

Course : COMP6575 – Research
Topics in Computer Science
Effective Period : December 2019

The Use of Theory

Session 04

Learning Outcomes

At the end of this session, students will be able to:

- LO 1: Describe the basics of writing research paper and the research lifecycle
- LO 2: Select the research topic, literature and writing strategies used in the project

Outline

1. Terms used in theory
2. Theory in Quantitative research
3. The Deductive Approach Typically Used In Quantitative Research
4. Options for Placing Theory in a Quantitative Study
5. Process in Qualitative Research
6. The Inductive Logic of Research in a Qualitative Study

Terms used in theory (1)

- Variable refers to a characteristic or attribute of an individual or an organization that can be measured or observed and that varies among the people or organization being studied.
- Variables are distinguished by 2 characteristics:
 - Temporal order
 - Their measurement (Observation)

Terms used in theory (2)

- For temporal order, It means that one variable precedes another in time. Because of this time ordering, it is said that one variable affects or causes another variable.
 - Independent & Dependent variables
 - Intervening or mediating variables
 - Moderating variables
 - Control variables
 - Cofounding variables

Quantitative Research

Theory in Quantitative Research

- Is an interrelated set of constructs (or variables) formed into propositions, or hypotheses, that specify the relationship among variables (typically in terms of magnitude or direction)
- A theory might appear in a research study as an argument, a discussion, a figure, or a rationale, and it helps to explain (or predict) phenomena that occur in the world.
- In quantitative studies, one uses theory deductively and places it toward the beginning of the proposed study.
- With the objective of testing or verifying a theory rather than developing it, the researcher advances a theory, collects data to test it, and reflects on its confirmation or disconfirmation by the results.

The Deductive Approach Typically Used in Quantitative Research

Researcher test or verifies a theory



Researcher test hypotheses or research questions from the theory



Researcher defines and operationalized variables derived from the theory



Researcher measures or observes variables using an instrument to obtain scores

Options for Placing Theory in a Quantitative Study (1)

Placement	Advantages	Disadvantages
In the introduction	As an approach of the found in journal articles, it will be familiar to readers, it conveys a deductive approach	It is difficult for a reader to isolate and separate theory base from other components of the research process (e.g with the methods)
In the literature review	Theories are found the literature, and their inclusion in a literature review is logical extension or part of the literature	It is difficult for a reader to see the theory in isolation from topics being reviewed in the literature

Options for Placing Theory in a Quantitative Study (2)

Placement	Advantages	Disadvantages
After hypotheses or research questions as a rationale	The theory discussion is a logical extension of hypotheses or research questions because it explains how and why variables are related	A writer may include a theoretical rationale after hypotheses and questions and leave out an extended discussion about the origin and rationale for the use of the theory
In a separate section	This approach clearly separates the theory from other components of the research process, and it enables a reader to better identify and to understand the theory base for the study	The theory discussion stand in isolation from other components of the research process (e.g., the questions or the methods) and, as such, a reader may not easily connect it with other components of the research process

Qualitative Research

Process in Qualitative Research

- The researcher begins by gathering detailed information from participants and then forms this information into categories or the themes.
- These themes are developed into broad patterns, theories, or generalizations that are then compared with personal experiences or with existing literature on the topic.

The Inductive Logic of Research in a Qualitative Study

Researcher gathers information (e.g., interviews, observations)



Researcher asks open-ended questions of participants or record fieldnotes



Researcher analyzes data to form themes or categories



Researcher looks for broad pattern, generalizations, or theories from themes or categories



Researcher poses generalizations or theories from past experiences and literature

References

- John W. Creswell. (2017). Qualitative, Quantitative, and Mixed Methods Approaches Research Design: 5th edition. SAGE Publications, Inc. ISBN: 978-1-5063-8671-3
- <https://www.monash.edu/rlo/graduate-research-writing/write-the-thesis/introduction-literature-reviews>

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Thank you