

Documentary Research & Thesis Design



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Table of contents

I - Chapter 01: Definition of the Subject	3
1. Objectives	3
2. Defining the topic	3
3. Topic title	5
4. List of keywords	6
5. Background information or literature review	7
6. Exercice : Thesis subject	8
7. Exercice : IMRaD Framework	8
Exercises solution	9

I Chapter 01: Definition of the Subject

The selection of a **subject** is contingent upon one's existing knowledge and personal interests in the topic, in addition to its relevance to the associated **course**. These are *essential factors* that should inform your decision.

1. Objectives

At the end of this chapter 01, the student will be able to:

In terms of knowledge:

- **List** the necessary tools for researching useful information and better **utilize** it in their final project.
- **Define** the different subjects of scientific documents.

In terms of understanding:

- **Demonstrate** the links between scientific research and other disciplines such as civil engineering, architecture, economics, etc.

2. Defining the topic

Definition

Defining the topic requires the **implementation** of a *systematic questioning exercise*. This involves **converting** a subject of inquiry into a *solvable issue*.

Method: Initiating information research

Prior to initiating information research, it is essential to **interrogate the topic** to confirm that you:

1. Thoroughly analyze the topic, including its *vocabulary* and *objectives*, to achieve mastery.
2. Clearly delineate the parameters of your research to establish the *topic's boundaries* and prevent *deviation from the subject matter*.
3. Ensure that all items are *remembered*.
4. Utilize brainstorming to determine the *necessary research required* to address the question.

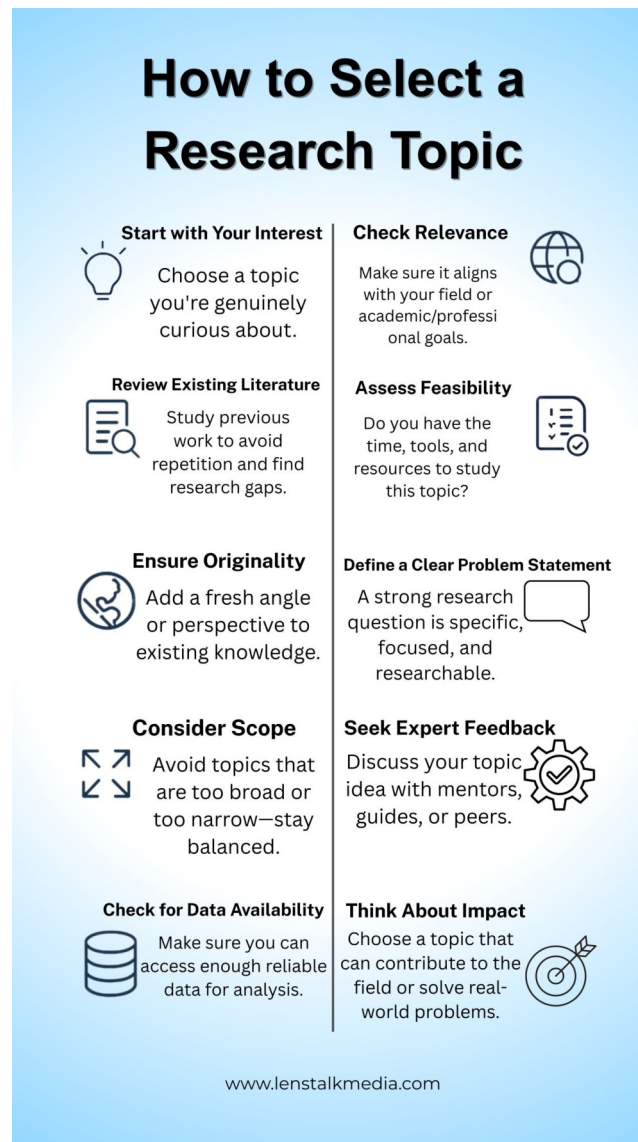


Fig. 2. How to select a research topic.

⊕ Complement: Process of defining a research topic

The document mentioned in the link at the end of this paragraph outlines the **process of defining a research topic**, emphasizing the *importance of focus and manageability in research studies*. It discusses various sources for identifying research topics, including theories, personal experiences, previous studies, and library searches, while *highlighting the significance of narrowing down broad topics*. Key characteristics of a good research topic include its researchable nature, theoretical or practical significance, and ethical considerations .

The selection of your topic is based on your *assignment* and *personal interests* appropriate to your course; describe it as a research question and select the keywords or phrases to use in your database article search.

See: *Define your topic*

🔗 Example: The 5W1H method

The **5W1H** method is an empirical framework that employs a series of fundamental questions to define, clarify, and investigate a topic more thoroughly. This work seeks to address the questions of **WHAT**, **WHO**, **WHEN**, **WHY**, **WHERE**, and **HOW**.

3. Topic title

Definition

The **topic** should be clearly articulated in a **brief statement** called the *title of the topic*. This entails a comprehensive analysis of the topic, articulating it succinctly, identifying key concepts, and sourcing appropriate synonyms.

Method: Utilizing significant terminology

The **title** can be effectively formulated as a question utilizing significant terminology. The research statement must *be highly precise*.

The title of an **academic paper** serves as more than a mere label; it represents the *initial and frequently sole opportunity* to engage a reader, *convey significance*, and *facilitate the discoverability* of the work in relevant searches. In the current research environment, characterized by the daily publication of thousands of papers, the title **serves as a crucial element** that can determine whether a work is *read, cited, or ignored*.

After reviewing and publishing numerous scholarly works, I have concluded that effective titles integrate clarity, precision, and appeal. The appropriate style is contingent upon the audience, discipline, and research objectives. Presented here are nine title styles, accompanied by examples and guidelines for their effective application.



Fig. 3. The art (and science) of academic paper titles: 09 styles to make your research stand out.

Example: Concepts and keywords

This step enables the *definition of the problem*, identification of necessary research needs, and selection of *concepts* and *keywords* for source searching .

4. List of keywords

Definition

Spoken language is not universally applicable for research tools. Consequently, it is essential to convert the research topic into concepts or **keywords**.

Method: Formulate the search queries

Each term in the statement is essential and will *relate to concepts* that will be utilized to *formulate the search queries*.

Upon selecting the **terms**, it is recommended to identify one or more *synonyms* or *related, opposite, or consorted* terms for each concept, along with their **English translations** that is *widely used in scientific research*, and you can find *multiple resources* that you will use in the citation.

Example: Lexical approach

A **lexical approach** should be employed to identify relevant *concepts* and **keywords**. Avoid filler words: articles, pronouns, and coordinating conjunctions. Examples include: the, a, an, some, of, it, etc.

Complement: keywords example

Another example of keywords can be found in the scientific article authored by Mostefa Hani and Burak Evirgen, published in the Computers and Geotechnics Journal, titled "Uncoupled thermo-hydro-mechanical modeling of a pykrete diaphragm wall for an alternative artificial ground freezing application".

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Research Paper

Uncoupled thermo-hydro-mechanical modeling of a pykrete diaphragm wall for an alternative artificial ground freezing application

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ARTICLE INFO

Keywords:

- Artificial ground freezing (AGF)
- Metro station
- Deep excavation
- Diaphragm wall
- Plaxis
- Thermal modeling

ABSTRACT

El Harrach Center metro station is an actual project constructed with conventional diaphragm walls in Algiers. This article primarily consists of a parametric study that makes use of the station's geometry for comparative analysis. In this way, three gaps are investigated using an alternative artificial ground freezing (AGF) application. The impact of thermal conductivity, specific heat capacity, and thermal expansion on the diaphragm wall's stability were examined; an innovative pykrete wall was investigated; and a new procedure was developed after modeling 216 cases of diaphragm walls with uncoupled thermo-hydro-mechanical modeling via the Plaxis program. In terms of total displacement, ground settlement, horizontal displacement, and excavation uplift, the diaphragm walls were different with and without thermal modeling by 96.20, 100.50, 4.20, and 2.50 mm, respectively. The effectiveness and stability of the innovative pykrete wall have been demonstrated to accurately represent on-site behaviour due to its perfect comportment against internal forces compared to other types of walls. The new procedure was developed regarding the optimum case that facilitates understanding the factors affecting the AGF method (distance between pipes, pipe diameter, freezing temperature, and freezing duration) according to its importance, cost, and the novel potential of thermal modeling for deep excavation projects.

Fig. 4. Keywords example in a scientific article.

5. Background information or literature review

Definition

For a clear understanding of the topic, refer to reference works that summarize the current state of knowledge in the field.

Method: Use of recent documentation

The **recent documentation** that the student may use at this stage will mainly include *scientific articles, Master II theses, Ph.D. dissertations, textbooks, standards, reports, conference abstracts and posters, and review articles*.

[cf. Writing a literature review research paper: A step-by-step approach]

Example: Recherche engines, translation tools, and appropriate AI tools

The students can use tools to help them **improve their research process**, like:

- *Recherche engines*, such as Google Scholar, offer a comprehensive overview of the topic, presenting a general understanding of the issue.
- *Translation tools* offer the linguistic definitions and meanings of terms.
- *Appropriate AI tools* help the student to paraphrase, summarize, and grammar check.

Complement: The importance of literature review in research methodology

The literature review is a **critical foundational step** in any research endeavor that must not be overlooked by researchers. This essential component *shapes the framework of the study* and *provides the necessary depth and context* to ensure the validity and credibility of the research. A literature review constitutes a **critical analysis** of published works within a specific field of study, facilitating the identification of existing *theories, gaps, and emerging discussions* that may significantly influence research outcomes.



Fig. 5. The importance of literature review in research methodology.

Note:Core structural components

Core structural components in academic papers typically adhere to a standardized format, commonly referred to as **IMRaD**.

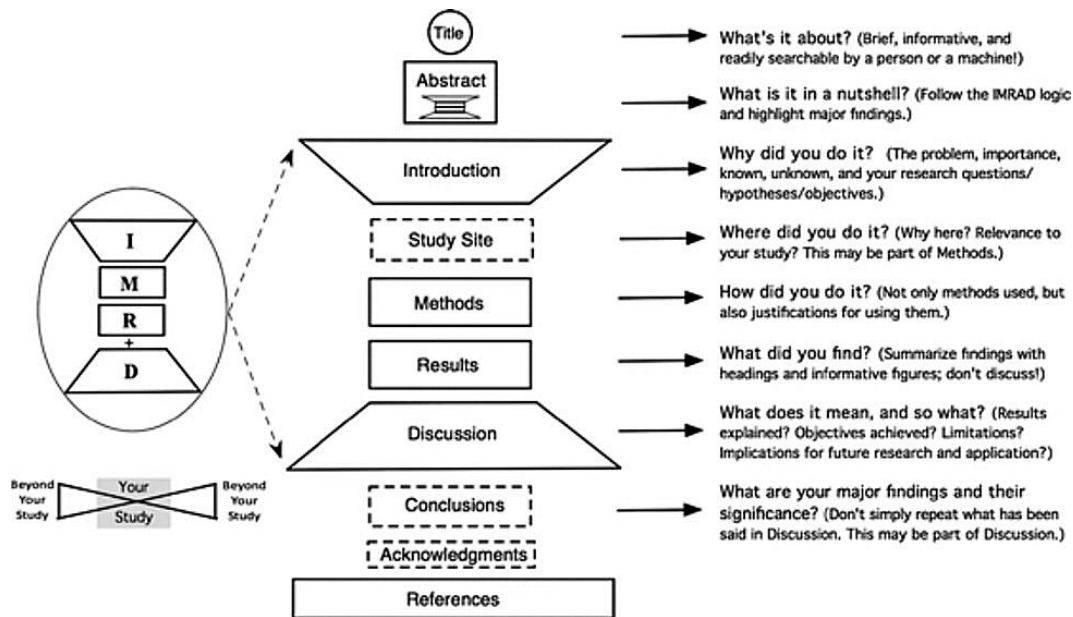


Fig. 6. IMRaD Framework

6. Exercise : Thesis subject

[solution n°1 p.9]

A theme subject is considered realizable if: (Select the incorrect response)

- ☐ The subject can be completed within the specified deadlines.
- ☐ The existing literature on this subject is extensive.
- ☐ The subject matter pertains to an area of relevance within the discipline.

7. Exercise : IMRaD Framework

[solution n°2 p.9]

IMRaD is an acronym for , , , and ; It is a way of a scientific article or thesis.

Exercises solution

> **Solution n° 1**

Exercise p. 8

A theme subject is considered realizable if: (Select the incorrect response)

- ☐ The subject can be completed within the specified deadlines.
- ☒ The existing literature on this subject is extensive.
- ☐ The subject matter pertains to an area of relevance within the discipline.

> **Solution n° 2**

Exercise p. 8

IMRaD is an acronym for **Introduction, Methods, Results, and Discussion**; It is a way of **writing** a scientific article or thesis.

IMRaD constitutes the conventional framework for scientific research papers and reports.