



Writing an Effective Abstract for a Scientific Paper

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Abstract

The publication of scientific paper is an integral part of the research communication process and the career in academia. In the course of scholarly writing, writing an abstract for a scientific paper is both a crucial and challenging endeavor; it should be accurately represented succinct summary of an entire document. The paper discusses the basic format with essential key components of a good abstract for a scientific paper writing and provides a basic guidelines for novice researchers and academia. The paper is based on review of scientific paper, extracted systematically from 'Google Scholar' search engine by using basic search strategy. An exhaustive but selective method was used to select the relevant literatures. In fact, the primary purpose of an abstract writing is to facilitate the communication of key findings with the readers so they can easily and quickly ascertain the gist of an entire work. More importantly, when writing an abstract, the fundamental five key components such as research context and objectives, brief outline of materials and methods, key findings, conclusion and significance/implications should be taken into account to accurately represent the entire paper. A well-written abstract enables readers to quickly and accurately recognize the fundamental content of a manuscript.

Key words: Abstract, writing, scientific paper, academia

Introduction

I have the strong impression that scientific communication is being seriously hindered by poor quality abstracts written in jargon-ridden mumbo-jumbo". -Sheila M. McNab

Reflecting upon this statement, in almost every field of professional life, quality writing is an essential component in the formation of social realities, institutions, and personal identities. Moreover, scholarly writing is significant to academic communities as well as society at large, as it describes its role in academic persuasion and knowledge construction (Hyland & Salager-Meyer, 2008). Good scholarly writing is difficult and time consuming. However, good scholarly writing has a number of attributes: the first can communicate to the accuracy and completeness of the information, while the second can communicate to the clarity of the writing. Scholarly writing should be so clear and concise that no room for ambiguity exists (Roush, 2017).

However, writing an abstract for a scientific paper is not merely writing one-paragraph of research content at the beginning of the manuscript; it must accurately and succinctly summarize the extensive body of work. It is crucial that abstract is written in a sharp and succinct manner. According to Weil (1970), an abstract is an abbreviated, accurate representation of a document. Abstracts of scientific papers are occasionally poorly written, lack important information, and present a skewed picture (Andrade, 2011). Thus, an abstract must set the tone for the rest of the paper. It establishes the first

impression. The abstract should convey the essence of the paper or article (Lim, 2022). The abstract is the last section to be written but it is the most important part of a paper because the abstract entices the reader to read the complete manuscript (Liumbruno et al., 2013). Historically, the first abstract in the form of a single paragraph was published in 1960 in the Canadian Medical Association Journal, with the idea that readers might not have enough time to read the entire paper, and a defined structured abstract was first published in 1991 (Nundy et al., 2022).

Therefore, scholarly writing an abstract for a scientific paper is both a crucial and challenging endeavor (Khatri, 2020). However, it may be hard in the beginning for novice researchers and beginners in academia. The exchange of ideas is essential for the advancement of all professions. Producing an abstract is a crucial component of this process, and it must be carefully planned if it is to serve its purpose correctly. The abstract enables readers to quickly grasp the purpose and major ideas of a paper, as well as informs other researchers whether reading the entire paper is worthwhile. Where authors “sell” their research productivity via abstract if done well, it will appeal to potential readers, prompting downloads and citations (Lim, 2022). Hence, this paper examines how authors can write an effective abstract when writing a scientific paper i.e. journal article or conference paper. For this, it presents the basic elements of good abstract for a scientific paper writing. Although the primary target of this paper is to serve as a guideline in abstract writing for novice researchers and beginners in academia.

Materials and Methods

The paper is based on available literatures from Google scholar search and author’s knowledge and experiences in scholarly writing. The selection of electronic databases is based on the relevancy and appropriateness of the topic area. To ensure the appropriateness and relevancy of the electronic database, the search literatures were evaluated and selected based on the coverage, focus, and structure of scholarly scientific papers in an abstract writing. To select the relevant literatures, an exhaustive but selective method was used.

Writing an Abstract for a Scientific Paper

The abstract should be written last, after all other sections have been completed. Writing abstract for a scientific paper is an important but difficult task to write and publish in academic journals. A large percentage of manuscripts submitted to academic publication are rejected due to poor writing (Jalalian, 2012). An abstract is a concise, brief, powerful, and complete summary of manuscript used to assist the reader in quickly determining the purpose of the manuscript. According to Cambridge Academic Content Dictionary, an abstract is ‘a few sentences that gives the main idea in an article or scientific paper. In scientific papers, abstracts are written in the form of a paragraph, usually of 150-250 words (check the guidelines for the word count).

A scientific paper is structured to meet the requirements of credible publication. It is highly sophisticated, with distinct and easily discernible component parts (Table 1). However, the contents of an abstract for a scientific paper vary across disciplines, journals, subject of scientific paper, and standards. For instance, According to Hartley and Betts (2009), a good abstract in social sciences should include a background, goals, methods, participants and location of study, results/findings, and conclusions/implications. Jamar et al. (2014) mention that an introduction of three sentences should include context, previous research, and the research's main theories in technical and library sciences. Method written in three sentences should provide “an exact description of the method used”.

Three sentences in the results should summarize the findings, and two sentences in the conclusion should discuss the implications. According to Gastel & Day (2022), an abstract should be viewed as a miniature version of the paper. The abstract should include a succinct summary of each sections: introduction, materials and methods, results, and discussion (IMRaD). Hence, the format of your abstract depends on the field of research and guideline (check list), in which you are working. Therefore, authors can craft an effective abstract by considering the following key components in a sequential manner (Figure 1 and Table 2).

Table 1: Abstract writing: Key components, guidelines for content design and strategies for content organization

<i>Key components</i>	<i>Guidelines for content design</i>	<i>Strategies for content organization</i>
Title	Title is your first impression; hence title should be well-worded and catchy as well as concise, accurate and informative. It should tell the reader exactly what the article is about. However, it should indicate accurately the subject and scope of the study. The title should include key words or phrases of study variables. A good title that accurately expressed the topic of the article and made it clear to the reader exactly what the topic was.	Be descriptive in title. Your title should be one-sentence punchline about your research. Incorporate relevant key words or terminology to help the readers find your research more easily. It is better to limit in less than 15 words and avoid abbreviations
Research context/gap & objective	In this section, the opening sentence summarizes the current state of knowledge (contextualize) on the topic and reveal the research gap. They describe what researcher/s already know with the help of literature. Begin the abstract with a sentence or two explaining the context of the study that attracts the readers quickly. However, readers (researchers) don't know everything; so you segue the existing gaps of the study and limitations. And you clearly state the precise objectives or specific purpose of the paper to address the research questions here.	Explain the specific problem you are addressing. Why is this study important in your field? Let the reader know why the research was undertaken. If the research new or novel, explain the gap in knowledge that your research is addressing. If you are adding to existing research, explain why this is important to do this. If the readers don't grasp the problem, they won't care about your research.
Materials & methods	You must now explain how you carried out your research. This section describes your methodology in broad terms so that readers can be confident in the rigor of your research.	Let the reader know how you tested your hypothesis; describe your study design, sample, study protocol, dataset that you used.
Key findings (Results)	This section will vary depending on whether you have developed a hypothesis or not. You describe on what you have found or what you expected to find. Display only the results that are directly related to the research objectives and conclusions. Because it captures the essence of your research. It should be written at a level that is well pitched the expertise of your intended audience, whether you are highly specialized researchers or educated laypeople. The major findings of the	Let the reader know what you found during your research. Did you accept or reject your hypothesis (if)? Did you answer the questions that you set out to explore? How did you study yield in concrete terms? Where there highly unexpected outcomes or were they largely predicted? Don't offer interpretation, reflections, or any discussion about your research at this point. This section will

<i>Key components</i>	<i>Guidelines for content design</i>	<i>Strategies for content organization</i>
Conclusion	research must be specified, but do not attempt to write lengthy evaluations of the research. State the overall reflection of the paper in gist, more stick in results-outcomes. Ensure that your conclusion is not exaggerated and is well-balanced. Whatever you claim or argue in the conclusion must reflect what is in the key findings of the research. It can be used simple and straightforward sentences in response to the objective and is solely based on the study's results.	increase your word count slightly. Conclude the results, what are the exact effects of results on the research field or the wider world? What other information is needed to expand knowledge in this area? What other kinds of studies would yield further solutions to the problems. It is the key takeaways of the article or study (i.e., the “discovery what”).
Significance/implications	Finally, in order to leave readers with an understanding of why your research work is pertinent, you must comment on the significance and/or implications of your researcher. There can be one sentence about the study's applications and significance. You can specify the people or the area where the study's findings can be applied.	Let the reader know why this research is important. What are the practical or societal implications of your research? More specific you can be, the better. The value/originality of the study (i.e., the “so what”).
Key words	Key words are a tool that assists indexing and search engines in locating relevant papers. If database search engines can find your journal manuscript, readers will be able to find it as well. This will increase the number of people who read your manuscript, resulting in more citations. Everyday words you think of in relation to your topic.	Read through your paper and identify any key terms or phrases that are most relevant to the topic of your work. Simply search with your key words to ensure the results are relevant to your scientific paper. Generally, it is limit in 3-5 key words or phrases.

Source: Anstey (2014); Plakhotnik, (2017); Hochberg (2019); Gastel & Day (2022). Derntl (2014); Rosenfeldt et al. (2000). Schultz (2009); Gastel & Day (2022); Jamar et al. (2014); McAdoo (2015). Burrows (2011); <https://authorservices.taylorandfrancis.com>

Example: Abstract	Key Components
Utilization of remittance at household level: A case of Khanigaun Village of Resunga Municipality, Gulmi District	Title
<p>The rural out-migration for labour of Nepal is a common livelihood strategy at household level. The remittances sent home by the migrants affect development at both the household and national level. With this consideration, this paper aims to examine the utilization of rural-out migrants' remittance at household level in Khanigaun Village of Resunga Municipality, Gulmi District. The study is mainly based on primary data and has utilized mixed method. The primary data were collected from 120 randomly selected sample by using household survey questionnaires and focus group discussions. The study households were those where at least one family member of household who are working in the foreign country. The study shows that majority of migrant households utilized remittance for consumption of food and very few households utilized remittance in investment purposes like business, real estate, and savings. As a results, household investment in business or productive sectors and savings were rather small, but remittances were also seen as important financial means for investment in human capital (i.e. education, health and hygiene), housing and land purchase. Therefore, the study concludes that most of migrant families had improved their living standard to some extent from the remittance money so far, either they used productive or not is in the debate. This paper suggests that workable policies and programs need to be developed by Nepal's policy makers for encouraging the utilization of migrants' remittances for productive use from household perspective as well in order to promote sustainable investment and growth.</p>	<p>Research context & Objective</p> <p>Materials & methods</p>
	Key findings (Results & discussion)
	Conclusion
	Significance/ Implications
Remittance, Out-migrant, Utilization, Household level, Khanigaun village	Key words

Figure 1. Format and example of abstract (Khatri, 2017)

Table 2: Some tips and checklist for writing an abstract

<i>Some tips for writing the abstract</i>	<i>Checklist for title and abstract</i>
✓ Abbreviations should be avoided unless the full expression is both lengthy and frequently used (Yang, 1995; Gustavii, 2008; Day, 1988).	✓ Accurately design title and abstract from keywords to represent the main sections.
✓ Citations should only be used when absolutely necessary (Yang, 1995; Gustavii, 2008).	✓ Use key words/phrases at the beginning of the title.
✓ Do not refer the reader to another article for information (Yang, 1995).	✓ Avoid abbreviations and passive voice as far as practicable (title and abstract).
✓ Do not provide information that is not included in the entire article (Day, 1988).	✓ Contextualize the study and specify objective (abstract).
✓ For the most part, if not all of the writing, use the past tense (Day, 1988).	✓ Begin the results section by responding to the research question and objective (abstract).
	✓ Briefly describe methods and indicate sample size (if (abstract)).
	✓ Confirm if the abstract covers the 4 Ws [1) Background: What is known and why is this study needed?; 2) Methods: What did you do?; 3) Results: What did you find?; 4) Discussion and conclusion: What does it mean?]
	✓ Ensure that the abstract can be read separately from the main text.
	✓ Revise title and abstract when the main text is revised.

Source: Cals&Kotz (2013); Cited in & adopted from Burrows (2011).

Conclusion

The process of writing an abstract for a scientific paper is an essential part of the research process. Good abstract writing comes from application of the basic principles and guidelines. The focus on the primary issues of why the work was done, how it was carried out, what was explored, and what the potential implications are the key aspects of writing the abstract. An abstract is a concise summary of core components of the entire paper that should be coherent, unified, and readable. The paper suggests that researcher should follow the logic of four C's (completeness, concise, clear and cohesiveness) in abstract writing for a scientific paper.

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