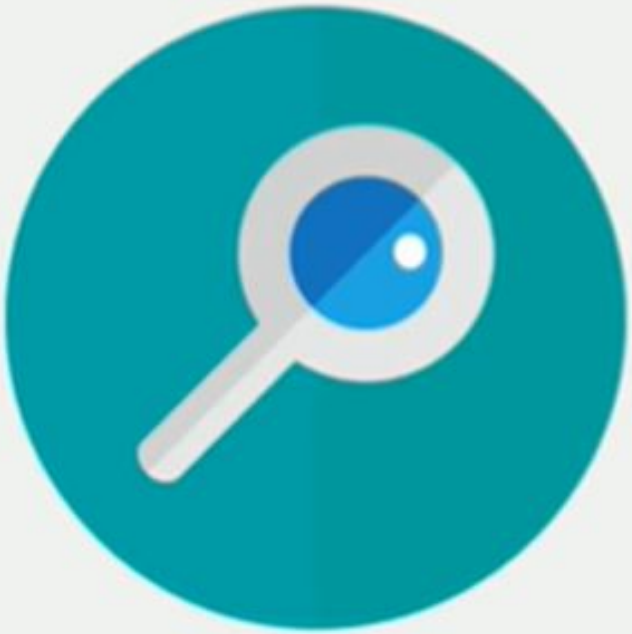
Objectives of research – Understanding research and its goals. Critical thinking. Topic selection and justification. Methods of scientific enquiry – formulation of hypotheses and testing of the same – Development of a research proposal-literature review – Theoretical and Experimental Processes.

Research

Search for Knowledge



Research is an objective and systematic search for relevant information on a particular subject or topic. It aims at finding answers to questions by implementing scientific procedures.

Objectives of Research

The objective of research is to find answers to the questions by applying scientific procedures. In other words, the main aim of research is to find out the truth which is hidden and has not yet been discovered. Although every research study has its own specific objectives, the research objectives may be broadly grouped as follows:

1. To gain familiarity with new insights into a phenomenon (i.e., formulative research studies);

2. To accurately portray the characteristics of a particular individual, group, or a situation (i.e., descriptive research studies);

3. To analyse the frequency with which something occurs (i.e., diagnostic research studies); and

4. To examine the hypothesis of a causal relationship between two variables (i.e., hypothesis-testing research studies).

Types of Research

Qualitative Research

- Provides insights and understanding of the problem at hand.

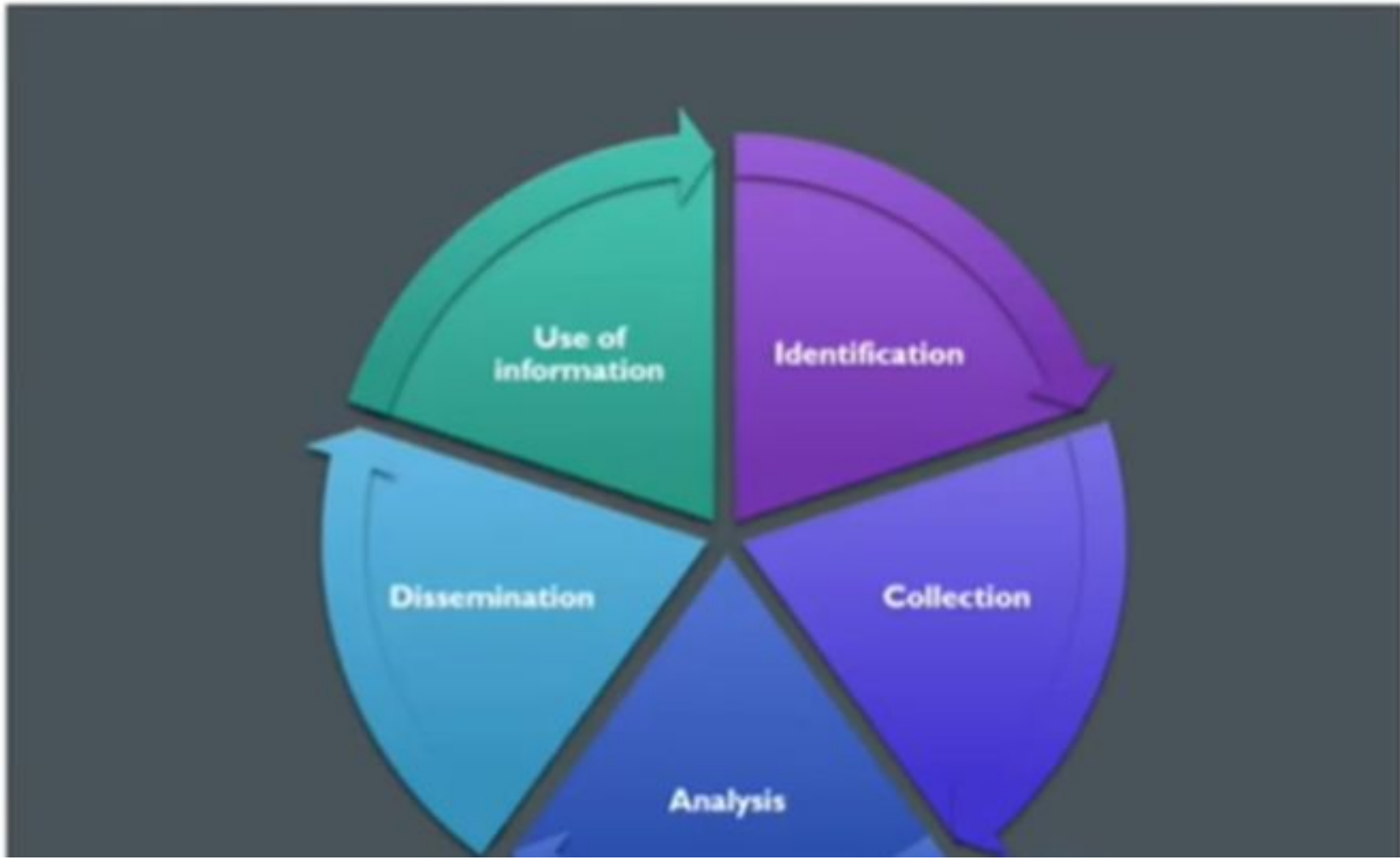
Quantitative Research

- Quantifies the data and generalizes the result from sample to target population.

DEFINITION OF RESEARCH METHODOLOGY

- **Research methodology** is the specific procedures or techniques used to identify, select, process, and analyze information about a topic. It follows scientific investigation principles.

DEFINITION OF RESEARCH METHODOLOGY



The Final Research Project Process

BEWARE

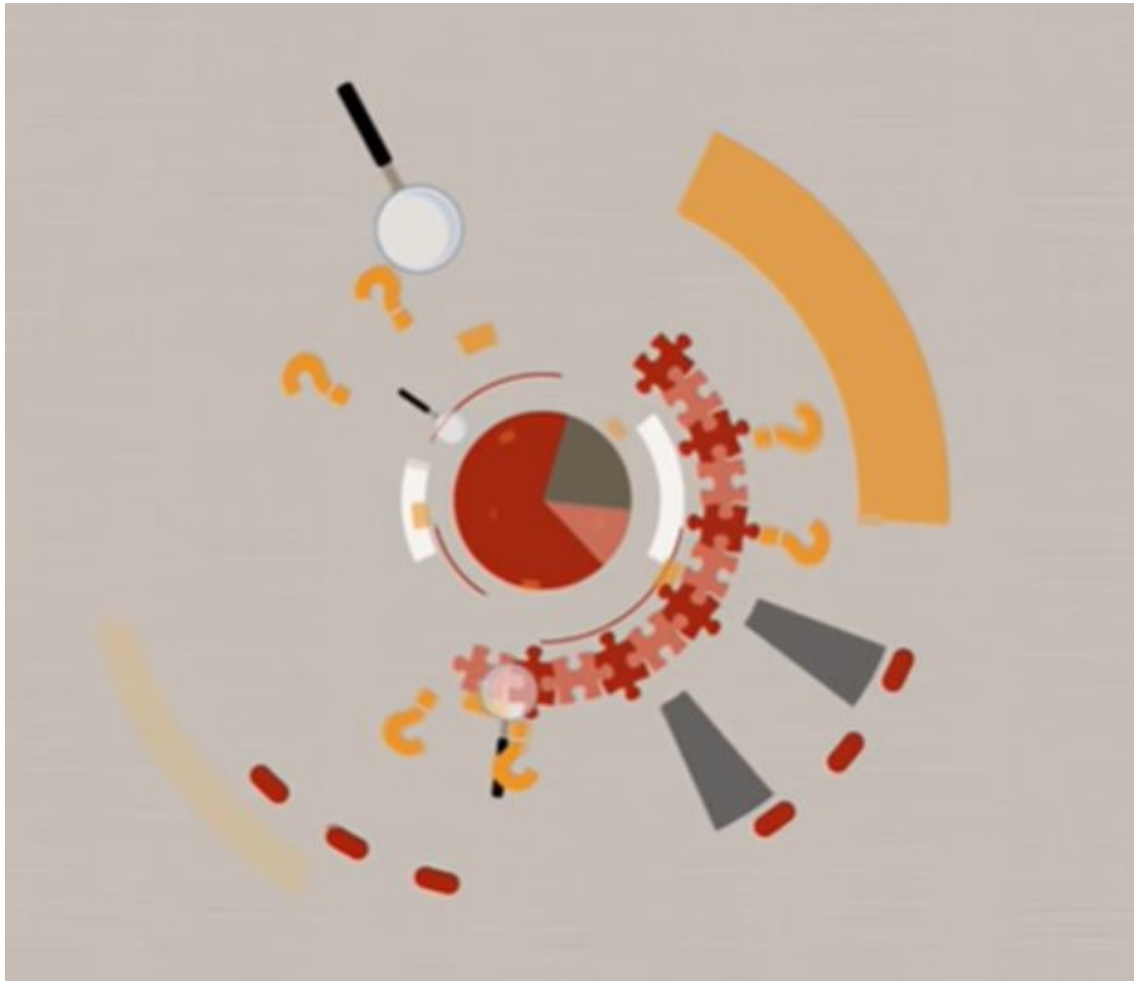
Methods

The techniques and procedures used to obtain data

Methodology

The theory of how research should be undertaken

Critical Thinking



https://www.youtube.com/watch?v=HnJ1bqXUnIM

https://www.youtube.com/watch?v=BVfI1wat2y8

Deciding to Publish and Submitting Your Paper

- What to publish?
  - abstract vs. full report
- Choosing your forum
  - Which type of journal is best for you?
  - What audience are you targeting?
- Research the journal
  - Publication guidelines
  - Article style

After Submission

- Publication Procedure (6-12 months)
  - Author submits
  - Editor is assigned to manuscript
  - Editor assigns reviewers (associate editors) to inspect
  - Reviewers decide on whether to review paper
  - Several reviewers inspect and edit
  - Editor decides on accuracy of revisions and whether to accept paper
  - If accepted, editor sends paper back to author with revisions
  - Author revises paper and sends it back
  - Possibility of second review process
  - Publication!

What is Peer Review?

- Review process for scientists by scientists
- Purpose
  - To filter what is published as “science”
  - To provide researchers with perspective
- Where is peer review used?
  - Scientific publication
  - Grant review
  - Tenure promotion

Scientific Misconduct

- Gift Authorship
- Redundant Publication
- Plagiarism
- Fabrication
- Falsification
- Conflict of Interest

Manuscript Structure

- Abstract
- Introduction
- Body of Article
- Results and Discussion
- Conclusions
- Acknowledgements
- References
- Figures and Tables

Give a Tentative Title

Figures → Introduction → Results and Discussion

Table

Again and Again work on Figures, Intro, writing

If required ask for help for more work

Abstract/Conclusion

Collect References
In parallel

Relevant Reference

Figures are the back bone of the manuscript

Introduction should be relevant to the work

Abstract

- Summary of Manuscript (200-300 Words)
  - Problem investigated
  - Purpose of Research
  - Methods
  - Results
  - Conclusion

Introduction

- Broad information on topic
  - Previous research
- Narrower background information
  - Need for study
- Focus of paper
  - Hypothesis
- Motivation and intro of problem (selling point)
- Overall 100-300 words

Methods and Materials

- Provides instruction on exactly how to repeat experiment
  - Subjects
  - Sample preparation techniques
  - Sample origins
  - Field site description
  - Data collection protocol
  - Data analysis techniques
  - Any computer programs used
  - Description of equipment and its use

Results

- Objective presentation of experiment results
  - Summary of data
- NOT a Discussion!

Discussion

- Interpret results
  - Did the study confirm/deny the hypothesis?
  - If not, did the results provide an alternative hypothesis? What interpretation can be made?
  - Do results agree with other research? Sources of error/anomalous data?
  - Implications of study for field
  - Suggestions for improvement and future research?
- Relate to previous research

Figures and Tables

- Tables
  - Presents lists of numbers/ text in columns
- Figures
  - Visual representation of results or illustration of concepts/methods (graphs, images, diagrams, etc.)
- Captions
  - Must be stand-alone

References

- Common Mistakes
  - Format, Format, Format
    - (Figures & Tables, Equations, and References)
  - Redundant Information
    - Text, Figures, Tables, and Captions
  - Type of Reference