Research Paper Outline

The research paper outline is essential for any article or term paper. The outline may make a great difference on how your work is interpreted.

Writing a research paper is as important as performing the actual research or experiment itself and can appear to be a very daunting task.

It does not matter what conclusions you arrived at or how perfect your experimentation was, if you put no effort into writing a good report then your study will not be taken seriously.

If you break report writing down into its constituent parts, it is not as complex as it seems and there is no reason to be worried. Scientific reports, for the vast majority of disciplines, are all structured in the same way; if you follow this structure then you cannot go far wrong.

It is useful to note that every scientific discipline, every university and even supervisors can have their own preferred methods of constructing reports; with this in mind, do not be afraid to ask for advice on the best research paper format for your report.

Layout and Length

For most assessed reports you will be told how long it should be, generally by the number of words.

This is generally only a guide and is not set in stone; in most cases this limit does not include appendices [1] and citation pages [2].

If you plan to write for a specific journal [3], a good advice is to check the research paper outline [4] of some

of the articles to get a better idea on how to write your article [5]. Here are a few outline samples [6].

If your report is complex and strays over this limit, there should be no problem, as long as you have not repeated yourself or filled your work with irrelevant information. It is good practice to bear in mind that the appendix [1] is there for any information that you feel could be omitted from the report without affecting the clarity.

Your report can be shorter than the advised word limit if everything that needs to be included is there. This is preferable than trying to pad out the report in order to fulfill some 'word count' facility on the computer, risking being penalized for irrelevance.

For longer reports, it is useful to break each section down into subsections, to make your report more reader friendly and easier to navigate.

Basic Structure

The vast majority of scientific reports can be broken down into the following constituent parts.

- Title [7] - Author(s)
- Abstract [8]
- Table of Contents [9]
- Introduction [10]
- Equipment and Methodology [11]
- Results [12] AND Discussion [13]
- Conclusions [14]
- References [2] and Citations [15]
- Appendices [1]

Title and Authors

Although the title [7] is the shortest page of your report, it is often the most difficult to write.

It is important to make clear to a researcher everything that needs saying but without the title being overlong and unwieldy. It does not have to be the first section written because, in many cases, the final title will not occur to you until you have finished writing the report.

Nowadays, most research establishments have a database to search titles by keyword so try to make sure that your title contains these. This is doubly important if your research is likely to be published on the internet.

The authors section should include your name, as the main writer of the report, alongside the name of your supervisor. In the case of working as part of a team, you should usually include the other members of your group here.

Abstract

The abstract [8] is the most crucial part of the report because anybody searching for your research on a database or in a journal will usually read only the abstract. Therefore, it must summarize your research, results and conclusions in less than 200 words.

Sometimes it is good to think of it as a sample of your research rather than a review [16]; it should inform the researcher that your article contains the information they need.

There are a few ideas on how to write your abstract but the best advice is that you look at some journals relevant to your research and try to format your abstract in a similar way.

Contents

This section and is merely a breakdown of sections and subsections by page number.

For a short and straightforward paper it may not be necessary to include a contents page [9].

This is not mandatory for a research paper.

Introduction

This section of your report is where you will document all the painstaking research [17] into the background of your experiment.

The main thing to bear in mind, when writing the introduction [10], is that a scientist who is unfamiliar with your exact subject matter may be reading the article.

It is important, therefore, to try and give a quick and condensed history of the research leading to your experiment, with correct citations [15].

You should also give a little background on why you chose to do this particular experiment and what you expect to find. It is a little 'old-fashioned' to hypothesis statement [18] at the beginning of the report but the reader should be aware of exactly what you are trying to prove.

Method

For this portion of your report you must describe the methods [11] used when performing the experiment. This should include, if relevant, the location and times of sample collection, what equipment was utilized, and the techniques used.

The idea behind the methodology section is that another researcher can exactly replicate your experiments without having to guess what equipment and what techniques should be used.

Scientific articles are peer reviewed and this includes the possibility that other researchers may try to replicate your results.

There have been many high profile scientific breakthroughs over the years whose results were unable to be repeated; these experiments were disregarded. For field studies you should give an exact map reference [19] and time as well as including a map in the appendix [1].

If you used complex machinery or computer programs in the course of your experiment, to avoid breaking the flow of your report, you should give only the main information and refer to the exact technical specifications in the appendix.

Results

These should be a quick synopsis of the facts, figures [20] and statistical tests used to arrive at your final results.

You should try to avoid cluttering up your report and insert most of your [raw data](#) [21] into the appendix.

It is far better to stick with including only [tables](#) [22] and [graphs](#) [23] that show clearly the results. Do not be tempted to insert large numbers of graphs and figures just for the sake of it; each figure and graph should be mentioned, referred to and discussed in the text.

Try to avoid putting in tables and graphs showing the same information; select the type that shows your results most clearly. It is usually preferable to use graphs and relegate the tables to the appendix because it is easier to show trends in graphical format.

Figures and graphs should be clear and occupy at least half a page; you are not a magazine editor trying to fit a small graph into an article.

All such information must be numbered, as diagrams for graphs and illustrations, and figures for tables; they should be referred to by this number in the body of the report.

You do not need to put the full breakdown of the calculations used for your statistical tests; most scientists hate statistics and are only interested in whether your results were significant or not. Relegate the calculations to the appendix.

The [results section](#) [12] of your report should be neutral and you should avoid discussing your results or how they differed from or compared with what was expected. This information belongs in the next section.

Discussion

This is the pivotal section of your hard work in obtaining and analyzing your results.

In your [discussion](#) [13] you should seek to discuss your findings, and describe how they compared and differed from the results you expected. In a nutshell, you are trying to show whether your [hypothesis](#) [24] was proved, not proved or inconclusive.

You must be extremely critical of yourself in this section; you will not get marked down for mistakes in [experiment design](#) [25] or for poor results, only for not recognizing them.

Everybody who has written a dissertation or thesis has had to give a [presentation](#) [26] to a room full of fellow students, scientists and professors and give a quick synopsis. These people will tear your report apart if you do not recognize its shortcomings and flaws.

Very few experiments are 100 per cent correct in their [design](#) [27] and conception so it is not really important what your results were, only that you understand their [significance](#) [28].

Usually you will have had some promising results and some that did not fit with what you expected. Discuss why things may have gone wrong and what could be done to refine the results in future. Suggest what changes in experimental design might improve the results; there is no right or wrong in science, only progress.

Finally, you can discuss at the end ideas for further research, either refining the experiment or suggesting new areas. Even if your paper was a one off, somebody may come along and decide that they find your research interesting and that they would like to continue from where you left off.

Summary and Conclusion

This is really just a more elaborate version of the [abstract](#) [8].

In a few paragraphs you should summarize your [findings](#) [14]. Your abstract will do most of this for you but, as long as you do not get carried away, especially for longer reports, it can help the reader absorb your findings a little more.

References

Include all of your direct [references](#) [2] here, even if you only found a couple of sentences.

In the case where somebody referred to an original source, reference that too, but if you did not manage to get hold of it, try to rewrite so that you will not have to reference (or use "referred in"-citation).

Acknowledgements

Here it is polite to [acknowledge](#) [29] anybody who helped you with this report, although do not go overboard; it is not an Oscar speech.

Your supervisor is a good start, as well as others who helped. If a landowner gave you permission to take samples then it is good practice to acknowledge them and give them a summary of your results, if permitted.

Appendices

[Appendices](#) [1] are very useful because they give you a place to dump raw data and calculations. They must still be laid out correctly; the data must be relevant and referred to in the main report.

If you have a lot of relevant [photographs](#) [30] of sample sites and methods then they belong here. It is also useful to insert a Google map plan to show from where you took samples.

Final Thoughts

Hopefully this will have given you a good oversight into writing that perfect report. It is not as daunting as it seems and if you do your research and listen to your supervisor then all should be well and you can get a good grade.

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