Urban and Regional Design Education: Making the Design Process Explicit

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Abstract
Urban and regional design are fundamental skills in the field of urban studies. Designing is a complex, personal, creative and open-ended skill. Performing a well-developed skill is mainly an implicit activity. In teaching, however, it is essential to make explicit what to do. Learning a complex skill like designing, is a matter of doing and becoming aware what should be done and how to do it. Therefore it will be helpful for teachers and students to make the steps, methods and/or activities in the design process explicit.

This paper distinguishes five generic elements in the urban and regional design process. These elements are based on the review of academic literature about the design process, on structured observations of design teaching, and based on personal experiences in design teaching. These elements are generic in the sense that they lay beyond the complex, personal, creative and open-endedness of the design skill: (1) exploring and deciding, or experimenting, (2) guiding theme or intended qualities, (3) domains or aspects, (4) frame of reference or library, (5) urbanism language: text and image.

1. Introduction: designing as a complex, personal, creative and open-ended skill

Urban and regional design are fundamental skills, disciplines if you like, in the fields of Urban Studies and Urbanism. Together they build the basis of the 2-year, 120ects Delft University of Technology Master’s program in Urbanism (Rocco and Rooij, 2010; Rocco, Biggs and Rooij, 2011). To master a skill thoroughly, one needs both high quality training sessions and a lot of flying hours: learning-by-doing. Like all design and/or skill oriented education programs, the MSc Urbanism program faces the challenge to teach students (how to master) design within limited time budgets of the Urbanism curriculum.

Designing is a complex, personal, creative and open-ended skill. Dreyfus and Dreyfus (1986) label the design process as ‘unstructured’. Lawson (2006) sees it as a ‘prescriptive job’, creating (features of) the future. Schön (Goldhoorn, 1991) points out that designing is complex: it is about different kinds of knowledge, about developing a personal system of preferences, and about using a specific language of sketching and modeling. For experienced designers the process is not split up in separate steps and actions, but the process is an undivided whole with automatic, unconscious steps and actions based on common practice or routine and moments of reflection and exploration (Lawson and Dorst, 2009).

How can teachers help students – beginners and/or advanced beginners – learn such a complex, personal, creative and open-ended skill like designing? How can we develop our teaching? To answer these questions, we needed to look deeper into the processes of learning and designing. The research work which fundaments this paper consisted of [i] literature research of the design process, on differences between novices and expert designers, on [ii] structured observations of
design teaching within the faculty of Architecture and the Built Environment (Van Dooren, forthcoming), and on [iii] personal experiences in design teaching.

This paper, in the first place, discusses the importance of making [things] explicit when teaching and learning. Knowing this, immediately, a crucial question raises: what do teachers have to make explicit and what do students have to become aware of in learning to design? To answer this main question of this paper, we formulate the hypothesis that, next to talking explicitly about the product, the design process has to be made explicit (section 2). We will elaborate in the third section of this paper on the design process in detail: five generic elements are presented as a framework for making the urban and regional design process explicit. In the fourth and concluding section we discuss how teachers and students in urban and regional design might benefit from this framework.

2. Making explicit in education

2.1 Doing and making explicit

Traditionally the ‘designerly way of thinking’ (Cross, 2007) is taught and learned in the studio, in a master-apprentice system, or in educational terms: in a process of learning-by-doing. Schön (1985; 1987) has pointed out the paradoxical character of the design education. He states that the student ‘is expected to plunge into the studio, trying from the very outset to do what he does not yet know how to do, in order to get the sort of experience that will help him learn what designing means’ (Schön, 1985: p. 57). For the student this is a confusing situation.

Not only for the student learning to design is a challenging and uncertain job, also for the teacher it is more challenging than it would seem. In principle, the teacher is an expert designer. However, in general, performing a skill like designing, is largely an implicit activity (Dreyfus and Dreyfus, 1986; Ryle, 2002; Lawson, 2006). For experienced designers it is often difficult to make explicit what they do. Schön (1985; 1987) refers to this as ‘knowing-in-action’.

However, in the process of learning and teaching a complex skill like designing, it is essential to make things explicit and to become aware of what to do. Dewey (in Logister, 2005) describes this as 'knowing is supporting to action': knowing makes us understand the relation between our actions and the consequences of our actions. A better understanding of these relations helps to act more focused and thoughtfully, more intelligently. Especially in unknown and new situations, it is important to use this understanding. Kolb (1984) describes learning as meaningful when four phases are included in the learning process:

1. concrete experience or 'feeling': sensory perceptions of concrete objects;
2. reflection or 'watching': observing and thinking, mental experimenting;
3. abstract understanding or 'thinking': translating experiences in general notions, conceptualising, relating;
4. active experimenting or 'doing': physical experimenting.

In these four phases making explicit and doing are more differentiated: concrete experiences (1) and active experimenting (4) relate directly to doing. Reflection (2) and abstract understanding (3) relate directly to making explicit.
2.2 Making explicit the process: a tool

To help the student in the process of doing design, the teacher and the student in a studio have regular talks. Personal observations of the dialogue between teachers and students (Van Dooren, forthcoming) tell us that we can distinguish four main layers in the discussions. To become experienced designers, students learn by doing, that is by working on a case study: the design project at hand (layer 1). In doing so, they discuss how to apply personal and general design principles, by which design oriented knowledge is made applicable (layer 2). Often a teacher or student (implicitly or explicitly) follows a design method, a personal or cultural design approach (layer 3). And last, but not least, students learn about the design process, the generic process steps and design (oriented) activities, which lie beyond the personal methods and cultural approaches (layer 4).

Being teachers and observing teachers at work, our main impression is that in design teaching, a lot is said about the product, but a lot less about the process. Probably, for skilled designers, it seems more natural to talk about the design product than about the design process. Perhaps the (large) variety of things that you do in a design process is so self-evident for expert designers that they tend to ‘forget’ making them explicit in the education situation.

Therefore, this paper defines and presents a basic framework of five generic elements to be distinguished in the urban and regional design process. The framework is meant as a tool to be used in design education, to make the design process explicit in a more clear and structured way. And we should not forget: designing is an interwoven process. The generic elements are to be distinguished, not to be separated.

Moreover, the generic elements are not meant as a recipe for the design process. They are general principles or common features, present in one form or another in any design process. The elements emerge in the design process, next to and interwoven with each other. There is no fixed step by step sequence. Design processes might differ a lot in terms of the emphasis that is put on elements and the way the elements are used, depending on the kind of project, the designer and the design discipline.

2.3 Literature and experience

Starting point for us and the foundation for defining the generic elements in the urban and regional design process is what researchers in this domain have written about the design process in general. Schön (1985; 1987) describes what happens in the design studio, and others like Darke (1979), Lawson (2004; 2006), Cross (2007) and Lawson and Dorst (2009) write about the design process in general. Apart from substantiating the generic elements in research about the design process, it is important that they are defined from an educational point of view. Therefore, we also relate to literature on the differences between novice and expert designers (Eastman, Newstetter and McCracken, 2001; Lawson and Dorst, 2009).

Furthermore, the generic elements have been developed in a process of experimenting and testing in design education practice. In a number of Delft University of Technology Architecture and Urbanism courses, students are trained in understanding the design process. The design process is made explicit during the training and is one of the important topics for discussion in the teacher-student dialogue. In structuring the education by and focusing on the generic elements, the student’s and our understanding of design further developed in the process of learning-by-doing and learning-by-reflection. In talking about the design process and the generic elements in design processes, the description of the generic elements have become more defined and more focused. The next section presents the five generic elements in detail.
3. Generic elements for urban and regional design

3.1 Exploring and deciding, or experimenting

The design process is a dialectical and paradoxical process. A process of thinking in broad outlines and in detail, of doing and reflecting, of intensive working and taking distance, of naming and valuing, of seeing what is and could be there and judging, of questioning and answering. It is a process of balancing between opening up possibilities, seeing new ways, analyzing, discovering alternatives, associating, encircling a subject, and abstracting it on the one hand and on the other hand reducing possibilities, testing, selecting, evaluating and making decisions. To summarize all these dialectical and paradoxical actions: designing is first and foremost a process of exploring and deciding, of diverging and converging, of experimenting.

Designing is doing experiments and learning about the consequences and implications of these experiments: a continuous process of ex-ante evaluation. Schön (1985) describes this process of doing (small) experiments also as ‘making a web of moves’. He defines the moves as changes in ideas and representations, in configurations, sketches and words and the consequences and implications of a move as traces in the virtual world of a drawing or model. Starting with ideas and sketches, with proposed solutions, the designer explores the problem and possible solutions with an open mind. The experiments or moves are evaluated and further experiments are done. Making moves means developing solutions as well as creating new problems to be described and solved. And making moves may be helpful in seeing things in a new way, in constructing new meanings and intentions.

In a way, the process of experimenting is a process of questioning or in the words of Schön (1985) a ‘reflective dialogue’ and a ‘conversation with the situation’. The designer is exploring and testing in experiments or moves with questions like: ‘What if I do this?’, ‘What do I have to do, to achieve this?’, ‘What is happening here?’, ‘Do I like this?’, ‘Does it fit in what I want to achieve?’ (Figures 1 and 2).

Figures 1 and 2. Exploring alternative ways to change an existing neighbourhood into a more child-friendly environment. And what happens when it has rained. A design study by 2012 Delft University of Technology Urbanism minor students supervised by author Rooij.

3.2 Guiding themes or qualities

Designing is working within an endless number of possibilities to come up, in the end, with an internally consistent whole. To be able to create a consistent whole, for helping in making choices, a designer needs an inspiring direction, an order, a guiding theme or a coherent set of intended qualities. The guiding theme is the way, in which the designer sees the design situation at hand.

Different researchers and designers name and describe the guiding theme in their own way. Schön (1985; 1987) describes designing as a situation of complexity and uncertainty which demands the imposition of an order and as ‘experimenting with a hypothesis’. He also writes about ‘constructing an order’, ‘giving meaning’ and ‘naming and framing’. Darke (1979) calls it a ‘primary generator’,
a ‘relatively simple idea’, a ground for making choices and for analyzing what the important aspects in the design are. According to Lawson (2006) working with two or more ‘primary generators’ is characteristic for the design process. Other notions used are: organizing principle, statement, pattern, idea, paradigm, concept, conceptual drive, vision, starting points, motive and guideline (Figure 3).

All the different notions for what we call the guiding theme, illustrate that the character of a guiding theme may vary. The guiding theme may be a quality, an image, a meaning, a material fascination, a functional theme, a description or a kind of ‘form language’. In fact, it would be better to describe the guiding theme as a sequence, a ‘train of thoughts’, developing in time. For example: starting with a meaning, vague and abstract, transforming into a more concrete, still open and multiple ‘form language’ to fill in.

The selection of proper, relevant or fitting guiding themes or qualities, is based on cultural and subjective judgment. It is based on experience, on being part of and having in mind the ‘design field’ and on the choice of what is liked for a longer time and seen as adequate in the particular context.

![Figure 3. Vision for a part of Rotterdam Zuid, the socio-spatial-economic connection between the Maas river and the deprived neighbourhoods of Rotterdam Zuid. A guiding long-term development proposal as fundament for the concrete urban projects by the 2012 Delft University of Technology Urbanism minor students supervised by author Rooij.](image)

### 3.3 Domains or aspects

The act of designing, of experimenting with a guiding theme, takes place in the world of compositions, patterns, structures, shapes and materials, in the world of program and use; a designer works with tangible elements. An experienced designer seems to work simultaneously in several domains and thus moves a lot across the domains. Lawson quotes Michael Wilford, who compares this complex work of a designer, operating on different fronts simultaneously, with a juggler, who’s got six balls in the air and ‘…the only way to keep them all in mind at once, as it were, is to oscillate very quickly between them like a juggler’ (Lawson 2006: p. 151).

Depending on the design discipline, the domains differ. Starting with a general definition for architectural design (Van Dooren et al., 2014), an effort has been made to develop a ‘common sense’ and therefore a relatively easy-to-remember and easy-to-work-with order. Five architectural design domains, then, are distinguished: space, material, function, site and context. In each domain
a lot of aspects come together. In a comparable way, domains can be described for the field of urban and regional design.

Carmona et al. (2010) distinguish four traditions in urban and regional design: the visual-artistic tradition, the social usage tradition, the place-making tradition, and the (still) emerging tradition of sustainable urbanism. Although the focus and starting points for these traditions may be different, there is a clear common denominator: urban and regional design is about developing spatial intervention proposals for (making or transforming) streets, neighbourhoods, city districts, cities and/or city-regions and urban design is referring to ‘…the process of making better places for people than would otherwise be produced’ (Carmona et al., 2010: p. 4). Urban and regional design proposals are thus made for a defined site, location or area, and are made within a certain socio-cultural context.

In line with this ‘working definition’ for urban and regional design, five main domains can be distinguished for urban and regional design: (1) urban space and materialization (2) program of the city, (3) planning, management and legal system, (4) socio-spatial setting, and (5) economic, ecological, cultural, and historical context. In any urban or regional design proposal you can find or trace back these five domains. Sometimes, the emphasis in a proposal is much more on one or another, but good urban and regional designs implicitly or explicitly deal with all of them. This can be nicely illustrated by the Delft University of Technology books on the Core of Urbanism, which can be easily explained in terms of these five domains (Figures 4-7).

3.4 Frame of reference or library

The act of designing takes place in a professional culture, in the context of the design tradition. Expert designers talk, sketch and think in patterns, in what is often called ‘precedents’ or ‘references’. Cross (2007) points out that the knowledge designers use, is embedded in the artificial world. The collected knowledge is analyzed and stored in images and diagrams. Designers build up a library or collection, for use during the design process, within which the examples are used, tested to the situation at hand, rejected, transformed, and so on.

Chess players, as shown in research by De Groot (Lawson and Dorst, 2009), recognize, rather than analyze a situation. Playing against amateurs, they win the game, by using patterns. However, playing against opponents of the same level, they have to come up with something new, original and surprising. Lawson and Dorst conclude that we see expert designers do the same; they do not just solve problems, but also add something new to the pool of precedents, to which other designers
can refer again. Working with references is a dynamic play with what you see and study as a designer and it changes over time.

3.5 Urbanism language: text and image

Urban and regional designers have two languages: the language of words and the language of images. Besides having a function in presenting the design result, sketching, visualizing and modelling (both physical and digital) are like thinking out loud, during the design process. Sketches and models are used as a way of thinking, of understanding, analyzing and experimenting. Sketching is a visual way of making solutions explicit in order to understand them. Designers 'externalize some features of the design situation in order to examine them in a more focused way', to 'stand back and look at it' (Lawson, 2004: p. 46).

Figures 8-12. Delft University of Technology Urbanism students at work doing an urban SWOT analysis for Rotterdam Zuid, using both words and images, filling in the SWOT confrontation scheme and visualising the conclusions, that is: the design task definition and/or design aims. (Photos by author Rooij)
The process of modelling and sketching runs parallel to the process of using words (Figure 8-12). Both languages capture different meanings and are therefore important features in the open design process. Our conscious memory has a limited capacity. The sketches and models function as an external, extended, memory. The last few decades the idea of the human consciousness as an embodied consciousness is developing. Researchers like Gallese and Rizzolatti (Keysers, 2012) showed that on a neural level there is a direct relation between what we see and what we do. Probably sketching and modelling are more than an external memory and scale model of reality: they are embodied cognition. In the words of Pallasmaa (2009): the unity of mind and body is an important factor in craftsmanship and artistic work.

4 Conclusions and discussion

To come up with a coherent design result, the urban and regional design process is a process of exploring and deciding with a guiding theme or (a number of) intended qualities. Designers have to be make statements in different domains. And the design process takes place in a context of a frame of reference and a language of both words and images.

We see the framework of the five generic elements as a pragmatic – that is easy to understand, remember and work with – description of the design process. But we understand that, just as Magritte showing in his paintings, a model or representation is not reality itself. Reality is much richer and more differentiated. However, the description of a design process can help in learning to design and in learning to understand design. Learning a complex skill is a matter of doing and becoming aware of what has to be done. Making the generic elements in design processes explicit will give a focus on this design process. In this way the teacher-student discussions can much easier relate to both the design product and the design process. It is expected that explicitly knowing the broad outline of the design process and working explicitly with the generic elements in the design process, will lead to more understanding, for students and teachers alike. It will help to act more thoughtfully and more focused.

For teachers, it means that they can train the students in the design process in a more focused, structured and systematic way, with a design at hand functioning as a case study. Focusing on the generic elements, will lead to a better understanding of what students have to be trained in and what has to be paid attention to in education. Knowing more explicitly about the design process will help to structure the dialogue in the design studio and the curriculum.

For students, being more explicit in the design process, will be helpful in the overall complex, sometimes confusing, learning process. Being more consciously aware of what designing is about, a student may get to grips with the ‘open, personal, complex and creative’ more easily. The generic elements provide a framework to distinguish the differences between urban designers, between the different personal methods and culturally determined design approaches. And last but not least, it may help students in becoming more independent in designing.

5 References
