



e-Planning Research Methodology

•Assumptions of Science; Theory of Knowledge

2014-2018

Pedro Ferraz de Abreu

UA - UL - UNL

Programa Doutoral Conjunto e-Planning



e-Planning

Research Methodology

01. The assumptions of scientific research
02. Theory of knowledge
03. Models of knowledge representation
04. Theory, thesis, methodology and research techniques
05. Writing a PhD's thesis and a Thesis proposal
06. Qualitative methods: case study, content analysis and others
07. Quantitative methods: sample,, indicators, correlations
08. Research tools: spss, sig, programming and prototype
09. Research Ethics

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•Assumptions of Scientific Research

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Assumptions of Scientific Research

There is a Universe we can Learn about



-What is Science? *Scientific Knowledge vs. Beliefs*

-What is the Universe? *Idealism vs. Materialism schools*

-What is Knowledge? *Plato vs Discovery*

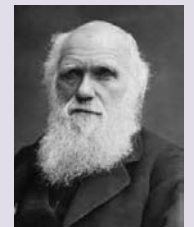
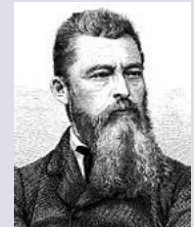
-What is Learning? *Can we learn? Are there limits to learning?*

-Why do we Learn? *Instincts, Darwin, Life dynamics*

-How do we Learn? *Sensors, Brain, Hands*

-How do we learn How to Learn?

Gnoseology - Theory of Knowledge





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•Knowledge Theory

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Theory of Knowledge

The key concept is **Knowledge**

*How to develop it, capture it, represent it,
store it, transmit it, process it.*



Theory of Knowledge

The key concept is **Knowledge**

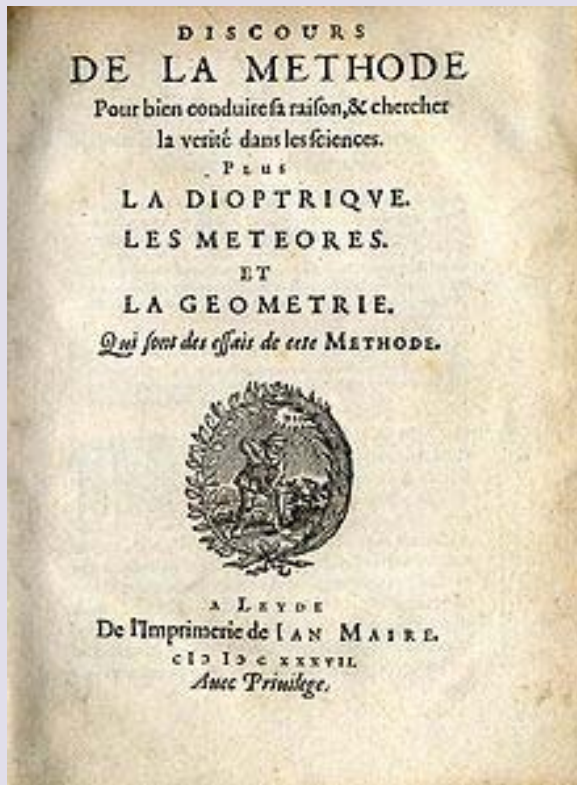
- **Gnoseology** (gnosis + logos)
- **Epistemology** (episteme + logos)
- **Schools of Knowledge Theory**
(ex. empiricism, rationalism, skepticism)

Flea Paradigm & Cogito ergo sum



Theory of Knowledge

The key concept is **Knowledge**



- Schools of Knowledge Theory
(rationalism - aware of its limits)

since the only method by which we perceive the external world is through our senses, and that, since the senses are not infallible, we should not consider our concept of knowledge to be infallible.

René Descartes

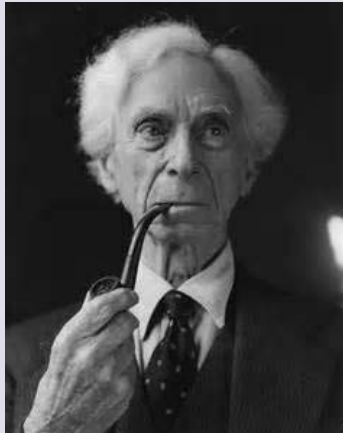
Cogito ergo sum

"I do not exist" is a contradiction in terms; the act of saying that one does not exist assumes that someone must be making the statement in the first place. Though I can doubt my senses, my body and the world around me, I can not deny my own existence.



Theory of Knowledge

The key concept is **Knowledge**



- Bertrand Russell (1926)
Theory of Knowledge

- Logic, Induction, Deduction

- Inference Engines

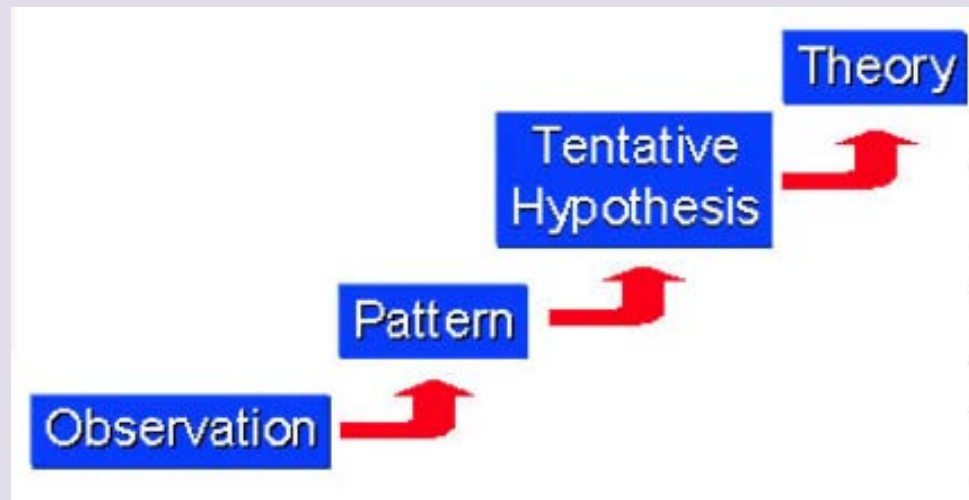
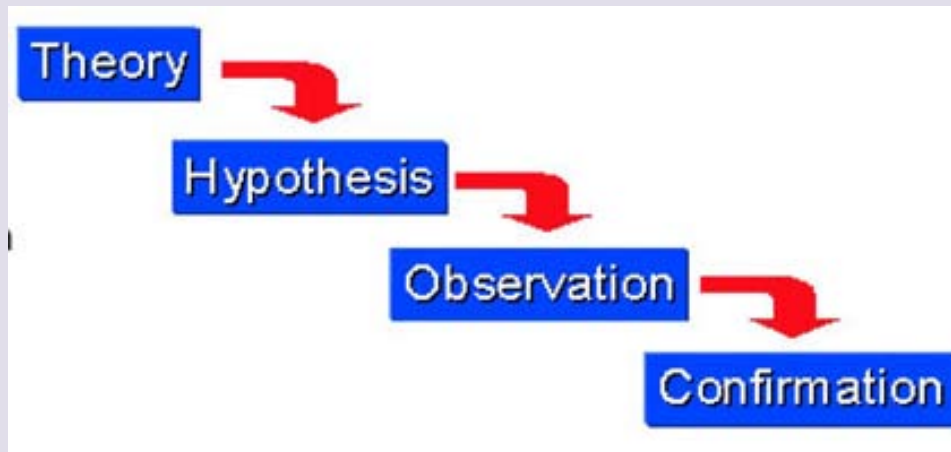
- Marvin Minsky (1980) (Frames)





Theory of Knowledge

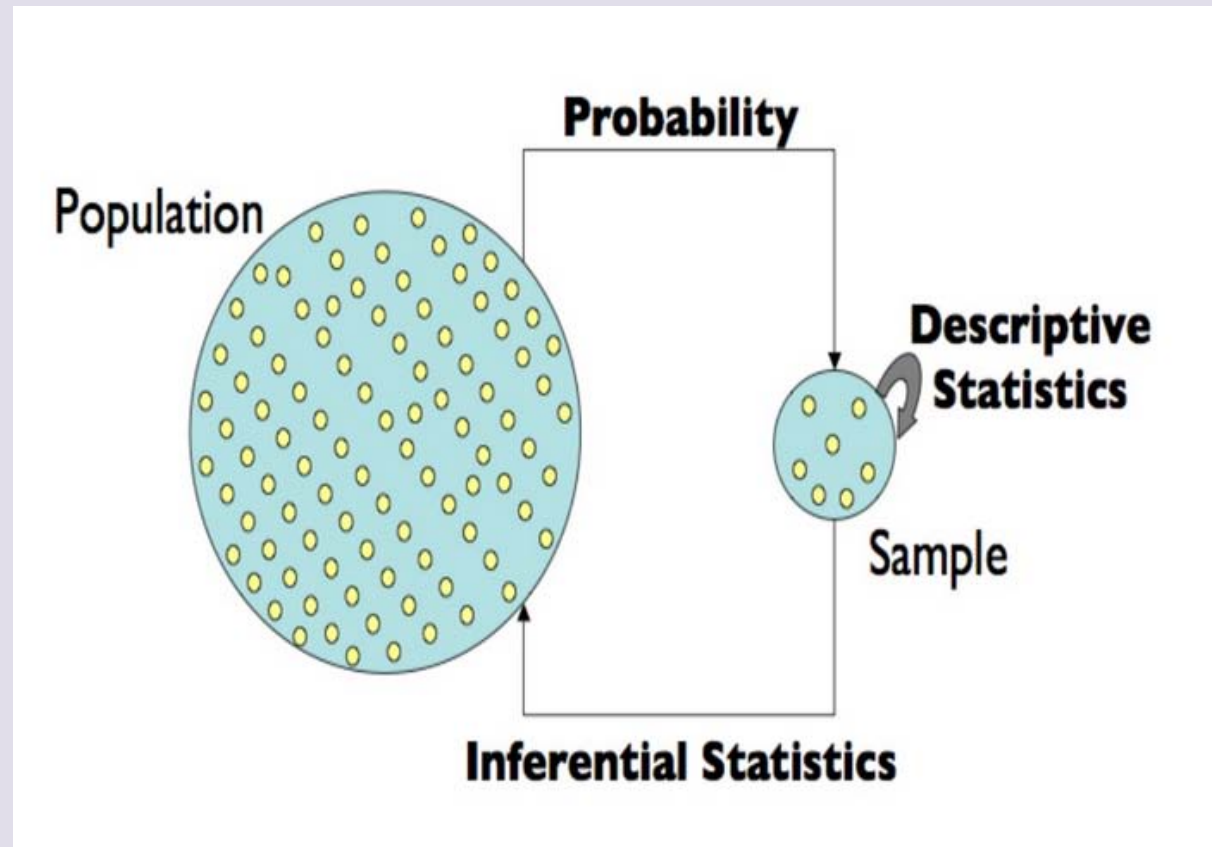
Induction, Deduction, Inferencing... Reasoning





Theory of Knowledge

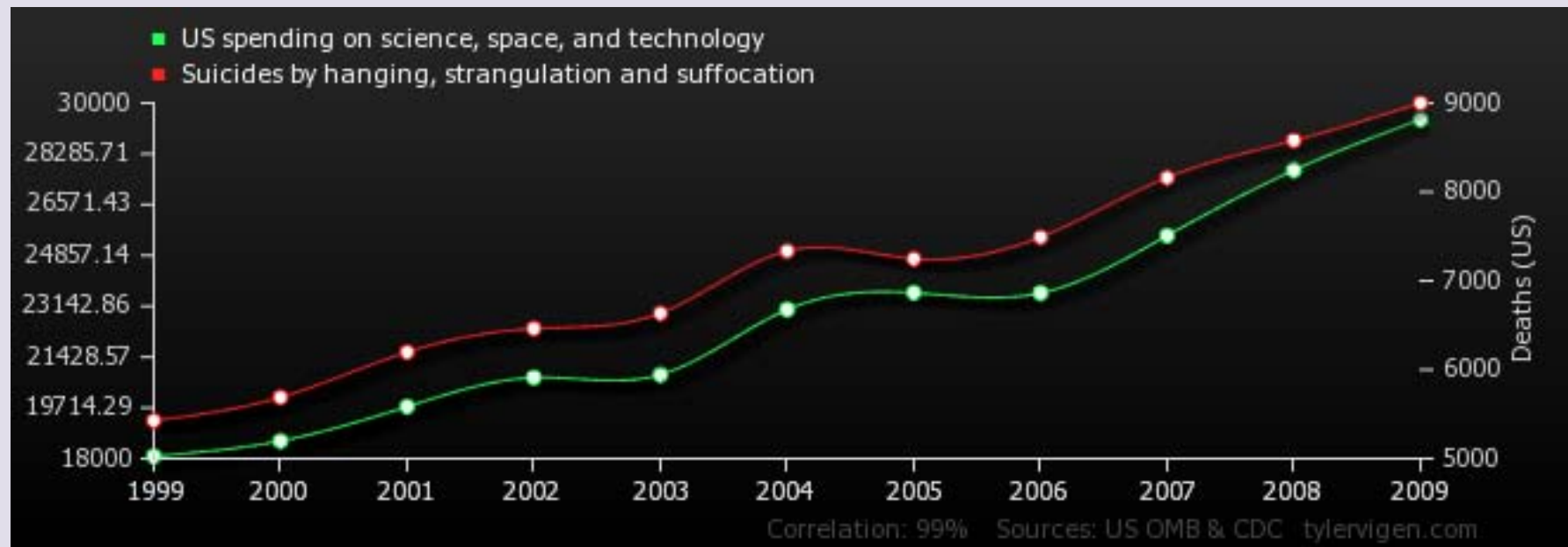
Induction, Deduction, Inferencing... Reasoning





Theory of Knowledge

Induction, Deduction, Inferencing... Reasoning





Theory of Knowledge

Induction, Deduction, Inferencing... Reasoning

In order to *generalize*,

- Change constants to variables,
- Drop conditions ("AND" clauses,
from IF part of rules),
- Add options ("OR" clauses),
- Climb in an IS-A hierarchy.

In order to *specialize*,

- Restrict the range of variables,
- Add conditions,
- Drop options,
- Descend in an IS-A hierarchy.



ICT and Knowledge Engineering

The key concept is **Knowledge**

How to develop it, capture it, represent it, store it, transmit it, process it.

But for that we need as well:

To select the Media most adequate to specific knowledge and communication...



ICT and Knowledge Engineering

what is communication

- theory of communication
- Shannon's equations
- neguentropy

$$(I = \log_2 1/P ; S = K \log_e P \quad K \rightarrow \text{Ct. Boltzman})$$





ICT and Knowledge Engineering

the universe as audience

The paradigm of boot straps / shoe laces



ICT and Knowledge Engineering

the universe as audience

The paradigm of boot straps / shoe laces

- interaction out of phase in space
 - cultural context
 - conceptual context
- interaction out of phase in time
 - embedded help
 - interface consistency



ICT and Knowledge Engineering

the universe as audience

The paradigm of boot straps / shoe laces

- chose de most adequate:

@ representation model

@ media support



ICT and Knowledge Engineering

The key concept is **Knowledge**

How to develop it, capture it, represent it, store it, transmit it, process it.

But for that we need as well:

To select the Media most adequate to specific knowledge and communication...

...Plus the **Representation Model**

Table 3.3.5.1.-1 - Knowledge Representation Models

Representation	Inference / Reasoning	System Dynamic
Expressions (equations)	Algebra	attribute driven
Rule-Based	Production Rules (forward/backward chaining)	event or attribute driven
Regular Grammars (Automata)	Production Rules (expansion)	event or attribute driven
Semantic Networks	Relational Rules	relationship driven
Object-Oriented	Inheritance (Z,N)	attribute driven
Script/Procedural	Dispatcher	event driven
Frames	Daemons	event driven
Intelligent agents	Blackboard	event driven
Case-Based descriptors	Pattern-Matching	attribute driven

In (Ferraz de Abreu) , 2002"New Information Technologies in Public Participation: A Challenge to Old Decision-making Institutional Frameworks"



ICT and Knowledge Engineering

Knowledge Representation

Knowledge Classes - Canonical Representation

- Term
- Concept
- Definition
- Model
- Rule
- Norm
- Procedure
- Methodology
- Description

(Pedro Ferraz de Abreu 1996)



Participatory Science

CITIDEP PROGRAMS

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- ICT & participatory science
- ICT & participatory democracy
- ICT, inclusion & cooperation
- ICT, policy & strategy



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- Governança Internet,
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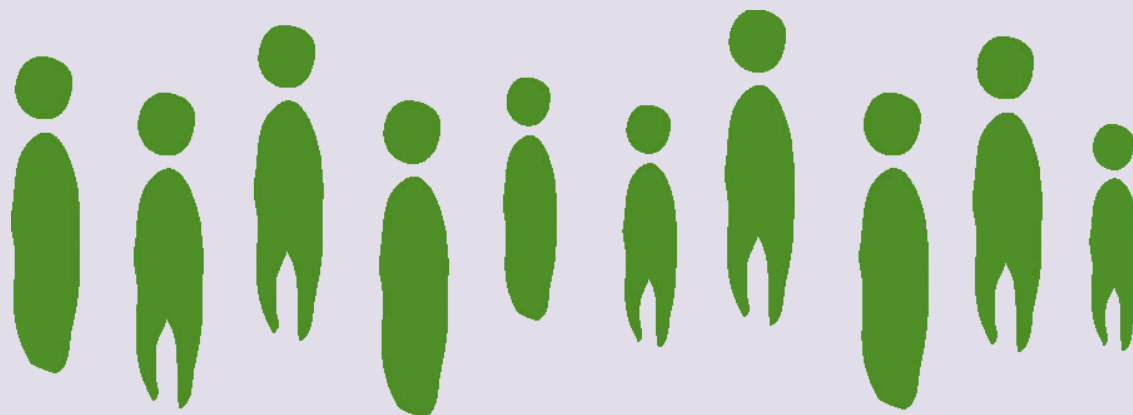
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Laboratórios de Tecnologia e Sociedade

2015-2018

UA

www.labtec-ts.net

(ainda em fase de proposta na UA)



www.e-planning.org

www.labtec-ts.net

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