

1. Science (lat. scientia, "knowledge") - formal way of asking questions using methodologies (or, systematic knowledge-based or prescriptive practice) to further our understanding of why things happen as they do in the nat. world, resulting in a prediction or predictable outcome.

Peirce's Theory of inquiry:

0. Discrepancy (Galileo - observation) ->

1. Abduction (hypothesis generation) ->

2. Deduction (prediction using hypothesis[method. - general -> particular]) ->

3. Induction (testing prediction, hypothesis validation [method. - generalisation of observations into statements]) -> 0.

Naturwissenschaften: induktiv(empirisch-quant/experiment)

Kulturw.: induktiv/hermeneutisch emp.-quant./-qual./herm(Sinn-Rekonstruktion)

Formalw.: deduktiv

K. Popper: Falsifiability, criterion of demarcation science/!science: logical possibility to show an assertion is false by observation/physical experiment (I. Lakatos: hard core of the theory may still be correct - "nature shouts inconsistent");

T. Kuhn: Science as no cumulative, but a cyclical process - a part. research perspective (paradigm) dominates for some time, then is replaced, but according to np rational proc.

(I.L.: one can compare theories development(t))

2. Scientific method - 3 step process:

1. observe (document facts reg. the relevant phenomena)

2. speculate(propose an explanation)

3. test (the explanation)

Anomalous phenomena: burden of proof in their observation - proving extraordinary claims take extraordinary measures to persuade the sceptical scientists.

Explanations:

Hypothesis - an untested, unproved explanation;

Theory - well developed, confirmed by data, broad and deep, and established expl.;

in gen. just better approximations

Correlation: regular, measurable variance between a pair of characteristics of a population - positive btw. P & Q: $P.have(Q) > P.notHave(Q)$;

Causation: one thing proceeds and causes other (responsibility, although multicausality possible; if causation then also correlation);

Causal mechanism: explanation of effects of a distant cause;

Laws: events as instances of general principles;

Underlying process: reductionistic redescription explaining the phenomenon on more basic level;

Function: purpose of the object in the foreground of the explanation;

Test: prediction & explanation tested in artificially made circumstances

falsifiability criterion: rule out factors that could account for a failed prediction even, if explanation correct.

verifiability criterion: accommodate factors that could account for a successful prediction even, if explanation wrong.

Null hypothesis: no difference btw. experimental and control group

No significance: no, or little overlap of confidence intervals of experimental and control group

3. Fallacies - illicitly used scientific methods, pretending to be scientific without evidence:

- argumentum ad hominem;
- false anomalies - omitted facts make smth mysterious;
- argument by elimination: ignoring other explanations;
- illicit causal inference: correlation w/ causation;
- unsupported analogies;
- untestable explanation: lack of evidence->evidence that true;
- redundant prediction: extend theory without testing it;
- ad hoc rescues: questioning the method

Randomised Causal Studies - subjects randomly divided into two groups before introducing the potential causal factor, effectively excludes other possible ones, but expensive & time-consuming;

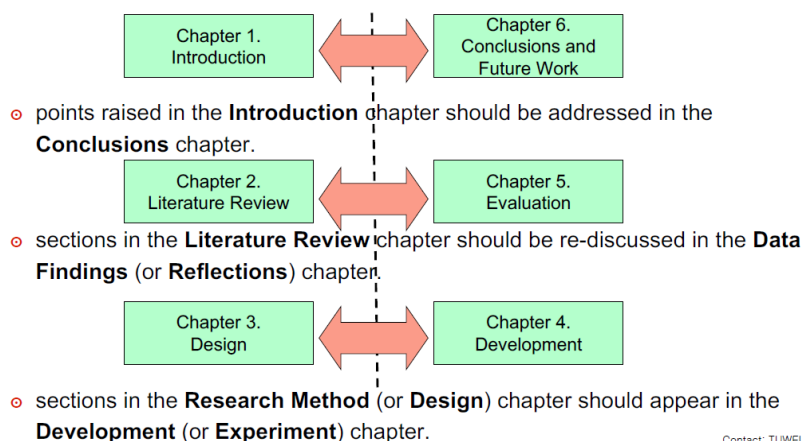
Prospective causal studies: 2 groups - 1. already with the suspected causal factor, 2. without
- emerging level of difference observed;

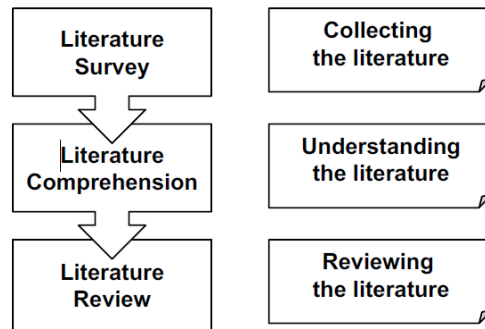
Retrospective causal studies: experimental (already with the effect) and control group.

4. Writing - types of research:

- Theoretical Orientation: Investigation of field, identifying strengths & weakness, areas for further development and investigation, incl. literature search or review
- Development project: Soft/Hardware systems, Process models, Methods and algorithms
- Evaluation project: Comparison and evaluation of different constructs
- Application-oriented project: Looking for a solution to a real world problem
- Problem solving: Development/improving understanding/technique/method/principle

Mirroring of Chapters





Literature Survey: identification and acquisition of materials (papers etc.) to get a comprehensive overview of the state of research - focused survey technique: summarise relevance of papers with tools' support, focus on ones related (almost) exactly to yours (broaden if needed)

Literature Review: approaches, methods applied by others, their results and observed shortcomings. Familiarisation of readers, putting in context, theme of the narrative is outlining the covered gap in research, its significance and comparison

Breadth - foundational research in this particular domain, there will be research mentioned from each of the areas

Depth - particular topic of research; Approx. the same number of research papers covered in both

Literature Review structure:

Beginning/ introduction - the main research topics and introduced definitions;

Middle - main research trends, key researchers, research beginnings -> research gap;

End/conclusion - great deal of work done, gap to address though.

Types of plagiarism:

1. Complete Plagiarism
2. Source-based Plagiarism: wrong, non-existing or misdirecting citation, data fabrication, data falsification
3. Direct Plagiarism
4. Self or Auto Plagiarism
5. Paraphrasing plagiarism
6. Inaccurate Authorship / Misleading Attribution
7. Mosaic Plagiarism - interlaying someone else's phrases or text within your own research.
8. Accidental Plagiarism