Generic Format for Research Project Paper

Paper Sections/Headings*
(*Detailed description of each section provided below.)

1) Abstract (a.k.a. Summary)
- Brief description of projects goal(s), subjects, findings and conclusions.
- Limit to one full page, double-spaced, 12-point font size or about 250 words.

2) Introduction
- Should answer the questions: 1) Why is this study of scientific interest; 2) What has been done before; and 3) What is the objective of my study.

3) Materials and Methods
- Provide all the methodological details necessary for another scientist to replicate/duplicate your work.

4) Results
- Present the results of the study, but do not attempt to interpret or evaluate their meaning. You will do that in your discussion.

5) Discussion and Conclusions
- Explain what the results mean or why they differ from what other workers have found; interpret your results in light of your hypothesis(es) and prediction(s); suggest future directions for research, new methods, explanations for deviations from previously published results, etc. Lastly, summarize what it all means in a concluding paragraph.

6) References Cited
- Provide an alphabetical listing of all the published work you cited in the text of the paper.

7) Appendix(ces)
- Include tables and figures; figures include graphs, charts, maps, pictures, etc. You can also include these within the text, if you'd like.

DETAILED DESCRIPTION OF PAPER SECTIONS

Abstract (or Summary)

- ➤ The Abstract/Summary is brief, typically, limited to about 250 words.
- ➤ The Abstract is a very important part of your scientific paper. It summarizes salient aspects of your paper and encourages a reader to read it. Most people will read an Abstract first in order to decide whether to read the entire paper.
- ➤ Write the Abstract last. I do recommend, however, that you take notes about the important parts of each section of your paper as you write. When done writing the paper,

read it over a couple of times, making a list of keywords, then organize these and your thoughts, and draft the Abstract.

➢ The biggest mistake in writing an Abstract is to state that such and such "will be discussed." Instead, consider it a succinct summary of the exact details of your findings, and not a summary of what you plan to discuss in your paper. Only the most important data and findings are contained in the Abstract.

➢ The Abstract should describe the purpose of the study, outline the major, findings and state the main conclusions.

➢ Start the Abstract by telling exactly what you did and how you did it.

- In the first two sentences, focus on the rationale and ideas of the study, and why it is important. For example, "This study determined impacts of concentrated food sources on the behavior of red squirrels."

- In the next few lines, focus on the materials and methods, and the data generated from the study. Discuss how the data were collected, compiled, and any statistical significance(s). Do not include the statistical test used; simply state what was significant.

- In the last few sentences, discuss the overall conclusion/decision, especially in regard to the hypothesis(es) stated for the study.

➢ Avoid using references in the Abstract.

Introduction

➢ The Introduction provides an overview of the project.

➢ It includes brief descriptive statements of the study subjects, such as their history, why they are interesting to study, little known facts about them, etc. Do not include demographic traits or other such details of your subjects here – leave that for the methods. This part can be brief or long depending on your preference.

➢ The Introduction section also includes the results and conclusions of previously published studies to help you explain why your study is of scientific interest and what you hope to add to the 'conversation.'

➢ The Introduction is organized to move from general information to specific information. Take care not to go too far afield in providing background information; limit the introduction to studies that relate directly to your present study. Emphasize your specific contribution to the topic.

➢ The last sentences of the introduction should be a statement of objectives and a statement of hypotheses. State the hypothesis(es) being explored and prediction(s) that arise from the hypothesis(es). This is a good transition to the next section, 'Methods,' in which you will explain how you proceeded to meet your objectives and test your hypotheses.

➢ Be very specific with objectives; for example, you might write:

- "My objective was to determine the effectiveness of decompressing coral reef fish caught for the aquarium trade. I hypothesized that ascent with many decompression stops would result in the lowest mortality rate."
- ➢ Virtually all material in your paper should directly pertain to these objectives and hypotheses.
- ➢ Avoid a detailed literature survey (summarize the literature) and avoid discussing any results or analyses in this section.
- ➢ The Introduction should be brief; in general, not exceeding two manuscript pages.

Materials and Methods

- ➢ The Materials and Methods section (or just "methods") includes information about your subject, the methods/techniques you used to collect data, and how you analyzed your data. This section should be written thoroughly enough that another scientist/researcher could duplicate your work.
- ➢ In describing your study subject, include who they are, where they come from, where they work, who they work with, their genders, years of experience, etc. – any information another researcher would have to know in order to duplicate your study.
- ➢ For your data collection section, include descriptions of what data was collected and/or used; where the data came from; how you organized the data; how you scored the data; how you summarized the data; and if you treated the data special in any, how and why you gave it special treatment – for example, if you leave out some trainers in some analysis. This is where you would also discuss any outliers and what you did with them. You also include here your operational definitions for scoring.
- ➢ In your data analysis descriptions, state the statistical test used for each prediction tested, and the level of significance at which the data was tested (which for everyone is $p=0.05$, regardless of what final probability resulted). Here is where to state and cite any statistical references or packages used.
- ➢ One of the most difficult things in writing a Materials and Methods section is deciding how much detail to give the reader. Too much can make this section too long, but you need to provide enough info so that replication of your study is possible.
- ➢ Other pointers:
  - Write in third person and past tense.
  - Write this section as you go; describe everything you do as you do it, then edit it later.
  - Do not tell the reader how to do the experiment as if you were writing a cookbook or lab manual.
  - Assume you are writing for experts in the field; do not include common sense directions or detailed descriptions of established trade methods. For example, state that rubrics were created and used, but don't go into how you created your rubric – everybody pretty much follows the same steps in creating rubrics.

Results

➢ The Results section describes the results of your work and includes a summary of the data found in your tables and figures.

➢ Write this section with accuracy, brevity and clarity.

➢ Use a good topic sentence for each of your paragraphs.

➢ Avoid providing interpretations or value statements about what the results mean. Save this for the Discussion section.

➢ Report the findings of all statistical analyses done as described in your Materials and Methods section.

➢ With regards to results summarized in tables and figures, it is best to construct your tables and figures before writing the Results section. Then be sure to include a summary of what is reported in each table/figure. Do not repeat exactly what is listed in the table/figure.

➢ Refer the reader to the table/figure first, then use your text to highlight the most salient differences and similarities in the data. What should your reader focus on when looking at your figures and tables?

➢ Number tables and figures in the same sequence as they are first mentioned in the text.

Discussion

➢ In this section interpret your data and draw conclusions regarding your hypothesis. Avoid repeating the results section – evaluate your data and their implications in a broader context (i.e., why should anyone care about this?).

➢ Key findings should be emphasized first.

➢ Compare your results and interpretation to other studies that were discussed in the introduction.

➢ Consider discussing these points:

- Does your data agree with current models or refute them?
- How has your work added to the knowledge base of your field?
- Were there any unexpected results or any problems encountered during the study?
- If you had problems during your study or if you are not satisfied with your results, how could the methods be modified to provide more definitive results?
- What future studies do your results encourage?
- What is the broad meaning of your results?

References Cited

➢ This section includes a list of all references cited in your paper.

➢ You should always check to be sure that all in-text citations are included in the References Cited and that all references listed are cited in the text.
➢ Follow a consistent format for this list. APA style is very common and is the one used in the education field. Here is a link to most common styles, including APA: http://subjectguides.library.american.edu/citation.

Appendix(ces)

➢ Include in this section your graphs, tables, maps, pictures, etc. Typically, just put one figure or table per page, however, if you have pictures, you can create a collage, but just one caption.

Format of Report

1) Header: On first page only, include your full name, course, semester, and date. On subsequent pages, include your first initial and last name.

2) Footer: On all pages, include the page number at right margin.

3) Lines: Use double-line spacing; indent each new paragraph by a minimum of 3 spaces or maximum of 5 spaces.

4) Headings: **All headings should be in bold face**; use two returns prior to a new heading; if space becomes an issue, only one return can be used. All **subheadings should be underlined with no bold face**; just one return before and after.

5) Font: Use Times New Roman font style and 12-point font size (or other recommended font style and size listed in field journals).

6) Margins: Use 1.0" margins for left & right margins, and 0.5" margins for top and bottom. Align all text left; recommend that you do not use justification for right margins.

8) Sources: Use a consistent and standard format for in-text citations and references cited sections.

FIGURES, TABLES AND REFERENCE FORMAT

Figure captions
Ensure that each table/figure/illustration has a caption. A caption should comprise a brief title (**not** on the figure itself) and a description of the figure. Keep text in the illustrations themselves to a minimum, but explain all symbols and abbreviations used.

Tables

Number tables consecutively, with Arabic numerals, in accordance with their appearance in the text. Each table should have a caption with a description of what the table describes. Place footnotes to tables below the table body and indicate them with superscript symbols. Be sparing in the use of tables and ensure that data presented in tables does not duplicate results described elsewhere in the article.

References

Check that all references in the text are in the reference list and vice versa, that their dates and spellings match, and that complete bibliographical details are given, including page numbers, names of editors, name of publisher and full place of publication if the article is published in a book. For papers in the course of publication, use 'in press' to replace the date and give the journal name in the references. Cite unpublished manuscripts (including those in preparation or submitted), talks and abstracts of talks in the text as 'unpublished data' following a list of all authors' initials and surnames. Do not include these in the reference list.

Web references

The full URL should be given. Any further information, if known [digital object identifier (DOI), author names, dates, reference to a source publication, etc.], should also be given.