

Organization and planning of scientific research

Lecture 5



What is experiment?

An experiment is a procedure designed to test a hypothesis as part of the scientific method.

The two key variables in any experiment are the independent and dependent variables. The independent variable is controlled or changed to test its effects on the dependent variable.

Three key types of experiments are controlled experiments, field experiments, and natural experiments.

Natural Experiments

Manipulative Experiments

Comparative Experiment

Experimentation and Research

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Methods of research

In any investigation an important (or even determinative) role is played by the methods of scientific research.

CLASSIFICATION OF RESEARCH METHODS

- General scientific \ general logical (analysis, synthesis, abstraction, idealization, generalization, induction, deduction, modelling)
- Theoretical (formalization, hypothesis and deductive method)
- Empirical (observation, experiment, comparison)

Analysis is the process of breaking a complex topic or substance into smaller parts in order to gain a better understanding of it.

The word comes from the Ancient Greek ἀνάλυσις (*analysis*, "a breaking-up" or "an untying")

Synthesis means to combine a number of different pieces into a whole. Synthesis is about concisely summarizing and linking different sources in order to review the

recommendations, and connect your practice to the research.

Synthesis usually goes together with analysis because you break down a concept/idea into its important parts/points (analysis), so you can draw useful conclusions or make decisions about the topic or problem (synthesis).



Difference between Analytic Method & Synthetic Method

No.	Analytic Method	Synthetic Method
1	Analysis means breaking up into simpler elements.	Synthesis means building up separate element and their combination
2	It proceeds from the unknown to the known facts.	It proceeds from the known to the unknown facts.
3	It is a method of discovery.	It is a method of presentation of discovered facts.
4	It is lengthy and laborious.	It is short and concise.
5	It pulls apart or breaks up the statement under solution.	It puts together or synthesizes known facts.