

RE-DESIGNING ARCHITECTURAL ARTEFACTS: A BUILDING'S LEARNING PROCESS

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1. Introduction: re-design assignment

This paper presents the background of an ongoing experimental design assignment. Students in the third year of the *Bachelor of Science in Engineering: Architecture* are asked to design a social housing project in an early 20th century wine storehouse in Brussels. A specific approach was used, contenting two main focus shifts for both students and tutors.

First, instead of focussing on the students' results of this assignment, attention is shifted towards their design process. During the design, students are encouraged to make a detailed analysis of the existing building, its constituting elements and characteristic aspects. The graphical output of these individual analyses is immediately made available to all students through the universities' digital education platform. All discovered interesting aspects of the existing building are thus collected, eventually forming a knowledge base about the building.



Figure 1. Existing building: plan/section – facade – internal hall – wine barrels

A second focus of attention in the exercise is the use of guiding strategies or concepts by the students. These strategies can be seen as attitudes towards the design, influencing – or even guiding or steering – design actions on the existing building. Similar to the analyses, the individually used strategies are collected and shared to the other students by means of the digital platform. Here the strategies will be generalised – and possibly undone from too many specific details – in order to be used in other contexts. Thus a collection of possible re-design strategies is formed.

2. Introduction bis: folding, two-fold and re-folding

We would like, as yet, to emphasise three background conditions which frame the ethical atmosphere of the content of the paper.

Firstly, the context of the story is an engagement towards sustainability in building culture what implies improved design strategies in order to enforce this. Sustainability here is seen, not as a body of techniques, tools, rules, knowledge about materials... but as an intention, an attitude, and a preferred

state of ‘being’ in the world in order to improve the quality of life. The human being is in this core awareness.

Secondly, inspired by co-operative learning strategies and socio-constructivist learning theories, we will argue in favour of their co-existence as a core value. As a direct effect, it resulted in co-writing this paper as an exercise in two-fold and re-folding of ideas and texts. The following section consists of more or less separate written texts, accordingly indicated with ‘JD’ respectively ‘JL’ being the authors’ initials. A date when the text was written in the format of ‘dd-mm-yy’ completes this code. The titles ‘co-writing’ indicate the parts which have been written together, and the titles ‘writing’ indicate separately written texts. (JL 30-03-04)

Thirdly, the paper pushes the acceptance of dis-continuity. In these the clear and understandable connection between cause and effect is problematic. One of the kernels used is the concept of ‘event’ [Deleuze, 1990] which implies a mental/conceptual shift of experiences and ideas resulting in constructing new paradigms and theories.

3. Co-writing, writing

3.1 Co-writing [concepts/processes]

The design process can be described using following concepts: design stages, spiral movement, feedback loops, random order, simultaneity and provocation. By using these concepts, a theoretical background for the specificity and character of the design process in the case of re-design is presented. This theoretically developed description of the design process will be confronted with the processes that are involved in the students’ designs. (JD/JL 26-09-03)

3.1.1 Writing [concepts]

Architectural education is still very often based on the Beaux Arts method of working on the basis of (photographed) precedents. Many attempts have already been made though, to develop models of the design process upon which more structured design methods can be based. (JL 12-01-04)

On a large scale, the development of a design can be divided into different stages. These stages typically include an information stage, a design stage, a detailing stage and a communication stage [Broadbent 1973].

Within these stages, a reiterating decision sequence (analysis – synthesis – evaluation) occurs [Dewey 1910] where a designer “goes round several times”. This reiteration can either be seen as a spiral movement [Mesarovic 1964] or as a sequence of feedback loops [Archer 1963].

During this process many decisions are taken. Tavistock [1966] says that each design decision sets in a train of consequences which can cause the initial decision to be changed. Levin [1966] adds that even when a decision is taken there is no indication that this decision will also be implemented; it can be understood as something different later on or can even be ignored.

Moreover, each design encompasses both logical analysis and creative thought. Jones claims “that any design method must permit both kinds of thought to proceed together” [Jones 1970]. Similarly, considering different design issues in a random order and being able to move between them in a rapid way is what can make a design richer.

Lawson [1990] talks about the design strategy for describing these aspects. He calls the early stages in design “analysis through synthesis”. The designer identifies the most crucial issues of the problem and formulates a solution idea. He then confronts this idea against other – more detailed – issues in order to check the relevance of the chosen option. Only when a path seems not to lead to a solution, he shifts his attention and another path is taken. (JL 06-01-04)

3.1.2 Writing [processes]

This theoretically developed description of the design process in terms of stages like analysis, synthesis, and evaluation, is tested in practical experiments. These processes are characterised by open-beginning and open-ended trajectories, emphasising verbs; designing instead of the design, ordering instead of order... (JD 12-01-04)

In analogy to mechanisms in learning, these processes are based on the reciprocal challenge of experience and reflection; and making it operational. (JD 06-01-04) This is referring to David Kolb [Kolb 1984] who created a dynamic model of four elements: concrete experience, observation and reflection, forming abstract concepts and testing in new situations. (JD 30-03-04)

It is very important to understand that processes occur in a context. This context is built up to the field of existing conditions, time in relation to cultural reception and the problem field, respectively connected to history and future. (JD 06-01-04)

Context is changing permanently. This implies that also the meaning of an intervention changes. By materialising this changing meaning (by making it visible) the context is changing again. Architecture can slow down, support or provoke this process or dynamic. It is not a question of choice, but a question of attitude to deal with these three strategies – which can also be present simultaneously. Thinking in terms of processes is more than applying management strategies (process control): it is about taking a stand towards the building – in the long and short term – in two senses: past and future. (JD 30-03-04)

3.2 Co-writing [awareness/attitude]

The aim is to develop a design method for re-design, based on the concepts and process definitions described above. The method intends to improve the transformation of our environment and its artefacts by making this transformation more sustainable. It intends to structure the knowledge and attitudes we need in order to interpret the existing artefact and the knowledge we need in order to transform this artefact into a new one, in a systematic way. (JD/JL 26-09-03)

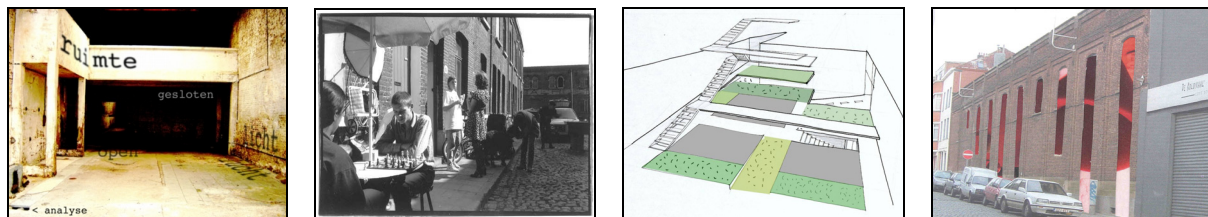


Figure 2. Analysis – intention – synthesis – intervention

3.2.1 Writing [awareness]

Architects – and all designers – should be aware of the impact of their actions. This is certainly true in case of architectural re-design. The re-use of a building evokes certain transformations, which in most cases are – almost – impossible to ‘undo’. This transformation acts not only in a physical sense: transforming physical elements of an existing building. Also non-physical elements of the existing building are re-used: its history, cultural values, concepts or ideas. All changes to these elements will leave ineradicable traces. (JL 14-01-04)

3.2.2 Writing [attitude]

The proposed design method intends to structure the potentials of the building, designer and user. In terms of permanent re-ordering, structures are dynamic displacements of categories (and their content), whether these categories are based on architectural classification (form, function, structure and situation) or pedagogical classifications (experience/reflection, analysis/synthesis, research/design...). It allows defining the qualities of the existing case (building part, building or the building in its environment) and the qualities in terms of explicit experience and reflection as a network of ingredients for a co-existing narrative. (JD 06-01-04) This co-existing narrative is based on two axes: firstly the relationship between building, designer and user; secondly the relationship between – in each case other – buildings, designers and users, forming an inter-disciplinary culture. (JD 30-03-04)

3.3 Co-writing [constructivism/continuity]

In the same way that a reciprocal continuity between the history/memory of an existing building and its transformation/renewal exists, a reciprocal continuity between education and profession comes up. Beside the practical use in our profession, possibilities and advantages for students to learn to deal with the high complexity of re-design in a more explicit way are expected. This way of learning - a dynamic integration (in terms of provocation) of knowledge, skills and attitudes - is the kernel of a learning organisation based on the Life-Long-Learning-approach. (JD/JL 26-09-03)

3.3.1 Writing [constructivism]

Above, procedural and attitude issues are described. Now we should come to the required knowledge necessary for bringing the (re-)design process to a good end. What knowledge did a designer use, and how did he interpret the problem? What knowledge was added by making this design? (JL 12-01-04)

We take a socio-constructivist view on knowledge development. Knowledge is not neutral, but it is constructed/shared through dialogue. (JL 06-01-04)

The method tries to cope with this by presenting knowledge as a part of the design case. Certain design knowledge is present in the process of a design. By capturing – as best as possible – this process the knowledge is captured as well as the context in which it was constructed, and in which it is true. The ‘story’ around this knowledge is as important as the knowledge itself and will therefore not be omitted. Only this presence of context allows sharing the true meaning of the knowledge with others. (JL 12-01-04)

At last, the aim is to integrate new findings, ideas, concepts, and facts... in our “constructed” body of operational knowledge. (JL 12-01-04)

3.3.2 Writing [continuity]

As interplay between Life Long Studying and Life Long Learning, a tension between on the one hand ‘problem solving behaviour and knowledge needed in the design and building culture’ and on the other hand ‘conceptualising behaviour and making things problematic’ nourishes a Life Long Strategy. (JD 06-01-04)

As a conceptual strategy, problematisation can be defined as a process in which the virtual differentiates itself in the active creation of something new. (JD 12-01-04)

3.4 Co-writing [log/portfolio]

As a methodological concept an integration of ‘permanent’ evaluation in the tension between analysis and synthesis is proposed. It is our conviction that analysis is an essential aspect in architectural design – and more specifically re-design – which can influence synthesis formation in an important way. (JL 30-03-04)

As a pedagogical concept a shift from product- to process-approach is proposed. Apart from the design method, log- and portfolio-assessment can support this systematic and explicit ‘facilitating’ of the transformation of existing building culture. Log (analysis/memory) on the one hand and portfolio (synthesis/intention) on the other hand are the interplaying instruments in order to launch the knowledge of our changing environment in a sustainable way. (JD/JL 26-09-03)

3.4.1 Writing [log]

The only means in which our aims for the learning process can be accomplished is by keeping detailed logs of the design process. Otherwise it is very likely that the constructed knowledge in a project will ‘die with the designer’ [Broadbent 1973]. In this log an architect keeps track of the different design steps of a project. New knowledge as well as attitudes and awareness can be derived from this log. A problem arising here is that these logs are for a large part only comprehensive for the author himself. This induces adding additional information to the information inside a log to make it comprehensive for others. (JL 12-01-04)

Another problem is the creation of massive amounts of information, which can be partly redundant. Therefore it is necessary that essential steps in the design process can be filtered in order to handle the collected knowledge. In this design exercise the facilitators ‘acted’ as filters to keep the information manageable. (JL 06-01-04)

3.4.2 Writing [portfolio]

Unlike a log (a collection of facts), a portfolio (based on that collection in the log) delivers evidence illustrating the design processes. (JD 06-01-04) The simple journalist’s questions like ‘what, who/why, how and when/where’ can integrate autonomous facts into an integrative insight for the time being. Essential is that the portfolio reveals a synthesis and intention. This represents the best possible solution at that time related to the present competencies (an integrated set of knowledge, skills and attitudes), materials..., in terms of shared intention/intervention. This is referring to an appropriate way of teamwork in which experts co-operate in order to ‘write’ an integrative quadruple analysis/intention/synthesis/intervention, being more than a summation of separate expert’s findings. (JD 12-01-04) This interplay can be operationalised by a spiral advancement in which analysis and synthesis are design methodological aspects, and intention and intervention architectural aspects, together a pedagogical outlook. (JD 30-03-04) The designer is one of these team players, in the role of architectural designer, a co-ordinator in the role of manager. Apart from the log, the portfolio is a second ‘instrument’ in making the process of designing explicit. (JD 06-01-04)

In terms of feedback, evaluation and re- evaluation, the portfolio is measuring growth and development instead of collecting singular facts. It measures attitudes towards what is essential and is an adequate overture for the strategy of self-reflection. Therefore it induces a sustainable engagement and makes the learner (designer, user and the building itself) responsible. (JD 06-01-04)

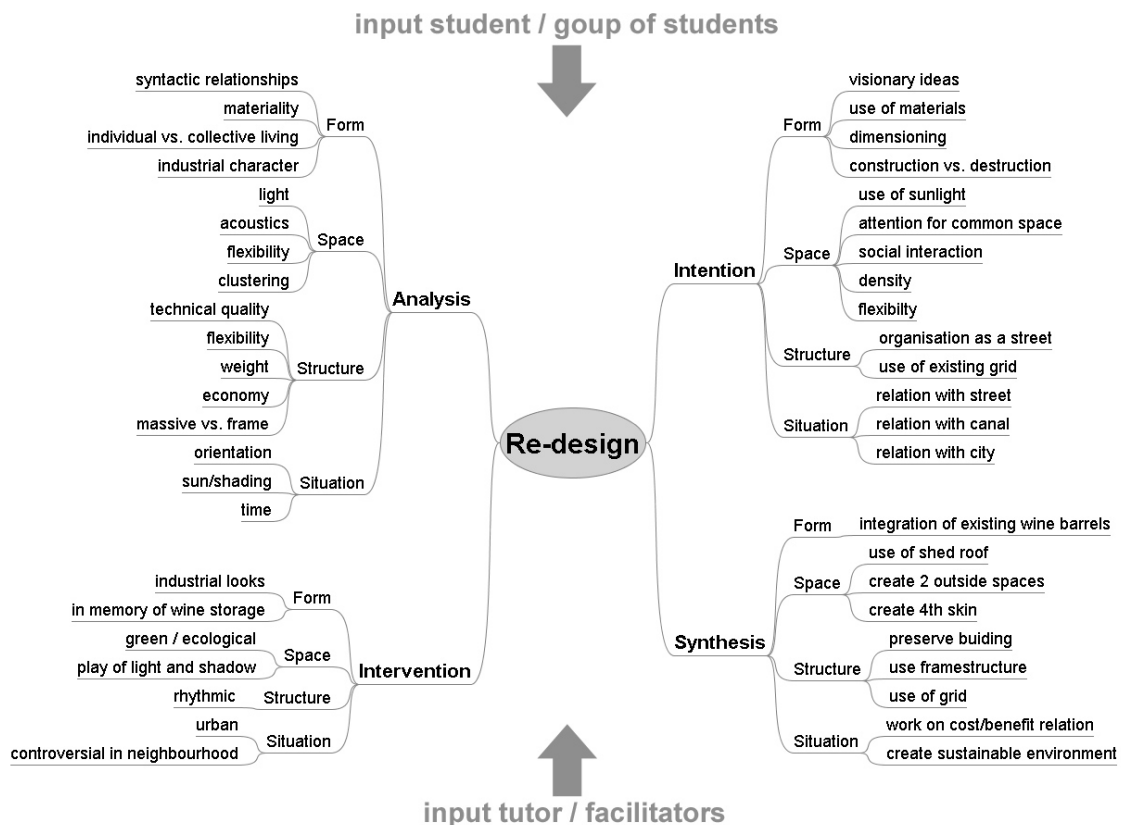


Figure 3. Fragment of mind map indicating dimensions considered by the students

3.5 Co-writing [transparency/meaningfulness]

The proposed design exercise emphasizes three goals. A first aim is a less complex assignment. This is achieved by an oriented deeper level study of (some) aspects of the design, in the context of a broader taxonomic framework. It improves sharing knowledge and attitudes, which are made more explicit and integrated. A second aim is the awareness of and understanding of regarding the re-designing artefacts (e.g. buildings) - in a metaphorical sense - as a learning process itself. (JD/JL 26-09-03)

A third aim is to enforce an insightful attitude towards transforming the world and its artefacts. (JD 30-03-04)

3.5.1 Writing [transparency]

All efforts described above have as a common aim to bring some more transparency in the black box that designing still is. Not a fixed, beatific and general design model is proposed with accompanying design method, but an attempt is made to create a means which can reveal – smaller or larger – parts of the design process and give them meaning. (JL 12-01-04) This makes the design decisions others have made more understandable. It reveals the issues they have considered for making their decisions. It suggests at least one way in which a specific issue is taken into account which can form a possible suggestion for future designs. (JL 06-01-04) By providing the students a means of sharing aspects of analysis and synthesis, intention and intervention, a less complex assignment is created. Instead of having to study all of these aspects – as far as this would be possible for most students – they can study only some of them and use the results that other students found for other aspects. This gives them the opportunity to spend time to their own preoccupations, and still get a full picture of the problem space to be able to develop an integrated synthesis and intention. (JL 30-03-04)

3.5.2 Writing [meaningfulness]

Several actors can be distinguished in relating meaningfulness to a factual reality:

- In contrast to the scientific approach of specialisation and atomic models of reality the aim is to ‘invent’ meaningful wholes in which differences are included instead of excluded. (JD 06-01-04)
- A pragmatical attitude is preferred instead of an utopia or idealistic attitude. It implies the presence and evaluation of concrete experience and tangible actions. (JD 06-01-04)
- In the context of making decisions about how to re-design existing buildings, a priority is given to state the ‘good’ questions instead of the correct answers. This attitude requires a worldview; under what circumstances can people inhabit our world in a qualitative way. (JD 12-01-04)
- Referring to the model of Newell and Simon [Newell and Simon 1972] in an article about “elements of a theory of human problem solving”, the notion of “meaningfulness” can be related to the intention to integrate new competencies into the long-term memory. (JD 12-01-04)

These actors will be brought into account in order to set up a dynamic taxonomy of criteria for renovation. Although nowadays there is a too large attention to the building as such (based on aesthetic categorisation), we support the idea to analyse the building in all scales (building elements and the building in a larger context). (JD 06-01-04)

4. Re-writing: layering and folding design knowledge

This paper has several goals. Most important we want to communicate our ideas about a design/education method which are applied in the setup of this assignment.

Not only guidance in the procedure to design can help students. A means of conveying existing and relevant knowledge will be essential to start finding their way in the massive body of knowledge already there. This knowledge is produced during design and is therefore ephemeral when not adequately captured during the design process. This demands certain attitudes which are trained during the assignment. The experiment tries to reveal how knowledge is built up during the design. This is knowledge about the building itself that can be used for the design of the new building, but secondly

some of the knowledge gained here could be transferred to other designs too. In a further phase of this research this aspect will be further explored.

In contrast to replacing a fixed situation - which is symbolised by an artefact - into another fixed situation, an attitude is promoted characterised by permanent shifting, gradations of problematisation, re-ordering... and thus: designing, co-designing, re-designing.

There seems to be an analogy between the way buildings are designed and learning environments are designed. In this sense, buildings – inclusive their future (designed) meaning – can be read as learning processes. Convinced about the fact that sustainable learning environments, in the way they are designed, are anticipating on change, constructivist learning, context-related dependency, flexibility... we can ask whether the design of buildings can be sustainable as well. It has implications on the way of designing and the way designing is taught.

Three dimensions of a (curriculum) design are essential: integration, critical reflection and the ability to change. Respectively we do mean by that: it's more than a logical and measurable summation of quantities; permanent feed-back/evaluation is required; and: it has the ability to support different/heterogeneous programmes in future.

Trying to find the essentials of the building and their dynamics related to values in order to actualize sustainability and co-existence is a main intention. With the figures 'event' and 'heterotopia' [Foucault 1993] at the back of our minds, re-novation and re-furbishment have to do with thinking in 'layers' and 'foldings'.

Learning strategies have to be designed in such a way that they provide the opportunity for learners (students and tutors/facilitators) to engage in open problem situations, focussed towards:

- A/ posing meaningful questions
- B/ inducing reflective attitudes
- C/ anticipating to changing conditions

To be supportive to that aim, design methods, design tools and attitudes have to be constructed through dialogue. The aim is to build a shared dynamical multi-dimensional knowledge body by an inter-disciplinary team of experts, this in order to make experiences operational.

For that, the analysis of a building to be renovated:

- A/ is based on an open set and critical use of institutionalized analysis categories;
- B/ occurs simultaneously with the act of synthesis; and is therefore creative as well;
- C/ creates a sustainable knowledge-body which goes beyond the information – stage.

As in a pedagogical context, it refers to a successive range of knowledge levels: information, insight, application, creative application and at last invention of new knowledge. The latter creates again new information.

Our synthesis about method/process knowledge allows us to understand specific problems previously encountered with students. Here we mainly allude to the poorness of design dimensions which are considered in a design. By confronting them with dimensions taken into account by their colleagues we hope to – partly – overcome this issue. The choice for a re-design project is partly decided by this. The qualities, problems and opportunities encountered during the analysis of the existing building are a first stimulus to start thinking about the new design from the same angles. Another problem is the evaluation of and resulting attitude towards design problems encountered. Again confrontation with strategies and concepts used by their colleagues to structure their design decisions hopefully acts as a provocation of taking important design steps.

The design exercise is not set up as a goal in itself, but is meant as a first step towards the development of an evolving design tool, comprising similar features as stressed in the exercise. The tool acts as an adapted log and portfolio which will help reaching our/the students' goals. The problems discussed about the amount of information, are handled by making use of a database which can be consulted through the internet. This makes collecting, handling and spreading knowledge more manageable.

5. Re-writing: conclusion

First, the consciousness of the learner (student or practitioner) of a wide range of fields involved in the design combined with the depth to engage into each of these fields is contemplated. This consciousness is always related to the learners' motivation, interests, learning style. Essentially what this tool tries to do is make designing (its knowledge and attitudes) more transparent and by this add to the value of the continuous work of designers.

Secondly the shift towards the working process instead of the artefact has been incorporated in the paper. Therefore the result of this paper does not resemble a normal setup and layout, but is partly conceived as a log and portfolio. Section 3 shows the log of the two authors represented as genuine as practically possible. Section 4 acts as a portfolio, synthesising only those elements which are essential in our plea.

Thirdly, we wanted to test our proposal of "working apart together". 'Writing, co-writing' was an underlying agenda of applying the principles of the design exercise to the act of writing a paper. Individually developed parts formed the basis of further thought and development and make the correspondence with 'designing, co-designing, re-designing' complete. Our suggestion in the exercise that individually developed ideas can and will bring forward new ideas when confronted to other people seems to work for the act of writing. Several separate ideas in the 'log' come together in the 'portfolio', even adding to its meaning. We hope that the running design exercise will bring similar results.

6. Re-writing bis

A second re-writing – apart from writing the 'portfolio' - was conducted after receiving the reviewers' comments on our paper. We can foresee even a third re-writing of the contents of this paper in the sight of the presentation at the conference itself. (JD/JL 18-06-04)

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Jonas Lindekens is Research Fellow of the Fund for Scientific Research Flanders, and studies re-design methods at the Vrije Universiteit Brussel, Department of Architecture. José Depuydt is Professor/Lecturer at the same university, where he is conducting research about pedagogy in architecture.

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