We can consider the landscape as a composition of physical, biological and cultural elements in relation to ecologic, social and economic parameters.

Endless possibilities to model the landscape:
- Methodology is important in this respect
- and also the ‘properties of the procedure’
- and of course: ‘the proof is in the pudding’

The Endless Landscape (myriorama), 1830
1.686.553.615.927.922.354.187.720 possible combinations (24 cards)
Design-based research
Design-based research

Random solutions or lack of argumentation?
Design-based research

Methodology = intended to make this search more effective
Methodology = a study of method: description, explanation and valuation
Objective

Introduction of a research strategy that systematically combines design research and research-by-design into a coherent research methodology for landscape architectonic design.

It offers an alternative view on the relation between Research and design by combining them in a strategy for knowledge-based design.
Research methodology

systems of inquiry
(e.g. practical sciences, "mode-2-knowledge", etc.)

research strategies
(e.g. research-by-design, modelling & correlation, engaged action research, etc.)

principles of study and practice
(e.g. analytical procedures, data collection devices, etc.)

Nijhuis & Stolk 2012, partial adapted from Groat & Wang 2002
Context-driven, problem-focussed and interdisciplinary research:
research carried out in context of application, arising from the very work of problem solving and not governed by the paradigms of traditional disciplines of knowledge: formal, physical, life, social and behavioural sciences (mode 1 knowledge)

Validity question is not “is it true”, but “does it work”
The design-based research as described is a process of abduction, an investigation on ‘what might be’, using verifiable knowledge derived from analysis of suitable precedents.

**Systematic exploration** to increase the understanding of the relationships between the world as it is and the possibility of what it might become

General research criteria:
- truth value (internal validity or credibility),
- applicability (external validity or generalisability),
- consistency (reliability, stability, or dependability),
- transparency (objectivity),

Sources of knowledge

Body of knowledge in landscape architecture is embedded in:

- **design theories**: objectives and principles
- **process of design**: design strategies and tactics
- **products of design**: compositions and their representations

Research methodology

systems of inquiry
(e.g. practical sciences, “mode-2-knowledge”, etc.)

research strategies
(e.g. research-by-design, modelling & correlation, engaged action research, etc.)

principles of study and practice
(e.g. analytical procedures, data collection devices, etc.)

Nijhuis & Stolk 2012, partial adapted from Groat & Wang 2002
Research strategies

- **descriptive strategies**: direct observation, social surveys
- **modelling and correlation strategies**: descriptive and synthetic models, simulations
- **experimental strategies**: preference studies
- **classification schemes**: typology, taxonomy
- **interpretative strategies**: discourse analysis, formal analysis
- **evaluation and diagnosis**: parameters and norms, landscape assessment
- **engaged action research**: participatory action research
- **projective design**: design experiments, design operations
- **logical systems**: pattern language, space syntax

Source: Deming & Swaffield, 2011; Groat & Wang 2002; Gomez & Jones 2010
Design as research strategy
Three possible combinations of research and design:

(1) Research feeds the design process with the ultimate objective to improve the quality of the designed object and increase its credibility: **research-based-design**

(2) Designs (or the process of designing) are used as a vehicle to make spatial problems visual and spatial (‘framing’) and to generate solutions: **design-based-research**

(3) Research undertaken on existing designs as a knowledge basis for future design: **design research-based-design**
Design research-based-design


Design research (analysis of existing designs or precedents) and research by design (formulation of new designs) can be understood as variable relationships between object and context.
Design research-based-design

Heuristics (way to find) lead to new discoveries and inventions by taking a methodical approach
Analysis, simulation and evaluation:
inter-subjective, verifiable, reliable en practical applicable. This implies grounded and transferable methods and techniques

Source: Nijhuis, 2010
Plan analysis

Analysis of a landscape architectonic design in such a way that you can creatively use the insights you have acquired in a new design. The drawings play a crucial role to distinguish different ‘layers’ in the design. The basic form, spatial form, metaphorical form and the form of the programme. These four aspects are the most general concepts that lay out the relation between the various aspects of the architectonic form and its perception in a systematic way.

Source: Steenbergen, et al. 2008; Nijhuis, 2010
Analysis of polderscapes

Geometric patterns in lake-bed polder the Beemster

Source: Nijhuis
Analysis of an estate landscape

Position and orientation estates Veluwe-Oost, the Netherlands

Source: Nijhuis
## Analysis of visual attributes

### 3D visibility analysis (eye-level)

**Stourhead landscape park**

<table>
<thead>
<tr>
<th></th>
<th>Viewpoint 1</th>
<th>Viewpoint 2</th>
<th>Viewpoint 3</th>
<th>Viewpoint 4</th>
<th>Viewpoint 5</th>
<th>Viewpoint 6</th>
<th>Viewpoint 7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temple of Flora</strong></td>
<td>53</td>
<td>x</td>
<td>67</td>
<td>43</td>
<td>62</td>
<td>85</td>
<td>36</td>
</tr>
<tr>
<td><strong>St. Peter's Pump</strong></td>
<td></td>
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<tr>
<td><strong>Croft</strong></td>
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<tr>
<td><strong>Cottage</strong></td>
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<tr>
<td><strong>Pantheon</strong></td>
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<tr>
<td><strong>Temple of Apollo</strong></td>
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<tr>
<td><strong>Bristol High Cross</strong></td>
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</tr>
<tr>
<td><strong>Maximum angular extent of the view (degrees)</strong></td>
<td>28</td>
<td>x</td>
<td>31</td>
<td>28</td>
<td>22</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td><strong>Minimum angular extent of the view (degrees)</strong></td>
<td>14</td>
<td>x</td>
<td>23</td>
<td>12</td>
<td>13 (10°)</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td><strong>Angular extent between foci</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum distance viewpoint - focal point (metres)</strong></td>
<td>368</td>
<td>1440**</td>
<td>318</td>
<td>497</td>
<td>494</td>
<td>3120**</td>
<td>478</td>
</tr>
<tr>
<td><strong>Minimum distance viewpoint - focal point (metres)</strong></td>
<td>306</td>
<td>x</td>
<td>343</td>
<td>305</td>
<td>324</td>
<td>320</td>
<td>90</td>
</tr>
</tbody>
</table>

**Mean**: 37.38 **Stdev.**: 2.97

**Mean**: 27.20 **Stdev.**: 3.89

**Mean**: 22.33 **Stdev.**: 3.92

**Mean**: 43.00 **Stdev.**: 8.57

**Mean**: 281.22 **Stdev.**: 94.76

*measurements based on calculated viewsheds, decimal figures converted to an integer
* incl. Temple of Apollo
** outside the valley garden

Source: Nijhuis
Analysis of space relationships

Exploring the architectonic quality of Piazza San Marco, Venice

Source: Nijhuis
Simulation of visibility

External factors: visual urbanisation: High-rise, city edges, wind turbines, etc.

Source: Nijhuis
Evaluation: change of visual character

Visual impact analysis of a landscape development plan

Source: Nijhuis
In typological research we compare compositions in order to make formal schemes and design aspects visible in their relation to the social and cultural problem posed. The type is to be regarded as a scheme which is derived from reducing the whole of formal variants to a common basic form. Three different aspects are distinguished that make meaningful comparisons of designs possible: the composition elements, the composition scheme and the transformation of the type.

Source: Steenbergen, et al. 2008; Nijhuis, 2010
Analysis of standard forms in an Italian Renaissance villa of Palladio

Location: Italy
Date: 15th century

Drawing: P. van der Ree, G. Smienk

Source: Steenbergen, et al. 2008
Composition scheme

Polder typology based on physical-geographic location

Source: Nijhuis
Analysis of the composition scheme of Castle Howard, an English landscape garden

Location: Castle Howard, York
Date: 1714-1770
Drawing: J. van der Zwart

Source: Steenbergen, et al. 2008
Comparative analysis of Hadrian’s Villa and elements from classic and baroque architecture

Location: Villa Hadriana, Tivoli
Date: 118-138
Drawing: M. Scarciglia

Source: Steenbergen, et al. 2008
Modelling the future: knowledge based design (design research) of place, space image and program resulting in a landscape composition

Source: Nijhuis, 2010
An experiment consists of taking composition elements, or a composition scheme, from a chosen example and applying them in the situation involved. By analysing the internal rules of this composition and taking them as the basis for a critical consideration of the problem, one can discover how a new design-in-the-making relates to the known examples. The examples selected must be suitable to serve as models in order to deal with the chosen theme.

Source: Steenbergen, et al. 2008; Nijhuis, 2010
Transformation of the type

Experimental transformation of an approach drive (Great Avenue at Castle Howard) to a park in a 20th century Dutch Garden suburb

Location: C. Lelylaan, Amsterdam Sloterplas
Date: 1934-2002

Drawing: D. Majdandzic

Source: Steenbergen, et al. 2008
Transformation of the topography

Experimental montage of a park system in the Randstad-Holland

Location: Randstad Holland
Date: 2002
Drawing: R. Wysk

Source: Steenbergen, et al. 2008
Experimental design aims at making an integral spatial proposal.

In preparing an experimental design, systematic use is made of plan analysis, typological research and goal-oriented design experiments. Design thus becomes a form of heuristic research, geared to exploring a possible or predictable future and the methodical discovery of the right composition.

Source: Steenbergen, et al. 2008; Nijhuis, 2010
De derde ontginning?

Ultimedes van west naar oost:
- Toekomstgebied intensieve veehouderij met gecentreerde collectieve voorzieningen
- Rentenierdersparadijs Peelvenen met een rijke variatie aan woningtypen en bouwijzen
- Horster woningbouw tussen beek en boszoom, tuinbeheer bij bosbeheer of natuurbeheer

Drie nieuwe knooppunten tussen A73 en spoor als uitbreiding van de zandputten
- noord: institutionele groenpark Olio
- midden: werklandschap Castenray
- zuid: themapark bij Horst

Toekomstgebied boom- en sierteelt met gecentreerde collectieve voorzieningen

Kastelen en overstroomgebied met aantrekkingsplaatsen voor de loer- en recreatievaart over de Maas
Design study
Concluding remarks

Research strategy that systematically combines design research and research-by-design into a coherent research methodology for landscape architectonic design.

Design research is an indispensable step in research by design. Together they constitute a heuristic approach for knowledge based and creative design.

This implies systematic use of plan analysis, typological research and goal-oriented design experiments geared to exploring a probable or predictable future and the methodical discovery of the right composition.
Further reading

C.M. Steenbergen & W. Reh, 2003
C.M. Steenbergen, S. Meeks & S. Nijhuis, 2008
C.M. Steenbergen, W. Reh, S. Nijhuis & M.T. Pouderoijen, 2009

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