HIXON WRITING CENTER

Writing Effective Abstracts

This handout offers students an introduction to writing a successful abstract to briefly communicate their research. Abstracts are used to attract readers, help determine acceptance for publication in journals, and select appropriate work for presentation at conference proceedings. Students working with this writing genre as part of a course assignment may have guidelines or requirements that differ from those described here.

Introduction

Abstracts are short, comprehensive summaries of a larger body of work. In addition to conveying the major research results, they also must put the work in context by providing background, motivation, and discussing implications. Abstracts are challenging to write because they must be able to stand alone, appeal to a non-specialist audience, and remain within stringent length limits (typically 100-400 words). Abstracts are used in a variety of scientific communication genres, including manuscripts, reports, proposals, and conference posters and presentations.

Purpose

Abstracts allow readers to find relevant research. They precede the main body of most scientific communication genres, providing an informational mapping to the content of a manuscript, poster, or other document. They are one of the first pieces of writing seen and judged by an audience: a journal editor uses abstracts to determine if the manuscript is worth reviewing; conferences review submitted abstracts to determine which researchers will be invited to present their work as a talk or poster; and readers skim abstracts to determine if they will read the entirety of a paper. Along with the title, abstracts often are the only information about a scientific research paper that is accessible online when performing a literature search. For this reason,
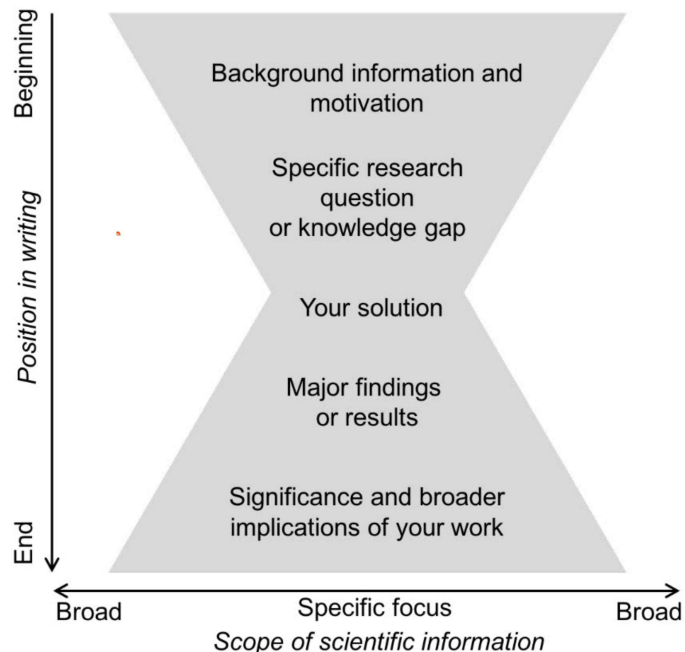

Figure 1 Abstracts are structured like an hourglass: broad background at the beginning, specific questions and results in the middle, and broad significance at the end.

abstracts are sometimes an author's only chance to communicate their research and its significance to a wide audience.

An effective abstract is comprehensive, clear, and concise.
A *comprehensive* abstract contains all of the relevant information necessary for understanding the significance of the work. For research manuscripts, this includes: sufficient background information to orient the reader; the motivation, question, or knowledge gap that puts the work in context; the method by which the question/knowledge gap is addressed; the major finding or key results that shed light on the question/knowledge gap; and the conclusions and implications of the findings. For review articles, the abstract reads as a table of contents written in paragraph form, telling the reader what topic(s) the review will cover, in what order, and why. Certain journals, commonly in the medical field, will require authors to write *structured abstracts* that use subheadings to organize information. The IMRAD format (Introduction, Methods, Results, and Discussion) is a commonly used structure for these types of abstracts.

Readers expect the information in the abstract to be presented in a predictable, logical order. Consider structuring content in the form of an *hourglass*, where the scope of information begins broadly in the background, narrows to the finer details of the methods and results, and finally broadens again when discussing implications and significance (*see Figure 1)*.

Writers can signal to the reader a transition between the different levels of the hourglass by using the following key phrases to introduce different sections (*Adapted from Hofmann 2014)*:
- **Question/Knowledge Gap**: "To determine whether…, we…"; "To answer this question, …"
- **Results**: "Here we show…"; "Our results indicate…"; "We demonstrate that…"
- **Discussion/Implication**: "These results suggest…"; "Our findings show…"; "For the first time, we demonstrate that…"

The title and abstract should support each other, sharing similar key terms and emphasizing the same finding or significance of the work. Some journals also publish a list of *key words* or *key terms* with the abstract to aid literature searches. A good abstract will also use these key words when describing the work and its broader implications.

A *clear* abstract uses precise writing that is accessible to a wide readership. Writers should write in short sentences, conveying one major point per sentence. Abstracts should be written in active voice and in the present tense, with an exception being made for events that happened in the past. The use of first person varies by discipline, but it is common to write "we found" or "our results show" in abstracts across many fields. Abstracts should not include abbreviations, jargon, references to other works, or self-references to content in the paper not already discussed in the abstract.

Writers must balance including all essential information with being as *concise* as possible. Abstracts are often limited to a few hundred words and must capture the reader's attention as they skim the paragraph. The language must be precise and the sentences active. Writers must strive to omit all unnecessary words, writing under the word limit when they are able.

Checklist for writers of abstracts
- ❏ Is there sufficient background to provide context for the question and results?
- ❏ Is the research question or motivation clearly stated?
- ❏ Are the major results or findings indicated?

- ❑ Is the significance of the work explicitly discussed?
- ❑ Does the writing follow the hourglass structure and use signals when transitioning between elements?
- ❑ Are the sentences free of technical jargon?
- ❑ Has the abstract been condensed as much as possible by omitting unnecessary words? Is the abstract within the journal's or conference's word limit?

Annotated examples of abstracts from the following disciples are available online on the Hixon Writing Center's Resources page: https://www.writing.caltech.edu/resources-for-writers

1. **Annotated abstracts in Math/Control Theory**

2. **Annotated abstracts in Physics before and after revision**

3. **Annotated structured abstract in Medicine**

Works Consulted
We consulted a number of works on this topic to create this handout, and you'll find their references here. This is not an exhaustive list of all works on this topic, and we encourage you to seek out additional resources as needed. This citation guide is in MLA format, and it is only a citation model if you are also writing in MLA style.

Hofmann, Angelika. *Scientific Writing and Communication.* New York: Oxford University Press, 2017.

Want to talk to someone about the information in this handout or how to apply it to your own writing? Make an appointment to come into the HWC and talk with a professional or peer tutor: writing.caltech.edu/tutoring