

## Chapter 3: Research Process

### 1-Introduction

There are various methods for defining an effective documentary research strategy, all of which are based on some key principles that we will explore in succession.

#### 2. Purpose of bibliography:

- The primary purpose of a bibliography is to help users find books and materials of interest.
- The secondary purpose is to assist in selecting books and verifying bibliographic information. Readers often use bibliographies to find resources on specific subjects in various formats.

### 3-Steps in Bibliographic Research

There are various methods for defining an effective bibliographic research strategy that revolve around four successive steps:

#### 3 -1- Investigation Phase:

It involves gathering the necessary documentation for processing the topic, including accessing databases, consulting manuscripts, conducting surveys, and more.

#### 3-2- Analysis Phase.

This phase involves creating a detailed plan for the intended research.

#### 3-3- Documentation Phase.

It involves sorting and organizing the data and useful elements obtained during the investigation phase. The objective is to consult ordered cards (bibliographic, citation, and thematic) in preparation for writing.

#### 4-4- Writing Phase.

It involves putting in writing the ideas and data organized on the cards following a progressive plan of presentation. The objective is to write paragraphs and sections following a logical structure.

## **5- Criteria for evaluating the quality and relevance of sources.**

In the face of the abundance of documentation, what needs to be mastered is the sorting of information and the delineation of useful resources. To do this, the research student must immediately combine several types of selection criteria:

- Searching by domain-specific keyword (Biology, Chemistry, Physics, Electronics, etc.);
- Searching by keyword in the title or author's name;
- Searching by keyword related to the topic, ensuring a specific research focus;
- Searching within the document's title: for a book, this would be the title listed on the title page;
- Searching in the abstract: it is typically found in most bibliographic records from databases, at the beginning or end of journal articles, and often on the back of books (back cover).
- Searching in the table of contents: it allows for a better understanding of the content (structure and logic of the argument) and helps identify relevant chapters.
- Searching within tables, graphs, etc.: they can aid in understanding the subject and be useful for your work.
- Introduction and conclusion: Consulting these sections helps in understanding the initial question and the author's conclusions.

## **6- Different types of documentation:**

- General or specialized dictionaries (paper);
- General or specialized encyclopedias (paper or electronic);
- Books, also referred to as publications or monographs (manuals, studies, published theses...)
- Journals, also known as periodicals, are a major tool for the publication of scientific research. Journals are available in both paper and electronic formats (paid or free).

## **7- Research process**

### **7-1- Phase of designing and constructing the study object**

To successfully carry out research, one must carefully plan, reflect, precisely identify a problem, formulate a central question (strengthened by others), imagine appropriate answers (hypotheses), and consider their validity. The steps of the object construction phase are as follows:

### **7-1-1- Select a research problem**

Drawing on readings (consulting books and works) and preliminary field observations, the researcher formulates a research problem. In other words, they develop and articulate, through a sequence of arguments, the translation of a major concern, the expression of "what is problematic" and "what constitutes a problem" and is worthy of study and elucidation. This involves stating the research questions, objectives, research hypotheses, and potentially the thesis position.

### **7-1-2- Counting the relevant books and works**

In this section, the researcher demonstrates a good understanding of other authors and works that have, in one way or another, addressed the field and research subject that are relevant to their own study.

### **7-1-3- Develop a framework of reference**

In principle, the framework of reference defines the particular theoretical perspective through which the research problem will be approached and addressed, placing the study in a context of significance.

## **7-2- Methodological or Discovery and Data Collection Phase.**

During this phase, the researcher explains and justifies the methods and instruments they will use to understand and collect data in response to the questions posed and hypotheses formulated. The researcher also specifies the characteristics of the population (human or non-human group) they will work with and from which they will extract information.

Finally, they describe the data collection process and outline the data analysis plan.

### **7-2-1- Selection of Data Collection Methods and Instruments**

At this stage, the researcher presents or outlines the methods they will employ and then describes the instruments or techniques that will be used. Various instruments are used to measure the study variables. These instruments can provide qualitative information (interviews, observations, etc.) or quantitative information (questionnaires, measurement scales, etc.).

### **7-2-2- Definition of the Study Population and Sample**

The researcher characterizes the population by establishing the selection criteria for the study, specifying the sample, and determining its size.

The accessible population is the portion of the target population that is within the researcher's reach. It can be limited to a region, a city, a company, an agency, a department, etc.

### **7-3/ Data Processing Phase**

A substantial amount of collected data (for example, two boxes of a thousand filled questionnaires, ten tapes, or gigabytes of recorded interviews) does not, on its own, constitute research. All this data needs to be processed. This means conducting an analytical process to isolate meaningful units (themes, patterns, variables...) abstracted from their context to perform a term-by-term comparison. Subsequently, the researcher synthesizes this information. This phase consists of two steps:

#### **7-3-1/ Data Analysis and Presentation**

Data analysis depends on the type of study and its purpose, whether it involves exploring or describing phenomena, or understanding and verifying relationships between variables.

Statistics are used for quantitative analysis.

Qualitative analysis involves gathering and summarizing non-numerical data in a narrative format.

Data analysis helps produce results that are interpreted and discussed by the researcher.

#### **7-3-2/ Interpretation and Discussion of Results**

Since the data is analyzed and presented using narrative texts, tables, graphs, figures, and other means, the researcher explains them in the context of the study and in the light of previous research.

Starting from the results, the researcher discusses their authenticity, revisits the hypotheses, appropriately references theories and authors who have addressed the studied issue. .

### **7-Command Languages**

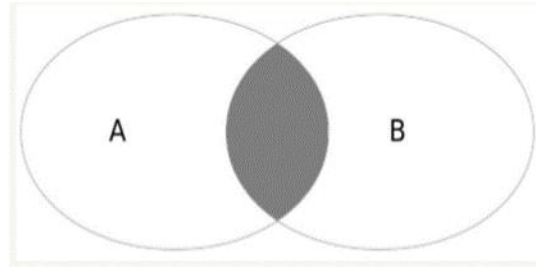
A command language consists of a set of commands to be entered into a document system (catalog, bibliography, table of contents, search engine, etc.) to ask questions, view, and select references.

#### **7-1- Boolean Operators**

Based on Boolean algebra, they allow for the combination of multiple search elements to refine or broaden a query.

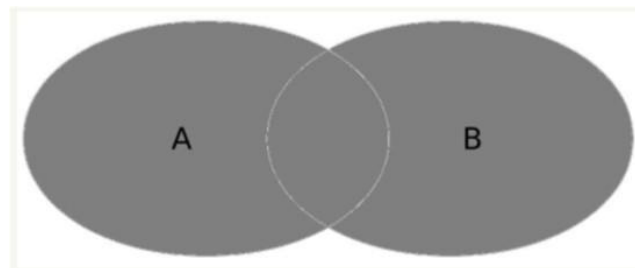
There are three operators: AND, OR, and NOT."

**AND:** The AND operator represents an intersection. With the AND operator, the displayed references contain both term A and term B. If either term is absent, the reference is rejected. Displayed references must belong to both sets



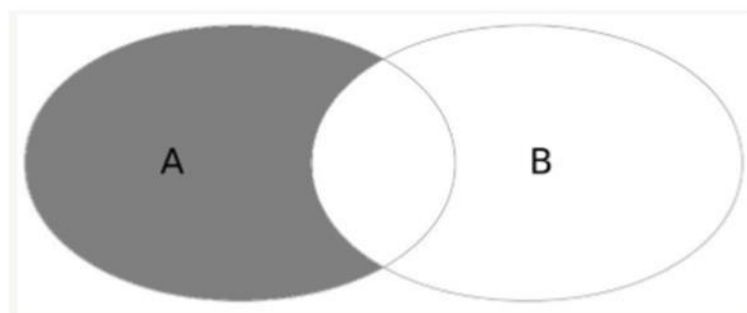
The AND operator has the effect of reducing the number of responses to a question. It is used to refine a question. For example, to search for a document on tomato diseases, one would use the query: 'disease AND tomato'

**OR:** The OR operator represents a conjunction. With the OR operator, the displayed references contain at least one of the terms in the equation. The displayed references belong to one or more sets.



The OR operator has the effect of increasing the number of responses; it combines the results from different sets. It is used to include synonyms in a search query. For example, to search for documents on wheat, one would use the query: 'wheat OR triticales OR blé'

**NOT:** The NOT operator represents exclusion. With the NOT operator, the displayed references contain term A but not term B. All references in set A that also contain term B are eliminated.



## **7- Organization of bibliography**

At this stage, it is important to first organize the bibliography, which sometimes gives to collect a significant number of documents. These documents could be stored in files and organized in folders with meaningful names. Thus, it would be useful to group the references according to their type, for example: *practical references*, *review articles*, *books*, *technical manuals*, etc. in a more practical way, the references can be grouped according to their relevance use for a given part of the work, example: Introduction, bibliographical review, Material and methods, chapter I ..., discussion, experimental protocols, etc. It is also of interest to compile these references in a file (Excel) in which can be notes the parameters of the document (title, source, date, name of the downloaded file, interest, etc.).