

وَلِلَّهِ الْعِزَّةُ الْمَعْلُومَاتُ جَامِعَةُ الْمَعَارِفِ

Department

Computer Science

القسم:

Subject Name:

Research Methodology

أسم المادة:

Year of Study:

2024-2025

السنة الدراسية:

Stage- Term:

Fourth Stage - First Term

المرحلة - الفصل الدراسي:

Lecture

First Lecture

المحاضرة

Instructor Name:

Dr. Mohammed I . Khalaf

أسم التدريسي:

Introduction

Research?

- A careful investigation for new facts in any branch of knowledge
- **Redman and Mory**: Research is a systematic effort to gain new knowledge

Introduction

- ❑ **Clifford Woody:** Research-
- ❑ defining and redefining problems, formulating hypothesis/objectives;
- ❑ collecting, organizing and evaluating data;
- ❑ making deductions and reaching conclusions;
- ❑ testing the conclusions to determine whether they fit the formulating hypothesis/objectives

Introduction

- Desire to get a research degree along with its consequential benefits
- Desire to face the challenge in solving the unsolved problems
- Desire to get intellectual joy of doing some creative work
- Desire to be of service to society
- Desire to get respectability
- Directives of government, employment conditions etc.

Why do research?...

- Validate intuition
- Improve methods
- Demands of the Job
- For publication/patent

Choose a subject

Based on an idea

Based on your experience

Based on your reading

Originality

Choose a subject

The important features of a research design

➤ **A plan**

Specify the sources & types of information relevant to the research problem

➤ **A strategy**

Which approach will be used for gathering and analyzing the data

➤ **The time and budgets**

Most studies are done under these two constraints

CHARACTERISTICS OF RESEARCH

- **Systematic- All steps must be inter related- one to another**
- **Logical- Agreeing with the principles of logic**
- **Empirical- Conclusions should be based on evidences/observations**

CHARACTERISTICS OF RESEARCH

- **Objectivity- It must answer the research questions**
- **Replicable- reproducible**
- **Transmittable**
- **Quality control- Accurate measurements**
- **All well designed and conducted research has potential application**

Define Your objectives

- ✓ Try to keep these simple
- ✓ The more variables the more difficult
- ✓ Use the opportunity
- ✓ Get help at this stage
 - ✓ Senior colleagues
 - ✓ Experienced researchers

Literature search

- ❖ Check to see if your idea is original
- ❖ Get articles
- ❖ Read articles and their references
- ❖ Most of these will be vital when writing up reports
- ❖ Find gap areas
- ❖ Find obsolete measurements and results
- ❖ Define objectives of the study

Steps involved in a research

- **Choose a subject**
- **Literature survey**
- **Defining and formulation of specific objectives**
- **Prepare Synopsis**
- **Procuring of suitable apparatus/materials**
- **Design of experimental set up**
- **Preliminary experiments**
- **Execution of the project**
- **Accurate measurements/data collection**

Steps involved in a research

1. Data analysis and error compounding
2. Hypothesis testing and verification
3. Results and discussion
4. Generalization, interpretation and drawing conclusions
5. Preparation of the project report or writing thesis

The Process of Research

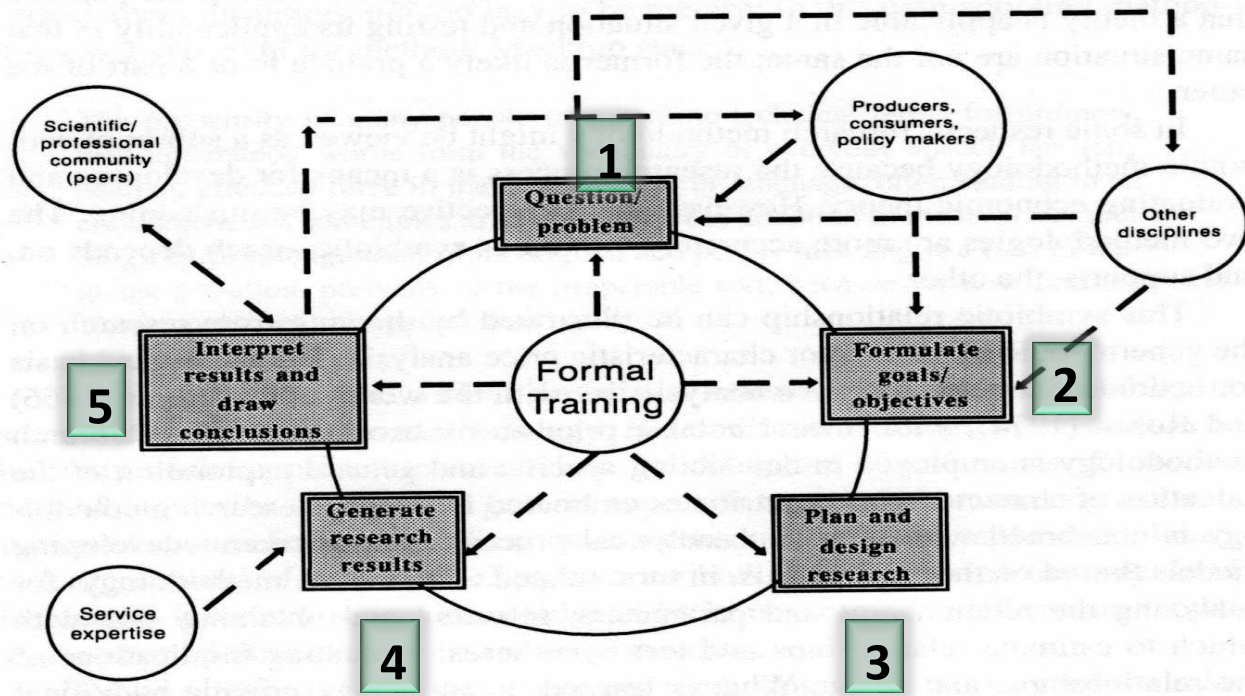


Figure 2.2. Schematic of research process.

Research article writing

1. Find suitable/specified journals
2. Get copy of Instructions to authors
3. Prepare article as per instructions
4. Select suitable titles
5. Authors and affiliations
6. Abstract
7. Highlights
8. Novelty statements

Research article writing

1. Introduction
2. Materials and methods
3. Results and discussion
4. Conclusions
5. Acknowledgements
6. References

Authorship/ethics

1. All authors should directly involved in entire study
2. Article is free from plagiarism
3. Should follow ethics

A Research Report

A Research Report generally include:

1. Introduction and Statement of problem
2. Review of relevant literature
3. Statement of hypothesis or research objectives
4. Theoretical resume
5. Description of research design
6. Description Experimental design
7. Description of measurement and data analysis
8. Error compounding
9. Presentation of Results
10. Discussion
11. Conclusion, limitations, and implications
12. Suggestions for future work
13. Acknowledgements
14. References cited
15. Appendices

Types of research

1. **Application-** Pure and Applied Research

Applied- Finding solutions for immediate problems facing a society/industry

Pure- Concerned with generalization and formulation of a theory

2. **Inquiry Mode-** Quantitative and qualitative

Quantitative- Measurements of quantity or amount

Qualitative- Concerned with qualitative phenomena (reasons for human behavior)

**“Science is not belief, but
the will to find out.”**