

Unit One: The Nature and the Process of the Scientific Method

Module: Research Methodology

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Objectives

- Revisit students understanding of the scientific method.
- Write effective research questions.
- Formulate different forms of hypotheses.

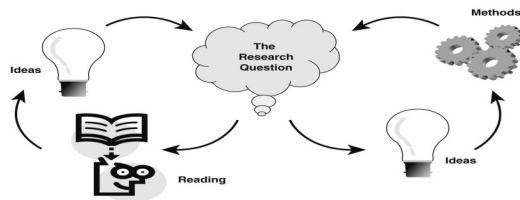


FIGURE 3.4 CYCLES OF RESEARCH QUESTION DEVELOPMENT

Getting your research questions right requires a process of brainstorming, reading reliable sources, defining relevant concepts, narrowing, clarifying, and tweaking earlier attempts at your question.

3. Hypotheses

3.1. What is a hypothesis?

Definition

A hypothesis is an assumption, an idea that is proposed for the sake of argument so that it can be **tested** to see if it might be true (Hypothesis, n.d)

Fundamental

A hypothesis tests the relationship between the **independent*** and **dependent*** variables and it is stated before the data collection.

Example

If people exercise for 30 minutes per day at least three days per week, then their cholesterol levels will be reduced.

3.2. What is null hypothesis?

Definition

The null hypothesis states that there is no significant difference or relationship between two or more variables.

Example

There is no relationship between exercising and cholesterol levels.

Note

Null hypotheses can be directional and non-directional.

As it sounds exactly, the directional one predicts the direction of the difference or the relationship between the variables, but the non-directional does not.

Advice

This handout goes hand in hand with the slides presented during the face-to-face session. In addition, it can be complemented by class discussions, notes, and the supporting resources offered online.

References



- Cohen, L., Manion, L., & Morrison, K. (2017). *Research Methods in Education* (8th ed.). Routledge. <https://doi.org/10.4324/9781315456539>
- Sukamolson, S. (2007). Fundamentals of quantitative research. *Language Institute Chulalongkorn University*, 1(3), 1-20.
- The Scientific Method: Steps, Terms & Examples. (2013, January 29). Retrieved from <https://study.com/academy/lesson/the-scientific-method-steps-terms-examples.html>.
- O'Leary, Z. (2004) *The Essential Guide to Doing Research*. London: Sage.

Glossary

**Background Research**

data available in books/journals/the internet from previous studies that can provide information about the studied subject

Conclusion

support or rejection of the experiment's hypothesis produced from the experiment's data

Dependent variable

the thing being measured in an experiment (i.e. the outcome)

Empirical Data

Information obtained through data collection methods (i.e: experiment/questionnaire/interview).

Experiment

a test that provides data that directly answers a question

Hypothesis

a potential answer for the research question that can be tested

Independent variable

the factor that causes or influences the outcome (i.e. the cause)

Research Question

The problem that a research is looking to answer

Scientific method

a series of steps used by scientists to answer questions about the world.