THEORY

METHODOLOGY

DEBATE

TIME

INFLUENCE

DESIGN SCIENCE
mirror to methodological process stuff of the 1990s

COGNITIVE REFLECTIONS
mirror to mindset movement we are in now

PROCESS METHODS
mirror to science stuff of the 1960s

MINDSET
mirror to cognitive reflections stuff of the 1980s

Participatory Design: technological (intergrating end users)

Participatory design: interaction design (integrating science methods)

what designers do and how they think. Sometimes called the "**Design Methods**" movement (Buchanan 1992; Jones 1992; Buchanan and Margolin 1995), these researchers sought to understand the processes and methods by which (successful) designers went about design activity especially in circumstances in which design problems were increasingly complex and Simon's "desired state of affairs" could not easily be defined in advance. Schon's (1983) description of individual, professional practices, focuses on the work by practitioners during their "reflection-in-action" as they move to reframe problems, based on judgement. Work by Rowe (1987), Cross (2006) and Lawson (1980/2006), for example, involved attempts to describe the thought processes of designers in action: their designerly way of knowing (Cross 2006) or design thinking (Rowe 1987).

User Centered Design: **Don Norman** (shift from participatory Design)

Meta Design (**Manzini**)

Service Design

participatory design

Human Centered Design

practice oriented product design

Design Thinking

Death of design thinking 2011

process and methodology of design

Design thinking as cognitive style

1969
SPLIT between design as about objects and their form (Alexander) and design about problem solving and rational procedures (Simon)

FIRST WAVE
1960s - 1980s

concerned with designers knowledge about objects and how to make them

cognitive aspects of design; what it means to be creative, how much relies on intuition and how personal is the process.

Design Thinking as a general resource for design

SECOND WAVE
1980 - 1990s

concerned with designer's knowledge about what people do with objects

1987 **(Suchman)** design as situated form of social action, informed by anth, soci etc

THIRD WAVE

Design thinking as a resource for organizations

the development of design thinking and its manifestation into methods, minds and all that has come before it

concerned with what designers do AND what people do with objects, and what the social impact of this is?

1960

First computer programs for problem solving, desire to sciencize design through computer use.

1962

The First Conference on Design Methods, London, UK.
Books on methods and theories of design in different fields are published by Morris Asimow (1962) (engineering), Christopher Alexander (1964) (design patterns), L. Bruce Archer (1965) (industrial design), and John Chris Jones (1970) (architecture)

The first notable books on methods of creativity are published by William J. J. Gordon (1961), and Alex Faickney Osborn (1963).

1965

First use of term DESIGN THINKING by **Bruce Archer i**n his book "Systematic Method for Designers"

1969

Herbert Simon (gets credit for concept of design thinking) establishes science of design

1972

Victor Papaneck: Design for the real world - Human Ecology and Social Change

1973

Robert McKim publishes *Experiences in Visual Thinking* which includes "Express, Test, Cycle" (ETC) as an iterative backbone for design processes.

First use of WICKED PROBLEMS **Horst Rittel and Melvin Webber** write "Dilemmas in a General Theory of Planning" showing that design and planning problems are wicked problems as opposed to "tame", single disciplinary, problems of science. Rittel proposes first/second generation split in design methodologies

1979

Bruce Archer DESIGN THINKING starts off the next decade's inquiry into designerly ways of knowing, stating: "There exists a designerly way of thinking and communicating that is both different from scientific and scholarly ways of thinking and communicating, and as powerful as scientific and scholarly methods of inquiry when applied to its own kinds of problems."

1980

Bryan Lawson *How Designers Think* about design cognition in the context of architecture and urban planning

1982

DESIGNERLY WAYS OF KNOWING **Nigel Cross:** professor of design studies and editor of *Design Studies* journal, writes *Designerly Ways of Knowing* showing design as its own culture to be taught in schools by contrasting it with science culture and arts and humanities culture. This is based on the idea that "There are things to know, ways of knowing them and ways of finding out about them that are specific to the design area

1983

Donald Schon: *The Reflective Practitioner* in which he sought to establish "an epistemology of practice implicit in the artistic, intuitive processes which [design and other] practitioners bring to situations of uncertainty, instability, uniqueness and value conflict

1984

Buciarelli - Reflective processes in engineering design

1987

Peter Rowe: *Design Thinking*

1988

AMBIDEXTEROUS THINKING Rolf Faste, Stanford, becomes a required class for graduate product design majors that extends McKim's process of visual thinking to design as a "whole-body way of doing

1991

Formation of IDEO, IIT program in Chicago

1992

Richard Buchanan *Wicked Problems in Design thinking*

1995

Victor Margolin and the product millieu - focused on the relation between design and social action

2001

Designerly ways of knowing (design models vs science models) Cross.

2005

Stanford's D School begins

Krippendorff (2006) suggests that design is about creating meaning

participatory design: Design as influenced by ethnography to examine user's situated practice Blomberg et al 1996; Kensing & Blomberg 1998; Squires & Byrne 2002

Roger Martin. *The Design of Business: Why Design Thinking Is the Next Competitive Advantage* (2009) Design thinking as a way to balance organizational tensions between exploration and exploitation

2007

Practice oriented product design suggests that a change in product is precipitated by a change in practice (**Shove** 2007)

2008

Robert Bauer and Ward Eagan: critique of design thinking in organizations -call for more focus on analytical thinking WITHIN design thinking and talk about epistemic modes within the design process (design thinking as epistemology of creative work)

2009

Lucy Kimbell (critical of the focus on designers within design thinking, wants a practice focused approach Ethnography of art-trained designers designing for service, suggestion of DESIGN AS PRACTICE and DESIGN IN PRACTICE as models for analysis

Ryalnder: its hard enough to understand design and thinking, let alone design thinking!

2010

Robin Adams et al (2010) study of what it means to be a design professional and how designers become professionals: locating designers knowledge and thinking within the contexts in which they work

Extension of design thinking into world of business and management: **Tim Brown** leads one of the world's most influential design consultancies, IDEO, and is the author of *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (2009)**, David Kelley, Nusbaum, Dan Pink**

(Badke-Schaub et al. 2010; Cross 2010; Dorst 2010; Tonkinwise 2010) highlight how recent popular accounts of design thinking ignore the extensive research on designers' ways of working over previous decades since the first Design Thinking Research Symposium in 1991 (Cross et al. 1992), let alone earlier events such as the Conference on Design Methods of 1962 (Jones and Thornley 1963).

Nigel Cross - Design Thinking: How Designers Think and Work

2012

2011: Nusbaum calls design thinking a failed experiment

DESIGN AS SCIENCE guy

distinguishes between design and the social sciences

believed that our world is made up of 'artifice'; objects create by man. His most notable book titled, *The Sciences of the Artificial*, analyses in great depth (from economics through to psychology) of the artificial world we have designed. As a result, Simon concludes that the ultimate artifice known to man is in fact the human brain.

famous definition of design *process which aims to improve existing environments into preferred ones*

We must aim to SATISFICE because our brains have limits

In light of todays large-scale, complex environmental and social issues, Simon stressed the most important factor for successful solutions is an understanding amongst all stakeholders- a common problem understood by all. When faced with large scale societal or environmental problems, Simon knew that the result had to be open and evolving, one *without final goals.*

Began focus on prototyping

resolving one problem opens up a whole new set of problems which can never achieve a finite 'true or false' solution

SUSTAINABLE DESIGN guy

begins human centered and sustainable design movements, and design thinking as problem solving

WICKED PROBLEMS guy

refered to policy planning, not form/ function

a wicked problem is: "*unique, ambiguous and has no definite solution"* and we need design, not science to tackle open eneded and evolving problems

celebrated ambiguity and uncertainty as the only way to solve wicked problems

The INSTINCTIVE guy

designer at the core of the process

forms of intuition that are unique to designers, based on tacit knowledge and instinctive process that generated designerly ways to know, things to know, and ways of finding out about them

not a creative leap, but the ability to build a bridge: analogical thinking and abductive leaps

not bisociation (papaneck), but a natural process

The phenomenon of study in each culture is
- in the sciences: the natural world
- in the humanities: human experience
- in design: the artificial world

The appropriate methods in each culture are
- in the sciences: controlled experiment, classification, analysis
- in the humanities: analogy, metaphor, evaluation
- in design: modeling, pattern-forming, synthesis

The values of each culture are
- in the sciences: objectivity, rationality, neutrality, and a concern for "truth"
- in the humanities: subjectivity, imagination, commitment, and a concern for "justice"
- in design: practicality, ingenuity, empathy , and a concern for "appropriateness"

The REFLECTIVE guy

believed in intuitive aspect of design, not interested in how problems are solved, just how they are framed.

totally focused on process, likened design to science, focused on cognitive thinking models

problem setting as the key act in design thinking: designers as examining how to approach a problem before it is taken on.

saw "wicked problems" as swampy lowlands

The WICKED PROBLEMS IS DESIGN THINKING guy

popularized wicked problems and design thinking

Connected design thinking to innovation, design thinking as multidisciplinary mindset

1. Symbolic and visual communication
2. The design of material objects
3. Activities and organized services
4. The design of complex systems or environments for living, working, playing and learning (Buchanan 1998, p. 9)

rejected the notion of design as a science. He describes design thinking as a 'liberal art' reflecting contemporary culture and used by professionals as 'insight' into resolving (*Rittel's*) wicked problems.

shifted the concept of design thinking away from a cognitive style toward an intellectual approach to problem framing and problem solving that acknowledged the social aspects of design work.

The PRACTICE OF DESIGN THINKING lady

difficulties associated with the word "thinking". The practice approach serves to emphasize the embodied nature of professional design work: how designers and stakeholders involved in design processes move, what they think, what they do and how it feels.

the emphasis on individual designers in design thinking overly privileges the roles that design professionals play in constituting the meaning and effect of design outcomes. Should consider teh role of objects and users in the process as co-creators (Shove 2007)

design thinking neglects to account for the artifacts without which design practice cannot proceed and which constitute design.

descriptions of design thinking that focus on individual designers and cognition fail to account for the situated nature of knowledge production and the institutions that serve to validate it.

The DESIGN THINKING IS INNOVATION guys

loosely-structured organizational process to stimulate innovation

Analysis and Synthesis, divergent and convergent thinking, design as problem solving, wicked problems

investigating outputs rather than internal processings of the designer or team. In other words, we now evaluate the result of design thinking rather than the thinking itself.

balancing between exploration and exploitation

Martin (2009) sees design thinking as combining abductive, as well as inductive and deductive, reasoning and argues that managers are ill-served by contemporary management education which neglects the former.

Ways that managers and designers judge reliability and validity

Tim Brown 2009 Design thinkers know there is no right answer to a problem. Rather, he argues, through following the non-linear, iterative design process that he calls inspiration, ideation, and implementation, the design process can convert prob- lems into opportunities.

design thinking as human centred activity based on empathy