
Subhash Chandra Parija • Vikram Kate
Editors

Writing and Publishing a Scientific Research Paper

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Why Write a Scientific Research Paper

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Subhash Chandra Parija and Vikram Kate

Various advantages result even from the publication of opinions; for though we are liable to errors in forming them, yet their promulgation, by exciting investigations and pointing out deficiencies of our information, cannot be otherwise than useful in promotion of our science. – John Abernathy



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Key Points

- Research work published as a scientific research paper disseminates the knowledge and information to a larger audience.
- Dissertation and thesis have a different meaning although both are used synonymously.
- Publication of research paper enhances fellowship and job opportunities for young researchers.
- Publication of research paper gives funding and leadership opportunity for senior researchers.
- Publication of both positive and negative results contributes to future research.
- Research papers provide reliable information about a disease and the available treatment options for patients.

Scientific research refers to the systematic and critical evaluation of research question about the presumed relation of an observed phenomenon. A scientific research paper is a written and published report describing the results of scientific research [1]. A research work carries meaning when it becomes widely known to the scientific community. The results of the unpublished scientific research are known only to the researcher and his peers. Publication of the research work in the scientific journal results in dissemination of knowledge and enables a larger audience to become aware of the scientific work [2].

A scientific research paper in addition to giving confidence to the young researcher helps in his career advancement as scientific research paper is a mandatory requirement for appointment to professional posts and the promotion of academic jobs. The present chapter outlines the need to write a scientific research paper by briefly taking through the history of scientific writing and elaborates the various benefits of writing a scientific research paper.

1.1 History of Scientific Writing

The word ‘science’, derived from the Latin word ‘scientia’, refers to knowledge [3]. The term research stems from the Middle French ‘recherche’ and Old French term ‘recerchier’, which means ‘to go about seeking’ or ‘search’. The present concept of communicating ‘researched knowledge’ through scientific journal evolved over a period [3, 4]. The earliest scientific documentation and communication in the form of clay recordings of astronomical data by Mesopotamian empires dates back to 3500 BCE. Ancient Greeks notably Aristotle’s publication of *Art of Rhetoric* in fourth-century BC in which he describes logical persuasion or argumentation formed the basis for scientific research [4, 5].

In the middle ages, the invention of paper and establishment of universities resulted in systematic collection and documentation of scientific data. However, dissemination of scientific knowledge was still limited as all books were copied by hand. The invention of the printing press in the fifteenth century by Johannes

Gutenberg quickly changed that as millions of printed books helped in rapid and extensive dissemination of new scientific findings [6]. While printed book served as an active reference guide, it was not effective in sharing new concepts or research results as a significant amount of information has to be gathered for a book. The need to disseminate novel results of research findings led to the birth of scientific journal in the seventeenth century [7].

The first journal in French *des Sçavans* published articles about all fields of knowledge [8]. *Philosophical Transactions* published by the young Royal Society of London soon after the French journal focussed only on scientific articles. The journal was aimed to create a public record of researcher's original contributions to clinical science and to encourage scientists to 'speak' directly to one another [9]. In addition to original research articles, earlier journals published abstracts of interesting papers already published in other journals. By the end of the eighteenth century, there was a significant increase in the number of scientific journals to overcome the long lag period in publishing novel scientific research. The increase in the number was accompanied by the introduction of specialty-specific journals.

The concept of peer review was introduced in the late nineteenth century to facilitate unbiased publication [10]. The idea of adding references to acknowledge findings already reported in the literature was soon added. By the twentieth century, the original scientific articles became more structured with the introduction of the standard format of introduction, methods, results, discussion and conclusions.

1.2 Need for Scientific Research Paper

One of the mandatory requirements of a postgraduate course and PhD degree is to do a dissertation or thesis. Although the terms dissertation and thesis are used synonymously, the two have a different meaning. The definition of the dissertation in Oxford dictionary is 'a long essay on a particular subject especially one written for a university degree or diploma'. In the dissertation, the emphasis is on systematic approach and research methodology rather than the originality of the research or research findings. On the other hand, in the PhD thesis, the focus is more on the novelty of research in addition to the research methodology.

The study outcome also plays a significant role in the acceptance of thesis. Both dissertation and thesis help in developing writing and research skills and critical analysis of experimental data and understand the statistical principles. However, most postgraduate students approach dissertation and thesis as just an essential requirement for the completion of the course. Once their course is completed, no special effort is taken to write a scientific research paper based on the dissertation or thesis. It is important to understand that any scientific research work carries significance only when it is widely disseminated among the scientific community. Publication of the dissertation and thesis as a research paper gives wider visibility to the research findings. Other reasons for writing a scientific research paper are outlined below.

1.2.1 To Develop a Scientific Writing Skill

Science could not have advanced, if scientists did not document every experiment performed, every data collected and every result obtained. But scientific writing does not stop with the maintenance of records, but to publish the research results in scientific journals. While maintenance of records is quite easy to do, publishing scientific papers can be tough, especially for young researchers who are entering the world of scientific publications. The process of doing a literature search, developing a hypothesis, doing actual research, analysing data, editing the research findings to a scientific paper and publishing an article for the first time will provide valuable experience and improve scientific writing skill of young researchers [11].

1.2.2 To Connect with Senior Colleagues

Young researchers are guided by the senior professors in the department to write a scientific research paper. It helps them to connect with faculty members in a way that is not often achieved in the typical classroom setting. Publication of research paper may also help young researchers to connect with researchers in other fields, providing new opportunities for interdepartmental and inter-institutional collaboration and future research.

1.2.3 To Enhance Academic Career

Publication of research paper in scientific journals improves your academic profile and resume. It improves your chance of getting admitted in fellowship programs offered by reputed institutes. Young researchers with strong research background have more chance of getting travel grant from various scientific societies to attend international conferences. Overseas fellowship programs and international conferences provide an excellent opportunity to shape the academic career of young clinicians [12].

1.2.4 Improves Job Opportunity

Academic institutes prefer clinicians with research articles published in reputed scientific journals for faculty posts. At the time of the interview, additional scores are given for the scientific publications. The number of publications and impact factor of the journal in which the article is published will determine the final score given for publications [13]. Naturally researcher with high-impact published articles stands more chance of getting faculty posts in academic institutes.

Components and Structure of a Manuscript

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The meaning of the paper is hidden by the way it was written – Mary Evans



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