VISUAL EPISTEMOLOGY FOR DESIGN IN COMPLEX SYSTEMS
WHO AM I?
DESIGNERS ARE MULTIPLE.

- graphic design
- communication design
- design research
- qualitative research
- social integration
- social sustainability
- design strategy
- complexity science
- information visualization
- knowledge visualization
- visual languages
- visual epistemology
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The logotype has been designed projecting some letters dimensions in order to generate a code that can represent the coexistence of MIT identity and Italian identity.
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MAKING SENSE OF COMPLEX SYSTEMS.
SIMPLE.
COMPLICATED.
COMPLEX.
SIMPLE.

sim(without)+plicum(fold)
COMPLICATED.

cum(with)+plicum(fold)
COMPLEX.

*cum*(with) + *plexus*(tied up with)
DEDUCTION.
does not work for complex systems
DEDUCTION.

does not work for complex systems
CHARACTERISTICS.

- Large number of elements
- Information has short range
- Open
- Richly interact
- Ignore the system
- Far from equilibrium
- Non-linear
- Loops
- Evolution
Complexity and Design.
we visually organize the world in order to understand it
we visually organize the world in order to understand it

visualizations are created to make sense of what we see
we visually organize the world in order to understand it

visualizations are created to make sense of what we see so we can take action
THE METAPHOR OF THE CARTOGRAPHER.
THE METAPHOR OF THE CARTOGRAPHER.

We designers are like the ancient cartographers, we produce representations of the world, as we know it.
We designers are like the ancient cartographers, we produce representations of the world, as we know it. We explore our world and we represent it, we use our representations to explore the world and to understand it.
SOME STORIES.
THE IMAGE OF THE WORLD.
The Hobo-Dyer Equal Area Projection

This new map belongs to the family of Cylindrical Equal Area projections in which the latitude and longitude lines form a rectangular grid. Other projections in this family include the Lambert, Gall, Behrmann, Edwards, and Peters projections. In the present case the “cylinder” is assumed to wrap round the globe and cut through it at 37½° north and south. In order to preserve the equal area property the shapes of the landmasses become progressively flattened towards the poles, but shapes between 45° north and south are well preserved.
ARBORE SCIENTIÆ.
THE POWER OF VISUALIZATION AND THE CONCEPT OF DIAGRAM

"It is one of the most significant developments in the process of design in the late 20th and early 21st centuries" (Mark Garcia)
The diagram is both the structure of a system and the visual representation of that structure.
DIAGRAMS.
THE GRID
IS A DIAGRAM OF A GRAPHIC LAYOUT
THE TABLE OF CONTENT
IS A DIAGRAM OF A BOOK

THE DIAGRAM IS BOTH THE STRUCTURE
OF A SYSTEM AND THE VISUAL
REPRESENTATION OF THAT STRUCTURE
The diagram is often a set of rules.
Diagrams.
Hospital System

The hospital: a system suitably the reinstatement of the user, function, and the flow of information, material. Therefore, the map is totally over the system, which some trees to the direct access of the users to the structure are diffused: the result towards right this way, where the semicircle is placed; as a matter of representation the processes and the taken back inside the structure. The exchanges is pointed out by the lines; following the radial of the lines: following the radial d of every process you reach the representation of communication between different actors of the system. At a second level, it has been pla...
Diagrams as generative tools

Operating devices able to reveal the weak links and the driving forces that can facilitate (or hinder) design
FIREFLIES BY KRIStian Cvecek.
PAINT ATTACK.
The field of Complex Systems is interested in relationships translating the strengths and the tensions among agents.
SYNCHRONOUS OBJECTS.
A POLITICAL ACT.

DIFFERENT DIAGRAMS, SAME SYSTEM

THE POLITICAL NATURE AND THE PRINCIPLE OF RESPONSIBILITY

EACH REPRESENTATION OF REALITY ARE INTENTIONALLY STRUCTURED AND THUS ARBITRARY, ANEXACT AND INCOMPLETE
VISUALIZATION HAS A DOUBLE FUNCTION.

**MEDIUM** FOR COMMUNICATION
(OR PERSUASION, OR ENGAGEMENT...)

**TOOL** FOR UNDERSTANDING
(OR PROBLEM SOLVING, PLANNING, ORIENTING...)
Visualization has a double function.

A **visual rhetoric** made of objects, relations among those objects and tools for managing the relation between objects and environment.

A **visual epistemology** describing how we interpret the world with visualizations.
Rhetoric is the art of using language to communicate effectively and persuasively.

Along with grammar and logic or dialectic, rhetoric is one of the three ancient arts of discourse.
How visualizations change the way we interpret, perceive and understand the world we live in.

Epistemology (επιστήμη episteme, + λόγος, logos) is the branch of philosophy concerned with the nature and scope of knowledge. It addresses the questions: What is knowledge? How is knowledge acquired? How do we know what we know?
CPF: VISUALIZATION AS A TOOL
what can we do when we are facing abstract notions that remind of \textbf{qualities} more than quantities?
Humans are developing new skills and patterns for cooperation across the scale from micro to macro—leveraging not only digital technologies but also, more and more, their own neurologies.

**BEYOND FOXP2: CROSS-SPECIES COLLABORATION**

- Non-human knowledge
- Human-animal communication
- New ocean research partners: pelagic mammals and big fish
- Non-human partners in eco-monitoring
- Guide animals: more diversified, more accepted
- Cross-species politics
- Asia: monkey labor
- Sentient landscapes
- Empathy breeding

**SUPERSTRUCT STRATEGIES**

- **Evolutivity:** nurture genomic diversity 
  & generational difference
- **Reverse Scarcity:** use diverse and renewable rewards
- **Extreme Scale:** layer micro & macro scales for rapid adaptation
- **Amplified Optimism:** link amplified individuals at massive scales
- **Ambient Collaboration:** leverage synergism with environmental feedback
- **Adaptive Emotions:** confer evolutionary advantage with awe & wonder

**MULTI-SECTOR SOLUTIONS**

- Micro-philanthropy networks
- Networks of giving
  - Decentralization & democratization of philanthropy
  - Happiness “bumps” surge waves
  - Seed networking
  - Distance solutions = new value
- Local clean-industry ventures

**THE APPLESEED ECOLOGY**

*Food as Disruptive Economy*

Games simulate real urban farm production + “bright green” high-tech-solutions + alternative currencies—with open-source values

*Source: H. Bormstein, 2007*

**THE NATURAL CURRENCY ECOLOGY**

Linking sustainability to sociability

Natural currencies get linked to renewable energy capacity + other eco-values + alternative exchange platforms + new structures for families—with a value on sociability

*Source: runismendo.com*

**OPEN-SOURCE DEVELOPMENT**

- Open Pharma
- Open food
- Open-source science

**ALTERNATIVE CURRENCIES**

Leaders in recovery:
- Brazil, South Africa, Vietnam, Rwanda

**GREEN HEALTH**

- Healthy place maps
- ECO-health for workers
- Health localism
- Health metrics for schools
- From issues of health cover...
Representing does not only mean to make a more or less accurate replica of the visible, representing does also mean showing the invisible.

Showing the invisible, in turn, does not only signify to merely illustrate the real existence, but it does means to imagine visual models of the possible, probable, and hypothetical.