Introductory lecture: Why and how to publish results of scientific research?

KEYWORDS: Writing; Research; Science; Communication; Publishing

Writing a scientific article is one of the major and final products of all scientists. Science is not a private thing. Scientific work is doing its job only when it is published, when belongs to other people. The highest value is reached when scientific information, as published material, becomes a part of the world fund of knowledge. Keeping scientific "results" unpublished indicate two possibilities: research is not finished or is finished but unsuccessfully. If you do not publish the results of scientific research it is the same as you did not work at all.

Why to publish?

There are many reasons why it is necessary to publish the results of scientific research. The most important one is the consequence of the fact that publication is an integral part of the scientific method of research. Scientific method is the best thing thought out up to now to get new and true knowledge or information. Researchers using scientific method, in short, begin by formulation of hypothesis and its verification in practice (experiment). The final phase of all scientific processes is publication of the obtained results in the form of scientific information (1,2). Values of this information can be established only when they are published.

Teaching about truth. The aim of science is truth. New information (knowledge) obtained by a scientific method is objectively true. One of the criteria of the objectivity of the scientific results is their intersubjective reproducibility. Namely, any scientist or competent person, if hypothesis and condition of its verification are clearly defined should, in repeated experiment, obtain nearly identical results. But to check this, scientific results must be published.

Scientific information as a resource. Today, any society can be viewed as economically rich, military powerful, cultural progressive and so on depending of how much available information possesses. Beside matter and energy, information is third entity for existence of life. But, contrary to matter and energy, information during communication elicit special quality: by use its value does not decline, by distribution its value does not decrease. On the contrary, its value in the process of communication increases.

Ethical character of scientific information. Science does not know for frontiers between states and differences in social, religious, race, sex and economic status, differences between groups and individuals. Scientists publish their results in international journals making them available to all interested in. In this way science has the widest ethical character, greater than a simple moral code based by political or religious bodies. The nature of the scientific work Faraday expressed in a sentence: To work, to finish, to publish.

How to publish?

It is not only enough to publish a scientific article. Writing is communicating. The main purpose of the scientific writing is to transfer ideas and information to other people. Or better to say, to transfer information to the person who needs them. This is best done through an original scientific article published in scientific journals. The job of the scientific article is to communicate information.

Definition. Scientific communication represents the whole process of publication, transfer and reception of scientific information. This is the basic mechanism of existence and development of science.

Transfer of information. If information is published but not transferred to person who needs them it is as a half bridge is built - information is published but fails to communicate. The model of communication (diagram) represents the way in which information is transferred to other people.

![Communication diagram](Image)

In this system, like other systems (radio, language-lecture), information is encoded, transmitted, received, decoded and stored. In written communication the message is transferred from facts to language, from language to written words, from written words to language in another mind, and out of that language into stored information (3).

Feedback. The response of other persons to our information (feedback) is very important in scientific communication. In language communication or in everyday conversation, for example, a person who is listening to a lecturer gives feedback by nod, smile, saying "yes" or "no" and so on. This indicates that communication, and not only transmission, is taking place. In written communication, feedback is less obvious. But written response of the editor, when the manuscript is sent back, response of the head of the department or data about the citation of our article could be clear indicator for effective communication.

Effective communication

First principle: To define aim of writing and to know who the readers are. As we already said, if information is to be communicated effectively, it must be more than only scientifically accurate and grammatically correct. Effective communication is a transfer of information to other people, or to person who is interested in. Two questions are of the primary importance here and must be clearly defined. First, what is the aim (purpose, task) of writing? It may be to describe, to explain, and to instruct, to teach a method and so on. Each aim will begin with different information! Second, who are the readers? Are they the same as we are? Are they alike or are they a mixed group? What do they already know about the topic? What do they need to know and so on? The presentation of scientific information must be in terms that they will understand.

Sufficient information and basic structure of article (4). Scientific article is a document that contains sufficient information to enable readers to critically assess information and to repeat the experiment. The basic structure of such a scientific article is given by the acronym IMRAD, which stands for Introduction (What question was asked?)

Methods (How was it studied?)

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The manuscript was received: 15. 09. 2002.

Accepted for publication: 1.10.2002.
Results (What was found?)
And
Discussion (What do the findings mean?)

Selection and arrangement of information. Whenever we have something important to say, e.g. at least one new and important information we should publish it. Very important for efficient communication is the selection of really relevant information from the obtained available material. Selection must be made in favor of the needs and interests of the reader. Selected information must be arranged. The most attractive scientific article is when new information is arranged in order of importance from the readers' point of view. The best organization is in a pyramid structure: at the top of pyramid are title and new information in short (abstract) and at the base are methods with most detailed information. This arrangement enables the majority of readers to get a quick, clear version of the essence of new information and the story that is to come. Today, nobody will show interest and read published material, which is not selected and arranged in order of importance. As in fundamental or basic science, effective communication is very important in clinical medicine. Writing and publishing is an obligation of every modern medical doctor. For those who read scientific and professional journals, who systematically and prospectively organize his or her everyday professional work or investigation, publication of obtained results will not be difficult at all. So it would be easier to evaluate the values of every single physician, group or institution.

REFERENCES

Original scientific papers, being the basic source of information concerning the latest scientific knowledge and achievements, must be structured. Thus, authors of scientific professional and conference papers must respect certain rules when writing their articles and presenting results of their investigations. This often poses limitations for scientists whose work is complex and creative. Bearing in mind that establishing rules means freedom for all, application of certain schemes when writing scientific papers provides an opportunity for researchers to find certain information in a great deal of available information.

Titles. One of the greatest intellectual skills is accurate, concise and precise ability in written expression, and it is especially necessary when constructing a title. Researchers know only too well the importance of a title, as the most transparent and most often read part of a paper, and how much time they need to write these "most complex sentences of the article". The title is the first thing that editors and editorial boards, as well as organizational committees of scientific or professional congresses see. Very often their decision whether the paper is going to be accepted for publication or not depends on the title itself. When the paper is published, it is the title that the readers see first. The title should attract the researcher's attention in order to be included in interesting literature. Sometimes, relevant papers might be missed on "first pass" because they were not written by certain generally accepted rules. "A title is a distinguishing form that cannot be shortened containing notions accurately describing the contents of the article" (1). The title must indicate the contents and the problem - that is object of the paper providing its inclusion into certain scientific disciplines and areas. There are indicative and informative titles: indicative reveal the area of investigation, and not answers the paper might offer, whereas informative titles convey messages of the paper on all its relevant elements (1).

There is not much guidance now to construct a title. The Uniform Requirements for Manuscripts Submitted to Biomedical Journals of the Vancouver Group indicate that titles should be concise and informative, while New England Journal of Medicine states that they should be concise and descriptive, but not declarative. This means that authors should resist the challenge of trying to condense the whole of their paper into the title. Authors are expected to construct concise, short, informative, explicit and attractive

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Titles, abstracts and key words in biomedical articles

KEYWORDS: Medicine; Research; Writing; Abstracting and Indexing

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The manuscript was received: 1. 10. 2002.
Accepted for publication: 10.10.2002.