

Research Methodology

Introduction

Introduction

- Science
- Knowledge
- Truth
- Meaning
- Engineer vs. Scientist

Reserve your right to think, for even to think wrongly is better than not to think at all.”

Hypatia, natural philosopher and mathematician

CRITICAL THINKING

Science

- We can see science from different perspectives,
 - **Science** from Latin *scientia*, *scire* to know
 - A department of systematized knowledge as an object of study
 - Knowledge or a system of knowledge covering general truths or the operation of general laws especially as obtained and tested through scientific method

Science

- Such knowledge or such a system of knowledge concerned with the physical world and its phenomena: natural science
- A system or method reconciling practical ends with scientific laws

To do *science* is to search for repeated *patterns*, not simply to accumulate facts.

Robert H. MacArthur

SCIENCE

Religion is a culture of *faith*; *science* is a culture of *doubt*.

Richard Feynman

SCIENCE

Knowledge

- Plato's Definition

- Plato believed that we learn in this life by remembering knowledge originally acquired in a previous life, and that the soul already has knowledge, and we learn by recollecting what in fact the soul already knows.
- **Knowledge is justified, true belief.**
- The problem with this concerns the word “justified”.

Knowledge

- Descartes' Definition
 - Deduction by which we understand all necessary inference from other facts that are known with certainty, leads to knowledge when recommended method is being followed.
 - Two methods [*intuition and deduction*] are the most certain routes to knowledge, and the mind should admit no others.

Knowledge

- *Propositional knowledge*: knowledge that such-and-such is the case.
- *Non-propositional knowledge (tacit knowledge)*: the knowing how to do something.
- Source of knowledge (A Priori Knowledge, Perception, Reasoning, Testimony)

Truth

- The correspondence theory
- The coherence theory
- The deflationary theory

Truth

- The Correspondence Theory
 - A common intuition is that when I say something *true*, my statement corresponds to the *facts*.
 - But: how do we recognize *facts* and what kind of relation is this *correspondence*?

Truth

- The Coherence Theory
 - Statements in the theory are believed to be true because being compatible with other statements.
 - The truth of a sentence just consists in its belonging to a system of coherent statements.

Truth

- The Deflationary Theory
 - The deflationary theory is belief that it is always logically superfluous to claim that a proposition is true, since this claim adds nothing further to a simple affirmation of the proposition itself.

All meaning is determined by the method of analysis where the method of analysis sets the context and so the rules that are used to determine the “meaningful” from “meaningless”.

C. J. Lofting

MEANING

Meaning

- At the fundamental level meaning is reducible to distinguishing
 - Objects (the what) from
 - Relationships (the where)
- Which are the result of process of
 - Differentiation or
 - Integration

Engineer vs. Scientist

- Engineering is both a *science* and an art
- Scientist discovers what is be (the facts) but Engineer builds what is not be (the tools).

Any Question?

THANKS