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## Chapter Three

### Writing the Research and Documenting Data

#### Final Format of the Research

After the researcher has collected data, recorded it, and conducted the necessary tests to reach conclusions, they then thoroughly review the drafts of the research or thesis to reorganize and finalize it. This is called the "final write-up" or the preparation of the report. Generally, the paragraphs and phrases are revised multiple times to ensure precise meaning, clarity, and accuracy of the documented information.

There are three key aspects to consider in the final writing:

1. **Scientific and Subject Matter:** In terms of using specialized scientific terms within the field of study, incorporating scientific concepts and theories, and effectively utilizing them.
2. **Linguistic:** Regarding the accuracy of language style, grammar, and syntax.
3. **Formal and Technical:** This refers to the physical presentation of the research, including order, numbering, punctuation, font type, paper quality, and references to figures and images.

#### Sections of the Research

The content of the research is presented in a logical, sequential manner, allowing smooth transitions from one topic to another. It is divided and structured into various sections:

1. **Preliminary Information**
2. **Body and Text**
3. **Conclusions and Recommendations**
4. **References**
5. **Appendices**

#### First: Preliminary Information

This includes secondary and supplementary information that appears at the beginning of the thesis or research paper, including:

1. **Title Page:** This contains the main title of the thesis or research paper centered on the page, with the name of the university, college, or institution at the top. The researcher's full name and the year of thesis completion are also included.
2. **Supervisors and Examiners Page:** In theses and graduation research, a page following the title page is usually reserved for listing the names of the supervisors and examiners.
3. **Dedication or Acknowledgment Page:** The researcher often dedicates their research to a beloved or close individual. Additionally, on a separate page, they

express gratitude and appreciation to everyone who significantly contributed to completing the thesis.

4. **Table of Contents:** The table of contents includes the names of chapters, sections, and main and subheadings, along with the page numbers where these topics can be found.
5. **List of Figures, Drawings, and Tables:** This contains a list of figures, drawings, and tables included in the research, along with their corresponding page numbers.
6. **Abstract:** This is a brief report where the researcher outlines the research problem, its scope, key procedures, and the main results and conclusions reached.

## **Second: Body and Text**

This is the largest and most important part of the research, representing the researcher's efforts in gathering information from various sources, conducting tests, and performing experiments (the practical aspect). It includes sections covering:

### **1. Introduction**

The research introduction addresses several vital aspects, including:

- **Motivation:** What drove the researcher to choose this research topic? This could also be stated as the research's goal or objectives.
- **Overview of the Research Problem:** It covers the general steps of the research problem and the areas included in the research, such as the sections of the study and its subject matter based on the identified problem.
- **General Overview of the Research Plan:** This includes the research methodology, sources, and information the researcher relied upon in their study.
- **Summary of Conclusions and Recommendations:** The researcher may provide an overview of the conclusions and recommendations reached, without necessarily going into detail but rather giving a sense of their nature, relevance, and associated entities.
- **Challenges and Obstacles:** An outline of the challenges the researcher encountered during different stages of the research.
- **Acknowledgments:** The researcher may express gratitude to individuals or institutions that went beyond their normal responsibilities in facilitating the research process and providing necessary resources.
- **Definition of Key Terms and Abbreviations:** If needed, essential terms and abbreviations are defined. The researcher may expand the introduction to include specific components common in scientific research, such as:
  1. **Research Objectives:** The main aims of the research.
  2. **Significance of the Research:** The importance of the study and the entities concerned with it.
  3. **Research Methodology and Data Collection Tools.**
  4. **Research Hypotheses.**
  5. **Scope of the Research.**
  6. **Other Methodological Aspects of the Research.**

### **2. Main Sections**

The researcher may choose to divide the research into two or three primary parts, often called "sections" or "parts." These are the broadest categories in research and studies, where each main section may consist of multiple chapters—usually more than one chapter. Since the term "sections" is often used for large-scale, extensive research, studies shorter than 100 pages generally rely on other divisions, such as chapters and topics, which will be discussed below.

### 3. Chapters and Topics

Dividing the research into a suitable number of chapters is recommended for organizing the research report or its final format. Each chapter should cover a particular aspect of the topic, presenting information logically through successive chapters. Chapters are structured to complement each other, ensuring coherence of ideas and information. Research papers are divided into chapters and topics, regardless of type—be it documentary, field-based, theoretical, or applied. Each chapter generally includes multiple topics (two or more), which distribute the content of a given chapter.

### Third: Conclusions and Recommendations

These are sometimes referred to as "results and suggestions." Every scientific research project, whether it's a thesis, an academic paper, or an applied study, should contain a set of conclusions drawn from the researcher's analysis of collected data. Typically, conclusions are organized into logically sequenced points, and good research findings must have specific characteristics, regardless of research style, methodology, or data collection tools:

1. **Clear Identification of Findings:** The conclusions should clearly highlight the insights obtained through the methodology and tools used, avoiding generalizations.
2. **Positive and Negative Aspects:** Conclusions may highlight both positive aspects worth mentioning and negative aspects requiring attention.
3. **Objectivity:** The researcher should avoid biases in stating conclusions and rely on factual positives and negatives.

As for recommendations (or proposals), these are the points and aspects the researcher finds essential to mention based on their conclusions. The researcher should consider several factors when presenting recommendations:

- **Non-Directive Language:** Recommendations should not sound mandatory but rather suggestive, such as, "The researcher recommends reviewing..." or "The researcher suggests...".
- **Supporting Each Recommendation with a Conclusion:** Each recommendation should be based on one or more conclusions stated in the conclusions section. Not every conclusion requires a recommendation; some may call for multiple recommendations, while others may not need any recommendations.
- **Feasibility and Realism:** Recommendations should be reasonable and practical, aligning with the capabilities of the institution related to the research or feasible resources available in the future.

- **Avoiding Generalizations:** Recommendations should be specific and clear, with details and rationale for any proposed measures, supported by facts and figures.
- **Alignment with Research Title, Problem, and Objectives:** Recommendations, as well as conclusions, should be directly relevant to the research title, problem, and objectives. The researcher should avoid discussing unrelated matters unless recommending that other researchers explore topics or issues that emerged during the study but were not directly related.
- **Organized by Themes and Secondary Topics:** It is beneficial to organize recommendations and conclusions into specific themes and secondary topics with clear headings, especially if there are many. This way, each theme or title encompasses a group of conclusions and recommendations.

## Fourth: References

When writing, a researcher often refers to information and results from various studies, either to clarify certain aspects needed for their research or to compare its findings with others. Sometimes, researchers may need to quote lines or paragraphs from other studies either directly (direct quotation) or by paraphrasing sections from another researcher's work in a new style (indirect quotation). In both cases, the researcher should avoid distorting the original meaning and should cite the source and the author's name, as acknowledging sources adds credibility to the research and reflects academic integrity.

Citing previous research and its results is typically done in several ways, varying based on the research discipline and the style of the journal in which the researcher intends to publish. Most published research uses one of two citation systems: the *Name and Year System* or the *Numbering System*.

### 1. Name and Year System (Harvard Style)

This system is commonly used in research related to agricultural sciences, life sciences, earth sciences, astronomy, and genetic engineering. Sources are cited by stating the author's name (or names) and the year of publication. Each source is listed alphabetically in the references list rather than in a numbered sequence. Here are some examples of how citations appear in this system:

1. The publication year is placed in parentheses directly after the author's last name when the source reference forms part of the sentence.
  - Example: Fayadh (1990) found that increased radiation doses in mature beans reduce trypsin inhibitor activity.
2. If the source reference follows the sentence, and is not part of it, both the author's name and year are placed in parentheses.
  - Example: Increasing radiation doses in mature beans reduces trypsin inhibitor activity (Fayadh, 1990).
3. For a source with two authors, cite both names:
  - Example: Fayadh and Baldawi (1990) concluded that increased radiation doses...
  - Or: Increasing radiation doses in mature beans reduces trypsin inhibitor activity (Fayadh & Baldawi, 1990).

4. When citing a source with three or more authors, the citation should include the first author's last name, followed by "et al." and the year of publication.
  - Example: Fayadh et al. (1990) found that increasing radiation doses...

### Reference List in the Name and Year System:

For research that uses this system, the references are arranged alphabetically by the last name of the first author, not by their order of appearance in the text. Each entry should include specific details, typically in this order:

- *Journal articles*: Authors' names, title of the article, journal name, volume number, issue number, and page range.
- *Books*: Authors' names, title of the book, publisher's name, city of publication, publication year, and page numbers or total pages.

The following examples demonstrate common styles used in fields that adopt the Name and Year System.

## 2. Numbering System (Vancouver Style)

This system is commonly used in fields like chemistry, physics, mathematics, laser technology, computing, electrical and electronic engineering, control and communication engineering, and in medical sciences, such as medicine, nursing, and public health. Here, sources are cited in the text using sequential numbers instead of the publication year, and the reference list is numbered according to the order in which sources appear.

Examples of in-text citation in the Numbering System:

1. When the reference is part of the sentence, only the source number is placed in brackets, e.g., [2].
  - Example: Saleh [2] found that the relationship between electron temperature and plasma electron density is nonlinear.
2. If the citation is not part of the sentence, the source number is simply placed in brackets after the sentence.
  - Example: The relationship between electron temperature and plasma electron density is nonlinear [2].
3. For a source with two authors, cite both names followed by the source number.
4. For three or more authors, the last name of the first author is cited, followed by "et al." and the source number.

### Reference List in the Numbering System:

In this system, the references are arranged in a sequential order based on their first mention in the text, rather than alphabetically. This style is often preferred for its simplicity, as it eliminates the need for titles, making the list more concise. While details may vary by discipline and journal, references typically follow this format:

- *Journal articles*: Authors' names, full article title, journal name, volume number, page range, and year.

- *Books*: Authors' names, book title, publisher, city, pages or total pages, and year.

Important rules for compiling a references list include:

1. References should be numbered sequentially, matching the order in the text.
2. Ensure accurate bibliographic details for each source.
3. Author names should appear without titles (e.g., "Dr.," "Engineer").
4. Cite the actual source used by the researcher.
5. For theses or dissertations, include the degree level, granting institution, and year, along with other details.
6. For a book with multiple editions, the edition number follows the title (excluding the first edition).
7. All authors should be listed for each source, without using "et al." in the references list.
8. Consistent formatting throughout the references list is essential.

## **Electronic Sources**

Recently, various types of electronic information sources have emerged, especially on the internet. These sources provide vast amounts of information across all fields and can be reliable resources when printed versions are unavailable. Common search engines like Google, Yahoo, and others enable users to find sites with the information they need. Reliable sources often include databases from reputable institutions, organizations, or publishing houses. Conversely, less credible sources, like personal sites or general news platforms, may lack the scientific rigor needed for academic research.

### **Citing Online Information Sources:**

Currently, there is no universal method for citing online sources. However, based on the source type, the citation may include some or all of the following details:

1. Author's name
2. Date of publication or last update
3. Full title of the document (research, book, report, article, or summary)
4. Name of the online journal, news site, university, organization, or company
5. Date of information retrieval
6. Website URL

The order of these details may vary based on the chosen citation style, either Name and Year or Numbering System.

## **Fifth: Appendices**

Some research papers require an additional section at the end, called the appendices, to include specific documents or details not necessary for the main body of the paper. Appendices may contain:

1. Essential correspondence showing documentary evidence of the researcher's efforts.
2. Survey forms used in field studies.
3. Relevant laws, regulations, and instructions cited in the research.
4. Forms or documents from the related institution.
5. Other supporting documents that enhance the study's validity.

It is advisable to reference the appendices in the text, e.g., "See Appendix 2."