has now created a separate staff to handle whistleblower cases.) Scientists are concerned that whistleblowers have too much power and protection and the accused too little, and many want more protection for accused researchers. Responding to questions about the whistleblower issues, Frankel commented that he works with member societies to set up standards for professional behavior, and he urges them to set a standard for the members' active obligation to report acts of misconduct. Both panelists discussed the question of who should investigate charges of misconduct, particularly in light of the inherent conflict of interest when an institution investigates one of its own members.

As the final section of the discussion, the panelists addressed the potential for misconduct and the detection of misconduct presented by electronic publication. They noted that the electronic medium makes manipulation of images and data easy, but it also allows (in theory) the creation of "digital signatures" or "digital authentication" for documents as a way to ensure that they are not tampered with after publication.

Multimedia Applications: Choosing an Information Delivery Medium That Meets Customer Needs

Speaker: Mikael Engebretson
Cisco Multimedia Division
St Louis, Missouri

Reporter: Addie Caelleigh
Academic Medicine
Washington, DC

The range of electronic media available to publishers can seem daunting: diskette, CD-ROM, the Internet, and such emerging technologies as CD-ROM with Internet links, DVD-ROM (digital versatile disk-ROM), and broadband Internet. For convenience, this cluster can be called "multimedia". The major elements of multimedia are text, images, video, audio, and animation—and a graphical user interface (GUI, pronounced "goopy").

Each medium has special cost and production considerations, as do the components, and the capacities of these media are being improved and expanded. For example, compression technology has increased the capacity of diskettes, and the "wavelet compression" now under development might make diskettes better suited for complex images. Capacity is irrelevant with regard to the Internet, but file transfer time is constrained by bandwidth. The emerging technologies present even more opportunities. The use of "bridge technology" to link CD-ROM and the Internet will counter some of the limits that publishers see in CD-ROM publication. Using this new technology, a publisher would publish a document on the Internet and ship a related CD-ROM to the customer, who would look at the Web document and be able to call up special images (video, for example) from the CD-ROM through links embedded in the Web document.

Likewise, the development of DVD-ROM will allow large-capacity collections of images (up to 17 gigabytes). The limitation is that the user must use special DVD players.

In developing multimedia products, a publisher must develop a budget, a schedule, product specifications, and a development team.

In considering new projects, publishers must know what they are trying to accomplish, be able to identify the target audience, know the proportion of the target audience that has the technology needed to use the new product, and understand how the content will be delivered to the user. There is a big difference between delivering static collections of text and images and delivering an interactive product. CD-ROM is a logical choice for the first, and the Internet is a better choice for the second. The publisher must be fully aware of the different implications of a target audience of single users, a large group of users at an institution (with technical support), and experienced computer users as opposed to novices.

In developing multimedia products, a publisher must develop a budget, a schedule, product specifications, and a development team (editor, producer, marketeer, and outside professionals). Budgets present special problems because multimedia markets are new and technology, target audiences, and users' experience are all changing rapidly. For any project, the publisher must be able to budget accurately for design, asset development and conversion, outside or in-house development, in-house project management, and manufacturing, packaging, and distribution. A unique feature of multimedia publication is the need to create and maintain a technical-support system for users (usually a telephone line, but possibly an Internet site).

Overall, Mikael Engebretson suggested, the primary electronic media for publishers to consider now are diskettes, CD-ROM, the Internet, and CD-ROM with Internet.