

Research Methodology

Flow of Research



Contents

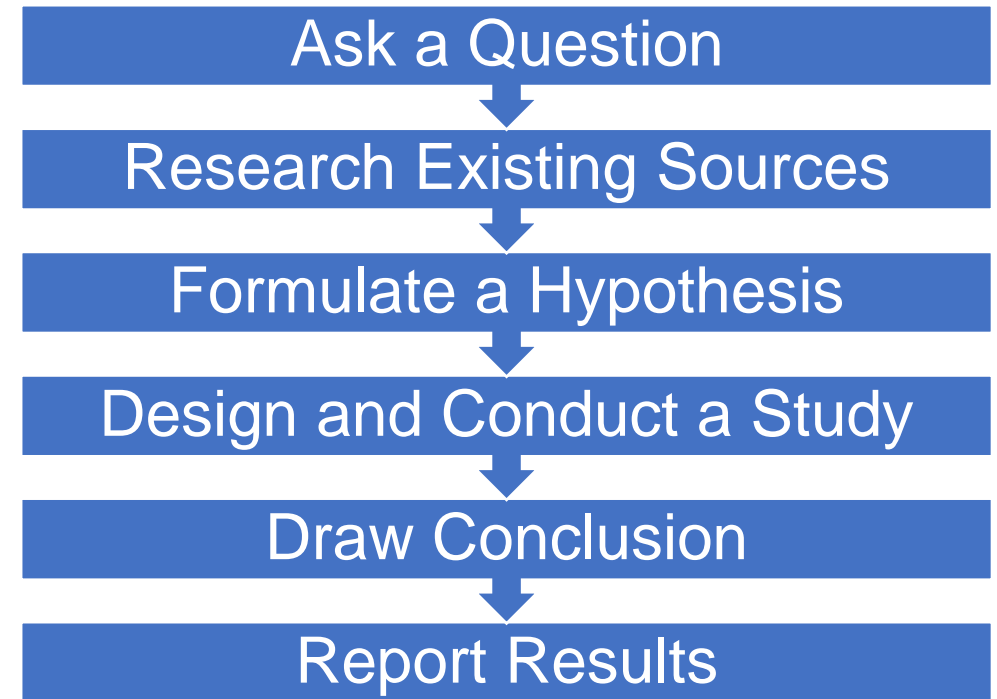
- 1) What is Research Process?
- 2) Research Topic
- 3) Literature Review
- 4) Clear Research Problem and Objective
- 5) Proposed Solution
- 6) Testing and Evaluation
- 7) Conclusion and Future work

1) What is Research Process?

Definition

- **Research process** involves
 - Identifying
 - Locating
 - Assessing
 - Analyzing the information
 - Need to support research question
 - Developing and expressing ideas
- These are the same skills (time)
 - Write a report or proposal
 - Or put together a presentation

The Scientific Method



Flow of Research



2) Research Topic

Why Research Topic is important?

- Can be **changed along the way** of doing research
 - Normally revise the research title at the end of the work
- Can be **specific** from the start
 - Researcher has very good background of the work
 - It is a continue research project
- Can be **broad** at the beginning
 - Researcher is lack of background on the topic

3) Literature Review

Tasks of Literature Review

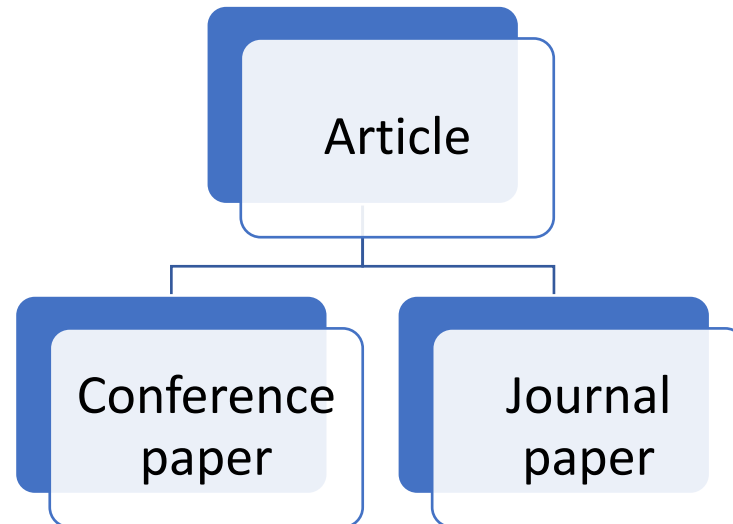
- Unavoidable work when doing research
- Some tasks in this stage:
 - Well note of the existing findings
 - Experiment and test
 - Comparing and analyzing existing solutions
 - Discussing on existing solution

While doing Literature Review

- Researchers should take **well note** about
 - **Proposed solutions**: algorithm, model, framework, architecture or tool
 - **Used data**: size, quality, format, originality, data collection method
 - The **logic** and **implementation** of solution, final product
 - **Evaluation** method
 - **Conclusion** and **perspective** of the work

Outcome of Literature Review

- Literature review can produce the **survey article**
 - **Discuss** the current state of existing solutions
 - **Compare** results of existing solutions (ex. through testing)
 - **Provide** discussion or opinions for future research direction



4) Clear Research Problem and Objective

Why clear research problem & objective?

- Can define **sub problems** to be solved
- Can define the **research design**
- **Research problem:** is a **topic** to be discussed
 - Focus on the **specific issues** (need to addressed or discussed)
- **Research objective:** explain the **research method, design, skills**
 - General objects or the main purpose of the study
 - The specific/minor objective
- **Research question:** is a **data collection instrument**
 - Should give an answer or tell the research what is all about

5) Proposed Solution

Which features are defined?

- A **new algorithm/system/framework** is defined with its detail info.
 - Ex. Difference modules of system are defined with their detail
 - functional description, inputs & outputs, interaction between the modules
- The **testing/learning data** is defined
- Normally, **evaluation method** is also defined
- Combine with the previous step, researchers know clearly
 - **What they must do**
 - **What to do first**
 - **How to do it when to do it**

6) Testing and Evaluation

Benefits of Testing and Evaluation

- Testing is done with **clear purpose** or **clear expected outcomes**
- After the test, researchers must be able to
 - **Analyze** and **evaluate** the obtained result
 - **Argument** on their selected data
- Can produce **original article** of **new discovery/solution**
 - **Explain** the new proposed solution
 - **Evaluate** the new proposed solution

7) Conclusion and Future work

Why make conclusion and future work?

- Researchers must conclude on their work by
 - Restating the **main argument**
 - Providing a personal **opinion**
 - Providing **perspective** for future research work
- Future work concerns
 - Deeper **analysis** of particular method (mechanisms)
 - New **proposals** to try different methods
 - Or **simply curiosity**