

**The effect of correction and republication of the biomedical literature –
A bibliometric analysis.**

May 9, 2006

Abstract:

Scholars have been using publications to formally communicate for over 300 years. Over that period, the body of literature has inevitably acquired flaws. Scientists have developed tools and procedures for managing the literature and for making post-publication changes to the literature as a way of identifying and preventing the promulgation of anomalies while preserving the historical integrity of the scientific record. Previous studies have used citation analysis to examine the effectiveness of the retraction of publications; this research to some extent emulates these earlier studies in that it evaluates another biblioremediative method, the practice of correction and republication.

One of the applications to which bibliometric analysis has been put is the evaluation of the effectiveness of the practice of retracting fraudulent scientific literature. To date no such studies have been performed on other types of anomalous literature, including those identified in the Medline database as "corrected and republished articles". This study applies citation analysis to measure the degree to which republished versions of articles have supplanted original versions as authoritative among researchers, interpreting citation as an author's endorsement of a document as being valid and relevant. The study then examines the degree to which researchers are provided with information about a flawed document's nature and the existence of a republished version. By measuring the extent to which authors cite original & republished versions and by measuring the degree to which users of bibliographic systems are provided with information about links between original & republished versions, insight into the effectiveness of correction & republication as a technique for remedying flaws in the literature is gained.

The purpose of this study is to evaluate the effectiveness of the phenomenon of correction and republication in the biomedical literature. If the practice of correction and republication is effective, then the incidence of citation of the flawed version should diminish, and increased incidence of citation of the republication should be observed. If there is no difference between citation levels for corrected and republished versions of articles, then correction and republication is not effective at preventing the citation of flawed publications that have been officially withdrawn by their authors or publishers. If prominent sources consistently provide users with information about the authoritative version of corrected articles then continued erroneous citation is not due to a failure of those bibliographic information resources in their goal of assisting researchers by providing them with the best material upon which to base their work.

Results indicate that post-republication citation of flawed versions of corrected and republished article pairs continues at rates almost equal to those of republications. Histogramic analysis of citation rates over time indicates that republications are preferentially cited after the third year post-correction. However, a t-test does not detect a difference between version citation levels until 8-12 years post-republication. Analysis shows that co-citation of document versions among subsequent authors is very uncommon, providing little evidence that authors citing invalidated literature do so knowingly. As a possible explanation for continued post-republication citation of flawed articles, prominent electronic bibliographic information sources were examined to determine how often they provide users with information about the republication. Results of this analysis showed substantial variability among sources in their provision of authoritative bibliographic information. The assertion that inappropriate citation behavior may be partly attributable to author ignorance is not refuted by this data.

Thus, the results of this study show that the practice of correction and republication is only modestly effective and does not prevent the continued citation of flawed literature post-correction. It is possible that the practice would be made more effective if prominent sources of bibliographic information were more consistent in

providing users with information about the status of anomalous articles and the existence of post-publication modifications to the literature. It is certainly incumbent upon the scientific community to increase the effectiveness of post-publication changes to the literature to prevent negative consequences that may arise as a result of errors in biomedical and health literature.