

Faculty of Design

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The strengths / limits of Systems Thinking denote the strengths / limits of Practice-Based Design Research

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"There is no purer myth than the notion of a science which has been purged of all myth." Michel Serres

#### 1 Introduction / framing

Science claims the separation of the human (society) and the non-human (nature).

Latour (1998): "Science and society cannot be separated, they depend on the same foundation. ..."

#### Design has always known this. Design Research can build on it ...



Figure 1.1 Purification and translation



## 2 Practice-Based Design Research (PBDR) as focus of interest

Design as a process of *"generating the unknown from the known"* (Hatchuel).

Descriptive **Analysis**, normative **Projection** and **Synthesis** are essential.

Controversies regarding the scientific validity of **PBDR**.

**PBDR** 

Adaptation to scientific standards impedes learning processes.

**SYNTHESIS** 

PROJECTION

# BIRKHAUSER Mapping Design Research **ANALYSIS**

#### 3 Fundamental problems and causal gaps

Problems of **control**, problems of **prediction**, incompatible domains of knowing lead to **causality gaps**.

Schön (1983) states the dilemma of "rigor or relevance".

"high ground" - "swampy lowlands"

Required:

- an appropriate notion of **complexity**,
- ways of dealing with uncertainty,
- an integrative **epistemological** framework,
- the reflection of observer involvement.



#### 4 Unresolvable blind spots

Blind spots comprise:

- unconscious and intransparent value systems,
- implicit driving forces,
- biased, selective, unreflected **pasts**,
- pseudo-objective scenariotechniques.

Blind spots are the necessary condition of every observation.

>>> use as many incoherent perspectives as possible



#### 5 Paradox and oxymoron

**Rittel** reveals the paradoxes: >> Planning as creating, exploring and reducing variety, Issue-Based Information Systems, planning as an argument ...

Krippendorff calls design research an "oxymoron": >> Design as the social construction of meaning through language by stakeholders ...

>> **Rorty** suggests narrative, speculative, poetic methods ...







## 6 Research Through Design (RTD) as an implementation of PBDR - C1

Design and Design Research as a cybernetic process of **experiential evolutionary learning** (Kolb).

**Research Through Design (RTD)** with **ANALYSIS - PROJECTION - SYNTHESIS** is one possible realization of PBDR. Note the analogy to the terminology of **Transdisciplinarity Studies**.

| Authors                     | Phases /components / domains of knowledge production |                    |                             |  |  |  |  |  |  |
|-----------------------------|--|--------------------|-----------------------------|--|--|--|--|--|--|
| Jones (1970                 | Divergence   | Transformation     | Convergence                 |  |  |  |  |  |  |
| Archer (1981)               | Science  | Design             | Arts                        |  |  |  |  |  |  |
| Simon / Weick (1969)        | Intelligence   | Design             | Choice                      |  |  |  |  |  |  |
| Nelson & Stolterman (2003)  | The True   | The Ideal          | The Real                    |  |  |  |  |  |  |
| Jonas (2007)                | ANALYSIS   | PROJECTION         | SYNTHESIS                   |  |  |  |  |  |  |
| Fallman (2008)              | Design Studies                                       | Design Exploration | Design Practice             |  |  |  |  |  |  |
| Brown (2009)                | Inspiration  | Ideation           | Implementation              |  |  |  |  |  |  |
| Transdisciplinarity Studies | System knowledge                                     | Target Knowledge   | Transformation<br>Knowledge |  |  |  |  |  |  |

#### 7 Systems Thinking constitutes RTD processes

Systems Thinking allows for the modelling of complex **design / inquiring** systems and thus provides a means of **communicating about** them and of communicating within them.

A purely scientific approach is unsuitable.

The differentiation between Design and Research is fuzzy, the transition is continuous.

Design Research is done in a **"designerly"** mode with scientific support.

| Einflussmatrix                |    |    |    |    |          |     |          |      | Ĭ        |     |     |          |    |     |          |     |    |     |          |
|-------------------------------|----|----|----|----|----------|-----|----------|------|----------|-----|-----|----------|----|-----|----------|-----|----|-----|----------|
| Konsensmatrix                 |    |    |    |    |          |     |          | Sу   | ste      | mmo | de  | 11:      | мн | 20  | 13       | JO  | AN | V2  |          |
| Wirkung von <sub>↓</sub> auf→ | 1  | 2  | 3  | 4  | 5        | 6   | 7        | 8    | 9        | 10  | 11  | 12       | 13 | 14  | 15       | 16  | AS | Р   |          |
| 1 Wohlbefinden (K/P/S)        | X  | 1  | 3  | з  | 0        | 1   | 2        | 2    | 1        | O   | O   | 0        | 0  | 0   | O        | O   | 13 | 546 | ÜBERSICH |
| 2 Identität des Marktes       | 3  | X  | 2  | 1  | 0        | 0   | 2        | 0    | 0        | 0   | 0   | 0        | 0  | 0   | 0        | 0   | 8  | 184 |          |
| 3 Verweildauer Tag∕Abend      | 0  | 0  | X  | 2  | 0        | 0   | 0        | 0    | 0        | O   | 0   | 0        | 0  | 0   | O        | 0   | 2  | 74  | ERKLÄRUN |
| 4 Konsum am Markt             | 2  | 0  | 1  | X  | 2        | 1   | 0        | 0    | 0        | O   | 0   | 1        | 1  | 1   | 1        | 1   | 11 | 308 |          |
| 5 Wirtschaft / Soz. Lage      | 2  | 0  | 0  | 2  | $\times$ | 3   | 1        | 1    | 1        | 1   | 2   | 2        | 2  | 2   | 1        | 2   | 33 | 429 |          |
| 6 Gesellschaftl. Klima        | 1  | 0  | 2  | 1  | 1        | X   | 2        | 3    | 1        | 0   | 0   | 0        | 0  | 0   | 2        | 1   | 19 | 285 | LOSCHER  |
| 7 Bürgerbeteiligung           | 1  | 1  | 0  | O  | 0        | 1   | $\times$ | 1    | 1        | 1   | 1   | 0        | 0  | 0   | 1        | 0   | 18 | 288 |          |
| 8 Umgang mit Randgruppen      | 1  | 1  | 1  | 0  | 0        | 2   | 0        | X    | 2        | O   | 0   | 0        | 0  | 0   | 0        | 0   | 8  | 144 | KOPIERE  |
| 9 Sicherheit vor Krimin.      | 2  | 1  | 2  | 1  | O        | 1   | 1        | 2    | $\times$ | O   | 0   | O        | 0  | 0   | O        | 0   | 11 | 198 |          |
| 10 Wohnen am Markt            | 2  | 1  | 2  | 0  | 0        | 0   | 2        | 1    | 2        | X   | 1   | 1        | 1  | 1   | 1        | 0   | 22 | 330 |          |
| 11 Büros∕Dienstleistungen     | 1  | 1  | 1  | O  | 1        | 0   | 1        | 0    | 1        | 3   | X   | 1        | 1  | 1   | O        | 1   | 20 | 240 |          |
| 12 Angeb. Einkauf/Gastro.     | 2  | 1  | 2  | 2  | 1        | 0   | 0        | 0    | 1        | 1   | 1   | $\times$ | 1  | 0   | 1        | 0   | 19 | 399 |          |
| 13 Angeb.Freizeit/Unterh.     | 2  | 1  | 2  | 2  | 1        | 0   | 0        | 0    | 1        | 1   | 0   | 2        | X  | 0   | 1        | 0   | 20 | 420 |          |
| 14 Gesundheitsangebote        | 2  | 1  | 2  | 2  | 1        | 0   | 0        | 0    | 0        | 1   | 0   | 2        | 1  | X   | 1        | 0   | 20 | 360 |          |
| 15 Kulturangebot              | 2  | 2  | 2  | 1  | 1        | 1   | 0        | 1    | 0        | 1   | 0   | 1        | 1  | 0   | $\times$ | 0   | 21 | 462 | DRUCK    |
| 16 Telematikdurchdringung     | 1  | 0  | 0  | 1  | 1        | 1   | 0        | 0    | 1        | O   | 1   | 1        | 2  | 2   | 1        | X   | 19 | 247 |          |
|                               | 42 | 23 | 37 | 28 | 13       | 15  | 16       | 18   | 18       | 15  | 12  | 21       | 21 | 18  | 22       | 13  | PS |     |          |
|                               | 31 | 35 | 5  | 39 | 254      | 127 | 113      | 44   | 61       | 147 | 167 | 90       | 95 | 111 | 95       | 146 | Q× | 100 |          |
| Konsens                       |    |    |    |    |          |     |          | MENÜ |          |     |     |          |    |     |          |     |    |     |          |

#### 8 Reflecting observer modes - RTD requires the shift from C1 to C2

Distinguish between classical detached inquiry and situated inquiry.

C2 contributes to substantiate the concepts of **research FOR / ABOUT / THROUGH design**. A fourth mode shows up: research **AS** design.

| Observer position and<br>perspective relative to the<br>design / inquiring system and<br>the life-world | 1st order cybernetics<br>Observer is situated outside the<br>design / inquiring system<br>producing facts | 2nd order cybernetics<br>Observer is situated inside the<br>design / inquiring system<br>producing (arte)facts based on<br>values |
|---|---|---|
| Observer looking outwards   | research FOR design   | research THROUGH design   |
| Observer looking inwards  | research ABOUT design   | research AS design (?)  |

#### 9 Zooming in: RTD and (critical) systems thinking

The RTD model comprises three core systemic dimensions:

the wider context (yellow), the design / inquiring system (red), and the driving force (blue).

#### In Science:

#### - the wider context is excluded as far as possible,

-the design / inquiring system is considered as disembodied, objective, Cartesian observer,

- the driving force remains implicit.

### research THROUGH design



#### 10 Relating RTD to a generic scenario model CFU

The **"Cube of Future Uncertainty" (CFU)** is a generalized framework for scenario approaches, defined by the three above mentioned systemic dimensions of RTD:

- the wider context
- the design / inquiring system, and
- the driving force,

and thus establishes the **systems-based connection between ANALYSIS and SYNTHESIS by means of PROJECTION**.



## 11 So what? Turning deficits and threats into strengths and opportunities

- Systems thinking and the positive acceptance of multi-perspectivity.
- The adoption of generative approaches as "playgrounds" for exploration.
- The explicit integration of facts and values into our systems of inquiry.

Ulrich´s **Critical Systems Heuristics** provides a promising approach.

CSH comprises the reflection and determination of system **boundaries** and **driving forces** as well as questions of **legitimacy** ...

... influences from Churchman, Rittel, Simon, Vester, ...



C. West Churchman "Philosophy of Social System Design\* melancholic ₩ Horst W.J. Rittel "Second Generation Design Methods" ironic

# 12 Perspectives: Design as the new model for Transdisciplinary Science

- Science as a **sub-category** of Design (Glanville).

- The concept of **Mode-2 science** emphasizes socially robust instead of true knowledge.

- Transdisciplinarity addresses all the indecent issues of designerly inquiry and takes them as the basis for a new kind of science.

>> Relation to "third phase science"
(de Zeeuw)

>> Epistemic democracy (Dewey)

>> Design and Science - approaching
each other (Jonas)

### Manifesto of Transdisciplinarity



BASARAD Nicolescu TRANSLATED by KAREN-CLAIRE VOSS

>> ...

The strengths / limits of Systems Thinking denote the strengths / limits of Practice-Based Design Research

"In other words, why not transform this whole business of recalling modernity into a grand question of design?" Bruno Latour