

◆ From Em-Space to E-Space: A History and a Future of Scientific Publishing

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Judith Axler Turner, liaison between the National Institutes of Health (NIH) and those who provided comment on the development of PubMed Central, pointed out that PubMed Central exemplifies the kind of challenge that can greatly change scientific publishing. Such challenges are a symptom of general dissatisfaction with scholarly publishing and are frightening to those in the established publication structures.

Turner related her own experience with the PubMed Central type of challenge when going online with *The Chronicle of Higher Education*, the first national newspaper to go online with full text. The University of Southern California, with a campuswide network, was eager to provide more information through the system; it offered its network as a test bed for an online *Chronicle*. The work involved creating content, converting an existing publishing system for editing and review, developing legal agreements pertaining to use of content, setting up project dimensions, and minimizing disruption of reporters' work.

The *Chronicle's* "PubMed Central" appeared in the form of a retired professor's proposed free online database that advertised faculty positions. Although job ads accounted for a large percentage of the

Chronicle's income, the editor decided to make its job ads free to users and advertisers. The table of contents proved useful to draw subscribers from those who accessed the site. It became apparent that the value of the job ads was in the context in which they were made available. Similarly, the value of scientific papers is determined by context: The value to researchers is in their availability; to publishers, controlling dissemination of papers makes them valuable.

Turner maintained that PubMed Central is not the publisher's current problem: Technology is the problem. Publishers' acceptance of technology and the Internet ranges from denial (not embracing opportunities) to anger (the government's having the nerve to publish research papers—a requirement of grants) to bargaining (compromising on agreements to restrict papers in PubMed Central) to acceptance (coming to terms with technology).

Turner emphasized that publishers must learn to use the Web as a publishing medium. Whether publishers are scholarly societies, university presses, or commercial publishers determines the business model. Web publishers must address editing and promotion, peer review, news services, review articles, customization and interactivity, and community-building.

- Editing: Although technologies change, editing to clarify meaning is a constant requirement.
- Peer review: Peer review presents problems; the new medium is an opportunity to change the process.
- News: Front-of-the-book features, as in *Science*, attract subscribers.
- Review articles: The quantity of review materials will grow; they focus the content and enhance its value.
- Customization and interactivity: When

scientists interact with Web materials, the materials are enriched.

- Alert services: People pay for services that give them the information they want.
- Special-purpose collections: Articles on particular subjects or sites with research themes that cut across disciplines save readers time.

When those services are combined on the Web, a community with characteristics that attract advertisers is formed. An example is BioMedNet, which provides, in addition to articles, personalization and customer service, special-focus collections, the *HMS Beagle* newsmagazine, the selling of laboratory equipment, Evaluated Medline, and recruitment and advertising. Society journals are competitive with larger publishers because the societies already have communities. Those communities, which are or could be global, might be more important than the papers produced.

Turner emphasized that anything publishers can do to help people in the scientific community spend their time well is good business. She concluded by pointing out the unexpected benefits of rethinking the business model for the *Chronicle* online: cheaper renewals, new advertisers, more varied audience, and interactivity. She suggested that PubMed Central is a starting point in helping other publishers rethink their businesses. By releasing older papers to PubMed Central for protection in archives (giving away their old product), publishers can save money and can focus on providing the services that libraries and other customers want. 