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Getting Started with Research “Writing-up the results of your research”

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Abstract

This paper gives an overview of the considerations and practical aspects of writing-up the results of your research which may be of interest to those beginning their research career or simply carrying out a research project for the first time as part of an academic qualification. It outlines practical steps for both writing-up the results of your research as an academic report and thereafter disseminating your results more widely as a peer-reviewed scientific publication.

Introduction

This is the third and final article in a series of articles in *Ultrasound* outlining the practical aspects of writing-up the results of your research in the form of an academic report, thesis or a scientific publication.^{1,2} In the second article in this series the importance of managing research data was discussed in terms of analysing the data throughout the project.² The importance of doing this will become apparent while undertaking the task of writing-up your research since, if the data has been left in its original unrefined state and is presented in this format in a report, it will appear dry, lacking insight and significance. It is inevitable that you will have to analyse your data in order to abstract the significance from it and to present it in a meaningful way to the reader.³

Whether the research you are carrying out is part of an academic qualification or a research study, the research will not be considered to be complete without the production of a report outlining the main results from the research.⁴ For the former, there will be detailed guidelines provided by the academic institution outlining their requirements for the production of the thesis, although the latter usually also has detailed guidelines regarding the main methodology and key outcomes of the research. For example most reports have a similar basic structure no matter their size or formality. This basic structure usually involves the following:

- a brief introduction to the subject and a description of why the work was carried out and why it was considered important;
- the background theory and related literature which describes what the current knowledge of the subject is and current research findings;
- a description of the aims and objectives of the research project;
- the methodology used in the research project;
- the key results of the research project;
- the discussion of the significance of the results and how they relate to other key findings in the area;
- and lastly a concluding section or chapter which sums up the most important aspects of the research project and the results, it may also include some recommendations for future work.

Practical Tips to Writing

Often the fear of the task of writing-up the results of our research can cause us to procrastinate and put-off starting the writing process. However, the following practical tips may be of use in helping you get started with the job of writing-up your research. A good starting point is to think about the overall structure of the report and draft an outline before beginning the actual process of writing as well as reviewing the requirements for the report, for example is there a word limit. A very useful way to help decide on the overall structure of your report is to spend a couple of hours looking at previous theses in the library of your institution or previous reports. If for the latter case, it is not possible to access previous reports, the guidelines are usually very detailed and prescriptive and so the structure will be already defined for you. Once you have decided on the structure of your report you should then think about the structure of each of the chapters or sections and then draft the main headings. Once you have decided on the main headings in each chapter or section, you should think about what comes under each main heading

and bullet each sub-heading. When putting these sections in a specific order it is good to view each as a part of the overall message and as such a common thread throughout the paper or report is required in order to link the different sections. In terms of filling in the details in each section it is often easiest to start with your results section, highlighting the most important findings from your research. In order to keep the momentum of writing the next easiest section to write is the methodology section which describes the exact process by which the results were obtained. It is important that this section is clear and logical and easy to replicate by another researcher. At this stage you have almost half of the write-up complete. Framing your research in terms of what is already known in this area and critiquing previous research in the area as well as discussing the most pertinent results will provide the reader with a good introduction to the topic. It will also provide you with the opportunity to present a justification for carrying out this research. For this stage of the writing you will have your notes from forming your hypothesis which was discussed in the first paper of this series as well as your notes from your literature survey which will both help in getting an overview of the area.¹

Writing your report or paper in this manner will hopefully prevent or reduce periods of writers block or procrastination which can be a common problem for both beginners to writing and even more experienced writers. In Table 1 some further suggestions for overcoming procrastination are presented.

The discussion section is where as a researcher you get to critically assess research studies in your area in terms of: their quality; the important of the findings; how these finding relate to other studies and very importantly your finding; as well as any limitations of your previous research studies; and your own. It is import to remember that critiquing others research papers is not rubbishing their work but rather presenting an objective evaluation of the argument presented, the methodology employed, the interpretation of the data and the context in which they presented their findings in relation to previous studies.

The conclusion provides you with the opportunity to highlight and draw together your argument. It is a chance to recap on the important aspects of your research and to reiterate the context of your thesis or paper, demonstrating your broader understanding of the area within which you are researching.

Tips for Writing and Preparing a manuscript for submission in a Peer Reviewed Journal

The most important consideration for writing a manuscript for submission in a peer reviewed journal is the instruction outlined for authors. This will help you to decide firstly if your manuscript is suitable for submission to the journal and if it fits with the journals remit as well as helping you to decide what type of submission your research would fit best to. For example, if it is short study or new methodology it may fit as a technical note or if it is a bigger, more complete study then it may be better as an original research submission. It could be that an audit of current practice was the focus of the work carried out or a refinement of a scanning procedure and in this situation the work could be submitted as an educational piece or as a pictorial review. Also, do not forget the literature review which was conducted at the beginning of the research study used to form the hypotheses as well as provide direction to the study, this can potentially be rewritten as a review article.

Once you have decided what type of manuscript you are preparing it is then important to review the instructions for that type of submission in terms of the word count, the sections which need to be included, the number of tables or figures and the style of referencing; all of these instructions should be adhered to as the paper will not get past the first stage in the review process otherwise. The majority of journals use an on-line electronic submission process which will provide a tutorial as to how to navigate through the submission process and you will usually be guided through this process by the software. The review process itself will be outlined in the journals instructions for authors, in the case of Ultrasound a double blinded review process is used, which means that neither the authors nor the reviewers know who each other are and so an unbiased and objective review can be given which is in the best interest for the author and the journal in terms of the quality of the review process. It usually takes at least 6 – 8 weeks from submission for the review reports to be returned to the author.

As a new researcher to the process of writing a manuscript and undergoing the peer review process it can sometimes appear that the review process is very harsh as an objective report on the quality of the submission will be returned without any “sugar coating”. The first review report can often come as a shock but once you remove an

emotional connection with the manuscript and look objectively at the manuscript in the light of the reviewers comments, the process can help would to refine your manuscript to be of higher quality. It is important when reading and dealing with reviewers reports that each comment is dealt with in turn, either with the appropriate amendment to the manuscript or a sound justification as to why no amendment was made. Writing a document outlining how each of the reviewers comments were dealt with is a good way to avoid ambiguity when it comes to the reviewers reviewing the resubmission. A suggested date for resubmission is usually provided by the journal, this time for resubmission is reflective of the amount of work that the manuscript requires, i.e. a shorter time for minor corrections and a longer time for major corrections.

Conclusion

In conclusion, it is the process of writing your research findings and how they relate to current knowledge or research in the area that really completes the process of carrying out a research study or project. This process forces us to view the data collected during the project objectively and evaluate how it fits with what we hypothesized and as well as with current research findings. Therefore, from what was discussed in this paper it should be appreciated that it is good to start writing as soon as possible. By writing a critical review of the literature in your research area it provides you with the context of your research and allows you to develop your argument and refine this as the research progresses.

Table 1 : Suggestions for Overcoming Procrastination

1	Draft your contents page
2	Draft the structure of your chapter or paper
3	Note down points that you think are pertinent to your introduction or discussion
4	Set yourself a target for writing a given number of words each day or week
5	Do not be over critical of your writing in the first draft use this process to put words on the page and after this edit
6	Don't allow yourself to do something else until you have written something, starting is often the biggest barrier
7	Discuss the draft with your supervisor and use the notes from this discuss to form your argument in the introduction or discussion
8	Bring your critical eye to the work once the first draft is produced
9	Separate yourself from your first draft, reread the next day or a couple of days later to gain objectivity of your writing.
10	Read plenty of other theses or papers to help you develop your own style of writing

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