



Challenges of scholarly publications on the Web to the evaluation of science—A comparison of author visibility on the Web and in print journals

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Abstract

This article reveals different patterns of scholarly communication in the XML research field on the Web and in print journals in terms of author visibility, and challenges the common practice of exclusively using the ISI's databases to obtain citation counts as scientific performance indicators. Results from this study demonstrate both the importance and the feasibility of the use of multiple citation data sources in citation analysis studies of scholarly communication, and provide evidence for a developing “two tier” scholarly communication system.

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1. Introduction

As the accelerated development of information technology, especially the rapid growth of the Web, is changing the circumstances and consequently the structures and processes of scholarly communication, there is renewed interest in the study of scholarly communication to see how it is being transformed, what the similarities or differences between the new formats of communication and the traditional ones might be, and how the new formats facilitate or inhibit the scholarly communication process (Borgman & Furner, 2002; Cronin, 2001; Zhao, 2003).

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Citation analysis and other informetric techniques have been applied successfully to the study of this new phenomenon in scholarly communication. As [Zhao and Logan \(2002\)](#) point out, some studies apply, often with modifications, informetric principles and techniques to study the characteristics and link structures of the Web. Examples include studies on search engines that make use of hyperlink structure ([Clever Project, 1999](#)), and so-called “Webometrics” studies ([Almind & Ingwersen, 1997](#); [Cronin, Snyder, Rosenbaum, Martinson, & Callahan, 1998](#); [Egghe, 2000](#); [Larson, 1996](#); [Rousseau, 1997](#); [Thelwall & Harries, 2004](#); [Turnbull, 2000](#); [Wilkinson, Harries, Thelwall, & Price, 2003](#)). Other studies consider “electronic ingredients” in journal articles—either in reference lists or in abstracts—to gauge the impact of electronic publications on traditional print journal-based scholarly communication ([Harter, 1992](#); [Harter & Kim, 1996](#); [ISI, 2004a](#); [Lu, 1999](#); [McCain, 2000](#); [Youngen, 1997](#)). Still others examine scholarly communication patterns demonstrated in research papers published on the Web, and study the differences from, and similarities to, what we have come to expect from print journal-based communication ([Goodrum, McCain, Lawrence, & Giles, 2001](#); [Lawrence, 2001](#); [The Open Citation Project, 2001](#); [Zhao & Logan, 2002](#); [Zhao, 2003, 2004](#)).

As part of a larger research project that aims to systematically compare scholarly communication patterns between the Web and the print world, the present study focuses on the comparison of author visibility between the Web and print journals as revealed from citation analysis, and discusses the challenges of scholarly communication being increasingly conducted over the Internet to traditional scholarly communication system in general and to the common practice of science evaluation based on the databases of the Institute for Scientific Information (ISI) in particular. The present study along with other parts of the project ([Zhao, 2004](#); [Zhao & Logan, 2002](#); [Zhao & Strotmann, 2004](#)) may contribute to the understanding of the transition of scholarly communication from print to electronic media, to advancing citation analysis theory and methodology, and to information organization and retrieval on the Web.

2. Research questions

Within a citation analysis framework, author visibility can either be measured in terms of how frequently authors have been publishing or in terms of how often their published works have been used (cited) by other scholars. Based on this consideration, the research questions to be explored in the present study are as follows.

- Are there any significant correlations between author rankings by number of publications identified from the Web and those identified from print journals in the field of XML research?
- What is the degree of correlation between author rankings by number of citations identified from the Web and those identified from print journals in the XML research field?
- What has contributed to the differences in author visibility between the Web and the print world?

A study we reported on earlier ([Zhao & Logan, 2002](#)) compared author rankings between the Web and print journals in the XML research field based on a visual inspection of a small set of highly visible authors. We found a considerable difference in publication patterns between these two views, but at the same time similar rankings of the top ten authors as ranked by the number of citations they received. We also noted the importance of examining the characteristics of author groups with different publication and citation patterns. The present study builds on this earlier study and examines the degree of correlation through the use of statistical approaches and more controlled data, and explores possible contributing factors to differences in author visibility by examining specific characteristics of authors.

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