TCE Communication and Expression Techniques

Level: 2nd Year (Licence)

Biological Sciences
Food Sciences
Agricultural Sciences
Ecology and Environmental Sciences

Scientific Report Writing & Bibliographic Research Methods

Part 1: Writing Scientific Reports

Scientific report writing is an essential skill in biology, chemistry, and environmental sciences. It teaches students how to present experimental results clearly, logically, and scientifically.

A scientific report aims to:

- ✓ Communicate the results of an experiment.
- ✓ Allow others to repeat the experiment (reproducibility).
- ✓ Develop scientific reasoning and critical analysis.
- ✓ Organize data and observations in a structured way.

The structure of a scientific report

The report is generally organized according to the following structure:

- ✓ Title page
- ✓ Introduction
- ✓ Bibliographical overview (general background)
- ✓ Materials and Methods
- ✓ Results and Discussion
- ✓ Conclusion
- ✓ References (bibliographic list)

For certain types of reports such as internship reports, dissertations, or final-year projects additional sections may be included:

- ✓ Abstract and keywords
- ✓ Dedication
- ✓ Acknowledgements
- ✓ List of tables and/or figures
- ✓ Table of contents
- ✓ Appendices

1. Cover (Title) page

The cover page is a formal component of any research document. It works like an "identifier card" for your

project, because it shows all the main information about the work you did. Below is the list of everything

that should appear on the cover page:

Country name

Ministry of Education

University information: name of the university, faculty, and department

Title of the subject: written in the center of the page, in bold, inside a box, and in a bigger font

• Student's full name

Supervisor's full name and academic rank

Academic year

For internship reports, dissertations, or theses, the cover page also includes:

• Order and serial numbers: given after the defense for organization and archiving

• A sentence describing the type of work: (internship report, dissertation, or thesis), the degree

(Licence, Master, Doctorate), and the study field

o Example: Master's thesis in Biological Sciences

• **Jury information:** full name, academic rank, and university of each jury member

• Defense date

2. Abstract

The abstract usually comes right after the cover page or sometimes at the end of the report. Its purpose is to

give the reader a clear and quick understanding of the main points of the work, helping them decide whether

to read the full report. A good abstract briefly explains: the aim of the study, the problem being addressed,

the method used, the main results, and the conclusions. It is often accompanied by keywords (up to ten) to

highlight the topic. For dissertations or theses, the abstract may be provided in several languages (e.g.,

Arabic, French, English in Algeria) to reach a wider audience (no citations in the abstract).

3. Introduction

The introduction should explain the main topic of the report and catch the reader's attention. It gives basic

background information and the scientific context. The introduction should include:

General context

Example: the importance of photosynthesis.

Problem / Research question

Does light affect plant growth?

2

Hypothesis

If light increases, then plant growth increases.

Objective of the experiment

This study aims to determine the effect of different light intensities on the growth of bean plant.

4. Materials and methods

In this section, the author should provide all the information needed to understand how the experiment or research was carried out. It must clearly explain what was done, where, and with what materials (e.g., study location, organisms tested, equipment, treatments, etc.). The goal is to give enough detail so that another researcher or student can repeat the same work. The description of the experimental procedure should include:

- ✓ The accuracy and type of instruments used
- ✓ The conditions in which the experiment or research took place
- ✓ The species or samples studied
- ✓ The experimental plan (duration, treatments, number of measurements, repetitions, etc.)
- ✓ The tools used to collect and analyze the data
- ✓ A photo of the experimental setup.

Writing style

- ✓ Use passive voice. For example, "Plants were measured every 24 hours."
- ✓ Use past tense.

5. Results and discussion

The Results and Discussion section is the core of the report. It usually requires the most time, effort, and critical thinking before reaching the final conclusion. This part is generally divided into two components analysis and interpretation which demand scientific honesty to ensure that the findings are accurate and trustworthy.

• Analysis:

This step involves organizing and presenting the results. Data should be displayed in suitable forms such as tables, graphs, or charts, and accompanied by brief explanations or comments.

• Interpretation:

This part focuses on understanding and explaining the meaning of the results. It evaluates how valid and reliable the findings are. The clarity and depth of the discussion reflect the author's scientific knowledge and reasoning skills. Although there is no strict structure for writing this section, several guidelines and examples can help students develop it effectively.

Example interpretation

Plants grown under higher light intensity showed faster growth due to increased photosynthetic activity.

6. Conclusion

The conclusion is the final part of the report. It restates the main findings and summarizes what the author has learned from the study. It should also evaluate whether the initial objectives were achieved. If the work is not complete, the author may suggest ideas or directions for future research.

Common phrases to start a conclusion: 'we showed that...', 'we found that...', 'we can conclude that...

Example:

Light intensity has a significant impact on bean plant growth. Plants exposed to full light grew 35% faster than those in shade.

<u>Note:</u> The introduction and conclusion are key sections of any report. They should give the reader a clear understanding of what the main text contains. For this reason, it is important to write them carefully and thoughtfully

7. References

Any scientific idea or information taken from a source must be cited (Article, book, thesis...).

Part 2: Bibliographic Research Methods

Bibliographic research refers to searching, selecting, analyzing, and organizing scientific information for school projects, reports, or scientific writing.

Objectives of bibliographic research

- ✓ Collect reliable scientific information
- ✓ Understand what is already known
- ✓ Support hypotheses with scientific data
- ✓ Avoid plagiarism
- ✓ Learn how to cite references

Steps in bibliographic research

Step 1: Define the topic

Clearly identify the subject you want to study.

Be specific to avoid too broad a search

Example:

• Food digestion in humans?

Step 2: Formulate research questions

- Ask yourself what you want to know about the topic.
- These questions guide your search.

Example:

- How does digestion work in humans?
- Which enzymes are involved in breaking down food?

Step 3: Identify keywords and synonyms

- List keywords related to your topic.
- Include synonyms or alternative terms to expand your search.

Example (food digestion):

• Digestion, digestive system, gastrointestinal system, enzymes, nutrient absorption

Step 4: Search for sources

Reliable sources include:

- Google Scholar (http://scholar.google.com/)
- Google Books (http://books.google.com/)
- Scopus Elsevier (https://www.elsevier.com/fr-fr/solutions/scopus)
- Web of Science (https://access.clarivate.com/login)
- These.fr (www.theses.fr)

Step 5: Conduct the search

Combine keywords using Boolean operators:

- **AND** \rightarrow narrows search (digestion AND enzymes)
- $\mathbf{OR} \rightarrow \text{expands search} (digestion OR gastrointestinal system)$
- **NOT** → excludes (*digestion NOT animals*)
- Check titles and abstracts for relevance.

Step 6: Evaluate sources

Choose sources that are:

✓ Recent (last 10 years preferred)

- ✓ Peer-reviewed
- ✓ Written by experts
- ✓ From reputable publishers (Elsevier, Springer, Wiley)

Step 7: Take notes

- ✓ Summarize key points
- ✓ Record definitions
- ✓ Extract useful diagrams
- ✓ Highlight important data

Step 8: Organize information

Group notes into:

- Introduction
- Methods
- Results
- Theory
- Applications
- Limitations

Step 9: Cite and reference

This avoids plagiarism and gives credit to authors.

How to cite bibliographic references?



Last name of author (1), First initial (1), Last name of author (2), First initial (2). Title of the book. Publisher, Place of publication, Year, Total number of pages.

Example:

Smith, J., Brown, L. Microbiology Principles. Springer, New York, 2019, 450 p

♣ Periodical article / scientifique paper

First initial of author (1), Last name. First initial of author (2), Last name. (Year). Title of the article. Journal name, volume, issue, page range.

Example:

Croce, R., Carmo-Silva, E., Cho, Y. B., Ermakova, M., Harbinson, J., Lawson, T., & Zhu, X. G. (2024). Perspectives on improving photosynthesis to increase crop yield. The plant cell, 36(10), 3944-3973.

4 Thesis, dissertation or internship report

Last name, First name. Title of the thesis/dissertation/report. Type of document -field. Place of defense: University, year, number of pages.

Example:

Bounaama, Khalil. Potentiel inhibiteur du fromage J'ben. PhD thesis - Animal Production and Biotechnology. Mostaganem: University ABDELHAMID IBN BADIS, 2024, 180 p.

Website

Author(s). "Title of the web page." Website name, publisher or organization, publication date. URL.

Example:

Mary Ellen Sanders. "World Gastroenterology Organisation", 2025. https://isappscience.org/new-global-guidelines-for-probiotics-and-prebiotics-for-gut-health-and-disease/

What is plagiarism?

Plagiarism is the act of reproducing the whole or part of a text (content or form) of another production in your own production without quoting the original source. It is similar to borrowing money from a friend and never returning it. Plagiarism happens when:

- ✓ Copying text without citation
- ✓ Using ideas without acknowledging the source
- ✓ Incorrect paraphrasing

To avoid it:

- ✓ Cite every idea that is not yours
- ✓ Paraphrase in your own words

By Dr. N. Aliouche