Identifying and Defining a Research Problem

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Outline

- What is a Research Problem.
- Sources of a Research Problem.
- Criteria for a Good Research Problem.
- Steps in Identifying a Research Problem.
- Defining the Research Problem

Objectives

❖ By the end of this lecture, students should be able to:

1. Define what a research problem is in the context of scientific inquiry.

2. Identify the characteristics of a good research problem.

3. Differentiate between broad topics and specific research problems.

4. Explain the steps involved in identifying a research problem.

5. Formulate a clear and researchable problem statement with examples

❑ What is a Research Problem?

- Is a **question**, **difficulty**, or **gap in knowledge** that a researcher aims to address through **systematic investigation**.

- Is a **specific issue**, **difficulty**, **contradiction**, or **knowledge gap** that a researcher seeks to address through **systematic study**.

- **Example:**
- **Vague:** "I want to study agriculture."

- **Specific:** "What is the effect of organic fertilizers on tomato yield in semi-arid regions of Iraq?"

❑ Sources of a Research Problem

- Research problems can arise from many areas, such as:

1. Practical Experiences
2. Literature Review
3. Theory
4. Social or Policy Issues

❑ Criteria for a Good Research Problem

- A good research problem should be:
- **Clear and well-defined**: Avoid vague language; state exactly what will be studied.
- **Researchable**: Must be possible to investigate with available time, resources, and methods.
- **Significant**: Should contribute to solving a real-world problem.
- **Ethically acceptable**: Should not harm participants, animals, or the environment.

❑ Example of a Poor Problem Statement:

✓ “I want to study diseases in fish.” (Too broad)

❑ Improved:

✓ “What is the prevalence of *Streptococcus agalactiae* in farmed Nile tilapia in Erbil during the summer season?”

❑ Steps in Identifying a Research Problem:

Step 1: **Broad Topic Selection**: Select a broad area of interest (e.g., public health, education, environment).

Step 2: **Narrow Down the Topic**: Focus on a specific aspect.

Step 3: Identify the Gap: Review existing studies to see what has not been covered.

Example: Past research looked at bacterial infections in shrimp, but little on fungal infections.

Step 4: State the Problem Clearly:

- Frame it as a researchable question.

- Example: “Does dietary supplementation with plant-based extracts improve the survival of Pacific white shrimp infected with *Fusarium solani*?”

❑ Defining the Research Problem:

- Once identified, the problem must be defined precisely to guide your objectives and methodology.

❑ Components of a Well-Defined Problem Statement:

1. Background Information:– Why this problem matters.
2. Gap in Knowledge:– What is unknown.
3. Purpose – What the study intends to achieve.
4. Scope:– The limits of the study.

❑ Example of Problem Statement:

"Despite the growing use of social media among young adults, little is known about its long-term impact on their mental health. This study aims to investigate the relationship between daily social media usage and levels of anxiety among university students."

Examples of Research Problems in Different Fields

- **Biology:** "What is the effect of salinity levels on the osmoregulation of red tilapia in bio floc systems?“
- **Public Health:** "What are the antimicrobial resistance patterns of E. coli isolated from street-vended food in Erbil?“
- **Education**: "Does using gamification in online learning improve student engagement in undergraduate biology courses?"

❖ Common Mistakes in Problem Identification:

- Choosing a problem that is too broad (e.g., “Water quality and fish health”).
- Selecting a problem without enough data or resources.
- Ignoring ethical concerns.
- Copying a study without adding novelty.

References

1. National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research. (1979). The Belmont Report.
2. World Medical Association. (2013). Declaration of Helsinki.
3. Council for International Organizations of Medical Sciences (CIOMS). (2016). International Ethical Guidelines for Health-related Research Involving Humans.

Thanks