

## Chapter VIII

# Opportunities and Obstacles to Narrow the Digital Divide: Sharing Scientific Knowledge on the Internet

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### **ABSTRACT**

*Access to scientific information is considered a competitive advantage to foster knowledge, research, and development; improve quality of education; and advance professional practices. Although, the Web was conceived to encourage information sharing, restrictions to some publications reduce access to knowledge, especially to those in developing countries. This chapter presents a conceptual framework of the knowledge transfer cycle, and examines key factors affecting the dissemination of scientific information. Current challenges facing the open-access initiative of making scientific information free and available worldwide are also discussed. This chapter examines key factors affecting the dissemination of scientific information and current challenges posed by the open-access initiative of making scientific information free and available worldwide.*

### **INTRODUCTION**

Information and communication technologies (ICT) have transformed the way scientific knowledge is shared nowadays. Scientific communities

have moved from being centered on a physical location (universities, colleges, research institutes, laboratories, or professional organizations), to being centered on a particular focus or topic of interest. Researchers work collaboratively at

international level using Internet, e-mail, online chats, electronic forums, mailing lists, Web sites, FTP sites, blogs, and wikis. Knowledge and information are shared within seconds around the world, and are available around the clock through remote databases, digital libraries, and electronic journals.

The Internet has provided a new channel for disseminating electronic journals, which have long been central to scientific communication. Electronic journals and the Internet together play an important role in the new paradigms of creating and sharing scientific knowledge: access through the Internet is currently the fastest and least expensive way to distribute scientific information worldwide. New models in the publication and codification of scientific knowledge have transformed the way people search for information. Now one has the ability to find articles by title, author, topic, and keywords, independently of the journals in which they are published. Then, there is a possibility that the article will be freely available on the Web or if not, one has the option to pay for the article through pay-for-view rather than subscribing to the entire publication. Furthermore, hypertext links within articles, extended bibliographic references including articles that cite and have been cited, and links to databases and related articles are changing the concept of “journals” as they have been known.

Electronic publishing has been considered as important to science as was the invention of printing, and is viewed as an innovation producing profound changes in scholarly communication. Used effectively, electronic resources and the Internet are fostering a new research paradigm that empowers researchers, authors, students, and the general public with richer communication at lower costs. In the same way as e-commerce, e-learning and e-government have eliminated the barriers of distance and time, e-research has provided a way to create, access, understand, use, and share knowledge with new ICT available in a networked society.

However, as a contradiction, inadequate access to scholarly scientific information is still considered an important barrier to research, especially in less developed countries (LDC) (Echeverri, 2006). Scholarly publishing has been criticized as being more focused on discussing restrictions than opportunities for dissemination when considering the potential offered by the Internet (Echeverri, 2006; Open Access, 2003). For example, licensing agreements are commonly required for access to documents, journals, books, and databases available on the Web, with layers of protection such as encryptions and password-protected subscriptions. Although information may be available in electronic format on the Web, this does not mean that it is “freely accessible” anytime, anyplace, and by everyone, which runs counter to an important principle of the Web: “free access to information for all” (Echeverri, 2006; Tenopir et al., 2003).

Even though, the power of the publishing industry is such that academic libraries are expected to pay whatever is necessary to obtain the material (Thomes, 2000), the critics of the high cost of scientific journals have taken action. In 2003, scientists at University of California organized a worldwide boycott of six scientific journals published, by Reed Elsevier, in molecular biology because of the prohibited costs of subscribing to the electronic versions of those journals, which in turn impedes the dissemination of scientific knowledge (Foster, 2003).

As one solution to the exorbitant costs of scientific journals, the Scholarly Publishing and Academic Resources Coalition (SPARC), a coalition of academic and research libraries and organizations, was created to correct the dysfunctions in the scholarly publishing system through the Open Access Initiative (OA). Although, more and more organizations and authors are joining the OA initiative, this is still in the early stages of adoption. In a study on open access to medical literature, McVeigh and Pringle (2005) found that less than 60% of articles published since 1992 in

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