50 TYPES OF STUDY BY DESIGN

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50.1 TYPOLOGY OF STUDY BY DESIGN

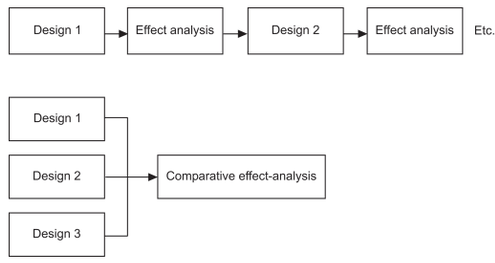
In this book study by design – also called research by or through design – is defined as the development of knowledge by designing, studying the effects of this design, changing the design itself or its context, and studying the effects of the transformations. The 'TOTE-model' from systems analysis may be recognised in this : Test → Operate → Test → Exit. Methodologically this should be preceded by a pre-design study, particularly in order to ascertain which requirements should be met by the design; although a design does not need to be goal-directed by definition.

'Means-orientated designing' is rather a journey of exploration, in search for unknown design solutions for goals yet unknown when the goal-generating context changes. In it the figure *'homo ludens'* fits, trying out things by playing. Means-orientated study by design in its pure form will occur rather infrequently. Who searches, always searches for something catering for a need. So there is minimally a latent idea of the results aimed at, for instance a higher experiential value, lower cost or better insight into the potentials of an existing area. An example is the doctoral study of Vollers (see Chapter 55) where, whilst designing, new and exciting forms of building façades have been developed. Means-orientated as well as goal-orientated study by design tries to generate insight into the relation between goals and means of design.

Next to the distinction in goal-orientated and means-orientated study by design, study by design may be cassified according to the degree in which object and context (in space, time, programme and boundary conditions) are constant or variable.

a. The object varies and the context follows. This is the case when a design intervention is made (under constant circumstances otherwise) in order to study its consequences on, for example, perceptual qualities, aesthetics and context, like in the design studies for the *'Kop van Zuid'* in Rotterdam, in order to introduce the programmatic and formal potential of that area.
b. The context varies and the object follows. An example is the positioning of the same design on a different location, in order to study the effects of the urban architectural or cultural context on the design and vice-versa (see for instance Röling's contribution, Chapter 52). Another example is provided by the changing of the requirements a design should meet, or of the weight given to the individual requirements. The subject of study is then which interventions in the design are desirable in order to acknowledge these new requirements.
c. The object as well as the context are manipulated, by changing an existing design and study the effects in different contexts.
d. A variant is that also the actors in the context vary. This applies, for instance, when a designer takes a design from another designer for point of departure and explores new possibilities by transformations in this design, generating different effects.

Another variable to classify study by design is the factor time (figure 489). Designing followed by research may take place chronologically (transformations in the design and analyses of effects on the context take over from one another) as well as synchronously (during the same period different design variants are subjected tot comparative analysis). Put differently: design variants may be developed sequentially or in parallel fashion. An example of the latter is an analysis of the contributions to a design contest. It also happens that the analysis of design variants occurs only after a sequence of design variants in the course of time. This way Frieden[a] studied a sequence of designs for Horton Plaza in San Diego, California. Due to



489 Chronological versus synchronous study by design

a Frieden, B.J. (2000) *Changing plans in midstream, a strategy for design innovation*, p. 109.

a lot of causes the plan preparation resulted in significant delay. Between the initiative and inauguration some 11 years passed into history. Since the requirements and the boundary conditions changed several times markedly (different norms for parking, different opinions about retail centres) nine different designs were made in the course of time. The comparative plan-analysis of Frieden is strictly speaking to be classified as design study. But, analysing the step-by-step changes in design and negotiations about design revisions comes close to 'study by design'.

A final variable to be mentioned, in which studies by design distinguish themselves mutually, is the kind of effect analysis. Design variants may be studied 'on paper', as well as in reality, by studying the effects in a full-scale mock-up or following realisation of the design.

Summarising study by design can be classified as to orientation on goal, or means; and the degree in which the following factors are constant or variable:

- the object (design);
- the context apart from actors (location, performance criteria, pre-requisites, legislation);
- actors involved (designer, client, researcher);
- time (moment of designing and effect analysis);
- way of testing (theoretical, experimental, Post-Occupancy Evaluation).

When study by design is orientated primarily on generating knowledge and insight we can rightfully speak about a study. If optimising a spatial solution is the first aim, it is a case, actually, of product development.

50.2 PROTOTYPE DESIGN

The development of prototypes involves both elements of study by design and product development. It includes a sequence of designing – testing – re-designing - and so on, until an optimal solution has been achieved. However, contrary to mass-production of consumer goods, a prototype design of a school, a health centre or whatever can not be reproduced regardless of its context. Most often the urban context, client's preferences and the number and characteristics of the users will differ from place to place. Still a prototype design may be used as a model needing only slight adaptations to local circumstances. As such, lessons learned from ex post evaluation may be used in continuous design improvement. For examples of prototype design including ex ante and ex post design research we refer to Chapter 20.

50.3 EXPERIMENTAL DESIGN

In order to conduct a technical experiment that aims at context-independent results, a test object (model) must be designed that meets certain specifications. A test model, however, does not have to meet the context-linked schedule of demands that it would actually be exposed to in reality, though the context of the experiment has its own requirements (experimental design). A good example of this kind of study by design is a wind-tunnel study that has to cover various constellations of a neighbourhood in order to expose the parameters that determine how energy is lost as a result of wind in various contexts.[a] The required local designs were re-created in circular models of three metres in diametre and tested in the wind tunnel.

50.4 DESIGN RE-CONSTRUCTION

Sometimes design research calls for a design re-construction in order to be able to compare a certain design with others. Thus 25 various plans for the Randstad were compared.[b] The basic materials could not be compared due to different planning horizons, different residential capacities, and different ways of creating the legend. The designs were then redrawn using the same legend.

This phase encompassed "interpretation" of the plans. The design of the legend formed a separate problem, since a legend in which the lions' share of the plans can be expressed by

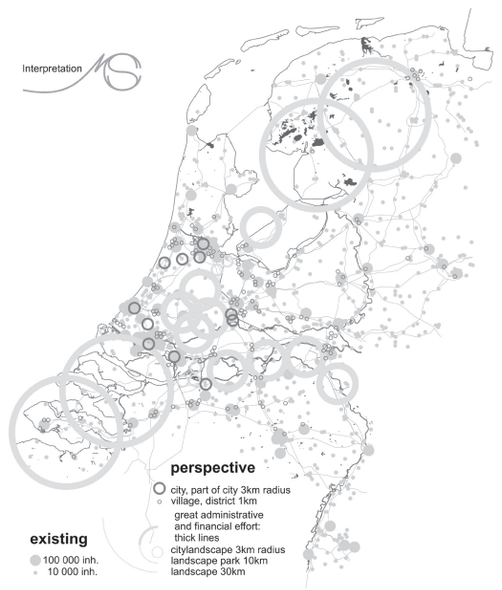
a Jong, T.M. de (1978) *Wind Weren*.
b Jong, T.M. de and J. Achterberg (1996) *25 plannen voor de Randstad*.

some of the plans was insufficient. A continuous adjustment of this legend (in order for it to also include the plans) again demanded a re-interpretation of plans already interpreted in the old legend, only now in the new one. When all plans had finally been included in a single legend, the interpretation was presented to the designers.

The adaptation of the legend led to a reduction that did not satisfy all designers. In many plans, key details were omitted so that the 'soul' of the plan was considered lost. This had not only to do with omitted topographical, context-linked details, but also with solutions essentially useable in the other plans as well, in another context. These details were thus not important for the comparison of the plans on the scale that the comparison involved.

After the interpretation came interpolation and extrapolation of the plans. One plan was made with 5 million people in mind, while the other had taken into account only 0.2 million people. Each plan with a capacity too small for the comparison therefore had to be expanded into a plan that would theoretically include 1 million people. For the plans with large capacity, a theoretical phasing-down was made in order to compare the plans' phases at which the plan capacity for 1 million was reached. Both treatments of the plans are forms of study by design in regard to plan comparison (design research).

Palette



Stream Land

490 Two out of four perspectives, see also page 496.[b]

50.5 SCENARIO DESIGN

A scenario does not only contain the extension of empirically established probable developments perspective, but also the unexpected policy interventions and possible spatial interventions. When developing scenarios so as to have different conceivable contexts at hand for the decision-making process, these possible spatial compositions need to be designed. In preparation for the Netherlands' Fifth National Policy Document on Spatial Planning, four such 'perspectives' were made:[a] Palette, Stream Land, Park Land and Urban Land. These scenarios each contain, aside from different forms of policy and empirical pre-suppositions, a spatial image as well (possible design).

50.6 LEAVING OUT PRE-SUPPOSITIONS

At the Faculty of Architecture in Delft, Zwarts presented a constructive design assignment for a steel building *in* a hall. Thus there was no need to take into account the climate, which meant that radically deviant details and additions could be made to the exterior surface. In this process, the influence of the climate on traditional detailing became clear.

Weeber did something similar by formulating an assignment for a building for a border crossing on a site where it was always a rainy 28ºC.[c] The people on one side of the border were also twice as big as those on the other side. Hertzberger calls for 'impossible assignments' in education as well, such as a house without any view atop a flat building.[d] With these kinds of assignments, the student is forced to abandon 'self-evident pre-suppositions'; a condition for creativity. Culture is the accumulation of unspoken pre-suppositions in the process of communication. Thus in early-classical Greece, mythical pre-suppositions regarding the creation and the working of the world were of course part of the explanation. Trade confronted the Greeks with other cultures. Thales of Milete was the first person to relativize the mythical pre-suppositions (doubt) on the basis of what he perceived. The revival of arts and sciences in classical antiquity testifies to the value of raising unspoken pre-suppositions.

a In this book, the word "perspective" is meant more in the sense of "probable future" than the scenario meant here as "possible future".

b This interpretation is derived from Jong, T.M. de and M. Paasman (1998) *Een vocabulaire voor besluitvorming over de kaart van Nederland*.

c Smienk, G. and J. Niemeijer (2000) *De hand van de Meester*.

d Hertzberger, H. (1999) *De ruimte van de architect: lessen in architectuur 2*, p. 28. English translation: (2000) *Space and the architect: lessons in architecture 2*.