

Part Four

Looking Into the Future of Multimedia

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How to Keep Up

We must make sure the Information Superhighway is not a toll road for the rich.

—Linda Roberts, as White House Education Adviser

We shouldn't be looking for ways to subject new technologies to old rules.

—Reed Hundt, as Federal Communications Commission Chairman

Technology is one of the most difficult areas in which to make predictions, because new inventions occur at such a fast pace that the future changes before it gets here. How can the future change before it gets here? Big companies invest millions of dollars promoting new products, leading the consumer to believe that their products will be the mainstream of the future, but shortly after coming to market, the products get abandoned because the vendors pursue newer technologies that promise bigger profits. This has happened so often during the past two decades that almost anyone involved with multimedia has been frustrated by purchasing so-called mainstream technologies that quickly go out-of-date and are abandoned by their manufacturers.

Knowledge is the best strategy for coping with fast-paced change. The more you know about the issues and technologies, the better prepared you will be to make strategic choices. Specifically, you can:

- Identify the frontiers that multimedia researchers are investigating
- Study technologies that are emerging
- Identify societal issues raised by the manner in which multimedia technologies are used
- Find out about and even contribute to new knowledge in this exciting field

The next four chapters consider these topics.

Multimedia Frontiers

After completing this chapter, you will be able to:

- Understand how researchers invent new uses for multimedia and use multimedia technology to find new methods for solving problems
- Consider what kinds of printed books can be or should be replaced by electronic books
- Know what is meant by the term *rural datafication*
- Explore how virtual reality will improve the multimedia user interface
- Dream about the multimedia possibilities of appliance-based computing
- Consider whether there are other frontiers of multimedia that ought to be explored
- Join and participate in the Electronic Frontier Foundation

- A **multimedia frontier** is a field of technological research and development in which investigators invent new uses for multimedia or determine the extent to which multimedia can solve problems by finding better ways of doing things. This chapter discusses how multimedia is being used to improve and transform publishing, provide better access to networked information, enhance rural communication, simplify the user interface, and extend the network to everyday appliances.

Electronic Publishing

How much longer will books, magazines, and newspapers continue to be printed on paper? Anyone who has used hypertext knows how printed manuscripts pale by comparison. Printed manuscripts do not contain links that let you expand the text and navigate to related information; hot words that let you trigger explanatory sound tracks, videos, or animations; or full-text Boolean (AND, OR, NOT) searching that lets you locate quickly the material you need. Printed music does not let you scroll the score back and forth to locate and hear precisely the theme you want to study. Mathematics and economics textbooks do not allow you to manipulate formulas and visualize your changes through dynamic real-time graphs.

The publishing industry knows this very well. Book publishers realize that their entire way of doing business is undergoing rapid and fundamental change, but they are not sure how it will emerge. Take this book for example. It includes a CD-ROM. How much of the text in this book would you have preferred to read on the CD-ROM instead? As Chapter 39 demonstrates, you can produce a CD-ROM for much less than a book, and you do not need a publisher to do so.

Knowing this, Microsoft has targeted electronic publishing as a strategic market opportunity. VP for technology development Dick Brass made the following prediction (ABCNews.com, October 1999, *Multilit* Web site) regarding how the new *Microsoft Reader* technology will unfold: By the year 2006, electronic news kiosks will allow people to download newspapers and magazines onto electronic reading devices. By the year 2010, the devices will be lightweight, have flexible screens and run off 24-hour batteries. By the year 2018, the newspaper on paper could become extinct. The future is electronic, the past is paper.

By the time you read this, a thousand classic titles from Penguin Books will be available on *Microsoft Reader*, which uses ClearType font-rendering technology to improve the readability of text on computer screens. Italian publisher Mondadori Editore Spa and the online Paris-based Editions 00h00.com have also adopted the *Microsoft Reader*. Brass predicts that printed books which normally cost \$30 will fall in price to \$5 for electronic versions.

To learn more about the scheduled rollout of *Microsoft Reader* products, follow the *Multilit* Web site link to *Microsoft Reader*. See especially the *Microsoft Reader* timeline, which predicts that by 2020, 90% of all book titles will be sold in electronic rather than paper form, and *Webster's Dictionary* will have changed its first definition of *book* to "a substantial piece of writing commonly displayed on a computer or other personal viewing device."

The Information Superhighway

In 1993, then Vice President Al Gore issued a report entitled *The National Information Infrastructure: Agenda for Action*. The report describes how the private sector would build, operate, and maintain the Information Superhighway, while the government was going to develop policies to ensure that all Americans have access to it, encourage private sector investment in building the network, and create a competitive market for telecommunications and information services. Concerned about how these policies would control what happens on the network, Farber (1993) explained the formation of an organization called the Electronic Frontier Foundation:

In July 1990, the Electronic Frontier Foundation (EFF) was founded by John Perry Barlow and Mitch Kapor (who also founded Lotus Development Corporation) to help civilize the frontier more rapidly. It has the aim of trying to assure freedom of expression in digital media with emphasis on applying the principles embodied in the Constitution and the Bill of Rights to computer-based communication. From the beginning, EFF was determined to become an organization that would combine technical, legal, and public policy expertise. It would then apply these skills to the large number of complex issues and concerns that arise whenever a new communications medium is born. To paraphrase John Perry Barlow, it will take years to civilize the electronic frontier and bring law and order to it. And to quote Mitch Kapor, "There's a new world coming. Let's make sure it has rules we can live with."

So many people are concerned about these issues that the Electronic Frontier Foundation has become one of the most frequently visited sites on the Web. To see for yourself, follow the *Multilit* Web site link to the EFF, where you will find instructions on how to join.

Another organization working to represent public interests in the emerging communications infrastructure is the Benton Foundation. Among its many services is *The Digital Beat*, a free online news service supported by the Open Society Institute. As Benton states, "Our aim is to equip you to be engaged in the public debate on the public

interest in digital television and the Internet. We will chronicle the action at the Federal Communications Commission and in Congress, the efforts of public interest advocates, the work of nonprofit organizations and government agencies to create new public services, technology developments, and communications trends.” To read *The Digital Beat*, follow the *Multilit* Web site link to the Benton Foundation.

Rural Datafication

Rural America has traditionally lagged behind the rest of the country in gaining access to technological innovations. Telephones, radio, and television came first to big cities. To provide access to the rest of the country, the Department of Commerce made capital funding available through its Public Telecommunications Facilities Program for rural communities to install modern telecommunications equipment. These funds are still available and have recently been used to provide rural communities access to satellites. The process of extending the Information Superhighway to rural America is called **rural datafication**.

AeRie, the Applied Rural Telecommunications Online Clearinghouse, has a resource guide on the Web containing examples of how rural communities throughout the world are using telecommunications for economic development. To visit the Clearinghouse, follow the *Multilit* Web site link to the AeRie project, which in turn links to the resource guide.

Virtual Reality

As you are aware from using this book and its CD, multimedia computers can show any picture, play any sound, and link any word of any document or any part of any picture to any object on your computer. What is missing? A better human interface. We need better ways for users to communicate with multimedia computers. As you learned in Chapter 5, researchers in virtual reality (VR) are actively working on this, and as new input and output devices get invented, multimedia computers will benefit.

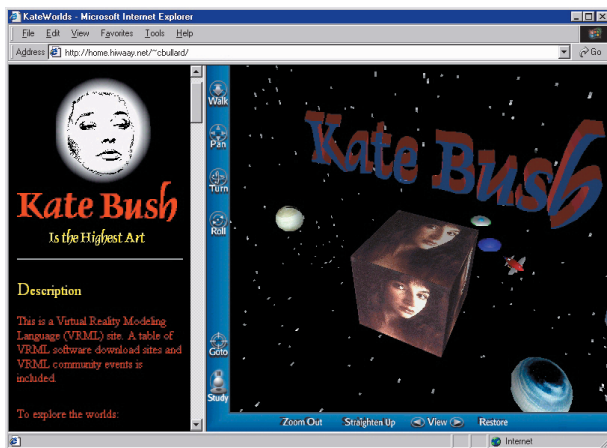


Figure 14-1 A VRML screen from Len Bullard’s tribute to Kate Bush. A static picture does not do this justice; use a VRML-enabled browser to visit this site and use your mouse to explore this 3-D world, which you will find at <http://home.hiwaay.net/~cbullard/>.

The Web3D Consortium is working to bring virtual reality to the Web. The consortium spearheaded the development of the Virtual Reality Modeling Language (VRML), which is an object-oriented language that lets you create navigable 3-D spaces for the Web. Figure 14-1 shows how Web page designers use VRML to add dimensions, texture, and “lighting” specifications to Web sites. For more examples, follow the *Multilit* Web site link to the Web3D Consortium, where you will find more information on VRML, viewers and authoring clients, mailing lists, newsgroups, and documentation. See especially the VRML Repository, which contains demos of VRML worlds in architecture, art, astronomy, biomedical sciences, chemistry, commercial applications, computer science, entertainment, environmental science, history, maps, mathematics, music, physics, and scientific visualization.

Appliance-based Computing

Imagine tiny computers embedded in everyday appliances, such as your microwave oven, refrigerator, dishwasher, telephone, video camera, TV, stove, swimming pool, garage door opener, thermostat, heater, air-conditioner, humidifier, and water softener. Now imagine a way to connect these devices to the network so they can communicate and stream data complete with multimedia sound, graphics, and video.

The computer industry is working hard to make this happen. Appliance-based computing is one of the most important frontiers in multimedia today, because it will make it possible for you to do things such as:

- Configure your stove to page you or send you an e-mail message if someone leaves a burner on too long.
- Monitor your home when you are out dining or attending a show and a baby-sitter is watching the kids.
- Instruct your garage door opener to phone you if it is opened while you are away on vacation.
- Be informed if someone jumps or falls into your swimming pool when you are not using it.

Sun's Jini technology is the early leader in appliance-based computing. Jini is a connection technology that already is appearing in some commercial products. Hewlett-Packard has adopted Jini in its JetSend network, enabling a camera to send an image, for example, to a remotely located printer. Jini enables the camera to locate the printer, and JetSend gets the picture there in a format the printer can understand. For the latest news, follow the *Multilit* Web site link to Jini Connection Technology and Hewlett-Packard's JetSend.

exercises

1. Do you think electronic book technologies such as the *Microsoft Reader* will ever replace printed books? Are some kinds of books more likely to be replaced than others? Give an example of a kind of printed book that should be replaced by an electronic version and explain why. Then give an example of a book that should not be so replaced and explain why not.
2. Follow the *Multilit* Web site link to *Microsoft Reader* to check the status of the rollout of Microsoft's electronic book technology. Is Microsoft on schedule? Is there a link for you to follow if you want to purchase one of the new electronic book titles? If so, how many electronic books are available for purchase now in the *Microsoft Reader* format?
3. To what extent has your local community become "datafied"? Are your schools connected to the Internet? Do teachers have access to it, or just the administrators? How about students? Is your local library connected? What about homes in your area: Does a cable TV franchise, telephone company, or Internet Service Provider make Information Superhighway connections available to homes? If so, at what speeds? What online services are provided?
4. View the classic VR movie *Lawnmower Man*, which you can rent from your local video store. Do you believe multimedia computers will ever enable users to experience VR immersion to the extent Jobe Smith (Jeff Fahey) does in the movie?
5. If you could invent anything you could think of, what kind of devices would you create for improving your computer's user interface? How would the devices help you communicate with your computer better than you can now? How would they make it easier to use? How would they make the simulated environments you experience seem more real? How would they get you more involved in the interaction?
6. This chapter listed several possible applications of appliance-based computing. Try to think of some more. List three additional ways you could use appliance-based computing to solve problems or improve your quality of life.