

Methods of teaching to write scientific articles in English for students

Boychayeva Durdona Rasuljon qizi,
NamSIFL
teacher

Annotation. *Many young researchers find it extremely difficult to write scientific articles, and few receive specific training in the art of presenting their research work in written format. Yet, publication is often vital for career advancement, to obtain funding, to obtain academic qualifications, or for all these reasons. We describe here the basic steps to follow in writing a scientific article. We outline the main sections that an average article should contain; the elements that should appear in these sections, and some pointers for making the overall result attractive and acceptable for publication.*

Key words: IMRaD, CREATE, method, qualification, *Elucidate the hypotheses*, experiment, analyze, research.

Background

Every researcher has been face to face with a blank page at some stage of their career, wondering where to start and what to write first. Describing one's research work in a format that is comprehensible to others, and acceptable for publication is no easy task. When you invest a lot of time, energy and often money in your research, you become intimately and emotionally involved. Naturally, you are convinced of the value of your research, and of its importance for the scientific community.

Getting started

A certain amount of preparatory work needs to be done before you ever write a word of your article. This background work should generally already have been accomplished by the time you are at the writing stage, because it also serves as background to the research project you are writing about. All the time you invest in preparing the protocol for your project is an advance on the writing of the article that will come out of your project. Thus, you probably already performed an extensive

What are the main sections of scientific article.

The vast majority of scientific journals follow the so-called “IMRAD” format, i.e. introduction, methods, results and discussion. Naturally, there are some exceptions to this rule, and you should always check the instructions for authors of the journal where you plan to submit your paper to ensure that this is indeed the recommended format. For the purposes of this guide, we will only discuss the IMRAD format, as it is the most widely used.

“IMRaD” format refers to a paper that is structured by four main sections: Introduction, Methods, Results, and Discussion. This format is often used for lab reports as well as for reporting any planned, systematic research in the social sciences, natural sciences, or engineering and computer sciences.

Introduction – Make a case for your research

The introduction explains why this research is important or necessary or important. Begin by describing the problem or situation that motivates the research. Move to discussing the current state of research in the field; then reveal a “gap” or problem in the field. Finally, explain how the present research is a solution to that problem or gap. If the study has hypotheses, they are presented at the end of the introduction.

Methods – What did you do?

The methods section tells readers how you conducted your study. It includes information about your population, sample, methods, and equipment. The “gold standard” of the methods section is that it should enable readers to duplicate your study. Methods sections typically use subheadings; they are

written in past tense, and they use a lot of passive voice. This is typically the least read section of an IMRaD report.

Results – What did you find?

In this section, you present your findings. Typically, the Results section contains only the findings, not any explanation of or commentary on the findings (see below). Results sections are usually written in the past tense. Make sure all tables and figures are labeled and numbered separately. Captions go above tables and beneath figures.

Discussion – What does it mean?

In this section, you summarize your main findings, comment on those findings (see below), and connect them to other research. You also discuss limitations of your study, and use these limitations as reasons to suggest additional, future research.

Abstract – Summarize the entire study

The abstract for the report comes at the beginning of the paper, but you should write it after you have drafted the full report. The abstract provides a very short overview of the entire paper, including a sentence or two about the report's purpose and importance, a sentence or two about your methods, a few sentences that present the main findings, and a sentence or two about the implications of your findings

In many courses, undergraduates are required to read published empirical studies and to use and analyze the information provided in those articles. However, students frequently struggle to understand the methods and results sections, often relying on the introductory remarks, conclusions, and sometimes only the abstract to extract the critical pieces of information from the study. Teachers are left in a difficult situation: their students need to read journal articles, but do not know how. This module is designed to help teachers facilitate understanding of empirical studies for undergraduate students in both the natural and social sciences. For those of you who work with teaching fellows, we also include an agenda for teaching these skills to others and a workshop evaluation form.

This module will focus on the CREATE method (Consider, Read, Elucidate the hypotheses, Analyze and interpret the data, Think of the next Experiment, articulated by Hoskins et al. in 2007). Although originally designed to be used in a classroom setting and working with a single journal article over several meetings, CREATE can be adapted to fit several different class activities and outside-class assignments. First, the key components of the method will be described; then suggestions for using CREATE in class activities and assignments will be provided.

1. Students begin by reading the introduction to the article. They are encouraged to **Consider** the relationships between the key concepts presented in the introduction. They often create a concept map of these ideas (i.e., a figure showing the relationship between the different ideas).

2. Next, students move on to **Read** the methods and results sections, including all graphs and figures provided in those sections. In order to make sure that they understand what they are reading, students are instructed to (1) annotate and re-title figures to improve clarity; and (2) draw pictures of the methods (i.e., a cartoon) indicating how the study was actually conducted. A worksheet may be used to guide students in their review of the results.

3. After they are clear on the methods used in the study, students **Elucidate the hypotheses** based on the results and write out the research questions above each figure or table.

4. With questions/hypotheses established, students begin to **Analyze and interpret the data**. They compare results between groups (i.e., experimental and control) and draw conclusions based on the data. At this point, students read the authors' discussion and evaluate their conclusions.

5. Finally, students are encouraged to **Think of the next Experiment**, to think critically about the study and generate ideas about future research projects. This may include generating questions to email the author(s), or it may involve designing follow-up studies.

Teachers may use the CREATE method as a way of teaching a series of journal articles coming out of a single lab (as the creators of the method designed it). However, it may also be used in several other class activities and projects. For example, students might be given outside class assignments that relate to a part of CREATE (e.g., create a concept map, draw a cartoon of the methods and procedures), or they might be assigned to go through the entire process as a homework assignment. Similarly, CREATE may be used for group assignments. Different students groups may be assigned to go through the entire process for different articles. Alternatively, one class may go through the steps for one article only, with the class divided into groups and each group doing one piece (e.g., Consider, Read).

Conclusion. Overall, while writing an article from scratch may appear a daunting task for many young researchers, the process can be largely facilitated by good groundwork when preparing your research project, and a systematic approach to the writing, following these simple guidelines for each section. It is worth the effort of taking enough time to prepare your article adequately, because seeing it in publication is a gratifying reward.

References

1. Stevens, LM and Hoskins, SG. (2014) The CREATE Strategy for Intensive Analysis of Primary Literature Can Be Used Effectively by Newly Trained Faculty to Produce Multiple Gains in Diverse Students. *CBE Life Sci Educ.* Summer;13(2):224-42.
2. G‘oziyev.E.G‘. *Umumiy psixologiya –T.*: Sharq, 2010.