

Researcher's Awareness of Writing a Scientific Research Article for Publication

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Abstract: *Scientific research is very important for the development of societies. Way of living can be improved by researchers' achievements. Scientists write and publish research articles for various reasons, such as testing hypotheses, sharing new knowledge, solving problems, and keeping themselves updated with the latest developments in the field. Writing and publishing a research paper in a peer-reviewed journal may seem a simple task at first while, in fact, it is a complicated and time-consuming process. This article provides useful information for academic authors, postgraduate students and researchers, who intend to write and publish their research papers in peer-reviewed journals, which could be a requirement for promotion or graduation. It is written in simple English which makes it easier to understand, especially, by non native-English speakers and will surely increase the manuscript's probability of being accepted for publication.*

Keywords: awareness, writing, publishing, scientific article.

1. Introduction

Conducting research is significant for the improvement of the quality of life. It enables us to discover and test new facts, develop new tools, and solve challenging problems. Writing and publishing results for the scientific community is the duty of researchers. It was reported that an English novelist said "We don't write because we want to; we write because we have to" (Gogtay and Sarkar, 2009, p. 237). Research findings can not be noticed until they are published. Research can be seen by most scientists, students and researchers all over the place when it is successfully published. It would not be egsaggeration to say that a completed research that has not been published is the same as a research that has not been done at all (Gopikrishna et al, 2010). Publishing research results allows authors to expand science, get promoted, and preserve scientific heritage of findings for the next generations (Peh & Ng, 2008). In addition, being a good scientific article writer helps in gaining recognition for you and your institution (Yore et al., 2004).

A scientific research article is defined as "a written and published report describing original research results" (Day, 1983, p.8). It is a research study carried out on a particular topic in a scientific way by some researchers and presents their interpretation or evaluation and usually published in a peer-reviewed journal. Writing a scientific paper for publication requires good writing skills. If a paper does not meet certain requirements concerning the way of writing, it has a little chance of being accepted for publication. A scientific article must answer a number of questions regarding the problem being studied, the importance of the study, the methods used, the results and their implications, and the future recommendations.

Although various books and articles about writing research articles for publication have been reported (Day, 1983; de Figueiredo, 2010; Falcão et al, 2016; Starovoytov, 2017), many researchers still find it a dreadful task, particularly, those who are non-native speakers of English.

This article is based on a series of presentations the author has presented for the academic staff of Sabratha University and the author's personal experience in this field. It aims at providing researchers in all disciplines of science with useful information about how to write scientific papers for publication in peer-reviewed journals. Although, in many cases, researchers learn about writing and publishing research articles by practicing through trials and errors, following the information provided by this article will surely make the process of writing much easier and more manageable.

2. Part one: Writing a scientific research article

2.1 Before writing

Writers often need to design a plan for their articles before start writing. They also need to review the relevant literature in order to draw a connection between their works and previous ones. Research article writers need to consider the fact that their articles have to be evaluated by some experts in the field before publication. It is also important to follow the guidelines and instructions of the publishing journal.

2.2 Types of research articles

There are many types of research articles. The following are the most common ones:

- 1- Full-length research article: This type of articles is also called a regular or an original article and contains about 15-30 pages. It is a comprehensive study of a subject and normally consists of the common structure (abstract, introduction, results,....etc). The present article will focus on this type of papers.
- 2- Review article (about 50 pages): This article provides a summary and/or a critical evaluation of a specific subject without introducing new results. It may also include comparison, analysis and identification of gaps of previously published research. In addition, this type of articles may suggest recommendations for future work.
- 3- Short (brief) communication article (around 5-10 pages). Although this article provides the literature with significant contribution, it is not as detailed as the full research article and may have a different structure (i.e. methods, results, and discussion sections could be combined).

2.3 Research article structure

The structure of a scientific paper varies from journal to journal. For details about article structure, check the *Instructions to Authors* of the journal you intend to send your manuscript to before start writing. Most papers follow the “IMRaD” format with some variations. The “IMRaD” is abbreviation for introduction, methods, results, and discussion. However, in many journals, articles are subdivided into the following sections: title, authors’ names and affiliation, abstract, introduction, methods, results and discussion, conclusion, acknowledgments and references.

2.3.1 Title

This part tells the reader about the idea of the paper and it is usually written after finishing writing the whole article. In fact, the title can be written in the beginning and modified several times during the writing process, and finally after the process of writing is completed. It is the part of the article that is seen first. Therefore, special carefulness should be taken when choosing it. It should be centred at the top of page and not underlined or italicized, simple, attractive, informative, clear and concise (usually not more than fifteen words). In addition, it should not contain any abbreviations or symbols unless they are well known by the readers (Peat et al, 2002). According to Day (Day, 1983), the good title can be defined as “the fewest possible words that adequately describe the contents of the paper”.

2.3.1.1 Types of title

There are various types of titles, the most used ones are as follows (Jamali and Nikzad, 2011):

1. Indicative (descriptive) title. This is the most frequently used title by authors (Bavdekar, 2016). It describes the subject of the article in general and does not indicate any results or conclusions. For example: “Behavior of chitosan in acetic acid solutions”.
2. Declarative (Informative) title. In addition to describing the content of the paper, this title includes a statement about the results presented in the article. Unlike the descriptive title, this type makes the reader less curious about reading the entire article. For instance: “Higer temperature leads to a significant reduction in chitosan viscosity”
3. Question-type (interrogative) title. This title is in the form of a question. For example: “How to write a scientific research article?”. According to Jamali and Nikzad (2011), articles with this type of titles have less citations but more downloads than the others.
4. Compound title. This type contains more than one of the above titles. Example: “Does high temperature have a significant effect on chitosan viscosity? A statistical approach”.

2.3.2 Authors’ names and affiliation

The title should be followed by authors’ names and then their affiliations. Complete contact information for the corresponding author should also be provided.

2.3.2.1 Ordering of authors

It seems that there is no certain written rule for author order since it depends on the decipline. However, in many cases, the first (main) author is the researcher who has undertaken most of the work and responsible for preparing the manuscript with the co-authors. The co-authors names are usually listed in descending order of contribution. The corresponding author is the one who may write the whole or part of the manuscript and accountable for manuscript correction and proof-reading. He/she also takes responsibility for communication with the journal editor until the manuscript is accepted/rejected. The corresponding author’s name is usually marked with an asterisk in the paper. As for students and supervisors, the common practice is that the student is the first author while the supervisor is the corresponding author. Please note that the corresponding author could also be the main author at the same time. From my point of view, the corresponding author is as important as the first author, if not more so, and in many cases, articles could not have seen the light of day without the enthusiasm and efforts of the corresponding author. Anyhow, all the authors should discuss about the author order from the beginning.

2.3.3 Abstract

Similar to the title, this section is usually the last to be written. It is a condense of the entire paper into one paragraph. It is considered as the most read part of the paper and the editor's decision is strongly influenced by its quality. The abstract should summarize the problem, objective, methods, results, and conclusions and should be kept as short as possible (usually between 100–250 words). It should also be simple, informative and written in the past tense. Moreover, this section should not contain references, figures, tables or charts. It is required to provide key words at the end of the abstract, which are used by search engines. These key words should describe the content of the whole article.

2.3.4 Introduction

Briefly, this section could be the answer to the following question: *What is the purpose of conducting the present work?* A good introduction should start with a statement of the problem being investigated and reasons for studying it. Give general background on the research topic moving from the general to the specific (like a logical or descriptive funnel). State the research question and its importance. Discuss the results of studies previously published related to your subject (short survey). Use present simple tense for referring to facts, such as background information and proven theories, or when you are explaining the importance of the work. Use past tense for literature review. You can also use present perfect tense (passive voice) when referring to the previous work. The objective and scope of the study is often expressed clearly at the end of this section.

2.3.5 Materials and Methods *How did you do the study?*

The purpose of providing this section is the possibility of reproducibility. All tests, methods, experiments, processes, structures and samples should be included in this section. Also, include description of materials (scientific names, purity and supplier), used techniques (model, manufacturer and country of origin), and data collection. If a technique is new, give sufficient details about it. As a rule of thumb, when using a standard method, you just cite the relevant reference. Provide maps, tables, flowcharts, and equations when necessary. Finally, you should indicate the statistical analysis method performed for analyzing the results. In brief, mention everything you did that may be important for the reader to know. Past tense (passive voice) is often used in this section unless referring to figures or tables thereby present tense should be used.

2.3.6 Results *What did you find ?*

This section should be dealt with the results only, no discussion or interpretation (Van Wagenen 1990). It should summarize and present the collected data and their analyses in tabulated and/or graphic forms. Use tables when absolute numbers are important and use graphs when trends are important, but do not duplicate reporting of data. All tables and figures must be numbered. Table titles are placed above while figure captions are located below. For showing relationships among data clearly, tables and figures must be clear, convincing and self-explanatory. Describe all findings including unexpected results, but do not discuss the implications of the results or give opinions. Show the accuracy by providing necessary descriptive statistics, such as means and standard deviations and include any statistical analysis used. Past tense should be used for describing obtained results and present tense for referring to tables and figures.

2.3.7 Discussion (heart of the paper) *What does it mean?*

This is where you can discuss and interpret your findings and provide an answer to the research question. This section is normally combined with the results or the conclusion section. Show whether your results agree or differ from earlier studies and highlight the implications, strengths and limitations of your work. End with a brief summary concerning the importance of work and relate your discussion back to the objectives. Remember that your discussion should be concise and informative. Finally, the writer may suggest recommendations for further work. Normally, the past tense is used when summarising the observations while present tense is used when interpreting and explaining the finding and the significance of work.

2.3.8 Conclusions

This part is sometimes optional, depends upon the journal. The purpose of including this section is to restate the key questions and give a summary of all the significant findings, interpretation and limitations of the work. Avoid repeating the abstract and support your claims with the evidence. Suggest applications and recommendations for future work and give the paper a strong closing! Use past tense for highlighting the findings and limitations of your work and use present tense for offering suggestions for future work.

2.3.9 Acknowledgements

This is an optional section. Acknowledge people (colleagues/consultants/technicians) who contributed to the article, but not sufficiently to merit authorship. Name the sources of funding that supported the research and state the grant number, if possible.

2.3.10 References

List all references you cited in the text according to the referencing style of the target journal (*instructions to/for authors*). Number of given references must be sufficient. Using bibliographic softwares, such as EndNote or Mendeley to store your references is highly recommended. This will enable you to make changes easily when needed. Make sure you have listed all references cited in the text, otherwise you may be charged with plagiarism.

2.4 Plagiarism

Plagiarism is a serious problem that writers face. Many definitions of plagiarism have been reported in literature. For example, and according to the Longman Contemporary English Advanced Learner's Dictionary, the plagiarism can be defined as "when someone uses another person's words, ideas, or work and pretends they are their own". Similar definition is given by the Cambridge English Dictionary "the process or practice of using another person's ideas or work and pretending that it is your own". Giles (Giles, 2005, p. 258) reported that plagiarism is defined as "attempting to pass off someone else's work as your own. Duplicate publication, or self-plagiarism, occurs when an author reuses substantial parts of their own published work without providing the appropriate references". It is the use of the whole or part of the published work intentionally or unintentionally of another person or people in your work without citing the source. There are many types of plagiarism, the most common ones are as follows:

- 1- **Word for word plagiarism:** The exact copying of a text (copy and paste).
- 2- **Paraphrasing plagiarism:** Rephrasing an author's words into your own words without acknowledging the source.
- 3- **Self-plagiarism:** The republication of the same or similar work in more than a journal or the reuse of substantial parts of your own published work without acknowledging it (Dellavalle et al, 2007).

2.4.1 Avoiding plagiarism

To avoid plagiarism, always give credit when summarizing or rephrasing others' words, ideas, opinions...etc. When using others' exact spoken or written words, quotation marks must be provided. All references must be cited accurately. No need to acknowledge facts that are common knowledge. However, if you are doubtful whether a statement is common knowledge, acknowledge it (It is better to be safe than sorry) (Bahadori et al, 2012).

Important notes

- 1- Manage time while writing your article (avoid procrastination).
- 2- Spend many hours reading books and articles relevant to your topic.
- 3- If you have two or more new and important ideas, do not consider them in one article.
- 4- Start writing while experiments are still in progress.
- 5- Writing a research article is a challenging task. No one gets it perfect first time.
- 6- Have a friend or colleague read your draft. Listen to what they say and accept their comments and criticism.
- 7- Do not write long paragraphs. Readers find them boring to read. Instead, break them up.

3. Part two: Publishing a scientific research article

3.1 Selection of the journal

After spending several hours writing your manuscript, the time has come to deal with the submission process after choosing the right journal. Check journals that have published articles related or close to your topic (cited references can be a good indication). Wrong choice of the journal will lead to the rejection of the manuscript. Considering the following criteria will help you select the right journal:

- 1- **Impact factor:** The impact factor of a journal is defined as a measure of the importance/rank/quality of a journal through calculating average number of citations to articles published in a particular year. Generally, the higher the impact factor value, the lower the acceptance rate. Although the impact factor is important in determining the quality of journals, other factors such as reputation and quality should not be neglected.
- 2- **Types of published articles** (full-length, review, short communication, case study ...etc).
- 3- **Charges:** Some journals charge fees for manuscript processing/publication, peer review or page color. You should be aware of all these fees before submitting your manuscript.
- 4- **Speed:** Although some journals publish weekly or monthly, others take several months and sometimes more than a year to publish. Check the "date received", the "date accepted" and the "date published" of some published articles of your target journal in order to estimate the average time to acceptance or rejection and the average time to publication.
- 5- **Focus:** Select the journal that focuses on areas related to your topic and matches your need. Most journals describe their specialization in their websites.
- 6- **Open access:** Check whether the journal offers an open access for published papers. Choosing an open access will increase the visibility of your work, and therefore increase the citation rate of your research. Please note that some open access journals charge fees for publication.

3.2 Before submission

Before you submit your manuscript to the chosen journal, you should read the final draft carefully, and then let your co-authors and one or more colleagues read it and get their feedback. Do not submit your manuscript to the target journal until it is approved by all co-authors. For saving time, if you are not sure about the choice of journal, you can contact and discuss with the editor by sending him the manuscript outline.

3.3 Submitting the manuscript

After following the journal's guidelines, your manuscript is ready to be sent. Most journals encourage electronic submission. Mailing hardcopies to the journal address is becoming less common nowadays. It is sometimes compulsory to write a cover letter to the editor including the title of the paper, names of the authors, importance of the article and its contribution to the scientific community. The letter should also state that the paper is not under consideration elsewhere.

After submission is done, the manuscript is normally checked for format and length suitability, plagiarism and fitting the scope of the journal before sending to reviewers (some journals encourage authors to suggest reviewers). Some editors do a quick scan for the whole manuscript prior to suggesting reviewers. If the manuscript is judged to be initially appropriate for publication, the reviewers are then suggested. Please note that many manuscripts are desk rejected (rejected without peer review).

3.4 Reviewing process

Reviewers play a significant role in determining validity and originality of the research, and their suggestions can significantly improve the manuscript. Based on their feedback, the editors will make a decision. The comments of the reviewers will include one of the following: accepted without revision (rare), accepted with revision (minor or major revision), or rejected. Please note that although the peer-review process is the best way available for manuscript evaluation, it is not always perfect, and many rejected manuscripts are published in another peer-reviewed journal. Figure 1 summarizes the peer-review process from submission until acceptance or rejection.

Generally, there are three types of review process; open (reviewer and author are known to each other), single blind (the identity of the author is known to the reviewer, but not vice versa) and double blind (reviewer and author are not known to each other). Among the three types mentioned above, the single blind review is the most practiced one.

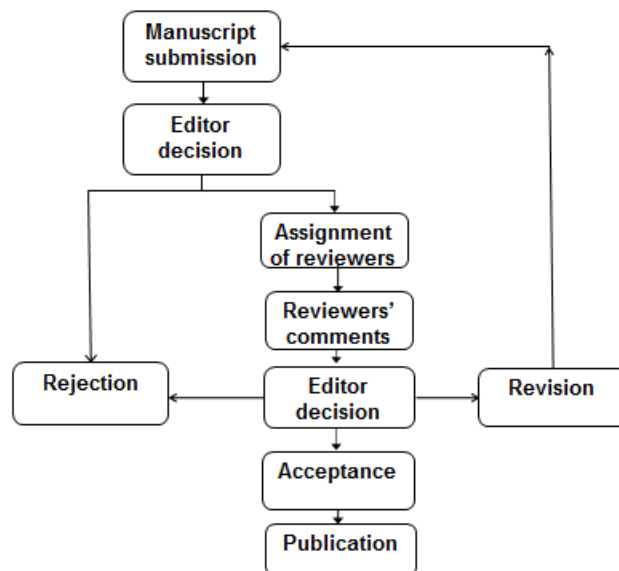


Figure 1: Schematic representation of the peer- review process

3.5 If your manuscript gets rejected!

If your manuscript was rejected, smile, relax and take deep breath. Be optimistic and do not give up! It is not the end of the world and even great scientists sometimes get rejection letters. Remember that “He who makes no mistakes makes nothing”. After

relaxation, read the referees' comments carefully and discuss with your advisor/collaborators/co-authors to improve the quality of the manuscript, and then submit it to another journal. DO NOT submit the same manuscript to another journal without making the revisions.

3.5.1 Common reasons for rejecting papers

There is a number of reasons for manuscript rejection (Nasef, 2007; Linton, 2012), which should be avoided. The most important ones are as follows:

- 1- Not following the author guidelines recommended by the journal.
- 2- Out of the journal's scope,
- 3- Poor organization.
- 4- Weak writing.
- 5- Plagiarism issues.
- 6- Excessive self-citations.
- 7- Unclear objective.
- 8- Incomplete methodology.
- 9- Weak discussion.
- 10- Too long manuscript.
- 11- Poor Language.

3.6 Revision and resubmission

When revision is suggested, consult your co-authors for improving the manuscript. Read the reviewers report on your manuscript carefully and respond to their comments point by point within the given time limit. The common procedure is to begin your reply with thanking the reviewers for sparing time evaluating your manuscript. Then, present your response in different color after reviewers' comments immediately. Delay in response may lead to considering your manuscript has been withdrawn. Do not respond to the reviewer comments in an argumentative way. If you disagree with some comments, be polite and support your claims with solid evidence and a convincing explanation. After resubmission, the revised manuscript will be checked by the editor before forwarding to the reviewers for another round of evaluation. If reviewers are satisfied with the corrections you made, the manuscript will be accepted for publication. Otherwise, the reviewers may suggest further corrections for improving the manuscript.

3.7 If your paper gets accepted

Once the manuscript is accepted, you will get the proof reading as well as the copyright transfer agreement (usually via email). Correct errors resulted from setting the paper in journal format and fill in the copyright agreement form for sending them back to the editor. You will receive a confirmation email from the editor, and your manuscript will then be published. Celebrate!

4. Conclusion

This article has given an introduction to the main elements of a good scientific article and the steps of the publication process. Some sections of a scientific paper, such as the title and the abstract, require special attention while other sections, such as the conclusion, are usually optional. Although the publication decision lies on several factors like the quality of work, following the instructions provided in this article will surely maximize the publication opportunity in peer-reviewed journals

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