Re[valuating]-architecture

RE[VALUATING]-ARCHITECTURE

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ABSTRACT

The architectural hierarchy of aims altered in the last decades. Quality and comfort have dethroned functionality!
We are already familiar with the taxonomy – quality certification in the construction world; but in architectural designs, it is not common to evaluate scientifically, if the design has quality or, if the designer has performed qualitatively well regarding the circumstances. Therefore, evaluations that go beyond technical regulations are usually vague and subjective.
Integrated in the doctoral research Re-Architecture: Lifespan rehabilitation of built heritage, supervised by Prof. Post and Prof. Erkelens, the architect Ana Pereira Roders is theorizing a design process for rehabilitation interventions, where the pre-design and design evaluation are key stages.

KEYWORDS design process, rehabilitation, lifespan, built heritage

INTRODUCTION

While in the construction world, the quality certification, is already mandatory (theoretically at least); in architectural designs, it is not yet common to evaluate scientifically its quality, particularly in rehabilitation designs. Architects are asked about their design decisions. Only if, in a building they designed, any calamity happens due to a design error, they are questioned even juridical, but not in a common basis, if the design has quality or, if the designer has performed qualitatively well regarding the circumstances.

Governmental Institutions mostly check scientifically the minimum requirements regarding the actual building technical regulations and master plans, Safeguard institutions check if the heritage traces are preserved (when the building is classified), Fire departments check if there are enough emergency exits and adequate circulation, etc. Therefore, immediate evaluations that go beyond technical regulations and legislation are usually vague and subjective, because they normally mix professional with personal perception and taste. Architectural designers have been privileged under the artistic protection, however, we believe that there should be a way to check / control quality in rehabilitation designs.

"Re-Architecture: lifespan rehabilitation of built heritage" is a doctoral research that aims to produce a design process support tool, that effectively helps architects increasing the quality of their designs by developing rehabilitation designs of built heritage with more lifespan consciousness. Consequently, this will directly contribute to the preservation of both natural and built heritage. This paper does not intend to expose exhaustively the research content, but present some developments regarding the second phase – design product, where the researcher is now active. The theoretical model formulation, as well as, the advantages of introducing such evaluation sub-stages in the rehabilitation design process, is the main purpose of this paper.

Research Method

The chosen research method is the design research methodologies, as described in the document *Op weg naar Promotie op Proefontwerp* (Trum, 1994). Accordingly, design

researches lead to the development and determination of criteria to which a 'good' design can be measured and control simultaneously quality in education.

Hence, this doctoral design research was structured in tree distinctive phases: the first phase for developing design theory, exploring the problem field (heritage and interventions) and taxonomy (built heritage and lifespan rehabilitation). Then, there is a second phase for developing the design product: developing, producing, and testing the tool to support architects; and a third phase of design result, validating both theory and production. (Pereira Roders, 2006)

Within the Pre-test phase, the theoretical model has and is being tested, in both countries Portugal and the Netherlands, so likely it will still be changed until the end of the doctoral research.

THE BUILDING PROCESS

According to De Groot (1999) the building process has several different stages (Figure 1), starting from the feasibility stage, where it is considered the possibility of constructing the building; following the briefing, design, construction, occupation, refurbishment, and ending in the demolition stage, when it is considered that the building is no longer feasible and must be destroyed.

Figure 1. – The building process stages (De Groot, 1999)
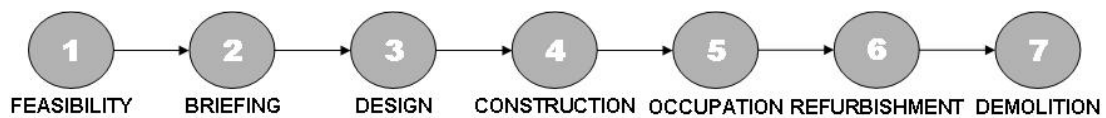
Dealing with built heritage, that often, didn't even had the first three stages when they where conceived, and that among time had passed several interventions; changing function, owners/users, etc.; it was necessary to structure the building process stages differently (see Figure 2). The building process was organized in seven distinctive stages: feasibility, briefing, pre-design, design, construction, occupation, and intervention.

Figure 2. The lifespan building process stages
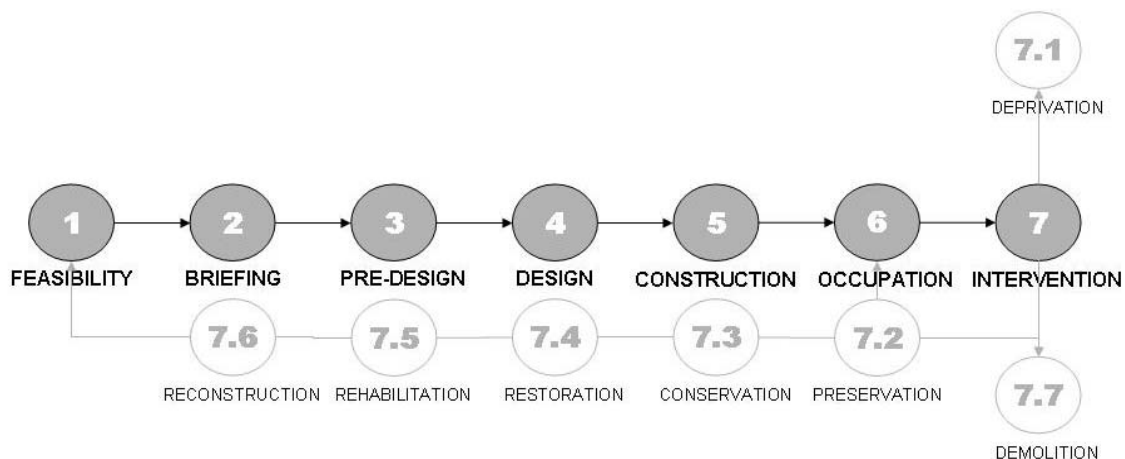
Subsequently, the type of intervention is the one that determines how far back, the process has to restart. Seven types of interventions were scaled and theorised, according to its impact in the building, respectively: deprivation (scale 1), preservation (scale 2), conservation (scale 3), restoration (scale 4), rehabilitation (scale 5), reconstruction (scale 6) and demolition (scale 7). Besides, each intervention has a passive and an active version. (Pereira Roders, 2006)

The intervention particularly considered in this research, rehabilitation, requires initial feasibility and briefing, however, these are not usual tasks for the architect. The architect, when involved in rehabilitation designs, usually has to deal with pre-established requirements and aims, by the building owners, based in subjective evaluations. Even if afterwards, the architect can always suggest partial changes in the initial requirements, found unsustained during following stages (pre-design, design, and construction), there is always an initial problem related to the building and environment past, present and future; to which the architect has to find solution(s).

For this reason, it was decided to focus in the support tool and respective design process, which include the pre-design and design stage. There, the architect has the responsibility to make decisions and simulate his design with quality and consciousness. With the technical knowledge available in the support tool, the architect can better sustain his ideologies, convictions and aims with concrete arguments.

THE DESIGN PROCESS

Progressing from Roozenburg, and Eekels, developed in 1991, who also progressed from Jones, developed in 1963 (Voordt, 2005), this research developed a theoretical model oriented towards a lifespan conscious rehabilitation design. (Figure 3)

Figure 3. Theoretical model – Design process
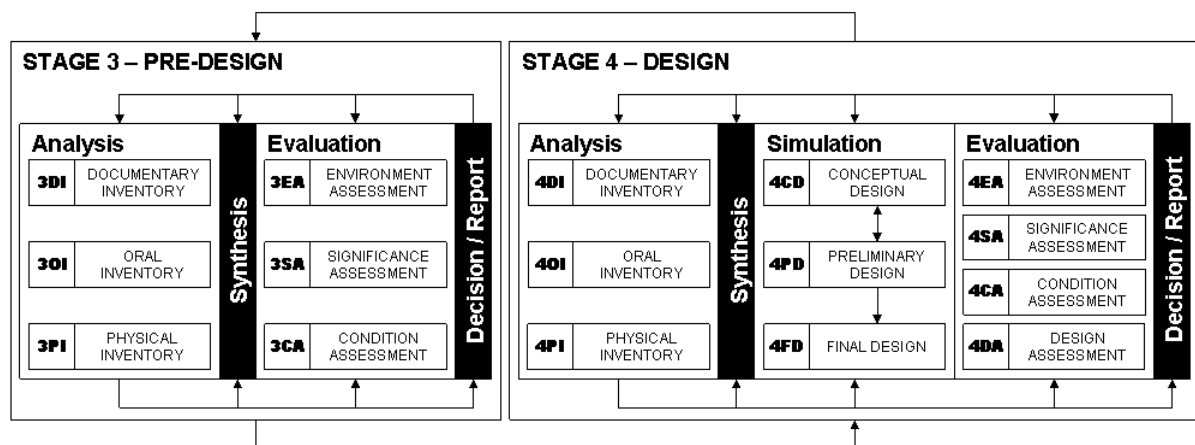
Stage 3 – Pre-Design

The pre-design stage is building-oriented (pre-existence), where the designer should only concentrate on the building and environment, and not yet in the new requirements. According to the theoretic model, the architect (designer) should pass through four different and successive sub-stages: the stage where he/she mostly develops an accurate inventory of all

available data, information and knowledge (analysis), the stage where he/she start synthesising all useful data, information and knowledge into specific streams (synthesis), the stage where he/she evaluates the weight of each stream in order to take some decisions (evaluation) and finally the stage where he/she develop / present pre-design reports (decision).

The first three sub-stages should converge into the last one, entitled as decision, with all designer's assumptions clearly organized. These reports are fundamental for bringing technical precision into the design, as well as sustaining the designer decisions with factual rationale, when facing and debating with the other intervenients (leaders, others experts and constituents).

Analysis

Within the analysis sub-stage, there are three types of inventories the architect should consider: the documentary (3DI), the oral (3OI) and the physical (3PI) inventory. We can find a similar structure, in the Charter Process, described in the Burra Charter (1988). For this case, the sources structured in this three categories where recommended for the purpose of "gather and record information about the place sufficient to understand significance" when involved in developing safeguard policies, nevertheless is also a good structure for the rehabilitation designs as well.

One source might lead to another, and the designer just has to follow the track, without getting lost in his analysis stage. Literally, we can state that the designer is for the building in study, as Sherlock Holmes was for the crime scene. Even if in fiction, this character became internationally famous (1887) for using as base, scientific methods, and logic in his experiences as detective, together with his assistant Dr. Watson, to whom he used to react, after a logic discourse "Elementary, my dear Watson!"

The 3DI would lead the architect through documentary inventory. It might be more difficult than it seems, especially regarding unlisted heritage buildings, because often the designs never existed, had been lost, partially lost or even the designs approved are not matching with the pre-existence. Nonetheless, the designer must always start searching for available documentation somewhere. There are several information sources locations where, for sure, the designer might find what he is looking for (governmental and private safeguard institutions, governmental municipalities, departments and archives, libraries and bookstores, general offices of registers and notary, energy / water companies, owners / users, etc.).

Building references can be available in two categories of documents; the primary documents, with original and unique information, found in public or private collections [sketches, drawings, feasibility, briefing, designs, manuscripts, maps, photos, registers (property, transfer), receipts, etc.]; and the secondary documents, product of an elaboration process, normally found in libraries or documentation centres (books, magazines, journal, reports, specific surveys, internet websites, etc.) In every country, there are different laws, institutions and archives structures; however, once you have developed and search sources for one rehabilitation design, you exactly know where to look further for documents in your country.

The 3OI would lead the architect through the oral inventory. The designer would have to contact the human environment, but, only the direct intervenients in the building: the leaders, the experts and the constituents; and try to inventory their both objective and subjective

informations. With their own priorities and aims, the intervenients often face overlaps and conflicts, especially when their range of interests differ and collide. This broad perception, beyond his own considerations, since the beginning, might lead the designer to a more adequate solution, which control and solves the inventoried overlaps and conflicts.

Very briefly, the leaders are all social individual or group that manage, conduct, and take decisions that can influence the living and judgment of a considerable group of people (e.g. religious, monarchic / estate, military, private companies, etc.). The experts are all social individuals with a high degree of skills or knowledge, and a particular perception over the heritage reality. They often have influence in the leader's decisions (e.g. sociologists / urban planners, historians / archaeologists, architects / engineers, contractors / workmen, etc.).

At last, the constituents are social individuals who play an important role regarding the survival of heritage, especially regarding the unrecognized heritage, by leaders and experts, during all this last centuries (e.g. interested members of society, neighbours, owners, users, etc.) All other social individuals that have an indirect relation with the building and do not fit the earlier descriptions are basically denominated as human environment.

The 3PI would lead the architect through the physical inventory. The architect would have to deal directly with the building or similar buildings and record all information physically available, collected via the four senses: sight – capturing the building geometry and colour, hearing – capturing the building sounds, touch – capturing the building textures, smell – capturing the building odours. With the help of the four senses it is possible to discover the building pathology / symptoms. The similarity factor, which might connect other buildings to the building in study, can be the same architect, same architectural discourse, same construction period, same constructor, same environment, etc.

Synthesis

The fundamental information collected in the analysis sub-stage (documentary, oral and physical inventories) is now filtered according to the assessments of the evaluation sub-stage. Within the synthesis sub-stage, there are three types of surveys the architect should consider: the building environment (3ES), the building significance (3SS) and the building condition (3CS) survey.

According to the Council of Europe - Directive 97/11/EC; amending Directive 85/337/EEC, on the assessment of the effects of certain public and private projects on the environment; "the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case and in accordance with Articles 4 to 11, the direct and indirect effects of a project on the following factors: human beings, fauna and flora; soil, water, air, climate and the landscape; material assets and the cultural heritage; the interaction between the factors mentioned in the first, second and third indents." (Council of Europe, 1997)

The 3ES would lead the architect through the environment survey. The architect would set all information environment-related, and synthesise the analysed information in the following three environment parameters: the natural, the built and the human environment. The natural environment contains the variables: natural newness (condition) and natural heritage (significance and condition); as the built environment contains the variables: built newness (condition) and built heritage (significance and condition). To support the natural and

environment survey, there are several maps (or other documentary format) that can be provided by the expertise, already synthesised by the expertise (e.g. fauna, flora, soil, water, air and climate); or re-created by the designer, based in other type of information found on the analysis sub-stage.

Last, but not least important, the human environment is the third parameter for the building environment survey. The human environment is the responsible for the irreversible conversion of a natural environment into built environment (green and urban structure), as well as, the reversible transformation of built newness into built heritage, through their perception and attribution of inherent cultural values.

The 3SS would lead the architect through the significance survey. The architect would set all information cultural values-related, and synthesise the analysed information in the following eight building significance parameters: the economic, the political, the social, the historic, the aesthetical, the scientific, the age and the ecological values. (Pereira, 2005a) The designer might deal with buildings where some of this identified cultural values are perceived generally (e.g. political) in the building and its environment, but also might deal with buildings where specific building forms / components / materials have that specific value attached. If that is the case, all should be clearly identified and described.

The 3CS would lead the architect through the condition survey. The architect would set all information building features oriented, and synthesise information in the following five building condition parameters: the substance, the function, the performance, the durability and the costs. (Pereira, 2005b) The condition survey is from the three surveys, the less problematical, when proving its scientific reliability. Even if this survey requires the information collected in the analyses pre-stage, most facts are measurable and can be further surveyed, without the influence of subjective interpretations, of the designer's observation.

Inversely, the first two surveys, are characterized as semi-objective (simultaneously subjective and objective information), however it only acquires a negative connotation, if the designer does not take seriously his tasks as analyser and synthesiser; which can also happen in an objective survey, such as the condition survey. For example, a designer that, alleging lack of time, tries to jump from the inventory, directly to the evaluation without making any synthesis / survey, might formulate some unsustained evaluations, and will not be able to prove why to give a two or a four in a scale of five. (Later to be discussed)

Evaluation

After all useful information has been synthesised and converted into useful working material the designer can start the evaluation sub-stage. Within the evaluation sub-stage, there are three types of assessments the architect should consider: the building environment (3EA), the building significance (3SA) and the building condition (3CA) assessment. When the pre-design stage is develop in group (multidisciplinary or unidisciplinary), it should be presented for each assessment, the individual and the average as the global assessment result; in a spider diagram. Such diagram structure, will support the introduction of new results, in the end of the rehabilitation design, to confront advantages / disadvantages of such solution.

The 3EA would lead the architect through the environment assessment. The architect would evaluate all information environment-related, and evaluate the synthesised information in the following two environment parameters: the natural, and the built environment (See Table 1).

Table 1. Building environment assessment

		Scale				
		5	4	3	2	1
natural		very high	high	reasonable	low	very low
	evaluation	5	4	3	2	1
built		very high	high	reasonable	low	very low

The 3SA would lead the architect through the significance assessment. The architect would evaluate all information cultural values-related, and evaluate the synthesised information in the following eight building significance parameters: the economic, the political, the social, the historic, the aesthetical, the scientific, the age and the ecological values. There is a clear difference in this table, when compared with the others (Table 1 and 3). Table 2 presents the evaluation scale, but also the risk scale. This risk scale was created to alert the designer, that not all cultural values imply the same level of risk for the building. And depending of their scale and weight, they can even represent higher degree of destruction.

This risk scale was developed based on relevant literature survey and their expertise judgment. Even it would have been very interesting to test it empirically, the contacts made, in the beginning of this research, shown that there is still a considerable scepticism regarding the exposing of rehabilitation design details and decisions. Often the final drawings do not discriminate which was the intervention regarding the remainings (except for classified buildings) and only the evident additions are easy to identify. Also subtractions are normally unreferenced in the rehabilitation designs. So, selecting different rehabilitation designs, and compares its degree of destruction, as initially planned, in order to empirically determine the risk of each cultural value had to be postponed for further researches.

Table 2. Significance assessment related to the risk factor

		Scale				
		5	4	3	2	1
all	evaluation	very high	high	reasonable	low	very low
economic		2	3	4	5	1
political		high	reasonable	low	very low	very high
social		2	5	4	3	1
historic	risk	high	very low	low	reasonable	very high
scientific		3	4	5	2	1
aesthetical		reasonable	low	very low	high	very high
age		5	4	3	2	1
ecological		very low	low	reasonable	high	very high

The 3CA would lead the architect through the condition assessment. The architect would evaluate all information building features oriented, and synthesise information in the following five building condition parameters: the substance, function, performance, lifespan, adaptability and costs. (See Table 3) Similar to the environment and the significance assessment, the designer, in this sub-stage, should evaluate the pre-existence, through the same one to five scale.

Table 3. Condition assessment

	Scale				
substance	5 very high	4 high	3 reasonable	2 low	1 very low
function	5 very high	4 high	3 reasonable	2 low	1 very low
performance	5 very high	4 high	3 reasonable	2 low	1 very low
lifespan	5 very high	4 high	3 reasonable	2 low	1 very low
adaptability	5 very high	4 high	3 reasonable	2 low	1 very low
costs	5 very high	4 high	3 reasonable	2 low	1 very low

(column "evaluation" spans across the substance–costs rows, centered)

Decision

After all inventories, surveys and evaluations are developed, the designer should be able to develop a pre-design report compiling all the information related to the building. The main objective of this pre-design report is to reconstruct the lifespan of the building (past and present), from its construction till the period where the rehabilitation is being designed.

Expert's reports has been used already since the XIX century, most commonly for archaeological and historic purposes, but lately it has also been used to support monuments and listed buildings restorations, as highly recommended by the Venice Charter (ICOMOS, 1964). Even if the rehabilitation design process has improvement, as main guideline action, several building elements, specially the ones with very high significance or condition, should be planned to remain in the building. Those elements often need to pass through a process of conservation or restoration, depending on its condition state.

This pre-design report will support the designer on his/her contacts with the other intervenients. Consequently, the building owner will be able to verify the coherence of his aims towards the building, as well as the technical requirements for operationalizing his plans. This can be a good solution to control and advice leaders, which may have overstated expectations, and do not consider the consequences of their actions towards the building and environment. This report should include only truthful information, free from premeditated judgments or intervention intentions, when analyzing, synthesizing and evaluating the building.

Stage 4 – Design

The pre-design stage is rehabilitation-oriented (new existence), where the designer should concentrate in the rehabilitation versus the building and its environment (pre-design report), and its new requirements. According to the theoretic model, the architect (designer) should pass through five different and successive sub-stages, similar to the pre-design stage, excluding for the sub-stage simulation in between synthesis and evaluation, further on described. Also the evaluation has a new assessment, which is the design assessment.

After analysing and synthesizing the fundamental information, then, the designer should start simulating and materializing his/her ideas and convictions in several different periods: conceptual (4CD), preliminary (4PD), and final design (4FD).

There is not a specific time or order for concepts to appear; they emerge in the designer's mind as an intercepted reflection of his/her personal experiences, the building, the environment, the requirements, etc. Every new factor can contribute for the development of new concepts or reformulation of old concepts. Concepts are subjective, irrational and sometimes unreasonable, so it is up to the designer to capture those emerging concepts and use them as design starting points. The 4CD is that particular moment, when by a complex process of continuous mutation, the world of ideas is converted into the building reality.

In the 4PD the designer just has to develop his design solutions for the rehabilitation "problem". He will have several technical knowledge and guidelines, so that he can develop a good quality and lifespan conscious design. In-between preliminary and final design it is advisable to develop an evaluation sub-stage, in order to verify if the designer is doing well. If not, there is still time go back and improve his solutions. The 4FD represents a conclusive period in what regards the designer's pure concentration in design developments. And from this moment, he is able to pass to the next sub-stage, the evaluation stage. Not always the final design matches the final design (after construction). Nevertheless, within the design stage, the final design is defined as the moment when the design developments are finished and can be evaluated, as well as, presented to the other intervenients as design decision.

In the evaluation stage, the designer evaluates the advantages / disadvantages of the chosen solutions, and can directly compare pre-design and design evaluation results, regarding the building's environment (3EA – 4EA), significance (3SA – 4SA) and condition (3CA – 4CA). Still integrated in the evaluation sub-stage, the designer can evaluate his own design results (4DA). The designer concludes his design process, when he finally decides specifically for a design solution. Finally, the decision sub-stage will collect and report the whole process.

CONCLUSION

Evaluations normally differ according to their aims, target object and intervenients involved, mutating the process in breadth and depth scale, method and evaluation result. With this research, we intend to develop a method to fulfil the need of structuring methodologically rehabilitation designs and built heritage characterizations. Lately, rehabilitation interventions have been increasing in the construction market, but, especially in the unlisted heritage buildings, often we find intrusive rehabilitations that neglect the building's past, present, and future; demolishing a higher percentage of building, with high significance and condition.

This theoretic model (prototype development) will perform as framework of the support tool for architects involved in rehabilitation designs (prototype production), soon available in website format. Every sub-stage will have a clear explanation and guidelines suggesting common procedures, however, it is not our intention to provide solutions to rehabilitation design problems. The architect will only have a support tool to help him through his own design process, as well as, in his interactions and argumentations with all other intervenients.

ACKNOWLEDGEMENTS

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