



STQP6014: RESEARCH METHODOLOGY AND INDUSTRY SEMINAR

RESEARCH PROBLEMS, QUESTIONS AND OBJECTIVES

RESEARCH PROBLEM

- ▶ A specific issue, difficulty, gap in knowledge, or challenge that a researcher intends to address in a study.
- ▶ It sets the foundation for the entire research process.

CHARACTERISTICS OF RESEARCH PROBLEM

- Clear and unambiguous
 - Researchable using available methods and data
 - Significant in terms of contribution to the field
 - Feasible within time, resources, and scope
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- EXAMPLE:
 - *There is a lack of understanding of how misinformation spreads on social media platforms among different age groups*

SOURCES OF RESEARCH PROBLEM

Literature
review

Real-world
issues and
gaps

Theoretical
frameworks

Stakeholder
needs

Personal or
professional
experience

DEFINING RESEARCH PROBLEM

Review the
current state
of knowledge

Identify gaps
or
inconsistencies

Narrow the
scope

Justify the
significance

EXERCISE RP

Research Problem Framing Worksheet

- Topic Area:
- Observed Issue:
- Why it Matters:
- What is Missing:
- Preliminary Problem Statement:

RESEARCH QUESTION

- ▶ A clear, focused, concise, and arguable question around which you center your research. It guides the inquiry, data collection, and analysis

CHARACTERISTICS OF A GOOD RESEARCH QUESTION

- Focused and specific
- Empirically investigable
- Relevant and significant
- Feasible and ethical

TYPES OF RESEARCH QUESTION

Descriptive:

- What is happening?

Comparative:

- How do two or more groups compare?

Relational:

- What is the relationship between variables?

Causal:

- What is the effect of one variable on another?

EXAMPLES

- How do different machine learning algorithms perform in predicting customer churn?
- What are the key motivations for data professionals to adopt ethical AI practices?

EXERCISE RQ

Draft your Research Questions:

- Problem Statement:
- Draft Research Question:
- Type of Question:

RESEARCH OBJECTIVE

- ▶ Clear, specific goals that the researcher intends to achieve in order to answer the research question.

CHARACTERISTICS OF GOOD RESEARCH OBJECTIVES

- SMART: Specific, Measurable, Achievable, Relevant, Time-bound
- Aligned with the research question and problem

Example RQ and RO

Research Question:

How does algorithm transparency affect user trust in AI systems?



Objectives:

1. To assess users' perceptions of AI transparency.
2. To evaluate the relationship between transparency and trust.
3. To compare user trust across different transparency levels.

EXERCISE RO

Aligning Objectives to Questions

- Research Question:
- Objective 1:
- Objective 2:
- Objective 3:

WHICH COMES FIRST?

In practice, the usual sequence is:

1. Start with the Research Problem

- This is the **anchor**. It identifies *what's wrong, what's missing, or what needs to be explored*.
- It sets the context and gives the rationale for the study.

2. Then formulate the Research Questions

- These are the **inquiry tools**.
- Once you understand the problem, you ask: *“What do I need to know or find out to address this problem?”*

3. Then define the Research Objectives

- These are your **action plan**.
- Based on the questions, objectives clarify *what you'll do to answer those questions* (e.g., measure, analyze, compare, model, etc.).



THANK YOU