Rules and guidelines for writing/judging articles

Introduction:

The purpose of writing a scientific article is to convey and sell the contents of scientific research to the world. The legibility of a scientific article will be, in part, dependent on the structure of the article. A structured way of providing data will help the reader understand the content of the article.

The format of scientific articles is often dictated by the scientific journals. Unfortunately, the compulsory format differs from journal to journal. The ideas about how to write a proper scientific article have changed over time and will probably change again in the future. In addition, teachers may have their individual preferences and ideas about the ideal structure of a paper. This means that it may be difficult for you, as a student, to learn how to write a scientific article.

I have tried to develop some guidelines, which can be used as a starting point for students, who want to learn how to write a scientific article. As outlined above, these are not strict rules, but mere guidelines. You can always decide to use other guidelines than given below. But remember that, whatever format you choose, the primary goal of structuring your writing is to increase the legibility of your article.

Preceding steps:

Before you start writing you have to

- assemble and arrange your data in such a way that they provide a clear basis for the message you are going to communicate

- define the readers you want to address: the way you write your article will be different when your readers are peers than when your readers are laypersons, for instance.

Guidelines:

General:

- Try to write as concise and to the point as possible.
- Headings and subheadings can be used to structure the article.
- Headings and subheadings are not part of the text.

- The components of a standard research article are:

  - ❖ Title
  - ❖ Authors
  - ❖ Abstract
  - ❖ Introduction

- ❖ Materials and Methods
- ❖ Results (containing Tables and Figures)
- ❖ Discussion
- ❖ Tables and Figures
- ❖ References

Title:

- Contains the main message of the article
- Attracts attention
- Can be extended by providing a subtitle

You want to convey the main message of the article in an arresting way, which means you have to come up with a good title. Ideally, you start with the title, because that forces you to think about the main message of the article. Often, though, the title will be composed after you have completed your article. In that case, you initially use a working title.

Abstract:

An abstract **contains**:

a) a short introduction (if necessary)
b) a clear description of the goal of the experiments/research
c) a concise description of the method
d) a factual description of the most important results of the conducted research
e) a conclusion

You can choose to describe the components b, c, and d per experiment.

Optional:

- mention the general interest of your research. This option is not compulsory, but as the abstract is accessible to a relatively large public, many investigators prefer to stress the putative general impact of their research in their abstract.

Avoid

- giving an extensive introduction and discussion
- giving references as much as possible
- using abbreviations

The abstract will be written after you have written your article. In some cases, however, you only present your abstract to the reader, for instance at a conference. Furthermore, you must keep in mind that the abstract is usually the only part of the article that is readily accessible to all readers. Thus, the story set down in the abstract must be comprehensible by itself and must entice people to read the entire paper.

Introduction:

An introduction comprises:

a) a broad introduction of the topic
b) a specific introduction of the topic
c) a hypothesis (not obligatory)
d) a research question
e) a description of the method that will be used to investigate the research question
f) the general importance/impact of the research
g) [a short description of the most important finding of the research described]

ad a) and b) The extent of the information should be such that it is easy for the reader to understand the hypothesis and the research question. Both too much and too little information will decrease the interest of the reader.

ad c) If the experiments described in the article are based on a hypothesis, this hypothesis should be given in the introduction.

ad f) The general impact of the research is usually given to help the reader translate specific research to a topic of his or her interest. Stressing how important your research is may enlarge the number of readers, and can also be a way of selling your research to the public.

ad g) The current line of conduct is to give a short description of the most important findings in the introduction. The idea behind it is to further activate the curiosity of the reader. Extensive reference to the findings described in the results section, should be avoided.

Materials and Methods

The materials and methods section:

- Describes exactly which materials have been used
- Describes all apparatus that has been used
- Describes how the experiments have been performed in general
- Describes how data have been obtained
- Identifies all characteristics of the subjects (animals, patients, etc) included in the research and control populations
- Describes patients and -if applicable, case histories,
- Describes the statistical methods that have been used
- etc.

Avoid

- Giving protocols
- Explaining why an experiment has been performed as described, unless this information is indispensable for the understanding of the experiment.
- Mentioning results

The goal of the material and methods section is to describe the experiments in such a way that they can be reproduced/repeated by an independent investigator.

The materials and methods section is usually written in the past tense.

Use subheadings to separate the components/experiments in the Materials and Methods section.

Use tables or figures (if allowed) to provide data that are cumbersome to describe in the text, like primer sets for PCR experiments.

Results

Guidelines for the description of the results are:

- Describe the factual findings of each experiment separately
- Transform the rough data of the experiments, so that they can be displayed to the reader in a purposeful way
- Give a short introduction and presentation of the method of each experiment
- Describe the data in the text
- Mention only those data in the text that are necessary to understand your reasoning
- End your description of an experiment with a conclusion [and/or a short interpretation]*
- Visualize data in tables and figures (see below) next to describing them in the text
- Refer too the figures and tables in the text
- Enable the reader to understand the text without the tables and figures

Avoid:

- Presenting the findings as rough data
- Discussing the findings (discriminate between description of facts and reasoning)

The purpose of the results section is to guide your readers through the data, to help them understand what you want to show them. You must allow the readers to follow your reasoning.

Example: To investigate whether this class was attractive to both boys and girls (= introduction), we counted the number of boys and girls present in the class room during the lecture (= method). We counted 10 pupils, 8 of which were boys (data) and 2 were girls (data). We concluded that there were four times as many boys as girls present during the lecture (conclusion), [indicating that this class was more appreciated by boys than by girls (interpretation).]*

[ ]* giving an interpretation may be necessary to clarify the background of experiments described in the article, but must be left out if it does not contribute to the legibility of the article.

Discussion

The discussion is the most variable part of the article.
Generally in the discussion the investigator:

- gives arguments to sustain the validity of the experiments
- answers the research question
- combines the findings of multiple experiments in a single conclusion
- places the results in a broad context
- compares the findings with the data found in the literature
- draws a conclusion
- (sometimes) formulates a new hypothesis
- mentions future prospects
- describes the general impact of the findings

Avoid:
- repeating most of the introduction
- repeating all the results

Figures and tables

Figures and tables are part of the results section.

Figures and tables consist of:
- a title. The title must be specific for the contents of the figure or the table, and must describe exactly what is being presented.
- a legend, that allows the reader to interpret the data whithout any further information.

In figures, both the title and legend are below the figure itself. In tables, the title is above the table, and the legend is below it.

The aim of presenting the data in figures and tables is to provide the data of your research in a schematic, concise and comprehensive way. The figures and tables are used to list or to illustrate the data presented in the text, not to replace them!

The reader must be able to understand the content of the figures and the tables without reading the text of the article. You may refer to the materials and methods section to remind the reader how the experiment was performed.

References

The references must be presented in such a way that they can be traced by the reader, indefinitely.

Many journals have their own reference format.
The Bachelor CRU 2006 recommends the format of the International Committee of Medical Journal Editors, based on the Vancouver referencing style.

International Committee of Medical Journal Editors (ICMJE)

Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Sample References

The International Committee of Medical Journal Editors offers guidance to authors in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication.

Sample references typically used by authors of journal articles are provided below.

Articles in Journals

1. Standard journal article

List the first six authors followed by et al.

Halpern SD, Ubel PA, Caplan AL. Solid-organ transplantation in HIV-infected patients. N Engl J Med. 2002 Jul 25;347(4):284-7.

As an option, if a journal carries continuous pagination throughout a volume (as many medical journals do) the month and issue number may be omitted.

Halpern SD, Ubel PA, Caplan AL. Solid-organ transplantation in HIV-infected patients. N Engl J Med. 2002;347:284-7.

2. Organization as author

Diabetes Prevention Program Research Group. Hypertension, insulin, and proinsulin in participants with impaired glucose tolerance. Hypertension. 2002;40(5):679-86.

3. Both personal authors and organization as author

(List all as they appear in the byline.) [Edited 12 May 2009]

Vallancien G, Emberton M, Harving N, van Moorselaar RJ; Alf-One Study Group. Sexual dysfunction in 1,274 European men suffering from lower urinary tract symptoms. J Urol. 2003;169(6):2257-61.

4. No author given

21st century heart solution may have a sting in the tail. BMJ. 2002;325(7357):184.

5. Article not in English

[Edited 12 May 2009]

Ellingsen AE, Wilhelmsen I. Sykdomsangst blant medisin- og jusstudenter. Tidsskr Nor Laegeforen. 2002;122(8):785-7. Norwegian.

6. Volume with supplement

Geraud G, Spierings EL, Keywood C. Tolerability and safety of frovatriptan with short- and long-term use for treatment of migraine and in comparison with sumatriptan. Headache. 2002;42 Suppl 2:S93-9.

7. Issue with supplement

Glauser TA. Integrating clinical trial data into clinical practice. Neurology. 2002;58(12 Suppl 7):S6-12.

8. Volume with part

Abend SM, Kulish N. The psychoanalytic method from an epistemological viewpoint. Int J Psychoanal. 2002;83(Pt 2):491-5.

9. Issue with part

Ahrar K, Madoff DC, Gupta S, Wallace MJ, Price RE, Wright KC. Development of a large animal model for lung tumors. J Vasc Interv Radiol. 2002;13(9 Pt 1):923-8.

10. Issue with no volume

Banit DM, Kaufer H, Hartford JM. Intraoperative frozen section analysis in revision total joint arthroplasty. Clin Orthop. 2002;(401):230-8.

11. No volume or issue

Outreach: bringing HIV-positive individuals into care. HRSA Careaction. 2002 Jun:1-6.

12. Pagination in roman numerals

Chadwick R, Schuklenk U. The politics of ethical consensus finding. Bioethics. 2002;16(2):iii-v.

13. Article published electronically ahead of the print version

Yu WM, Hawley TS, Hawley RG, Qu CK. Immortalization of yolk sac-derived precursor cells. Blood. 2002 Nov 15;100(10):3828-31. Epub 2002 Jul 5.

Books and Other Monographs

1. Personal author(s)

Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

2. Editor(s), compiler(s) as author

Gilstrap LC 3rd, Cunningham FG, VanDorsten JP, editors. Operative obstetrics. 2nd ed. New York: McGraw-Hill; 2002.

3. Author(s) and editor(s)

Breedlove GK, Schorfheide AM. Adolescent pregnancy. 2nd ed. Wieczorek RR, editor. White Plains (NY): March of Dimes Education Services; 2001.

4. Organization(s) as author ***[Edited 12 May 2009]***

Advanced Life Support Group. Acute medical emergencies: the practical approach. London: BMJ Books; 2001. 454 p.

5. Chapter in a book

Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. In: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93-113.

6. Conference proceedings

Harnden P, Joffe JK, Jones WG, editors. Germ cell tumours V. Proceedings of the 5th Germ Cell Tumour Conference; 2001 Sep 13-15; Leeds, UK. New York: Springer; 2002.

7. Dissertation

Borkowski MM. Infant sleep and feeding: a telephone survey of Hispanic Americans [dissertation]. Mount Pleasant (MI): Central Michigan University; 2002.

Other Published Material

1. Newspaper article

Tynan T. Medical improvements lower homicide rate: study sees drop in assault rate. The Washington Post. 2002 Aug 12;Sect. A:2 (col. 4).

2. Audiovisual material

Chason KW, Sallustio S. Hospital preparedness for bioterrorism [videocassette]. Secaucus (NJ): Network for Continuing Medical Education; 2002.

3. Dictionary and similar references

Dorland's illustrated medical dictionary. 29th ed. Philadelphia: W.B. Saunders; 2000. Filamin; p. 675.

Unpublished Material

1. In press or Forthcoming *[Edited 12 May 2009]*

Tian D, Araki H, Stahl E, Bergelson J, Kreitman M. Signature of balancing selection in Arabidopsis. Proc Natl Acad Sci U S A. Forthcoming 2002.

Electronic Material

1. CD-ROM

Anderson SC, Poulsen KB. Anderson's electronic atlas of hematology [CD-ROM]. Philadelphia: Lippincott Williams & Wilkins; 2002.

2. Journal article on the Internet *[Edited 12 May 2009]*

Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J Nurs [Internet]. 2002 Jun [cited 2002 Aug 12];102(6):[about 1 p.]. Available from: http://www.nursingworld.org/AJN/2002/june/Wawatch.htmArticle

3. Monograph on the Internet *[Edited 12 May 2009]*

Foley KM, Gelband H, editors. Improving palliative care for cancer [Internet]. Washington: National Academy Press; 2001 [cited 2002 Jul 9]. Available from: http://www.nap.edu/books/0309074029/html/.

4. Homepage/Web site *[Edited 12 May 2009]*

Cancer-Pain.org [Internet]. New York: Association of Cancer Online Resources, Inc.; c2000-01 [updated 2002 May 16; cited 2002 Jul 9]. Available from: http://www.cancer-pain.org/.

5. Part of a homepage/Web site *[Edited 12 May 2009]*

American Medical Association [Internet]. Chicago: The Association; c1995-2002 [updated 2001 Aug 23; cited 2002 Aug 12]. AMA Office of Group Practice Liaison; [about 2 screens]. Available from: http://www.ama-assn.org/ama/pub/category/1736.html

6. Blogs *[Added 12 May 2009]*

Holt M. The Health Care Blog [Internet]. San Francisco: Matthew Holt. 2003 Oct - [cited 2009 Feb 13]. Available from: http://www.thehealthcareblog.com/the_health_care_blog/.

KidneyNotes.com [Internet]. New York: KidneyNotes. c2006 - [cited 2009 Feb 13]. Available from: http://www.kidneynotes.com/.

Wall Street Journal. HEALTH BLOG: WSJ's blog on health and the business of health [Internet]. Hensley S, editor. New York: Dow Jones & Company, Inc. c2007 - [cited 2009 Feb 13]. Available from: http://blogs.wsj.com/health/.

7. Contribution to a blog:

Mantone J. Head trauma haunts many, researchers say. 2008 Jan 29 [cited 2009 Feb 13]. In: Wall Street Journal. HEALTH BLOG [Internet]. New York: Dow Jones & Company, Inc. c2008 - . [about 1 screen]. Available from: http://blogs.wsj.com/health/2008/01/29/head-trauma-haunts-many-researchers-say/.