a new building. No less than 466 contributions from 50 different countries have been received, each including an A0 poster with drawings and explanations. In this case, an integral assessment of all contributions is not possible at all. Not only because the contributions only sketched the main outlines of the idea, but in particular because it would be too time consuming. Therefore the entries were assessed according to three criteria: visionary power, architectural quality, and economic and ecological feasibility. Among the remarkable concepts with respect to architecture education of the future there were proposals for flexible educational buildings, designed to adapt to changes in education over the course of the years. In addition to sustainability, the social and educational functions of the building were recurring themes in many of the entries. Sustainability, for instance, was reflected in special attention to the climate, energy management and the cohesion between indoor and outdoor areas, and also in feasible proposals for reusing existing buildings. In contrast to a design contest with so many contributions, in the context of research and education an integral design assessment might be possible, inspiring, and instructive.

For this purpose an integral assessment of the former faculty building-in-use has been conducted by a team of people with different disciplines and backgrounds (VOORDT et al, 2007b). From this experience and the research that has been discussed above it may be concluded that by an integrated assessment of a design (ex ante) or building-in-use (ex post) great lessons can be learned on how to synthesize form, function and construction within the boundaries of project constraints.

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Qualidade do projeto e usabilidade: um gêmeo de Vetrúvio

Resumo

Este artigo explora diferentes indicadores de qualidade do projeto arquitetônico usados em debates e avaliações de projetos na Holanda. Além da antiga tríade vitruviana da utilitas, firmitas e venustas, é defendida uma visão mais ampla quanto à qualidade do projeto arquitetônico. Como as construções vão muito além da "arte livre", a usabilidade e a opinião do usuário, em especial, devem ser incluídas entre os indicadores de qualidade do projeto. O marco teórico dos indicadores de qualidade foi utilizado para refletir sobre os critérios que foram aplicados para selecionar o projeto da nova prefeitura e biblioteca de Deventer. Uma comparação entre a teoria e a prática mostra que há divergências entre uma avaliação integral da qualidade usando múltiplos critérios, preferências e interesses pessoais e restrições, como limitação de tempo, dinheiro e informação. Ao mesmo tempo, avaliações integradas de projetos (ex ante) ou de construções em uso (ex post) são essenciais para acumular um corpo de conhecimento sobre como sintetizar forma, função e construção dentro dos limites das restrições do projeto.

Palavras-chaves: *Qualidade do projeto. Usabilidade. Medição. Indicadores de desempemho.*

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