Practical Research

Planning and Design

Tenth Edition

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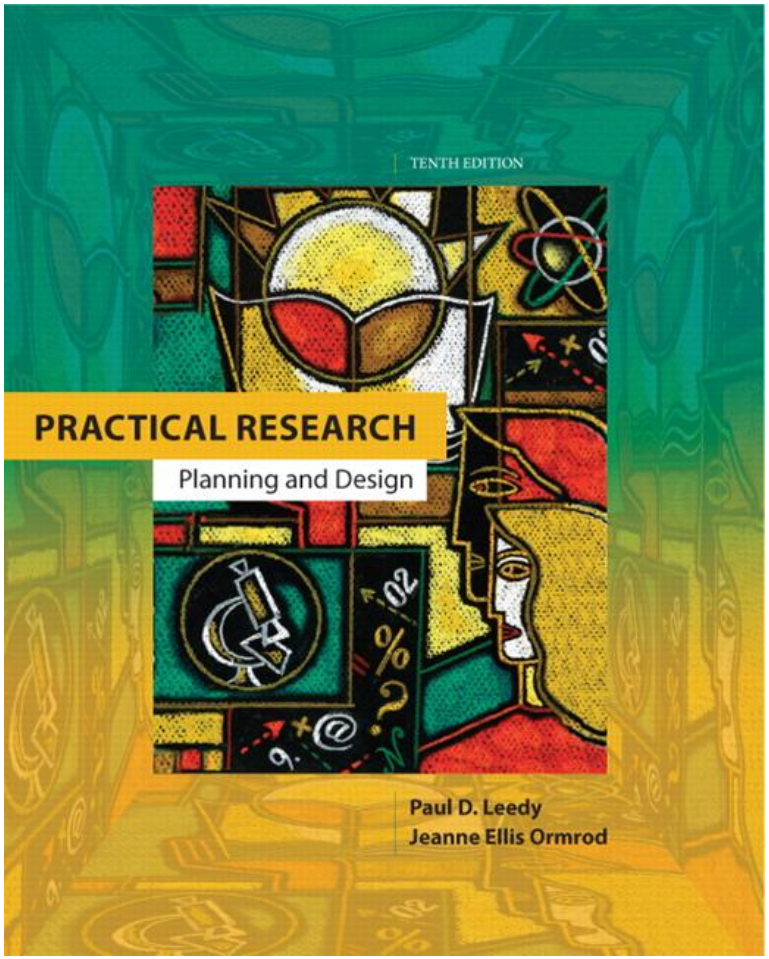

Chapter 1

The Nature and Tools of Research

What is Research?

It can have many meanings:

1) In early education it can mean one thing
2) In social context it can mean another
3) In Formal Research it has still another

We are concerned with Formal Research.

What Research Is Not:

- Only gathering information.

- Put effort to just collect hard-to-locate information

- Only Transporting facts from one location to another

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Research is:

A systematic process of collecting, analyzing, and interpreting information (data) to increase understanding of a phenomenon about which we are interested or concerned.

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Formal Research :

Intentionally enhancing the understanding
Of a phenomenon and communicating that to the larger scientific community.

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Characteristics of Research

- Originates with a question or problem

- Requires clear articulation of a goal

- Requires a specific plan for proceeding

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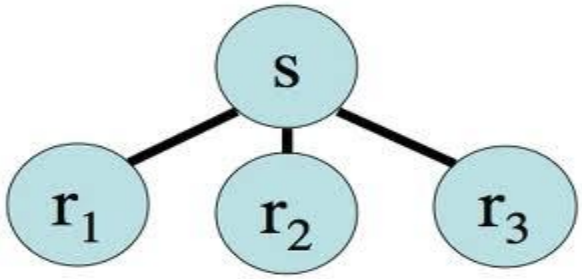
Characteristics of Research …

- Divides Problems to sub-problems



- Is guided by the specific research problem, question, or hypothesis
- Requires a specific plan for proceeding
- Accepts certain critical assumptions
- Requires the collection and interpretation of data
- Is, by its nature, cyclical or helical

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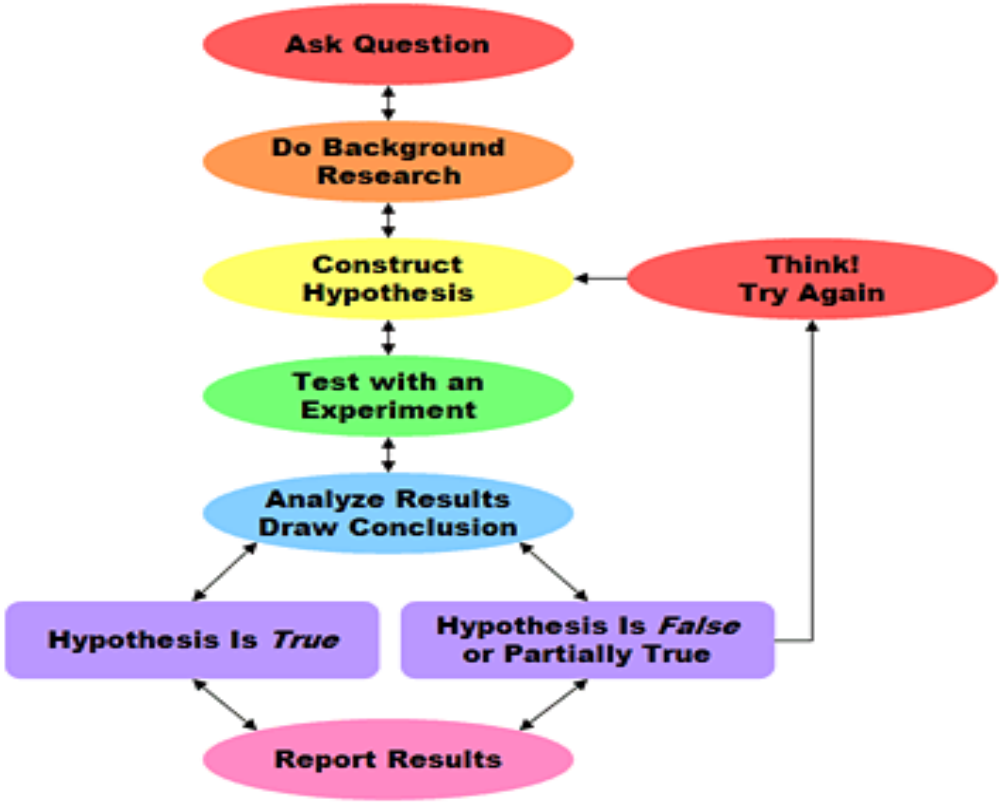
Hypothesis:

A logical supposition, a reasonable guess, an educated conjecture which provides a tentative explanation for a phenomenon under investigation.



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Hypothesis:

Should be :

1) Concise - Should be able to write a sentence/paragraph

2) Bounded – An open ended hypothesis is very hard to research and prove

3) Of interest to a wider community – It is hard to get published if know cares about your problem and more important it is very hard to get funded if no one cares.

Assumptions:

Assumptions are self-evident truths. A statement by the researchers that certain element of the research are understood to be True.

You also need to clearly define the assumptions surrounding and bounding your research.

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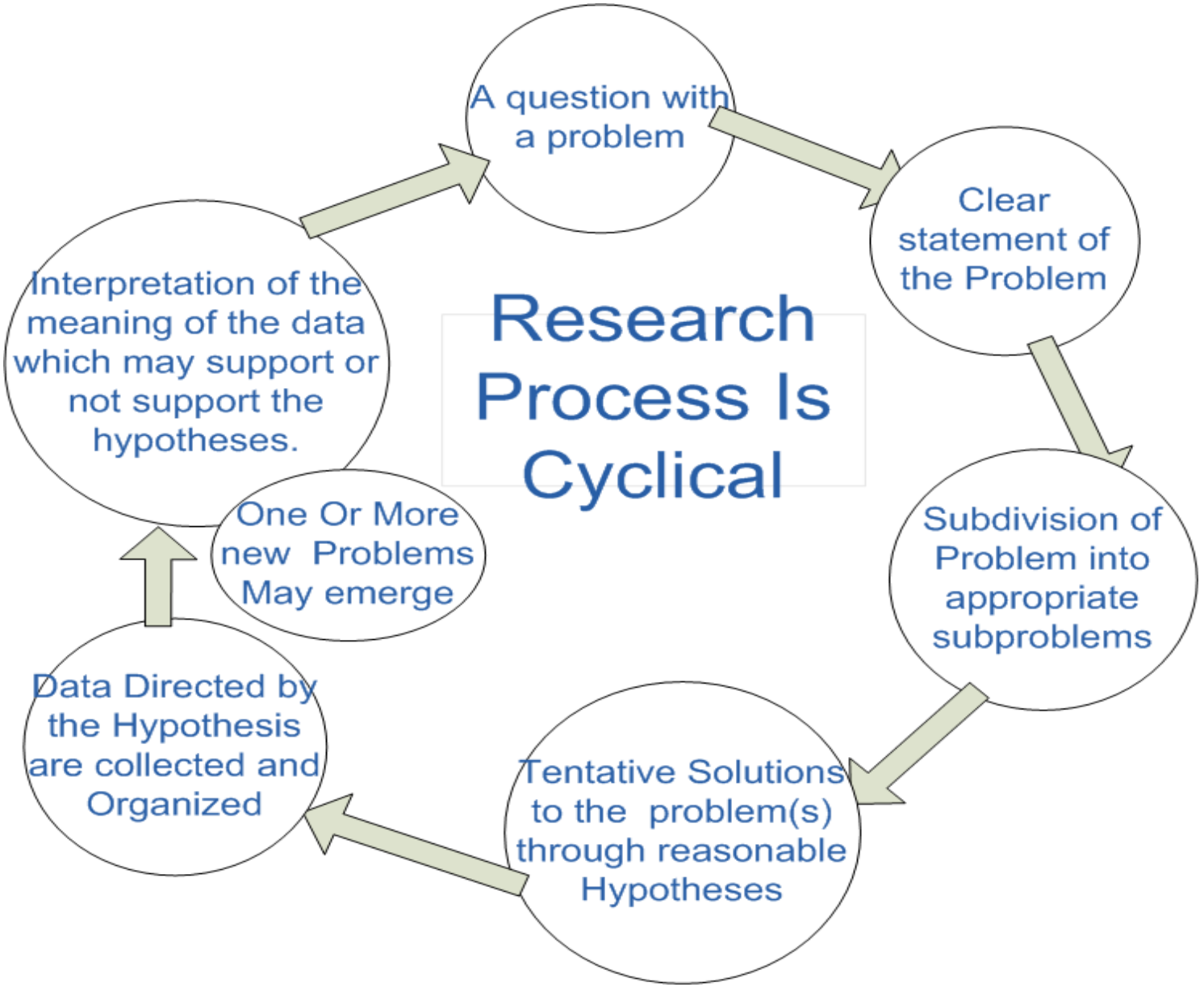

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Research Tools:

Specific mechanisms or strategies the researcher uses to collect, manipulate, or interpret data.

Research Methodology:

The general approach the researcher takes carrying out the research Project. This approach dictates the particular tools the researcher selects.

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Six Tools of Research

The library and its resources

Computer technology

Measurement

Statistics

Language

Human Mind

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The Library and Its Resources

- Human societies use libraries to assemble and store knowledge
  - Store information in more compact forms
    - microforms, compact disks, online databases
  - Fast and efficient means of locating and accessing information on virtually any topic
  - Available on the Internet

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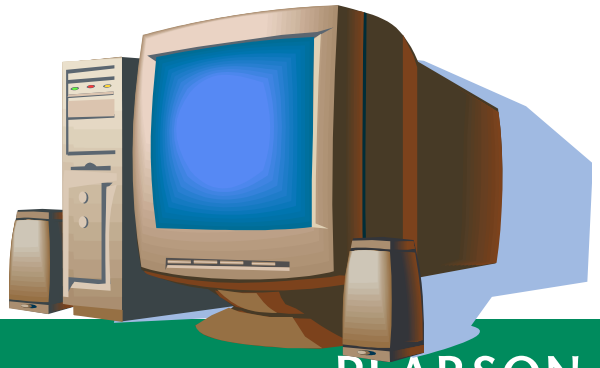
Computer Technology

- Compact and portable
- calculate, compare, search, retrieve, sort, and organize data
- Be a fast and faithful assistant
  - Planning the study
  - Literature review
  - Study implementation and data gathering
  - Analysis and interpretation
  - Reporting



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Measurement

- To identify a systematic way of measuring a phenomenon being studied
- Measurement instrument
  - Everyday measurement instruments
    - Rulers,scales,speedometers
  - Specialized instruments
    - High-powered telescope(astronomer)
  - No concrete physical phenomena need measurement
    - Questionnaire(sociologist)

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Statistics

- Principal functions:
  - Describe the data
  - Draw inferences from the data
- More useful in some academic disciplines than in others
- Calculating statistics is not the final step in a research project

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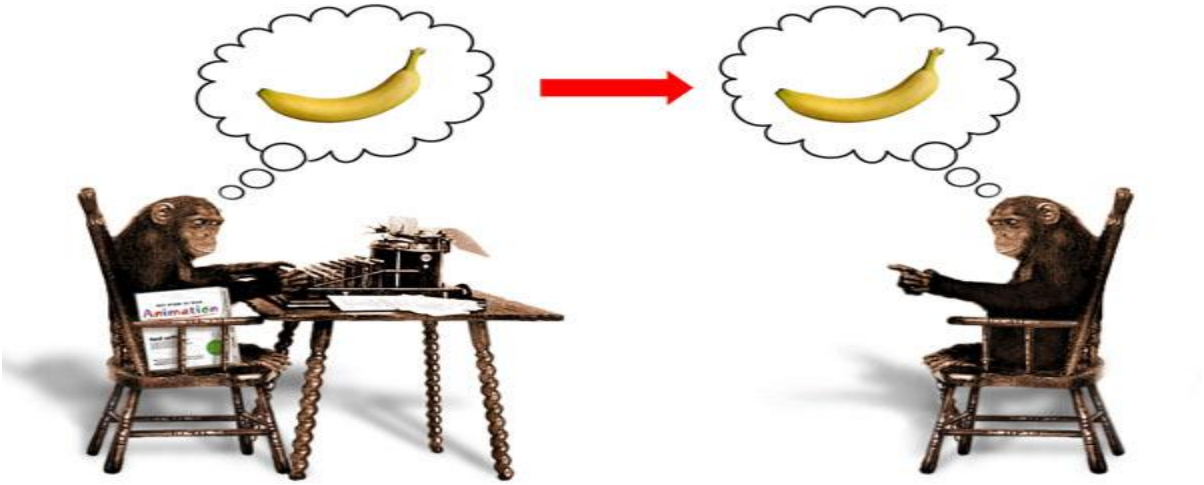
Language

- Enable us to think more effectively
- The concepts that the words represent enhance our thinking in several ways:
  - Words reduce the world's complexity
  - Words allow abstraction of the environment
  - Words enhance the power of thought
  - Words facilitate generalization and inference drawing in new situations
- The value of knowing two or more languages
- The importance of writing



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Writing to Communicate

- Say exactly what you mean.
- Continually keep in mind your primary objective in writing your paper, and focus your discussion accordingly.
- Provide an overview of what you will be talking about in upcoming pages.
- Organize your ideas into general and more specific categories, and use headings and subheadings to guide your readers through your discussion of these categories.
- Use concrete examples to make abstract ideas more understandable.

"You've gotta help me! I can't read my own writing!"

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Writing to Communicate

- Use figures and tables to help you more effectively present or organize your ideas and findings.
- At the conclusion of a chapter or major section, summarize what you have said.
- Anticipate that you will almost certainly have to write multiple drafts.
- Fastidiously check to be sure that your final draft uses appropriate grammar and punctuation, and check your spelling.

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Human Mind as Tools of Research

Eventually, it is **you** who decide.

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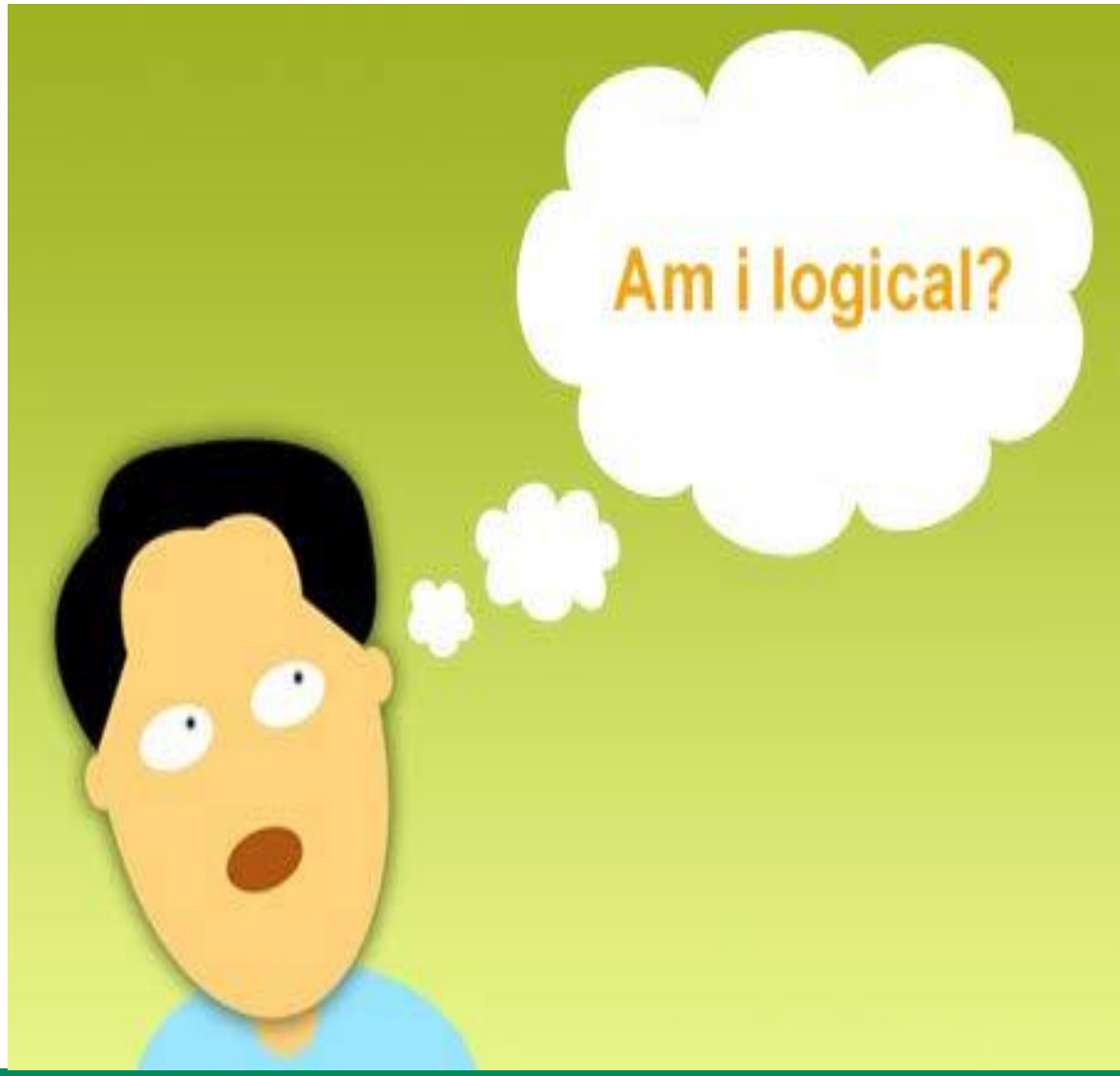
Reasoning Tools for Research

- Critical Thinking
- Deductive Logic
- Inductive Reasoning
- The Scientific Method
- Theory Building



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Critical Thinking

Components of Critical Thinking:

- verbal reasoning
- argument analysis
- decision making
- critical analysis of prior research

Ask Questions….:

-What does it mean?

-What does it mean to others?

- What are examples / use-cases?

- How does this apply to real life?

-- and so on.

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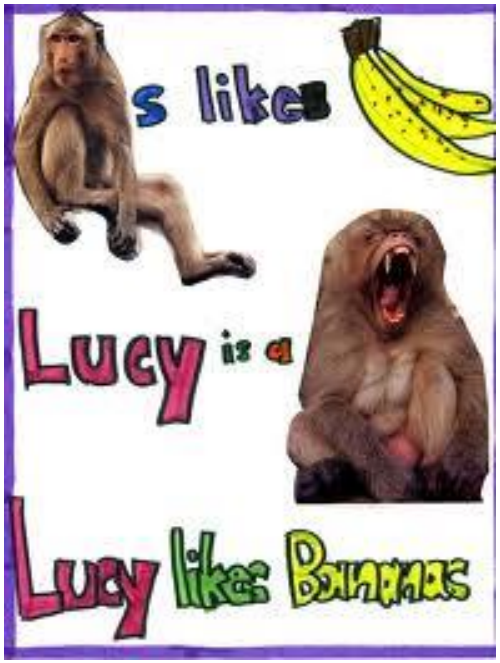
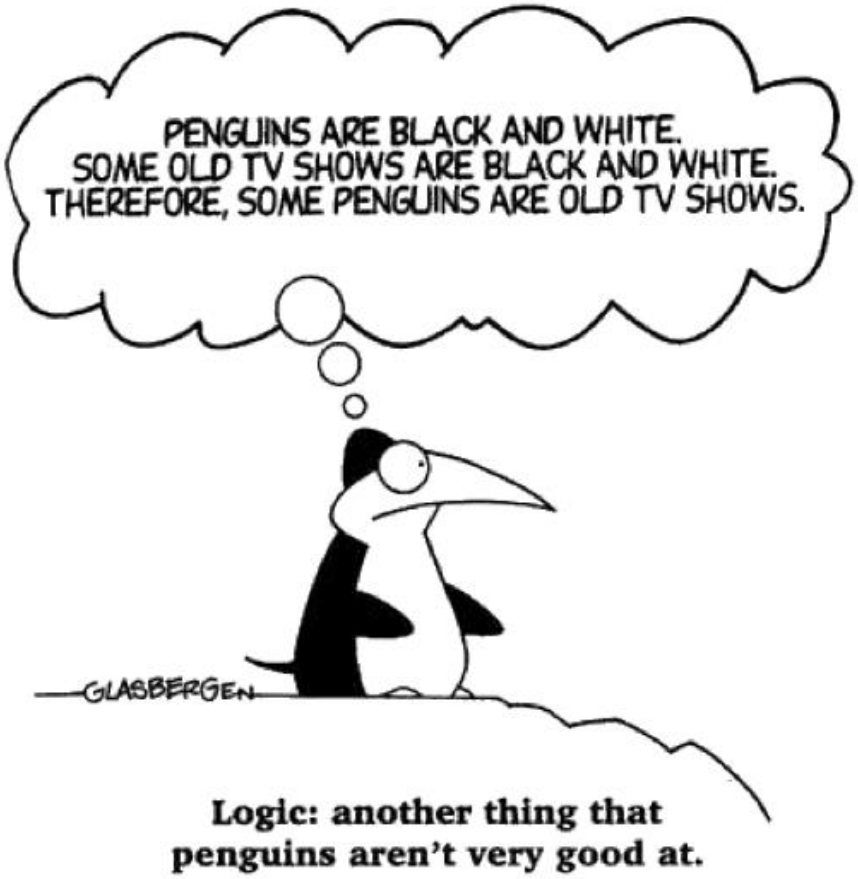
Deductive Logic

Given one or more premises which is taken to be true. Conclusion or decision is being made logically from this premises.

- Premise
- Premise
- Conclusion





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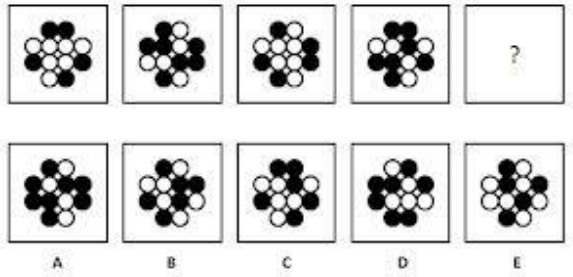
Inductive Reasoning

reasoning from detailed facts to general principles. Also called "bottom up" reasoning.



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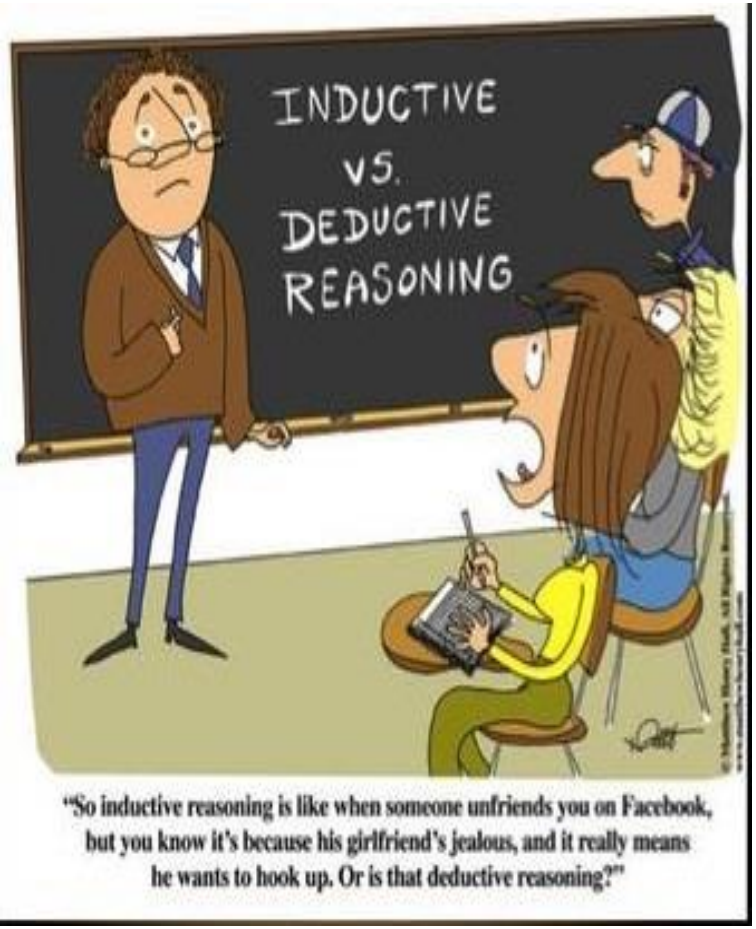
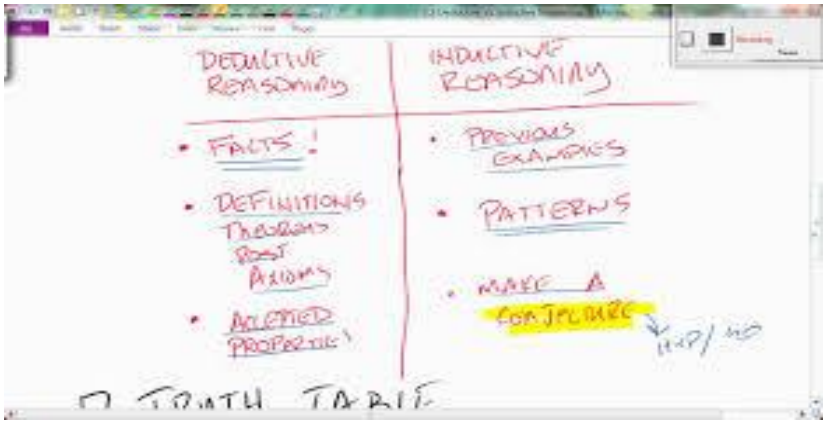
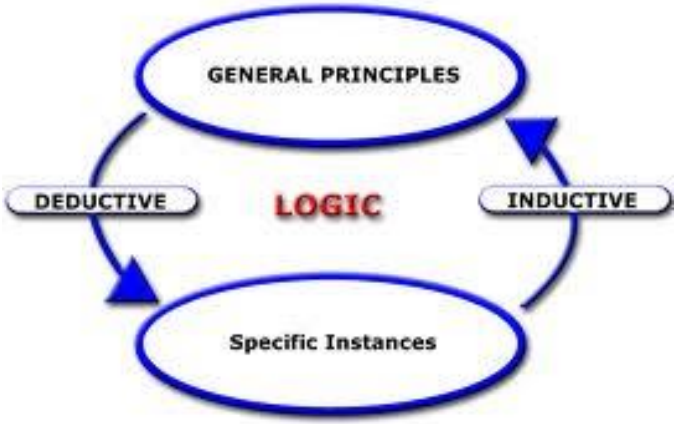
Inductive vs Deductive Reasoning







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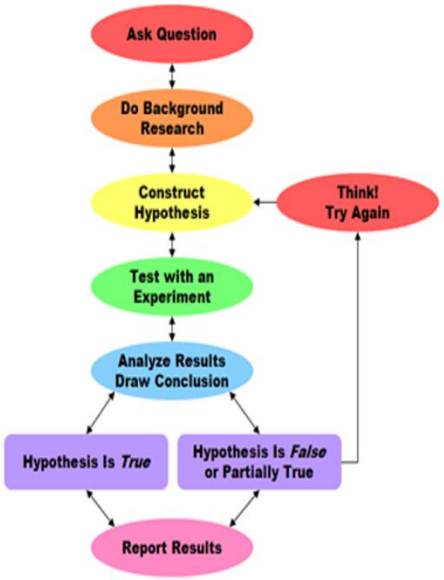
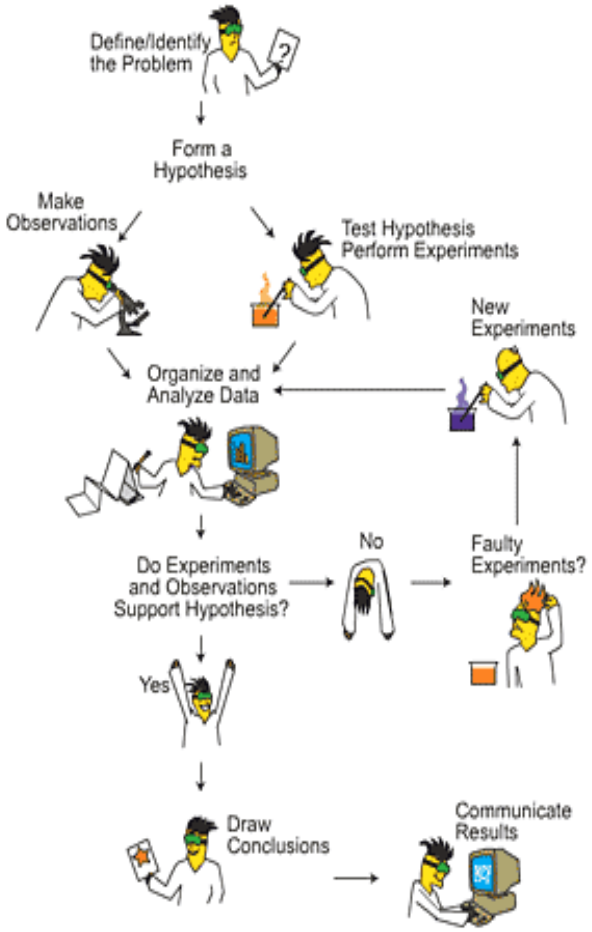
The Scientific Method:

The scientific method is a set of techniques for investigating phenomena, acquiring new knowledge, or correcting and integrating previous knowledge





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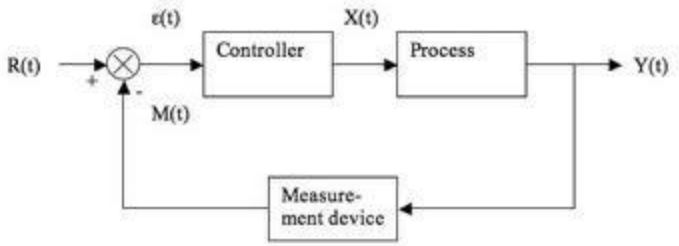
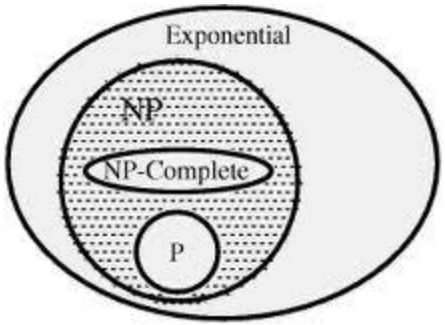
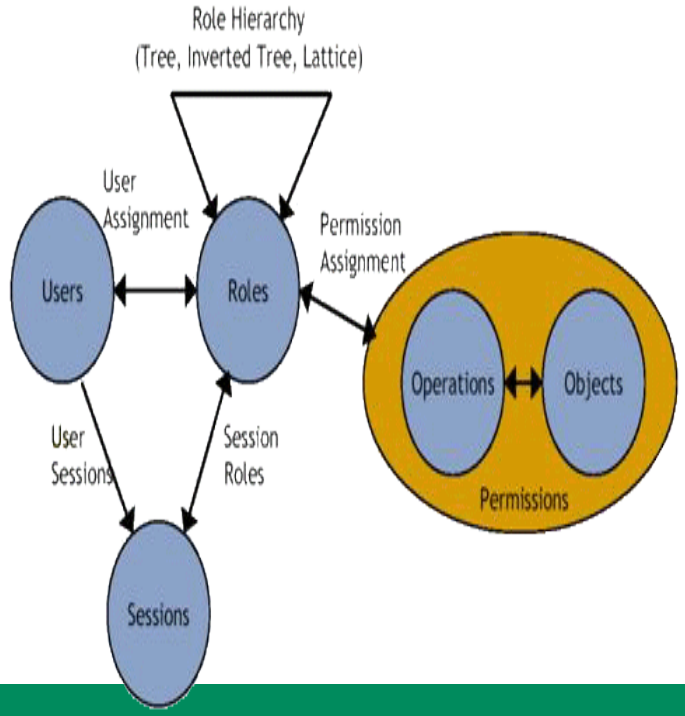
Theory Building

Theory Building is people making sense of the world around them. We all do it all the time. Kids build theory about where they come from.







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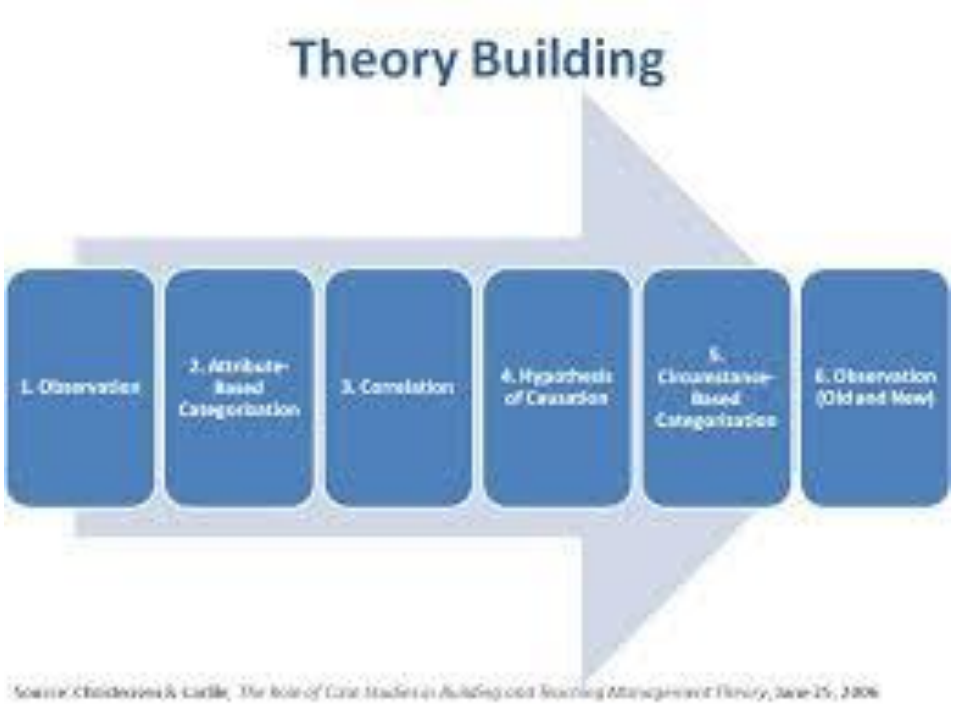
Theory Building Continuing…

What it takes to build a theory?

Steps:

1. Observe
2. Organize
3. Find Co-relation
4. Create hypothesis
5. Justify Hypothesis
6. Build Model



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Collaboration

collaboration Brings Power.

Who to Collaborate with:

-Friends?
-Colleagues?
-Faculties?
-Industries?
- and so on…

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Doing Research – last of all motivation….

After all we have to do the research to graduation, enter our profession and a happy family.

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