

VOUS SAVEZ, LES SCIENTIFIQUES
SONT DES GENS COMME
TOUT LE MONDE!

"ARRÊTONS
D'AVOIR
PEUR!"

HA HA HA!



Chapter II : Critical reading of a scientific article; Course 2

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I. Read an article

To facilitate your understanding, always keep in mind the following analysis method:

1. **Identify the structure of the text** from the reading of the **summary**.
2. **Identify the hypothesis**
3. **Define the purpose of the study**: This involves understanding why the text was written and what the author hopes to achieve by writing it.
4. **Determine the methodology used**: This involves identifying the methods and techniques that the author used to gather and analyze their data.
5. **Identify the main results**: This involves summarizing the key findings of the study.
6. **Draw the main conclusions**: This involves interpreting the results of the study and drawing conclusions about their significance.
7. **Identify the research gaps**: This involves identifying areas of the study that require further research.

1. Identify the structure of the text from the reading of the summary

A scientific article generally contains an **abstract that summarizes the main information of the article** (context, hypothesis, methodology, conclusions). Once the abstract is read, **or if no abstract is available**, quickly skim through the article to assess its relevance and quality, while familiarizing yourself with the overall ideas presented and the authors' thought process, through the titles of the different paragraphs.

2. Identify the hypothesis

Hypotheses constitute the underlying reason for the research and the way in which intuitions and theories will be tested. They help to define the purpose of the article.

Two types of hypotheses generally present themselves, which are often found in any type of article:

A. General or theoretical hypothesis

B. Operational hypothesis

The main difference between a theoretical hypothesis and an operational hypothesis lies in their level of abstraction and specificity. The theoretical hypothesis is more abstract and general, providing a broad conceptual framework, while the operational hypothesis is concrete and specific, detailing how variables will be measured and tested in the study.

3. Define the purpose of the study

Knowing both hypotheses, you are able to define the purpose of the research, or the goal that the author of the article seeks to achieve.

Defining the aim of the study, We find :

"In this paper, we present **Or** the aim **Or** the goal

In review article: **to review the**

4. Determine the methodology used

The methodology must be strict: everything must be explained concretely and nothing should be omitted.

The authors used the "....." method.

5. Identify the main results

Results: This section should present the results obtained from various experiments, research, and tests without analyzing them. These results respond only to the operational hypothesis.

In this section, the results are presented in the form of figures and tables, which must contain all the information necessary for their understanding.

Discussion: In the discussion section, you interpret your results. You indicate if the obtained results are consistent with existing theory and compare the obtained values with those mentioned in the literature. You analyze your results and explain any deviations from the theory. You interpret the value of the results and state if they are significant or not. It is essential to include all references in the text.

6. Draw the main conclusions

In the conclusion, you summarize the main results, provide a general assessment of the experiment conducted, and mention any improvements.

"In conclusion,

7. Identify the research gaps

The openings will remind you of the gaps in the study while also placing the results within a large context of research and future interest.

"We claim to do further analyses other areas.

II. Example "research article (research report)"

1. How to Read an Article

1. A **research article** is not read like a literary work.
2. It can be read **without following the order** of the sections.
Reading all the sections is not always necessary.
3. However, it is **advisable to read and understand the abstract** thoroughly before proceeding with the rest of the article.
4. Ultimately, the **reading strategy** for a scientific publication depends on the **reader's needs and goals**.

II. Example "research article (research report)"

1. How to Read an Article

After skimming the title and the abstract:

- To familiarize oneself with a **research field**, it is beneficial to **read** the **Introduction** and **Discussion** sections.
- To **delve deeper** (approfondir) into **the results** if they are interesting, we **examine** the **Discussion** and then the **Results** sections.
- To develop an **experimental work** (experiment, survey, sampling, etc.), it is the **Materials and Methods** section that **would be interesting to examine** carefully

II. Example "research article (research report)"

2. Possible orders of reading

1. Abstract - Discussion and Conclusion - Introduction - Results -
Materials and Methods.
2. Abstract - Introduction - Discussion and Conclusion - Results -
Materials and Methods.
3. Abstract - Materials and Methods.
4. Materials and Methods, Results, Discussion and Conclusion,
Introduction.

II. Example "research article (research report)"

3. Using an Article

- 1) **Abstract:** This is to quickly get an idea if the topic is relevant or not.
- 2) **Introduction:** This is a source of potential references on the subject.
- 3) **Results:** Rich in graphics, this section allows one to form an idea about the results and to interpret the figures without reference to the text.
- 4) **Discussion:** This section cites other similar studies or those with different results.
- 5) **Note that:** citations are used to support the authors' observations and ideas.
- 6) **Bibliography:** This section is a niche of references related to the topic.

II. Example "review article "

Abstract

The great benefit sustainability of ecotechnology requires an effective policy supported by social perception, an incorporate with the environment impact assessments, cost-benefit analysis and intellectual property. Ecotechnology of phyto remediation is cost effective and ecologically friendly, which utilize the natural abilities to restore environment. It is the use of green plant based systems to remediate contaminated soils, sediments, water or air. Some epiphyte plants, especially those from Spanish moss, *Tillandsia usneoides* (Bromeliaceae), known as air plants, has been widely used in biomonitoring studies of air pollution in South America countries. The aim of this paper was to review the biological living of *T. usneoides* and applications for applying our current research in summer monsoon rain and rainy season in Southern Thailand .

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Keywords: *Tillandsia usneoides*, crassulacean acid metabolism (CAM), epiphyte, biomonitor, ecotechnology

The ILPIA (ILPIE) plan: as follows: Introduction,

Literature,

Problem,

Implication,

and Future.

It is best suited to review articles

Table 1. Summary of biomonitor researches of *T. usneoides*

| Studied areas | Methods | Description | References |
|-----------------------------|--|---|------------|
| USA | Determination of mercury in <i>T. usneoides</i> by cold vapor atomic fluorescence spectrophotometry and plant tissue by mass spectrometer | Spanish moss use as a biomonitor of atmospheric mercury potentially | [13] |
| Germany | Cell turgor measurement of <i>T. usneoides</i> using the probe and chlorophyll fluorescence image | The absorption of water vapor increasing by atmospheric humidity and no significant with plant tissue | [14] |
| Southeastern USA- Argentina | (1) Evaluate the potential of <i>T. usneoides</i> for monitoring stable ¹³³ Cs from solutions as an analog of radioactive Cs using atomic absorption spectrometry (AAS) | Plant was able to survive relatively high Cs stress and accumulate Cs quickly | [15] |

Article Review

II. Example "review article "

**The ILPIA (ILPIF) plan: as follows: Introduction,
Literature,
Problem,
Implication,
and Future.**

It is best suited to review articles

III. Evaluation of a scientific article

Some evaluation criteria for a scientific article:

- Sets out the research problem at the beginning of the article
- Shows how the problem is addressed and developed by the theory
- Establishes links with other existing work in the literature in a relevant and informative manner, without seeking to be exhaustive (de manière pertinente et informative, sans chercher à être épuisé)
- Explains the experimental hypotheses, if any (this depends on the methodology chosen)
- Concludes within the limits of the results
- Demonstrates how the study helped to resolve the problematic question
- Outlines and discusses the theoretical and practical implications that can be drawn from the study

III. Evaluation of a scientific article

III.1. Critical reading

By reading a scientific article in a structured way, we can better determine whether it is relevant and useful for our work.

To read a scientific article properly, follow these steps:

- Read the introduction to the scientific article
 - ❖ Identify the problem addressed
 - ❖ Identify the research questions
 - ❖ Consider the authors' approach
- Read the method section
- Read the results section
- Determine whether the results answer the specific questions
- Read the conclusion and discussion
- Read the abstract
- Save the scientific article and note the source reference

III. Evaluation of a scientific article

III.1. Critical reading

| No. | Questions asked | | Yes | No | Comments |
|-----|--------------------------------------|---|-----|----|----------|
| 1 | Is this article | An original work? A new subject? | | | |
| 2 | Is the title | Suitable for the content? | | | |
| 3 | Is the abstract | informative? Does it contain the main results? | | | |
| 4 | Is the introduction | Sufficient? Informative? | | | |
| 5 | Is the materials and methods section | clear? Appropriate? Ethical? | | | |
| 6 | Are the results | efficient? Satisfactory in terms of statistical analysis? Well presented? | | | |
| 7 | Are the tables | satisfactory? Clear? Necessary? Adequate in number? | | | |
| 8 | Are the figures | satisfactory? Clear / of good quality? Necessary? Adequate in number? | | | |
| 9 | Discussion | Does it include other studies? | | | |

III. Evaluation of a scientific article

III.1. Critical reading

| N° | Questions asked | |
|----|---|--|
| 10 | What is the type of this article? (An original ? A Review?) | |
| 11 | List the names of the authors, reviewers, and the editor." | |
| 12 | What is the affiliation of author (x)?" | |
| 13 | Identify the name of the main author (Lead author) of the article. | |
| 14 | Identify the volume and name of the journal of the article: | |
| 15 | Identify the Year of publication of the article | |
| 16 | Identify the Year of submission of the article | |
| 17 | Identify the DOI of the article | |
| 18 | Identify the number of pages of the article | |
| 19 | Identify the Corresponding author of the article | |

III. Evaluation of a scientific article

III.2. Internal critical analysis

- How are the arguments presented?
- How are the results stated (énoncés)?
- What is the nature of the conclusions?
- Does the method comply with the research protocol?
- Why do we say that we have identified this or that method?
(Pourquoi dit-on que l'on a identifié telle ou telle méthode ?)

VI. Evaluation of a scientific article

III.2. Internal critical analysis

By reading the article, can the reader find out:

- How was this research conducted and in what context?
- What contracts were signed with the participants and/or institutions?
- What subjects and/or situations were encountered (and how many)?
- Was the sample selected?
- How were they selected? If not, why and how were the subjects selected?
- What data was collected?
- What measures were taken to make the research valid and faithful (or credible)?
- If categorisations were used, how were they defined?
- Before or after data collection, why?
- What are the ethical and political implications?

VI. Evaluation of a scientific article

III.3 External critical analysis

5.3. External critical analysis

Saying and arguing :

- What relevance does this methodological approach have among others? (Quelle est la pertinence de cette approche méthodologique parmi d'autres ?)Would other methods have been possible?