Peer review of technical manuscripts

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"Peer Review," the downfall of many papers and the heartbreak of authors, is the most difficult component of publishing for researchers to accept. What is peer review? Peer review is the analysis of a paper by someone with sufficient knowledge of the subject to be able to make a judgement as to the merit of the paper.

Why Review?

Why do we need to review papers? In the early history of scientific investigations, the researcher kept detailed notes and logs of the observations, procedures, and results. Many early studies were conducted to satisfy the researcher's personal curiosity. The notebooks were a method of keeping track of information. These notebooks provided the written record of the investigations but were relatively inaccessible. There are several instances where duplicate research was conducted at several locations because the information was not available in common media. This problem led to the establishment of technical journals for the publication of scientific research results.

The early journal articles were frequently quite long and detailed with extensive tables and figures of the actual data. From these detailed reports, a reader could make a judgement decision as to the validity of the study. With time, the articles become shorter with condensed summaries of the actual data. These shorter articles created problems for readers. An author is very familiar with the procedures and actual data. A statement that is very clear to the author may lack an important component to make it understandable to others. Peer reviews insure that a knowledgeable reader can understand how the information is collected and make a judgement decision as to the validity of the results.

Kinds of Review

Peer reviews may be relatively informal or a highly structured process. There are several degrees of peer review. While they are not completely unbiased, co-authors are the first level of peer review. The author's co-workers are another level of peer review. Many institutions, agencies, and organizations have a formal review process as part of their publication policy. Most technical journals employ a peer review process, with refereed journals usually utilizing some form of anonymous review.

Peer reviews by co-authors and co-workers can be of great benefit in the early stages of manuscript preparation by giving the author guidance in maintaining a coherent logic. These peer reviews however, can also be misleading. Co-workers may have some knowledge of the studies which they inadvertently use to interpret the results, although that information is not clearly stated in the paper. These reviews also are usually done at the author's request and there is a tendency to be forgiving of errors. Some reviewers do not like to be overly critical of a co-worker's material for fear of appearing to be jealous or petty. In some instances co-workers will be lenient, using the justification that someone else in the peer review process will point out the problems that need to be corrected.

Some agencies and groups employ technical editors to work with the authors. These editors provide a valuable service by offering assistance in the writing structure. Unfortunately, these technical editors do not have the technical training to provide the necessary evaluation of the scientific merit of a paper that is required for a good peer review.

In most instances, the best peer review is obtained when the identity of the reviewer remains anonymous. Reviewers tend to be more critical when they are assured that the author does not know the source of the comments. Then too, even in science there are instances, fortunately rare, where an author has deliberately made misleading or erroneous statements or conclusions. Anonymous peer review is one mechanism for detecting this practice.

Critical Comments

The most important contributions from anonymous peer review are the comments to clarify the paper. These comments are frequently needed to better understand the procedures used, such as the experimental design and data analysis. A good scientific paper must be written so that someone else can duplicate the study and end up with the same results.

Authors are frequently quite upset with peer reviewer's comments. In many instances they state "...the reviewer did not understand what was being said." What the author failed to understand was that the reviewers were reading and interpreting in their own minds what was written. Their interpretation was different from what the author had in mind during the writing. The author had failed to clearly state what was being done. The author had not prepared a good paper.

Most people take the peer review of a paper as a serious task. If the reviewer can understand the paper, the author will receive a "good" review. If the paper is poorly written and not clearly stated, the reviewer must then try to interpret what the author was trying to say. This is when the reviews become more and more "unsatisfactory." There will be a point where the reviewer feels that time is being wasted and the author will receive a "reject" recommendation.

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Journals usually have subjects and standards which the author must meet. A well-written paper on the wrong subject or in the wrong format may be rejected by the peer reviewers of one journal and accepted by the peer reviewers of another. Journal editors use the peer reviewers to maintain the quality of papers that are published.

There are very few writers who are capable of preparing a scientific paper that does not require some modification and editing. The peer review process gives the author the guidance to present the information in a forum that can be used by others. A peer review that does not make suggestions for improvement probably means that the reviewer did not read the paper or did not understand what was being said, and did not have the courtesy to admit it. A good peer review can be worth its weight in gold. Don't look a gift horse in the mouth.