Chapter 3 : Scientific article

1.Definition

A scientific article is a written publication by a researcher, expert, doctoral student or scientist, most often within a scientific journal. Before being published, scientific articles are evaluated by a scientific committee. Once published, they can serve as a bibliographic reference for other research and thus advance science.

2. Scientific Articles Structure

> **Title page**

The title page is located at the beginning of the article and provides key information about it. it includes the title, the author's name, the institutional affiliation, and sometimes additional information.

*Title

The title is the pert that readers always read first. The title should be very attractive, containing as few words as possible, and it is best not to give away the research question of the article. This could result in less interest in reading the article. It's important to keep in mind that this is an opportunity to arouse the reader's curiosity and interest to encourage them to read the article.

*Authors

It is essential to make special mention of the authorship of the manuscript. The order of the co-authors typically reflects the relative significance of their contributions. The first author is the one who makes the most significant contributions to the research work, such as acquiring and analyzing the results, or to writing the manuscript.

Follow the instructions of each journal to state who is the corresponding author and provide details of funding of the study, conflicts of interest, and presentation of the content at a congress in the field.

*Abstract and keywords

Most regular articles begin with an informative abstract which is limited by most journals to 150 to 250 words or even less. An abstract provides maximum information with minimum words, covering (1) the Objective ; (2) Materials and Methods; (3) Results; and (4) Conclusions. many journals ask the author to put a list of three to five key words or short phrases for indexing. The key words are typed right after the abstract. Several journals further specify that words already in the title should not be included.

The majority of scientific journals follow the acronym IMRaD (Introduction, Methods, Results and Discussion), which should correlate with the questions that the article should answer : Why was this research done? (Introduction); How the research was carried out (Methods); What was noted (Results), and how significant is the data put forth (Discussion)?.

*Introduction**

The introduction of a scientific article serves to announce the problem of the study and to provide basic information about the research. To do this, the author must have a good knowledge of the literature on the subject, beyond the literature that more directly supports his study. An exhaustive bibliographic search must therefore be carried out in order to be able to provide divergent points of view if they exist.

 In the introduction, the author must absolutely identify:

- the problem;
- the objective of the article (respond to the identified problem);
- the research hypothesis.

Methodology (Materials & Methods)

Methodology is the foundation of a scientific article. A deficient methodological section may lead to the reject of the article. The methodology section should describe how the research was conducted. It provides a portrait of the location (study site) and the period of research, the parameters that were measured (sampling).

Results

In this section, the author presents the results without carrying out interpretations or analyzes. This presentation of the results must be done exclusively for the data justifying the conclusions and concerning the objective of the article. In the results section, it is essential to sort out what is necessary and what is not. The addition of irrelevant data may be a criterion for rejection or request for major corrections to the article. Additionally, readers don't want to have to sort through all of your data.

In the results section, the author must adequately present their research data. There are several ways to do this: text, tables, graphics. Both tables and graphs must be clear. They should not contain too many ideas (usually one illustration = one idea). In general, tables and figures serve to present the most relevant data and organise them in a visual format that allows the authors' message to be understood.

*Discussion

The discussion takes and interprets the findings reported in the results section, evaluates their significance, and examines the implications. Among the whole sections of an article, this is probably the most challenging to write and will demonstrate how well the author understands the results. But it does not mean that the discussion should made long, especially if there is little to discuss.

*Conclusion

The conclusion section should present (1) a succinct summary of implications of the findings, (2) general implications of the study, and (3) suggestions for further research.

*References

The references included in the manuscript should only be those necessary and up to date (ideally from the last 5 years). In general, around 30 references are used for original articles, more or fewer will be used depending on the editorial standards and article format. To make citation indexing during the writing of the article more efficient, authors are increasingly using bibliographic referencing systems (e.g., Mendeley) for this task which also act as reference databases and adapt to the different formats of each journal.

3. How to read a scientific article

Reading a scientific article is a complex task. The worst way to approach this task is to treat it like the reading of a textbook—reading from title to literature cited, digesting every word along the way without any reflection or criticism. Rather, you should begin by skimming the article to identify its structure and features. As you read, look for the author's main points. Generate questions before, during, and after reading. Draw inferences based on your own experiences and knowledge. And to really improve understanding and recall, take notes as you read. This handout discusses each of these strategies in more detail.

*Skim the article and identify its structure

Most scientists read the abstract first. Others—especially experts in the field—skip right from the title to the visuals because the visuals, in many cases, tell the reader what kinds of experiments were done and what results were obtained.

You should probably begin reading a paper by reading the abstract carefully and noting the four kinds of information outlined above. Then move first to the visuals and then to the rest of the paper.

Therefore, when you begin to read an article for the first time, skim the article to analyze the document as a whole. Are the sections labeled with headings that identify the structure? If not, note what the structure is. Decide which sections contain the material most essential to your understanding of the article. Then decide the order in which you will read the sections.

*Distinguish main points

Because articles contain so much information, it may be difficult to distinguish the *main points* of an article from the *subordinate points*. Fortunately, there are many indicators of the author's main points :

-Document level : Title, Abstract, Keywords.

-Visuals (especially figure and table titles)

-First sentence or the last 1-2 sentences of the introduction

- Paragraph level: words or phrases to look for : surprising, unexpected…

*Generate questions and be aware of your understanding

Reading is an active task. Before and during your reading, ask yourself these questions:

-Who are these authors? What journal is this? Might I question the credibility of

the work?

-Have I taken the time to understand all the terminology?

-Have I gone back to read an article or review that would help me understand this

work better?

-Am I spending too much time reading the less important parts of this article?

-Is there someone I can talk to about confusing parts of this article?

After reading, ask yourself these questions:

-What specific problem does this research address? Why is it important?

-Is the method used a good one? The best one?

-What are the specific findings? Am I able to summarize them in one or two

sentences?

-Are the findings supported by persuasive evidence?

-Is there an alternative interpretation of the data that the author did not address?

-How are the findings unique/new/unusual or supportive of other work in the field?

-How do these results relate to the work I'm interested in? To other work I've read

about?

-What are some of the specific applications of the ideas presented here? What are

some further experiments that would answer remaining questions?

*Draw inferences

Not everything that you learn from an article is stated explicitly. As you read, rely on your prior knowledge and world experience, as well as the background provided in the article, to draw inferences from the material. Research has shown that readers who actively draw inferences are better able to understand and recall information.

4. Using tenses in scientific article

While writing a scientific article, choosing the tense (s) is essential. As a generalisation: There are three tenses used: simple present, simple past and present perfect. Their use varies from one section to another.

*Abstract

The abstract section usually refers to your unpublished results and uses the past tense.

*Introduction

The introduction include a background information which is generally accepted as fact in a discipline. This section also include an explanation why the present research is important. It is usually presented in the present tense.

Present perfect tense can be used in the introduction when referring to previous research, communicating recency or currency. Currency may be positive (asserting that previous studies have established a firm research foundation) or negative (asserting that not enough relevant or valid work has yet been done).

*Methods

Past tense to describe what was done in methods section. It is customary to use a form of the simple past tense to describe what is done in the study.

*Results

In the results section, the past tense used to detail the results obtained.

*Discussion

In the discussion section, the present tense is normally used to explain the significance of the results.

Writers may use the past tense to summarise their findings, in combination with the present tense to explain or interoret what the results mean.

*Conclusion

The final section summarises the main findings and the major implications of the study, point out any limitations, and ofter suggestions for future research. To do these things a combination of tenses is used.

*Figures, tables and graphs

Figures, tables and graphs are referred using the present tense.