

To read: A Practical Guide to Writing an Abstract

A PRACTICAL GUIDE TO WRITING AN ABSTRACT

An abstract is a self-contained, short, powerful statement that describes a larger body of work. In scientific communications an abstract is a tool used in a variety of contexts; it is an integral part of a published paper, book, funding proposal, thesis, research report, or a conference paper. In a scientific paper the abstract is an accurate summary of the main aspects of the entire manuscript, usually in one paragraph of 150 - 300 words, using a simple, clear way of writing.

The ability to write an informative, accurate, attractive and concise abstract is a valuable skill for researchers. Writing a good abstract requires a considerable amount of time, effort, practice, mentoring, and patience.

The Function of the Abstract

An abstract has three main functions: (1) provides a summary of the paper, (2) “sells” the paper to the editors, reviewers, and potential readers, and (3) helps with the indexing of the paper, making it retrieval by various search engines. An abstract generally answers at least three critical questions including “Why this study was carried out?”, “What did the author do and how?”, and “What was the main result and what was new compared to previous works?”

The abstract motivates the readers to go through the main text as it is the main mechanism by which readers decide on whether they should obtain and read the full paper .

The abstract is also used for indexing purposes, as most databases enable readers to search abstracts and to have a quick retrieval that limits the extraneous items recalled by a “full-text” search

Content of Abstract

The abstract consists of four basic parts:

the study question/hypothesis/objective,
the experiments/methods conducted to answer the question,
the results of the study, and
the answer to the question.

Furthermore, the abstract may start with some background information, which will put the current study into perspective. The abstract may, then, end in applications, implications, recommendations, or speculations based on the answer to the question. The basic elements of abstract template are presented in the table.

	Abstract Section	Comments
1	Introduction/ Background	2-3 sentences of background information to focus on the importance of the study question: (1) what is known (2) what is unknown (knowledge gap/ problem)
2	Study question/ Hypothesis	What the study intended to examine
3	Methods and materials	Methods and materials observation
4	Results	Selective and most important results that answer the question
5	Importance of findings	A sentence stating the application, recommendation, or speculation based on the answer

Introduction (Background)

The background information should be brief and in harmony with that given in the introduction section of the paper. It starts with a general topic (what is known in the field) and knowledge gap or problem, and narrows down to a specific topic (study question/hypothesis) of the study. The beginning can be more

interesting by creating stress, e.g., by making a statement followed by «however» or «but» and then «stating a problem», «contradiction», or «gap in knowledge».

Hypothesis/Question

Study question/hypothesis or objective is a clear statement of the main aim of the study and major hypothesis tested or research question. Without addressing the study question/hypothesis, the abstract is meaningless and lacks an anchor for understanding the methods or the results.

Materials and Methods

To emphasize the materials and methods used, essential and more important details are enough to indicate “how the hypothesis was tested”. They may include design, setting, subjects, the main outcome (s) and a brief description of statistical methods. When authors address the study setting, they need to give general rather than specific information.

Results

Not all results, but only the most significant (those answering the question) are presented in the abstract. The main findings should be presented not as general and broad statements but as specific results/data and their statistical significance (absolute numbers, percentages, means). To make the abstract more efficient, details of the experiment may be included in the statements of the results.

The results presented in the abstract should be arranged in a logical order, including chronological and importance order (most-to-least or least-to-most important).

Conclusion(s)

In this section, the author needs to state whether the hypothesis is accepted or rejected based on the data presented. The conclusions should be straightforward, brief, and specific to the study findings/observations. If word limit permits, the conclusion may begin with an opening statement such as «Our study showed ...» or «Our results indicated...». New and important aspects of the study or observations need to be emphasized. To answer the question, use the same key-terms, point of view, and verb as in the question .

In the final sentence, state the importance of the work. This can be presented by stating the applications, recommendations, implications, or speculations that are based on the findings. Try to avoid any broad/general statements about the need for more research; instead, give explicit recommendations for further studies. Authors are advised to be specific and focused on their findings, do not overestimate the importance of them, and avoid broad claims and strong statements.

Organization of the Abstract

An informative abstract is organized in the following order: background (if any), question, experiments, results, answer to the question, and importance of the work (by stating applications, recommendations, implications, or speculations). Journals may favor an unstructured abstract, which is just a conventional abstract with running text; or they may prefer a more structured format that has distinct labeled sections.

Compared to the traditional format, structured abstracts provide more details, with clear headings for the main components of the abstract . This format also enables the readers to quickly judge about applicability and validity of the findings. Structured abstracts are also easier to search and more simple to read, and are generally welcomed by readers and authors. The structured abstract, however, has been criticized for its greater length and its imposed style and rigid uniformity that may inhibit author creativity and may bore the reader.

Features of a Well-Written Abstract

A good abstract is simple, specific, clear, unbiased, honest, concise, precise, complete, and structured. Since readers may never read further than the abstract, it should provide a general understanding of what was studied, how the study was done, what was found, and what conclusions were drawn. A well-written and informative abstract stands on its own, apart from the rest of the manuscript. An important feature of a

well-written abstract is keeping continuity, defined as moving smoothly from the background information to the conclusion. Of course, a good abstract must be based on data already collected and analyzed. Reading abstracts from recent issues of the target journal may also provide some helpful hints. Some general tips to write an effective abstract are provided in the table

Writing Tips for making a Good Abstract

Parameter	Details
Continuity	Use the same key-terms; use consistent order of details; use a similar point of view in the question and the answer; use either parallel form or consistent point of view for comparisons and other parallel ideas
Verb tense	Use past tense for the experiment and the results; use present tense for the question; use past/present tense to answer the question
Sentence Structure	Use short sentences; avoid noun clusters
Abbreviations	Abbreviations are useful once a long-phrase must be repeated several times in the abstract (if an abbreviation is used in the abstract, it must be explained)
Signaling to the topics	Use signaling the topic at the beginning of the sentence: (1) Question: To determine... (the word "hypothesis" help the reader to find the hypothesis of the study easier); (2) Experiment: To test the hypothesis..., to answer the question...; (3) Result: We found...; (4) Answer: We conclude/concluded..., therefore, ...; (5) Implication: These findings suggest that...
Length	Follow the author guidelines (usually 250 words or less is recommended). Some strategies for shortening an abstract: (1) Eliminate meaningless phrases; (2) Eliminate phrasal verbs and superlatives; (3) Cut prepositions, especially "of"; (4) Change noun phrases to verbs

The Procedure for Writing an Effective Abstract

Writing an abstract requires careful, logical, and clear thinking. To draft an abstract, a stepwise process needs to be followed. Planning, drafting, reviewing, peer-reviewing, editing, and packaging are proposed as essential steps of developing an abstract. Overall, the initial step is to consider the manuscript entirely and select key contents, weight the importance of each word, and iteratively polish the story. In drafting an abstract, a practical and efficient suggestion is to copy and paste from the main text. Thus, 2 - 3 key sentences can be selected each from the introduction, material and methods, and discussion (mainly the first or the concluding paragraph), and several sentences from the results (including statistical analysis). Next, the obtained unfocused and disorganized text needs to be extensively edited by removing unnecessary details and extra words to provide coherence and a natural flow.

The first draft is proposed to be set aside for 1 - 2 days (a short resting period) and then, the author needs to edit it again or send it for peer review by an unbiased outsider (e.g., a colleague, advisor, other mentors) to give thoughtful, concise, and honest criticism of the work. After careful consideration of the comments, the authors can promote their work and prepare the final draft. The final step that needs to be considered is packaging, which is done by following the journal style and a final check for possible misspelled words, incorrect grammar, exceeding the word count, and failure to comply with size and font specifications.

Most Common Mistakes in Writing an Abstract

Taking a look at the common mistakes and flaws of the published abstracts is helpful to make an effective abstract. In brief, these weaknesses include omitting or vaguely stating the question, stating an application/implication instead of an answer, and substituting a descriptive abstract for a hypothesis-testing study. Missing important information, exceeding the word limits, lacking appropriate organization, and overstating the data are other common mistakes that are generally seen in poorly written abstracts. Apart from content mistakes, there are also two other common mistakes that are generally made in writing an abstract for a scientific paper. These are formal aspects (e.g., the layout of the abstract, its structure

and length) and linguistic-stylistic aspects (grammar and spelling, stylistics and punctuation). The typical characteristics of a poorly-written abstract include not being self-sufficient, containing irrelevant details, and not giving any background information. Other common flaws include misleading reporting, misleading interpretation and inadequate extrapolation of the results, using causal language.

Keywords

At the end of the abstract, 3 to 10 keywords or short phrases are usually provided that are used for cross-indexing so that various search engines can retrieve the paper. It is suggested that keywords be different from the words that are within the main title; however, they can be variants of the terms/phrases that are used in the title, the abstract, and the main text. Effective keywords are those that are familiar within the field and are specific to the paper. Listing very general terms as keywords is not recommended because they are not helpful.

Conclusion

Overall, a well-written abstract should accurately summarize the main aspects of the full paper. It should be simple, clear, unbiased, honest, concise, precise, stand-alone, complete, and preferably structured. The first impressions that an abstract makes may go a long way towards the decisions made by the editors and the reviewers of the paper. Also, the post-publication success of the paper, such as citation performance, is also affected by the abstract. The ability to make an informative and accurate abstract, including a concise and clear statement of the problem/gap of knowledge, the motivation behind the research, the study question/hypothesis, enough description of the experiments, novel results, and a captivating conclusion, is a critical skill with broad implications. Authors, therefore, need to follow available guidelines and journal's guide for authors to arrange a strong and convincing abstract.

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