

# Writing a Good Journal Paper – A Guide for Graduate Students

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## Abstract

*PhD students are often required to publish their work in international journals to demonstrate that the work carried out is original. This brief article is written with aim of sharing the author's own experience in publishing journal papers. It is meant to serve as a guide to graduate students new to writing journal papers.*

## 1. Introduction

There are two main reasons for doing research. One reason is to come up with a solution to a problem that has commercial value and the other reason is to contribute towards knowledge. The first reason is usually confined within the realm of commercial enterprises, such as the industry. The second reason is the concern of the academia. Due to the limited financial resources, academic research is now being pushed towards commercial application as well. However, there is a major conflict between commercially inclined research and academic research. Whilst in the former publishing the work is detrimental, in the latter publication is a measure of research achievement.

The goal of academic research is publication. It is only through publication that new knowledge can be shared with the rest of the world. A thesis produced by a graduate student is not considered as a published document and thus is not listed in the major citation indexes. The research work is considered complete only when it has been accepted by the research community in that particular field of study. The acceptance is by means of journal publications. If there is no intention of publication, probably there is no need to carry out an academic research in the first place.

Writing an MSc or PhD thesis is an arduous task. However, writing a paper for publication is not as difficult as it may seem. This article provides some tips to postgraduate students on writing a good research paper for journal

publication. Although what constitutes a good paper vary from one field to another or even from one researcher to another, the tips presented in this writing merely serves as a guide to publishing journal papers based on the author's (limited!) experience.

## 2. How do we start?

In the course of undertaking a research, the graduate student would have read many related research papers published in the past. There are three main reasons for reading previously published papers. Firstly, the students needs to know what has been done in the past; secondly, what has not be solved in the past and thirdly, to find out in what ways the student's own work answers the issues not addressed by the previous researchers. If the research work is planned carefully after identifying the limitations of the past work and is carried out systematically, the work is easily publishable. Thus, study of past literature is an essential element in all research.

The student with the help of the supervisor has to decide in which journal the work is to be published. The papers reviewed throughout the course of the investigation will give a clue as to where this type work will be acceptable. However, the paper must be written to meet the standard required by the journal. The students must read the latest on-line authors guideline as many journal editors continuously update the scope of their journals.

## 3. Preparing the manuscript

Before starting to write a journal paper it is important to list down a number of points: What is the problem being solved? Why is the problem important? Has anyone in the past solved a similar problem? If yes, in what way(s) your solution is different or better? What is the contribution of your study? What is its practical significance? It is usually easier to get a paper

accepted if it focuses only on one clear problem! Since a PhD research is carried out over a long time and may comprise several stages, with each stage focusing on one issue, it is possible to publish several papers from one PhD work if it is properly planned.

### 3.1 Writing the Introduction

The Introduction section is the most important part of the paper and is also the most difficult to write. A poorly written introduction will distract the reviewer from the main focus of the paper and prompt him/her to assume that the work has been poorly carried out. A good introduction should consist of three clear paragraphs. In the first paragraph, the student should explain the background of the research. In the second paragraph, a critical review of past work should be detailed out. In the third, the authors' own contribution and the significance of the findings should be explained. In many cases, more than three paragraphs are used with each guiding the reader through various aspects of the problem being studied. However, a lengthy introduction should be avoided so that the problem highlighted is succinct.

The background should begin with a general statement that concerns the field of study, for instance:

*'Wear of cutting tool is well-known to affect tool life and the surface quality of the finished product...'*

It is not necessary to cite reference in the first sentence since these are general. The second and third sentences should guide the reader towards the problem being solved. These should include previous work that is closely related to the work reported in the paper. The paragraph should end with a problem that has yet to be solved, thus giving a hint to the reader that the author is going to attempt in solving the problem.

A detailed review of closely related papers should follow in the second (or subsequent) paragraph. The review must be critical and highlight the limitations of existing methods. Include the most up-to-date journal papers, including those in-press and cited using the DOI numbers. As a rule of thumb, it is normally good to review several papers published by the journal to which the work will be sent. The literature review paragraph should end with a general

comment on the limitations of the existing methods.

In the last paragraph of the Introduction the author(s) should explain the focus of the current paper and how it solves the problem highlighted in the previous paragraphs. Description of the outline of the paper is normally not necessary because the reader can browse the paper himself/herself to find out how the paper is organized.

### 3.2 Writing the Experimental setup and Methodology

The Introduction is usually followed by a section that describes the experimental setup used and the methodology. If the work comprises only a simulation study, then this section explains how the simulation was carried out. For experimental setups, a photograph of the setup followed by a schematic diagram will help the reader to understand the facilities used in conducting the research. Very detailed information of each equipment used should be provided, e.g. model, manufacturer, specifications etc. Detailed information is necessary to enable anyone to duplicate and verify the research results. Color images and photographs should be avoided as the final print is usually in black-and-white, unless they are essential in highlighting the points raised in the paper.

Common errors in this section include:

- i) Incompatible font or text size with figure size, i.e. using texts that are too large or too small compared to the figure.
- ii) Explaining about the figure in the caption.
- iii) Highlighting certain features in color, whilst the reviewer prints in black-and-white to read the hardcopy

The methodology is best described using a flowchart. A flowchart gives an impression that the work has been planned and carried out properly. Each stage in the flowchart should be explained in detail in the text. Remember that a flowchart shows processes rather than outputs.

### 3.3 Presenting and Discussing the Results

In this section, the authors should present and explain their results. Though the reviewer can read a table and figure out what it says, it is

normally courteous to explain what the data in a table (or figure) show. Sometimes the authors have to decide whether to use a table or a figure to show their results. If numerical values are important then a table should be used. However, if a trend is more important then a graph should be used. A graph should always be used when several sets of data or different trends are being compared. Colors should be avoided in graphs because not all reviewers will take color prints when reviewing the paper.

Since all experimental work contain errors (systematic and random) it is essential to provide some indication of the accuracy of the data collected. If an instrument is used in the measurement, the accuracy of the instrument and the range of validity of the results should be explained. Repeating the experiment several times and using mean values when drawing conclusion is necessary to show that the results are reliable.

When discussing the results, the author(s) should explain how the results solve the problem highlighted in the Introduction. A comparison with published results should also be made to show how the solution presented is better compared to those carried out by others.

### 3.4 Writing the Conclusion

The conclusion should be as concise and as succinct as possible. Avoid conclusions like '*A method for .... has been developed in this work*'. What has been developed in the study is not as important as how the developed method solves the problem and the significance of the solution. Explain exactly how you solved the problem highlighted in the Introduction. Thus, your conclusion may be written like this: '*The use of ..... method increases the accuracy of measurement by 20%. Compared to previous studies, the propose method .....* '. You may write the conclusion in a point form, though this is usually done by more experienced researchers. Ensure that what you claim in the conclusion is substantiated by data in the Results and Discussion section. Any limitation of your method should be highlighted here or explained in more detail in the previous section.

### 3.5 Writing the Abstract

Writing the Abstract is usually the last task in drafting the paper and thus has been deliberately put in the later section of this article.

An abstract is essentially a summary of the whole paper. A distinguishing feature of the abstract is that it should stand alone. Thus, the abstract should contain all the elements of the full paper in one concise paragraph: Background, methodology, results, conclusion and contribution. References to specific published literature should be avoided in the abstract.

### 3.6 The References section

The method of writing references depends on the format used in the journal in which the paper is intended for publication. This section should be written together with the Introduction where past papers are referred to. The method of citing the paper in the main text also depends on the Author Guideline given by the publisher. Although organizing the references is a trivial matter, a properly written references section gives an impression to the reviewer that the authors have not taken care in writing the whole paper.

As far as possible, only past journal papers should be listed in the References section. In some cases, text books may be cited. Conference papers should not be used in the literature review or listed because many conference papers do not undergo the same review process as a journal paper. Anyway, if the conference paper reports a high quality original research, then the work is most likely also published in a journal. References to websites should as far as possible be avoided in journal papers as web pages are changed over time.

### 4. Checking and proof reading of manuscript

Most graduate students prepare their manuscripts completely in electronic form, i.e. as a softcopy. It is easier this way compared to writing the paper and later typing it into the computer. Figures, tables and images can be easily edited and prepared in the electronic format. However, it is essential that at least one hardcopy is printed out and read word-by-word to ensure that there are no careless typographical errors, spelling mistakes and grammatical errors. A reviewer feels frustrated on seeing a spelling mistake that could have been easily checked using the spelling editor in Word. It may give the impression that the rest of the work reported in the paper may not be given due care as well.

It is best to check the paper for errors and accuracy a few days after the writing has been completed. In this way the student can give a fresh look at the paper and spot errors more easily. A manuscript should not be submitted in haste. It is extremely important that each author reads the paper carefully as the accuracy of the material reported is the collective responsibility of all the authors.

## **5. Manuscript submission and the review process**

Most manuscript submission is now done on-line. Many on-line submission systems generate a 'pdf' file that the author(s) have to check and approve. Since some large image files may not be reproduced properly in the pdf version, the authors have to look for completeness in the final document. It is easy to miss a table when submitting the manuscript on-line.

It is normal for the editor of the journal to send the paper to two or three reviewers if it falls within the scope of the journal. The review process usually takes two to three months. A reminder can be sent to the editor if the review takes longer than six months. Upon receiving the reviewer reports, the paper should be revised accordingly. If additional experimental work is required to justify the claims made, the paper will normally be rejected. Major correction comprises explaining some parts in more details, adding more references, including more data etc. Most papers submitted require major corrections. However, there are also journals that accept papers as submitted, but these are rare.

## **6. Concluding remarks**

Reading an e-mail from an editor that starts with '*I am pleased to inform you that your paper has been accepted .....*' can be the most gratifying moment of the entire research effort for many academic researchers. It not only gives a sense of accomplishment but also the pride of being part of the worldwide research community. The research work has now been documented and archived for a long time. Other researchers can build upon the work reported and thus push the frontiers of knowledge further.

Writing a good journal paper that is accepted for publication is a personal challenge. One is easily set back when the first paper is rejected. The reasons for the rejection should be carefully

studied and the paper should be improved substantially before being re-submitted to the same journal or a different journal. Persistence is often the key to successful publishing. Good luck.

## **References:**

*This article was written from the author's own experience in publishing and therefore no other material has been referred to.*