Chapter 1: Writing a scientific report

Course 3. Writing a dissertation and thesis (Memoire, These)

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Course Objectives

Objectives

- Define what a Master's dissertation is.
- Understand the purpose and importance of a dissertation.
- Identify key characteristics of a well-structured dissertation.

Key Points

- A dissertation is an advanced research project that develops analytical and scientific skills.
- It allows students to specialize in a research area and enhances their job prospects.
- It follows specific norms of presentation and structure.

Introduction

Scientific work follows a specific research method to develop its ideas and **give structure to the content of the dissertation**, it also needs to meet some methods and **norms** of presentation that show the **form of the dissertation.**

The **purpose** of this course is to prepare the student to **write a dissertation** that **conforms** to the **presentation norms** of a **Master's dissertation**

Course description

1. Definition
2. Dissertation types
3. Master's dissertation structure (IMRAD)
4. Theoretical framework
5. Characteristics of test presentation in the dissertation
    - Pagination and page formatting
    - Advice on text typography

Definitions

1.1. Definition of a master's dissertation

A Master's dissertation is a report or scientific presentation. Or **is a formal academic document** that **presents the results** of an independent **research project** conducted by **a student** as part of their **Master's degree**.

Un mémoire de master est un rapport ou une présentation scientifique. Il s'agit d'un document académique formel qui présente les résultats d'un projet de recherche indépendant mené par un étudiant dans le cadre de son diplôme de master.

It demonstrates the student's **ability to formulate** a research **question**, review relevant literature, apply appropriate research methods, **analyze data,** and present **findings** in a structured and coherent manner.

Il démontre la capacité de l'étudiant à formuler une question de recherche, à examiner la littérature pertinente, à appliquer des méthodes de recherche appropriées, à analyser des données et à présenter les résultats de manière structurée et cohérente.

New chat

The dissertation is prepared according to specific academic and formatting directives, contributing to the advancement of knowledge in a particular field of study.

Le mémoire suit des directives académiques et de formatage spécifiques, contribuant à l'avancement des connaissances dans un domaine d'études particulier

1.2. Dissertation objectives

The **aim of the Master's dissertation is to**:

- Understand the key components of a dissertation.
- Improve academic writing and citation skills
- **Assist and help** the **student** in **practicing research** and mastering some of the methods and techniques of research, knowing that the dissertation is the student's first research exercise.
- Offer the student the opportunity to focus on a more specific domain of research that will become their domain of expertise.
- -Obtain a job (directly or indirectly by obtaining a master's or doctorate).

2. Types of master's degrees

Master’s dissertations generally fall into two main categories: **Research Dissertation (Academic)** and **Professional Dissertation**. Each type has distinct objectives, methodologies, and expectations.

Research Dissertation (Academic)

A **research dissertation** is a scholarly document that explores a specific research problem through **theoretical analysis, data collection, and interpretation**. It is **problem-driven**, meaning the student must define a clear research question or hypothesis and investigate it systematically.

Un mémoire de recherche est un document scientifique qui explore un problème de recherche spécifique par le biais d'une analyse théorique, d'une collecte de données et d'une interprétation. Il est axé sur un problème, ce qui signifie que l'étudiant doit définir une question ou une hypothèse de recherche claire et l'étudier de manière systématique.

Research Dissertation (Academic)

Characteristics

1. **Synthesis of Literature**: A detailed literature review to establish the research context.
2. **Problematic Approach:** Clearly defined research questions, hypotheses, and objectives.
3. **Methodological Rigor:** Application of qualitative, quantitative, or mixed research methods.
4. **Original Contribution:** The study should add new insights or findings to the academic field.
5. **Structured Presentation:** Follows the IMRAD format (Introduction, Methods, Results, and Discussion).

Research Dissertation (Academic)

Example

A student in **Microbiology** conducting a research dissertation might investigate:

"The Effects of Ultrasound-Assisted Activation on Thermostable α-Amylase Activity."

- **Problematic:** How does ultrasonic irradiation affect enzyme stability and efficiency?
- **Methodology:** Experimental analysis using Response Surface Methodology (RSM).
- **Results:** Data interpretation based on enzyme kinetics and structural modifications.
- **Conclusion:** Findings contribute to enzymology and industrial biotechnology applications.

Research Dissertation (Academic)

Example : Trial Formulation of a Moisturizing Cream Based on Olive Oil Enriched with a Medicinal Plant", here are the extracted elements in bullet points:

- **Problematic** :
  - How to formulate an effective moisturizing cream based on Olive oil enriched with a medicinal plant?
  - What are the moisturizing and beneficial effects of this formulation on the skin?
- **Methodology** :
  - Selection and extraction of Olive oil.
  - Choice and incorporation of a medicinal plant with moisturizing or therapeutic properties.
  - Formulation of the moisturizing cream in the laboratory. And Stability, efficacy, and skin tolerance tests.
  - Analysis of the physicochemical and organoleptic properties of the cream.
- **Results** :
  - Development of a moisturizing cream And Evaluation of moisturizing performance and potential therapeutic effects. Comparison of results with conventional moisturizing creams.
- **Conclusion** :
  - The formulation based on Olive oil and medicinal plant shows promising moisturizing properties.
  - Potential use in natural cosmetic care.
  - Prospects for optimization and commercialization of the cream.

Research Dissertation (Academic)

Essai de Formulation d'une crème hydratante à base d'huile d'oléastre enrichie par une plante médicinale", voici les éléments extraits sous forme de tirets :

Problématique :

- Comment formuler une crème hydratante efficace à base d'huile d'oléastre enrichie par une plante médicinale ?
- Quels sont les effets hydratants et bénéfiques de cette formulation sur la peau ?

Méthodologie :

- Sélection et extraction de l'huile d'oléastre.
- Choix et incorporation d'une plante médicinale aux propriétés hydratantes ou thérapeutiques.
- Formulation de la crème hydratante en laboratoire.
- Tests de stabilité, d'efficacité et de tolérance cutanée.
- Analyse des propriétés physico-chimiques et organoleptiques de la crème.

Résultats :

- Obtention d'une crème hydratante à base d'huile d'oléastre enrichie.
- Évaluation des performances hydratantes et des éventuels effets thérapeutiques.
- Comparaison des résultats avec des crèmes hydratantes conventionnelles.

Conclusion :

- La formulation à base d'huile d'oléastre et de plante médicinale présente des propriétés hydratantes prometteuses.
- Potentiel d'utilisation dans les soins cosmétiques naturels.
- Perspectives d'optimisation et de commercialisation de la crème.

Professional Dissertation

A professional dissertation is designed for students who engage in practical, real-world projects, often within a company, hospital, laboratory, or government institution. It is solution-oriented, meaning it focuses on applying knowledge to a professional context rather than generating purely theoretical insights.

Le mémoire professionnel est destiné aux étudiants qui s'engagent dans des projets pratiques et concrets, souvent au sein d'une entreprise, d'un hôpital, d'un laboratoire ou d'une institution gouvernementale. Il est orienté vers la recherche de solutions, ce qui signifie qu'il se concentre sur l'application des connaissances à un contexte professionnel plutôt que sur la production d'idées purement théoriques

Professional Dissertation

Characteristics

1. **Practical Implementation:** The student works on a real-world problem within an organization (Mise en œuvre pratique : L'étudiant travaille sur un problème réel au sein d'une organisation).
2. **Internship-Based:** Conducted in collaboration with a professional establishment (Basé sur un stage : Réalisé en collaboration avec un établissement professionnel.
3. **Project Management:** The dissertation often involves evaluating and improving professional practices (Gestion de projet : Le mémoire implique souvent l'évaluation et l'amélioration des pratiques professionnelles.
4. **Limited Theoretical Component:** Emphasizes applied research rather than extensive literature synthesis (Composante théorique limitée : L'accent est mis sur la recherche appliquée plutôt que sur une synthèse exhaustive de la littérature.
5. **Deliverables:** May include reports, technical documents, recommendations, or intervention strategies (Produits livrables : Il peut s'agir de rapports, de documents techniques, de recommandations ou de stratégies d'intervention.

Professional Dissertation

Example:

A student in **Biotechnology** completing a professional dissertation might work on:

"Optimization of Fermentation Conditions for Industrial Enzyme Production in a Biotechnology Firm."

Internship Site: A bioengineering company specializing in enzyme manufacturing.

Project Scope: Developing cost-effective fermentation protocols for enzyme production.

Methodology: Conducting pilot-scale fermentation trials and optimizing conditions.

Outcome: Proposing industrial recommendations to improve production efficiency.

Structure of a Master's Dissertation

A **Master's dissertation** follows a structured format to ensure clarity, coherence, and academic rigor. Below is a **detailed breakdown** of the essential components of both **research and professional dissertations**.

Structure of a Master's Dissertation

Writing your dissertation takes time and a number of revisions/drafts, so start writing up parts of it as soon as is practical

- **Cover page** (Organization, Title, Author, Jury, Date)
- **Acknowledgements**
- **Dedication**
- **Table of Contents**
- **Abbreviations**
- **List of tables**
- **List of figures**
- **Main body**
- Bibliography
- Appendices
- Abstract

- Introduction
- Literature review
- Methodology
- Findings
- Analysis/Discussion
- Conclusions
- Recommendations

Structure of a Master's Dissertation

1. Cover Page

- University name and logo.
- Title of the dissertation.
- Student's full name.
- Name of the supervisor(s).
- The members of the jury (President of the Jury (or Chairperson), Examiners
- Degree program and faculty.
- date of defense.

2. Acknowledgments : Expressing gratitude to supervisors, colleagues, institutions, and family.

Structure of a Master's Dissertation

3. List of Figures and Tables; Enumerates all figures, graphs, and tables with their titles and page locations.

4. List of Abbreviations.

5.Table of Contents; Includes all headings and subheadings with corresponding page numbers.

Main Body Structure

The main body differs slightly between **research dissertations** and **professional dissertations**, but both follow a logical structure.

Structure of a Master's Dissertation

A. Structure of a Research Dissertation

1.Introduction

1. Background and significance of the topic (Contexte et signification).
2. Problem statement and research question.
3. Hypothesis (if applicable).
4. Objectives of the study.
5. Overview of the dissertation structure.(Aperçu)

2.Literature Review

1. Summary and critical analysis of relevant studies.
2. Theoretical framework (cadre) and key concepts.
3. Identification of research gaps.

3.Methodology

1. Research design (experimental, qualitative, quantitative, mixed methods).
2. Data collection techniques (survey, experiments, interviews, case studies).
3. Data analysis methods (statistical tools, software used).
4. Ethical considerations (if applicable).

Structure of a Master's Dissertation

A. Structure of a Research Dissertation

4.Results

- Presentation of findings using tables, graphs, and figures.
- Statistical analysis (if applicable).
- Comparison with existing research.

5.Discussion

- Interpretation of findings in relation to the research question.
- Implications for theory, practice, or industry.
- Limitations of the study.
- Suggestions for future research.

6. Conclusion and Recommendations

- Summary of key findings.
- Final remarks on the significance of the research.
- Practical applications and recommendations.

Structure of a Master's Dissertation

B. Structure of a Professional Dissertation

1.Introduction

Context of the professional project.
Definition of the problem.
Objectives of the project.
Overview of the dissertation structure.

2.Literature Review (Optional or Brief)

Background information relevant to the project.
Analysis of previous studies, professional guidelines, or industry standards.

3.Project Description and Methodology

Presentation of the host organization (company, hospital, institution).
Problem analysis and objectives of the project.
Methods and tools used (case studies, fieldwork, technical analysis).
Constraints and limitations of the project.

Structure of a Master's Dissertation

B. Structure of a Professional Dissertation

4.Findings and Analysis

- .Presentation of results.
- Discussion of key insights gained from the internship/project.
- Practical challenges and solutions.

5.Recommendations and Implementation

- Practical recommendations for the company/organization.
- Feasibility and impact analysis.
- Suggestions for improvement.

6. Conclusion

- Reflection on the overall experience.
- Lessons learned from the professional setting.
- Future perspectives.

Structure of a Master's Dissertation

Final Sections

6. References (Bibliography)

•Follows a standardized citation style (**Harvard, Vancouver**).

•Lists all sources cited in the dissertation.

7. Appendices (If applicable)

•Raw data, additional figures, interview transcripts, or questionnaires.

•Any supplementary information relevant to the study.

Structure of a Master's Dissertation

8. Abstract; A concise **summary (150-300 words)** covering:

- Research problem or project goal.
- Objectives and methodology.
- Key findings and conclusions.
- Keywords (3-5 words).

4. Theoretical context (literary review)

4.1. Definition

At the beginning the student is ignorant of the immense number of research works that have been done on the subject.

So the first aim of the literary review is to try and reduce this ignorance.

- The literature review (also called theoretical background) is a critical synthesis of existing research related to the topic of the thesis. It provides a context for understanding key concepts, theories and methodologies, ensuring that the study is based on existing knowledge.
- It consists of a critical and comparative analysis of different sources. The process requires reading the most recent research and compiling an extensive list of bibliographical references.

4. Theoretical context (literary review)

4.2 Objectives of a synthesis

The principal objectives of the literature review are:

- To produce an original synthesis of what has been done already;
- To interpret known ideas, practices and approaches in new ways;
- Introduce new data on old subjects or problems;
- Adapt the theories of a specific context to another context;
- Apply a transdisciplinary approach using a variety of methods.

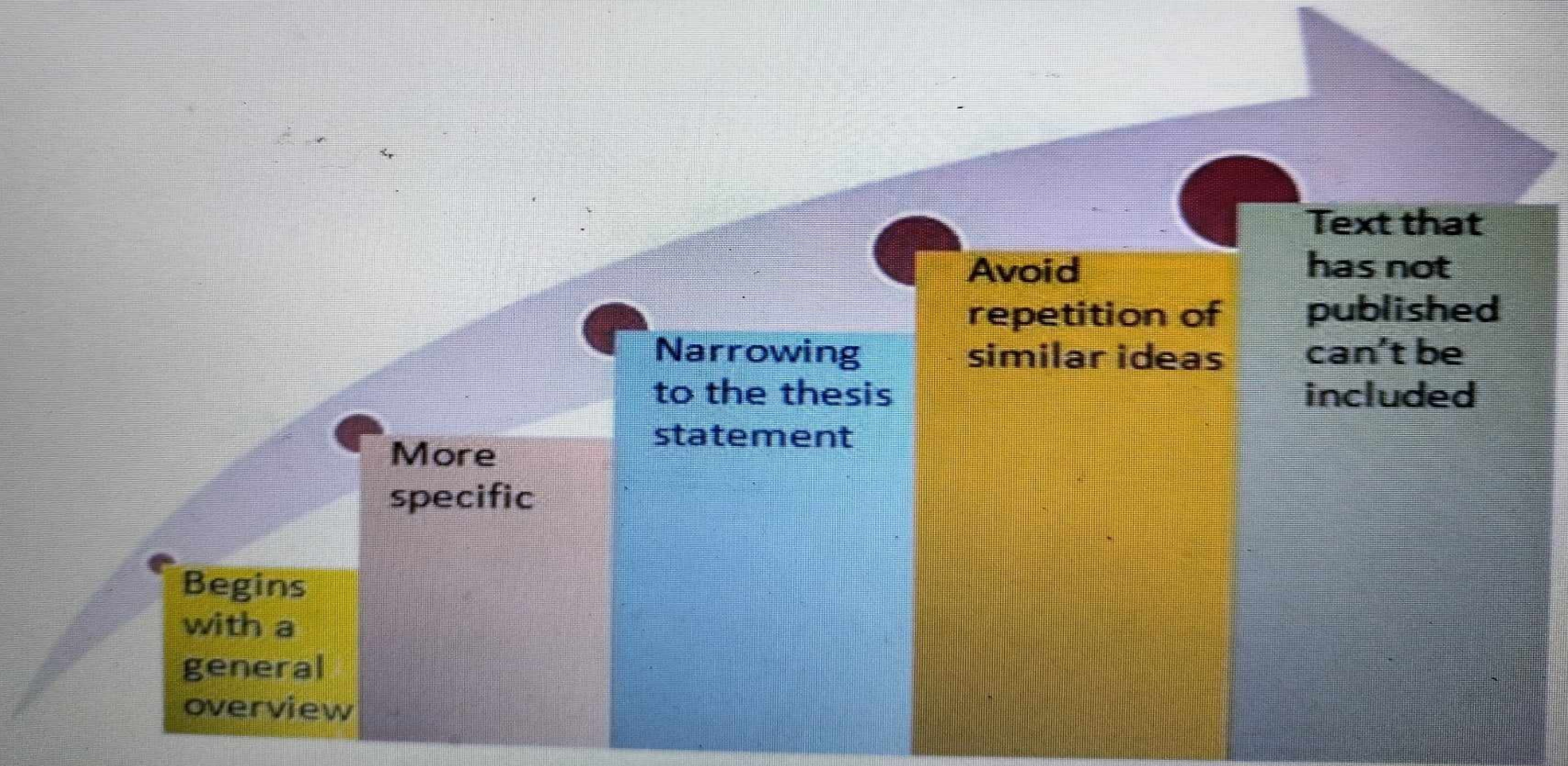
INDIVIDUAL WRITING TASKS*

- **Abstract** (200-300 stand-alone summary of all the above)
- **Introduction** (context, focus, aims, objectives of the dissertation)
- **Literature review** (summarises existing knowledge around the topic)
- **Methodology** (how you found things out)
- **Findings** (what you found out)
- **Analysis/Discussion** (understanding findings, discussing what they mean)
- **Recommendations** (any further actions suggested by those findings)
- **Conclusions** (key things those findings indicate, clarify or confirm)

Introduction:

First paragraph	• What is known
Second paragraph	• What is unknown?
Third paragraph	• Why the study was done

Tips for writing introduction:



Key Points To Write Review of Literature:

Review of Literature are not summaries but arguments.

- It must contain necessary information and all major work on the topic.
- Reviews should involve synthesis
- Only put material which help in research.
- Copy and Paste of abstracts from paper is not acceptable.
- Read the abstract, understand it and then rewrite it briefly in your own words.
- Cite the reference of paper along with each abstract.
- It is good to initially start with reading review articles .

Materials & Methods:

Objective:

- To explain what work was done and how it was done.
- To explain why I chose the methods.

Word range:

- Detail of experimental work in about 500-1000 words

Tense:

- simple past tense

Elements:

- Details of instrumentation
- Sample collection
- Reagents used
- Experimental techniques.
- Appropriate controls
- Experimental conditions

Tips for writing Materials & Methods:

- Start writing while you are performing your experiments.
- At the end match the order of methods & results of your experiments.
- Methods section and result section should be clearly rel
- Always includes citations for procedures that have been described previously.

Results:

It describes

- Findings of your research
- Observations of your experiments
- Your own data with evidences

Objective:

- The objective is to present a simple, clear and complete account of the results of your research.

Word range:

- Contain about 500-1000 words

Tense:

- Past tense

Tips for writing results:

It does not include

- Discussion
- Interpretation
- References

It is easiest section to write (*if you recorded* the results carefully).

Representation of data:

- Pictorial form
- Tabular form
- Graphical form

Discussions:

Discussion is the most original write-up because it contains writer's own point of view.

Objective:

- To interpret and describe the significance of your findings.
- To connect to the introduction by way of research questions or hypothesis.
- To explain how your study has moved reader's understanding of research problem.

Word range:

1000-1500 words.

Tense:

Present tense.

Conclusions:

The opinion you have after considering all the information about something.

Objective:

- To summarize your principal findings
- To emphasize on what should now be accepted established knowledge.

Tense:

- Past Tense

Features:

- It should relate back to the introduction.
- Must contain summary of evidences supporting each conclusion.
- Give significance of your results & any practical

Types of References:

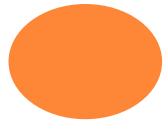
There are two types of references:

- **In text citation:**
  - As source of information
  - This demonstrates support for your ideas, arguments and view.

- **References/ Bibliography:**
  - Complete details of everything you cited
  - Appears in an alphabetical list
  - At the end of your thesis

Wrinting each chapter

1. Don’t start with the introduction or conclusion
2. Start where you feel happiest
3. Typically a middle chapter
4. Finally conclusions and end with the introduction



5. Characteristics of dissertation test presentation

The form of the manuscript plays a major role in the quality of the work, and although there are various types of presentation, the most commonly used are:

Margins and paper format:

- A4 format (21cmx29.7cm).
- Page margins: 2.5 cm on each side (left, right, top and bottom).

Pagination: from the first page of the introduction to the last page of the conclusion.

- Pages are numbered at the bottom.
- Unnumbered interleaves (Intercalaires)