

Scholarly Communication and Bibliometrics

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Introduction

Why devote an *ARIST* chapter to scholarly communication and bibliometrics, and why now? Bibliometrics already is a frequently covered *ARIST* topic, with chapters such as that by White and McCain (1989) on bibliometrics generally, White and McCain (1997) on visualization of literatures, Wilson and Hood (2001) on informetric laws, and Tabah (2001) on literature dynamics. Similarly, scholarly communication has been addressed in other *ARIST* chapters such as Bishop and Star (1996) on social informatics and digital libraries, Schamber (1994) on relevance and information behavior, and many earlier chapters on information needs and uses. More than a decade ago, the first author addressed the intersection of scholarly communication and bibliometrics with a journal special issue and an edited book (Borgman, 1990; Borgman & Paisley, 1989), and she recently examined interim developments (Borgman, 2000a, 2000c). This review covers the decade (1990–2000) since the comprehensive 1990 volume, citing earlier works only when necessary to explain the foundation for recent developments.

Given the amount of attention these topics have received, what is new and exciting enough to warrant a full chapter in 2001? What is new is that electronic scholarly communication is reaching critical mass, and

we are witnessing qualitative and quantitative changes in the ways scholars communicate with each other for informal conversations, for collaborating locally and over distances, for publishing and disseminating their work, and for constructing links between their work and that of others. Most readers of this chapter will be scholars and students who conduct research; write papers; submit their work to journals, conferences, and book publishers; search for new information resources; and read the work of other scholars. We expect that most readers conduct substantial portions of their scholarly activities online. Many will have their own Web sites where they post their work, and many will circulate their work to colleagues in electronic form, whether through direct distribution or through online preprint servers. The cycle of scholarly activities is blending into a continuous, looping flow, as people discuss, write, share, and seek information through networked information systems.

In technological terms, scholarly communication is being transformed through the use of personal and portable computers, electronic mail, word processing software, electronic publishing, digital libraries, the Internet, the World Wide Web, mobile phones, wireless networks, and other information technologies. But how much has human behavior really changed? How much has the infrastructure for scholarly communication changed? Are we witnessing a revolution in scholarly communication, or an evolution? Or a coevolution of technology and behavior? (Bishop & Star, 1996; Borgman, 2000b; Kling & McKim, 1999). And how do we determine what kinds of change are occurring?

Bibliometrics offers a powerful set of methods and measures for studying the structure and process of scholarly communication. Citation analysis, the best known of bibliometric approaches, has become more sophisticated, and the advent of networked information technologies has led to quantitative and qualitative advances in other bibliometric methods. More content is available online in digital libraries, and more of it is in full text (and in other media including still and moving images, sound, and numeric data). More connections exist between documents, both in the form of citations and in the form of active hyperlinks that allow an information seeker to move between related documents (Cronin, Snyder, Rosenbaum, Martinson, & Callahan, 1998; Harnad & Carr, 2000; Lynch, 1998). Bibliometrics is being applied in new ways, to ask new questions. Co-citation measures designed to identify relationships between print

publications are being applied to frame the intellectual space of the Web (Larson, 1996). Similarly, impact factors, which were developed to assess the influence of a journal, an author, a laboratory, a university, or a country, are being applied to assess the influence of Web sites (Almind & Ingwersen, 1997; Ingwersen, 1998; Smith, 1999). In addition to bibliometrics, scientometrics, and informetrics, we now have “cybermetrics” (the title of an electronic journal) and “Webometrics” (Almind & Ingwersen, 1997). Citations are complemented by “sitations” (McKiernan, 1996; Rousseau, 1997).

Bibliometrics is now an accepted method in the sociology of science (J. R. Cole, 2000; Cronin & Atkins, 2000; Merton, 2000), especially by scholars whose inquiries are well served by quantitative methods and structural approaches. Others prefer more qualitative methods and more interpretive or constructivist approaches to the study of scholarly communication. Bibliometrics has gained popularity due to its complementarity to econometrics, social network analysis, and other quantitative approaches to modeling behavior (Diamond, 2000). Concerns such as the nature of “trust” have moved from sociology to electronic commerce, and may be modeled through bibliometrics (Davenport & Cronin, 2000). Documents are no longer viewed simply as stable artifacts of communication. Rather, documents can be malleable, mutable, and mobile (Bishop & Star, 1996), and can have a “social life” (Brown & Duguid, 1995, 2000). New genres of documents are emerging to take advantage of the special capabilities of electronic forms. Electronic publishing, while expanding rapidly, still consists of a wide range of unstable forms and genres (Kling & McKim, 1999; Schauder, 1994). As electronic publishing evolves, and perhaps stabilizes, we can employ bibliometrics to observe patterns and trends as they emerge. Bibliometrics can be applied to a broader array of behaviors and to a broader array of content than in the past, and thus more sophisticated methods and measures are required (Paisley, 1990). Indeed, a generation of scholars schooled in bibliometrics is developing innovative new methods to explore new research questions, and scholars schooled in other areas are contributing new methods and new questions. In sum, this is an ideal time to devote an *ARIST* chapter to scholarly communication and bibliometrics, and to draw yet more researchers’ attention to fertile territory that is ripe for exploration.