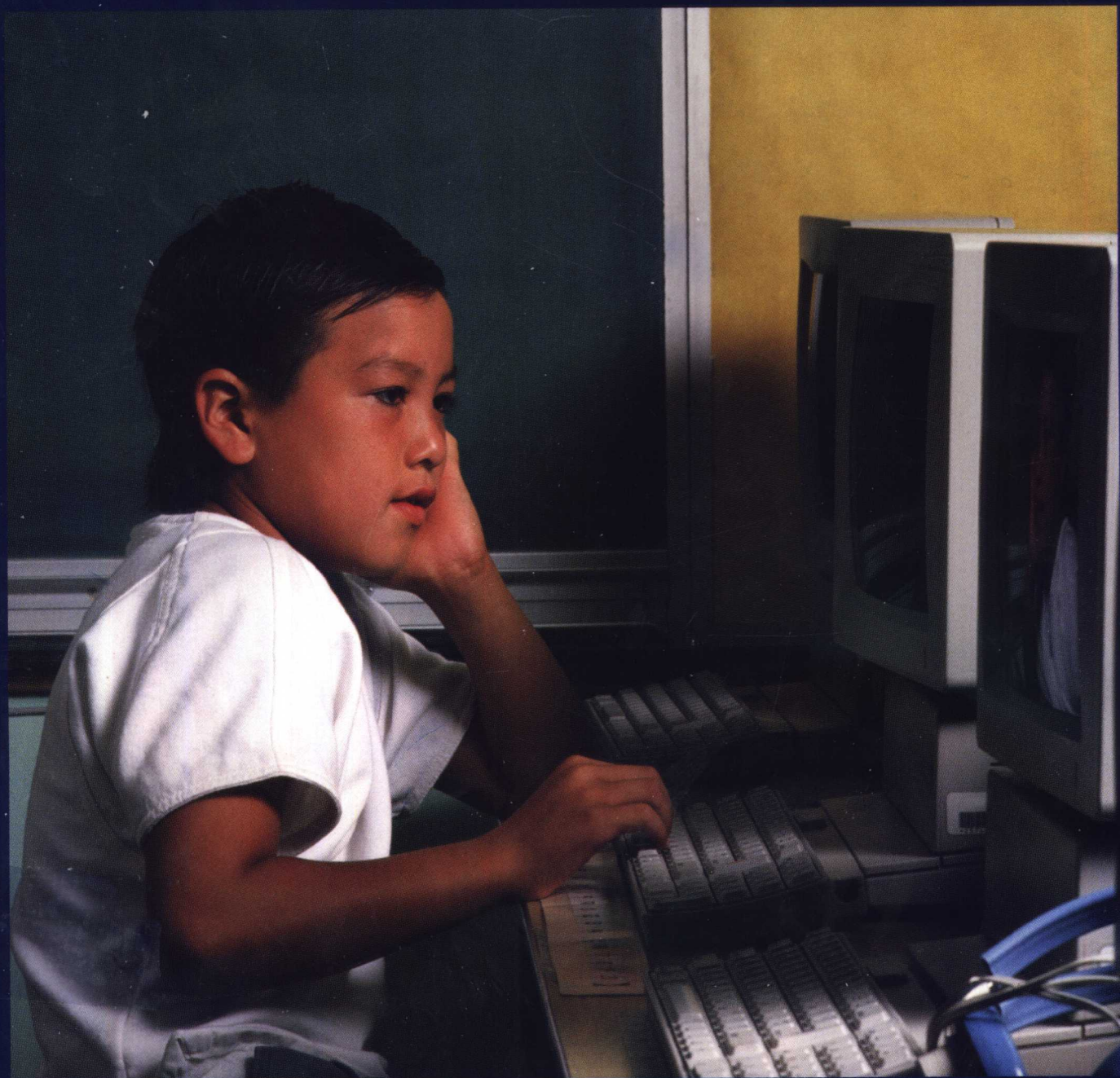


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University of Akron

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Members of the Advisory Board are instrumental in the final selection of articles for each edition of ANNUAL EDITIONS. Their review of articles for content, level, currentness, and appropriateness provides critical direction to the editor and staff. We think that you will find their careful consideration well reflected in this volume.

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To the Reader

In publishing ANNUAL EDITIONS we recognize the enormous role played by the magazines, newspapers, and journals of the *public press* in providing current, first-rate educational information in a broad spectrum of interest areas. Many of these articles are appropriate for students, researchers, and professionals seeking accurate, current material to help bridge the gap between principles and theories and the real world. These articles, however, become more useful for study when those of lasting value are carefully *collected, organized, indexed, and reproduced in a low-cost format*, which provides easy and permanent access when the material is needed. That is the role played by ANNUAL EDITIONS. Under the direction of each volume's *academic editor*, who is an expert in the subject area, and with the guidance of an *Advisory Board*, each year we seek to provide in each ANNUAL EDITION a current, well-balanced, carefully selected collection of the best of the public press for your study and enjoyment. We think that you will find this volume useful, and we hope that you will take a moment to let us know what you think.

Computers in Education, Eighth Edition, is part of the *Annual Editions* subseries called *Computer Studies*. This unique series is designed to provide you with the latest information and trends regarding computers and the role they play in people's lives. One of today's trends is the mass move toward the Internet, whose World Wide Web carries digital technologies, including phone mail systems, bulletin boards, teleconferencing systems, and interactive networked multimedia systems. These technologies provide an electronic pipeline that can reach students anywhere on Earth.

Multimedia and interaction have become part of the education and entertainment industries, and a new product has taken the name "edutainment." The business world has recognized the value of edutainment and has responded with megamergers such as Disney and ABC, Westinghouse and CBS, and Time Warner and Turner Broadcasting. These megacorporations are betting billions of dollars on the future of networked, interactive edutainment. Within the next few years, we will be zipping our way along the worldwide digital highway on our way to edutainment that will stimulate us to interact with realistic simulations and key information that will enable us to conceive new and more powerful ways of thinking about and solving sophisticated problems. This edutainment highway will link all homes, schools, universities, and businesses with a wide broadband communication cable system. In the very near future, we will have the needed links to bring the community, home, school, and business together in a lifelong interactive educational experience.

However, today we can almost do the same thing with current technology. A computer with a modem, speakers, and a CD-ROM player is a dynamic and capable machine for delivering excellent interactive educational packages. There are many excellent educational and business titles available for networked use. We are now realizing the long-sought benefits of technology within the education and training systems of the United States.

This volume addresses the question, "How are the U.S. education and training communities riding the back of current technologies to make us a better edu-

cated and more competitive nation in today's global economy?" We have reviewed the literature and selected key statements that respond to the issue.

In addition, there is an abundance of articles dealing with distance learning, networking, the Internet, and interactive multimedia applications for classroom, laboratory, and home. There is a pressing need for a publication that brings together this wealth of pertinent information on the successful implementation of current technology into schools, homes, and businesses as well as the new hardware/software applications that have made this possible. The *Annual Editions/Computer Studies* format uniquely meets this need.

This anthology addresses the current issues confronting computer-using educators and trainers. Both need to know about current classroom applications and software evaluations. It also provides a close-up look at integrating technology into the curriculum, teacher training, interactive multimedia, the Internet, and distance learning applications.

This volume is designed for use by educators involved in preservice and inservice education of educators, trainers, and administrators. It is also intended for parents, students, school board members, and others concerned about the use and impact of computers on today's education and training activities. Efforts have been made to include articles without references to specific hardware or software that may become quickly outdated.

As always, it is expected that you will have suggestions for improving future editions of *Computer Studies: Computers in Education*. You can help shape the next volume by completing and returning the postage-paid article rating form located on the last page of this book.

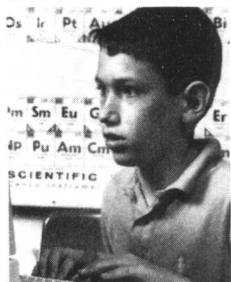


John J. Hirschbuhl



Dwight Bishop
Editors

UNIT 1



Introduction

Six selections examine the current state of computer implementation of the learning environment and the clash between earlier Industrial Age and present Information Age education.

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1. **School Reform in the Information Age**, Howard D. Mehlinger, *Phi Delta Kappan*, February 1996. 8
The forces driving *the Information Age* seem irresistible. It is impossible both to participate fully in the culture and to resist its defining features. If schools are an "immovable object" they are beginning to meet the "irresistible force"—Information Age technology. Howard Mehlinger is certain that schools will be unable to resist the new technology. And they will be profoundly changed by it.
2. **System 2000: If You Build It, Can You Manage It?** Andrew M. Weiss, *Phi Delta Kappan*, February 1996. 15
Districts are increasingly building complex computer systems to meet changing requirements for *technology-rich education*. Andrew Weiss suggests guidelines for implementing such systems and describes the administrative organization that these systems will require.
3. **The Modern Land of Laputa: Where Computers Are Used in Education**, Chris Morton, *Phi Delta Kappan*, February 1996. 22
While the real world uses computers to move forward, schools often use them in a misguided effort to support nineteenth century instructional practices. The idea of "computer as tool" permits the ignorant to justify a decision to reject it. Chris Morton makes a case for *computer environments that shape and support the educational structure* in the instructional process and the development of lifelong learning within the whole population.
4. **Education Wars: The Battle over Information-Age Technology**, James H. Snider, *The Futurist*, May/June 1996. 26
New information technologies will transform education, but only after a battle with the education establishment. Information Age education requires far fewer teachers to achieve the same or even better results. James Snider believes that the new education economics suggests a power shift away from regional educators to national educators and to students.
5. **21st Century Classroom**, Vance Viscusi, *TechTrends*, April/May 1996. 31
Vance Viscusi conjures up a *virtual classroom* experience in which students maximize their learning potential in virtual environments. He believes that the virtual classroom is the classroom of the twenty-first century. The innovative technology of the next century will be Introspective Machines that will give students the answer to the question, "How does what I am learning relate to me?" This article provides a peek into the twenty-first century learning environment.
6. **Unfilled Promises: Can Technology Help Close the Equity Gap? Maybe—But It Hasn't Happened Yet**, Jane McDonald, William Lynch, and Greg Kearsley, *The American School Board Journal*, July 1996. 33
The authors show that many school leaders today are betting on advanced telecommunications as the best way to give all students an equal educational opportunity. In the 1990s, many school administrators and teachers have turned away from the Integrated Learning System (ILS) approach and started using computer labs as resources for independent student work. The article discusses the need for school districts to revitalize their skills in *planning for technological change* and provides a blueprint for doing it.

UNIT 2

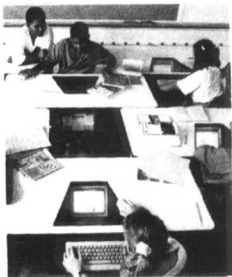


Curriculum and Instructional Design

Four articles provide information on employing microcomputer-based software in the classroom.

- Overview 36
7. **Interactivity and Computer-Based Instruction**, William D. Milheim, *Journal of Educational Technology Systems*, Volume 24, Number 3, 1995-1996. 38
- Interactivity is one of the most important factors in the *design and development of effective computer-based instructional materials*. William Milheim describes this instructional component, its overall purpose in various learning environments, benefits that can be gained from its utilization, and its specific use within computer-based education.
8. **The Relevance of HCI Guidelines for Educational Interfaces**, David J. Gilmore, *Machine-Mediated Learning*, Volume 5, Number 2, 1996. 43
- Human Computer Interface (HCI)* has gathered many guidelines for interface design and has discovered the strengths of direct manipulation as an interaction technique. David Gilmore shows how good performance can be associated with low rates of transfer, how poor initial performance can give rise to more robust knowledge for harder problems, and how command giving rather than direct action may produce better learning.
9. **Designing Interactive Learning Environments**, Y. Akpinar and J. R. Hartley, *Journal of Computer Assisted Learning*, December 1996. 50
- This article details *computer-assisted learning (CAL) environments* in which the software is interactive and is able to adapt to different styles of learning and teaching. The authors discuss evaluation data taken from school children. The data indicates that the program had positive effects on learner performance. The authors argue for and describes the design principles of interactive, adaptive learning environments, taking as an illustration an application in the learning of fractions.
10. **Design and Application of Teaching Software**, Glenn G. Hammack, *Optometric Education*, Winter 1996. 58
- Glenn Hammack focuses on *the graphical user interface (GUI)* and the benefits of the common screen interface across the environments. Emphasis is on resulting benefits of navigation and interactive self-paced instruction. Hammack describes the use of such software in a multi-instructor lecture/lab course and in a semi-problem-based learning course. In an evaluation by students, the software-based instruction scored better than a traditional handout-and-slide/overhead session.

UNIT 3

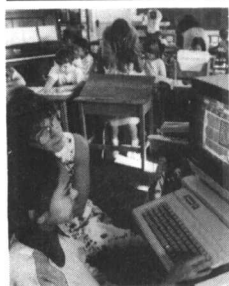


Classroom Applications and Software Evaluations

Five selections provide criteria for the selection and implementation of instructional software in the classroom.

- Overview 64
11. **NAEYC Position Statement: Technology and Young Children—Ages Three through Eight**, *Young Children*, September 1996. 66
- As technology becomes easier to use and *early childhood software* proliferates, young children's use of technology becomes more widespread. Therefore, early childhood educators have a responsibility to examine critically the impact of technology on children and to be prepared to use technology to benefit children. This position statement addresses several issues related to technology's use by young children.
12. **Children's Computers**, Anastasia P. Samaras, *Childhood Education*, Spring 1996. 72
- Without teacher support, children in computer contexts may experience an unsustained locus of control through a trial-and-error process that is devoid of task conceptualization. The anecdotes collected in this article illustrate that *teachers can adapt and extend learning within the computer context*. Anastasia Samaras believes that computers enable teachers to accommodate children's learning styles and abilities.

UNIT 4



Teacher Training

Five selections examine the problems associated with staff development and teacher education to ensure teacher computer competency in the classroom.

13. **Software Evaluation**, Daniel D. Shade, *Young Children*, September 1996. 76
Daniel Shade discusses software evaluation in general terms. He provides a checklist for teachers to use in evaluating software and a list of 10 resources that can be of help in developing a knowledge *base for software availability and review*. This article is a useful "how to" on software evaluation.
14. **Where Computers Do Work**, *U.S. News & World Report*, December 2, 1996. 81
The authors found six schools that had lessons to teach all of us about computer technology. The article provides anecdotal accounts of how students are using computers to become better problem solvers and more computer capable. The reports result in recommendations for *using computers in a learning situation*. In addition, the authors provide four rules to compute by: beware of flashy software programs, use computers only where they make sense, train teachers, and do not expect miracles.
15. **Instructional Applications of Computer Games**, John V. Dempsey, Barbara A. Lucassen, Linda L. Haynes, and Maryann S. Casey, *American Educational Research Association*, 1996. 85
The authors discuss criteria for selecting an instructional game, including simplicity, adaptability, potential for educational use, difference from other similar games, and ability to be played by one person. They also describe a study in which 40 computer games were sampled by 40 adults. Results showed that the games could be used for teaching problem solving and decision making. Lists of the games used and of *instructional benefits* of the various games are appended.
- Overview** 92
16. **Structuring Telecommunications to Create Instructional Conversations about Student Teaching**, Bob Schlagal, Woodrow Trathen, and William Blanton, *Journal of Teacher Education*, May/June 1996. 94
The authors state that student teachers are disconnected from university methods courses, other classrooms, and their peers, and that they seldom reflect on or discuss their experiences with their cooperating teachers. The article describes a study of this complex situation. The study found that *a structured electronic mail environment* is a key element in creating productive public discourse among prospective teachers.
17. **Six Stages for Learning to Use Technology**, Anne L. Russell, *National Convention of the Association for Educational Communications and Technology*, 1996. 102
This study is qualitative and based on personal e-mail diaries written by adult learners. It identifies *six stages adults go through as they learn to use technology to communicate electronically*. The sample consisted of 30 teachers studying in a postgraduate university course in which a compulsory assignment required them to learn to use e-mail.
18. **Dimensions of a Knowledge Support System: Multimedia Cases and High Bandwidth Telecommunications for Teacher Professional Development**, Joan Mazur and Traci Bliss, *National Convention of the Association for Educational Communications and Technology*, 1996. 108
The authors describe a project that centered on the development of a series of five secondary and five elementary cases that capture the dilemmas and accomplishments of teachers involved in reform. The cases were used to train teachers with case facilitation skills and technology to develop and support a professional community of teachers. The project also explores the use of telecommunications for ongoing *professional development and collaboration*.

UNIT 5



Multimedia

Six selections demonstrate how educators have harnessed the power of multimedia to improve their students' education.

19. **Interactive Video Cases Developed for Elementary Science Methods Courses**, Sandra K. Abell, Katherine S. Cennamo, and Lois M. Campbell, *TechTrends*, April/May 1996. 112
Researchers in the United States and Europe are beginning to explore uses of *integrated media in teacher education*. The authors report on a project that developed interactive videodisc materials about teaching elementary school science. The goal of the project was to use the interactive video cases to facilitate the development of a cadre of teachers who can enhance their science teaching and the science learning of their students.
20. **Stage a Well-Designed Saturday Session and They Will Come!** Miguel Guhlin, *Technology Connection*, May 1996. 116
What? Come on a Saturday? Miguel Guhlin believes that the keys to integrating technology are classroom teachers. Supporting them, therefore, must be the first step in any technology training program. *Build a technology training program* addressing teachers' issues and they will come—after school, on weekends, during the summer, and in their free time.
- Overview** 118
21. **Interactive Multimedia: Cost Benefit Analysis Issues**, John J. Hirschbuhl, *Journal of Instruction Delivery Systems*, Fall 1996. 120
John Hirschbuhl states, "We are now *using multimedia as a tool to develop thinking skills* needed to assimilate massive quantities of information needed to transform information into solutions for today's fast-paced changing society." He shows how these powerful systems impact the learner's problem-solving ability and track progress. Several case studies are cited to demonstrate how such data can be used to illustrate the return on investment generated by the impact on learners.
22. **Converting a Traditional Multimedia Kit into an Interactive Video CD-ROM**, Annie Y. W. Nicholson and Johnson Y. K. Ngai, *Journal of Educational Technology Systems*, Volume 24, Number 3, 1995–1996. 123
This article describes the conversion of videotaped instructional programs to interactive CD-ROM-based desktop learning systems. The authors report on the *development of courseware* with full motion and full screen video stored on CD-ROM by making use of various compression and decompression (CODEC) technologies.
23. **The 21st Century Classroom-Scholarship Environment: What Will It Be Like?** William D. Graziadei and Gillian M. McCombs, *Journal of Educational Technology Systems*, Volume 24, Number 2, 1995–1996. 130
The article describes the *development of a teaching-learning module* in biology that makes creative use of the Internet and other communications and computing media. This example is placed in the context of strategies that must be employed—both logically and globally—in order to realize the author's vision of the twenty-first century classroom-scholarship environment.
24. **Video to the Desktop and Classrooms: The IUPUI IMDS Project**, Ali Jafari, *T.H.E. Journal*, February 1996. 138
Ali Jafari describes the technical requirements for *delivering multimedia capability* to every desktop computer on the IUPUI campus. This system delivers interactivity, random access, random search, multimedia authoring, cross platform, Web environment, media digitizing, and more. The Interactive Multimedia Distribution System is a comprehensive system that includes the ability to do usability studies that are employed to improve overall ease of use.

UNIT 6

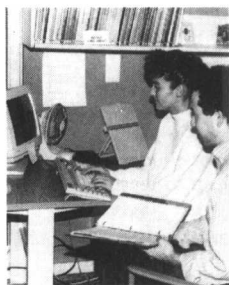


Special Issues

Six selections discuss the newly discovered potential of computers in educational applications.

25. **Multimedia and Cultural Diversity**, Maria A. Pacino and Joe L. Pacino, *T.H.E. Journal*, January 1996. 143
The authors describe the development and implementation of a CD-ROM project, *Exploring Cultural Diversity*. The project helps students to react openly to dramatized issues and then to express personal views. The experience guides students through essential steps of critical thinking and metacognition. The title also enhances *interactive communication among students and instructor*.
26. **Strengthening the Visual Element in Visual Media Materials**, R. Dwight Wilhelm, *TechTrends*, April/May 1996. 146
R. Dwight Wilhelm asks the question, "How can we more fully exploit the potentially powerful visual element in video and audio-visual material?" Wilhelm clinically describes the process of optimizing each element in audio-visual material and takes the reader through the storyboard/script-writing process. The emphasis in this article is on *exploitation of the visual*.
- Overview** 148
27. **Factors Facilitating Teachers' Use of Computer Technology**, Warren C. Hope, *The Clearing House*, November/December 1996. 150
Warren Hope discusses *the problems of implementing technology* with teachers who are disinclined to use technology in the classroom. He specifies five factors that will make teachers more likely to adopt computer technology. He also advises us that it is not prudent to leave the decision about using computer technology up to teachers or to force them to use it.
28. **Making the Most of a Slow Revolution**, Steven W. Gilbert, *Change*, March/April 1996. 152
Steven Gilbert believes that 1995 was the year in which educational uses of information technology passed on to the "mainstream faculty" in many colleges and universities. He states, "*Electronic mail and the World Wide Web* are bringing computing into instruction in the way word processing brought computing into personal use for students and faculty in the 1980s." He develops a report that is based on 12 recommendations for developing an instructional strategy for integrating information technology.
29. **The Coming Ubiquity of Information Technology**, Kenneth C. Green, *Change*, March/April 1996. 165
Kenneth Green believes information technology has finally emerged as a permanent, respected, and increasingly essential component of the college experience. He reports major gains in the proportion of *college courses and college faculty using information technology*. Green states, "The potential of technology to provide new tools and information resources . . . remains an appropriate and attainable goal." He provides the data, the charts, and the examples to support his claims.
30. **Computing Our Way to Educational Reform**, Paul Starr, *The American Prospect*, July/August 1996. 173
Paul Starr discusses how the computer revolution of earlier decades has now turned into a *communications revolution* and has opened up important new possibilities for learning. Starr believes that as the entire world of communication and knowledge is transformed, it becomes inconceivable to leave education out. He points out that the qualities of education we care about most are not technological, but are matters of educational philosophy and practice.

UNIT 7



The Internet and Computer Networks

Five articles address several issues about the Internet and other networks: using the Internet for interactive field trips; how to use the Internet for bilingual studies; using the Internet as a ready-reference resource; how to plan for local area networks.

31. **Mad Rushes into the Future: The Overselling of Educational Technology**, Douglas D. Noble, *Educational Leadership*, November 1996. 182
Douglas Noble believes that getting schools to leap onto the Information Highway is just the latest in a series of corporate forays marked by ignorance, self-interest, and marketing madness. He believes that there is no need to join the mad rush into the future or to gamble with our students' education. This article discusses *the need for cautious planning and teacher training* so that education does not become the servant of technology.
32. **A Response to Douglas Noble: We're in This Together**, David Dwyer, *Educational Leadership*, November 1996. 187
David Dwyer responds to the sharp critique of the emerging instructional technology market presented by Douglas Noble. He cites the mounting evidence of *gains computers have brought to schools*. In addition, the author concludes that technology adds value to schools when it is an integral part of a comprehensive plan for instructional improvement and when teachers are adequately prepared to use it as one more tool in their arsenal.
- Overview** 190
33. **Journey into the Unknown**, Dan Buettner and Cathy de Moll, *Learning*, January/February 1996. 192
The authors describe an electronic, highly interactive, hands-on field trip entitled *MayanQuest*. This program gives students on the Internet the capability of peeking over the shoulders of professional scientists, reading data, and engaging in meaningful dialogue with experts on location. The article includes a Get Started on the Journey list of resources that can be used by teachers to locate electronic field trips.
34. **Traveling the Internet in Chinese**, Fan Fang, *Educational Leadership*, November 1996. 195
Fan Fang tells the story of how Chinese bilingual students use the Chinese language to communicate in Chinese around the world and to publish what is probably the world's first online student newspaper in Chinese. The program involves pen pals who are conversant with Chinese. Fang describes how Chinese students became conversant in all academic activities in their primary language and made tremendous progress in learning English. This is *an ESL/Internet success story*.
35. **Ready Reference on the Internet: A Beginning List of Sources**, Barbara Ripp Safford, *School Library Media Activities Monthly*, May 1996. 198
This article discusses selection of *Internet ready-reference sources* for home page or bookmark lists. The author notes that teachers and students should participate in the selection process and suggests as an activity that students make their own evaluation criteria. The article provides a list of geographic information and government sites and makes comments about them.
36. **Monster Job!** Sally Laughon and Barbara Kurshan, *Multi-Media Schools*, January/February 1996. 201
The authors describe how some K-12 teachers became moderators of educational telecommunications projects and present results of a survey of 100 moderators about their roles. They review types of *networks that provide online learning environments*, electronic bulletin boards, Internet lists, World Wide Web, and networks. Tables list expressions that describe moderators and World Wide Web project sites.
37. **Tips & Tricks for K-12 Educational LANs**, Philip Hess, *T.H.E. Journal*, April 1996. 205
Philip Hess offers *guidelines for school districts planning to add computer technology*, especially local area networks (LANs). Topics include electricity for laboratories, networkable software, hard drives, file servers, computer classes for parents, laboratory technicians, telephones, facilities, considerations, inservice teacher training, access issues, planning, and budget issues.

UNIT 8



Distance Learning

Six articles discuss the value of interactive technologies within a distance learning environment.

Overview	210
38. Distance Learning, the Internet, and the World Wide Web, Sandra Kerka, <i>ERIC Digest (Eric Clearinghouse on Adult, Career, and Vocational Education)</i> , Digest No. 168, 1996. Sandra Kerka states that some of the newest methods of <i>distance learning (DL) use the Internet and the World Wide Web</i> . Distance learning has the potential of reaching a global audience. It takes on several forms, which are listed in the article. One of the forms is multimedia, which supports constructivist approaches to learning. Kerka mentions the disadvantages, such as limited bandwidth, slow modems, reduced media, reliance on student initiative, loneliness, and many others.	212
39. Distance Learning's Explosion on the Internet, Rita Laws, <i>Journal of Computing in Higher Education</i> , Spring 1996. This article focuses on <i>distance learning (DL) and the Internet</i> . It is divided into three parts. The first section consists of an introduction to the world of DL online and includes a four-step road map of success for students. The second part deals with the nine different distance learning applications found on the Internet. The third section contains a bibliography of useful books, journals, and software catalogs for people who are interested in DL.	215
40. Seven Principles for Good Practice in Distance Learning, Jacquelyn Tulloch, <i>National Community College Chair Academy</i> , February 14-17, 1996. This paper focuses on seven principles of good practice to guide initial program development. It also discusses several low- and high-tech solutions to consider when <i>implementing distance learning</i> . Jacquelyn Tulloch discusses how to encourage student-faculty contact and six other interesting questions that will help focus attention on how to implement a distance learning program.	221
41. Teaching at a Distance: Student Involvement through Interactive Multimedia, John J. Hirschbuhl, Jim Jackson, and Dwight Bishop, <i>11th Annual Conference on Distance Teaching & Learning Proceedings</i> , August 9-11, 1995. The authors describe the effects of a <i>self-paced interactive multimedia computer simulation</i> on teaching, learning, motivation, and costs. This design includes a method and tactics for fostering learner interaction and engagement in the teacher-learning process and for improving student cognitive development, all within a <i>distance learning environment</i> .	224
42. The Challenge of Distance Education, Marjorie A. Cambre, Barbara Erdman, and Leslie Hall, <i>Journal of Staff Development</i> , Winter 1996. A <i>distance learning environment</i> that includes avenues for interacting, such as telephone, e-mail, live teleconference call-in, regular exchange of course assignments, and postcard feedback is described in this essay. Instruction is delivered via videotaped prepared programs, four live teleconferences, and a 163-page course manual. The authors report potential obstacles in developing and delivering instruction and in securing interaction between students and faculty, and they make recommendations.	226
43. Factors in Determining Rural School Readiness to Use Distance Learning, Bruce O. Barker and Michael W. Dickson, <i>Rural Educator</i> , Spring 1996. "Is your school ready to include distance learning as part of its instructional program and what direction should be taken to implement distance learning?" The information presented in this article is directed to rural school administrators who are interested in adding <i>distance learning as part of their schools' instructional program</i> .	230
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Selected World Wide Web Sites for Computer Studies: Computers in Education

All of these Web sites are hot-linked through the *Annual Editions* home page:
<http://www.dushkin.com/annualeditions> (just click on a book).

Some Web sites are continually changing their structure and content, so the information listed may not always be available.

Internet Search Engines and Directories

Search the Internet—<http://www.isleuth.com/>—The Internet Sleuth is not a well-known search engine, but it offers a wide variety of specialized searches by category.

WebCrawler—<http://webcrawler.com/>—This is a fast and weighty search engine that analyzes the full text of documents, allowing the searcher to locate keywords that may have been buried deep within a document's text.

WebCrawler Guide—<http://webcrawler.com/select/>—This search engine to the "best on the Net" is organized in categories, such as arts, business, chat, kids, life, games, entertainment, health, and so on.

Yahooligans! The Web Guide for Kids—<http://www.yahooligans.com/>—An excellent site for children, this resource can be used if you wish to limit access by your students but still allow independent searching.

Internet How-To Resources

Beginner's Guide to HTML—<http://www.itc.univie.ac.at/docs/html-primer.html>—This is a primer for producing documents in HTML, the markup language used by the World Wide Web.

Consortium for School Networking—<http://www.cosn.org/>—This site provides information and discussion on how to implement networks in schools and updates on legislation affecting education and networking. It offers online resources and forums.

Getting U.S. Teachers Online—<http://quest.arc.nasa.gov/online/table.html>—This NASA resource provides online service providers, listed by state, as well as other access options for K-12 teachers.

Teaching with Electronic Technology—<http://www.wam.umd.edu/~mlhall/teaching.html>—This collection of World Wide Web sites addresses the use of electronic technologies in the classroom, which range from general and theoretical resources to instructive examples of specific applications to teaching and learning.

Web66—<http://web66.coled.umn.edu/>—The Web66 project is designed to facilitate the introduction of Web site development into K-12 schools. The site includes a directory of schools on the Web.

Writing HTML—<http://www.mcli.dist.maricopa.edu/tut/index.html>—Here is a tutorial for creating World Wide Web pages, which will allow an educator to create classroom home pages.

General Education Sites

Educational Resources Information Center—<http://www.aspensys.com/eric/index.html>—At this site there are links to all ERIC sites: clearinghouses, support components, publishers of ERIC material. You can search the ERIC database, find out what is new, or ask questions about ERIC.

ERIC Clearinghouse on Reading, English, and Communication (ERIC/REC)—http://www.indiana.edu:80/~eric_rec/—This site is dedicated to providing educational materials, services, coursework, and exemplary lesson plans to everyone interested in the language arts. Links to many other educational sites.

Goals 2000—<http://www.ed.gov/pubs/goals/progrpt/index.html>—The reform initiative started by the U.S. Department of Education has a progress report to share.

National Regional Educational Laboratories—<http://www.nwrel.org/national/regional-labs.html>—The Regional Educational Laboratories are organizations across the country that provide research on resources for education.

Online Internet Institute—<http://www.oii.org/>—A collaborative project between Internet-using educators, proponents of systemic reform, content area experts, and teachers who desire professional growth, this site provides a learning environment for integrating the Internet into educators' individual teaching styles.

Teachers Guide to the Department of Education—<http://www.ed.gov/pubs/TeachersGuide/>—Government goals, projects, grants, and other educational programs are listed here as well as links to services and resources.

Instructional Planning Resources

Boulder Valley School District Home Page—<http://bvsd.k12.co.us/>—This is the site of a district-developed home page containing planning ideas and links to educational resources for teachers and students.

Canada's Schoolnet Staff Room—<http://www.schoolnet.ca/adm/staff/>—Here is a resource and link site for anyone involved in education, including special-need educators, teachers, parents, volunteers, and administrators.

Classroom Connect—<http://www.classroom.net/>—This is the premier Web site for K-12 teachers and students, with links to schools, teachers, and resources online.

ENC Online—<http://www.enc.org/>—The Eisenhower National Clearinghouse includes science and math resources, lesson plans, a search engine, and more.

Mighty Media—<http://www.mightymedia.com/>—The mission of this privately funded consortium is to empower youth, teachers, and organizations through the use of interactive communications technology.

Mustang List of Lesson Plans—<http://mustang.coled.umn.edu/lessons/lessons.html>—This source leads to many other sites that contain electronic lesson plans, including online interdisciplinary projects.

NASA Aerospace Education Services Program—<http://www.okstate.edu/aesp/AESP.html>—This site leads to cross-curricular projects, science, technology, space, literature, math, language, astronomy, writing projects, museum links, and space image libraries.

Teachers Helping Teachers—<http://www.pacificnet.net/~mandel/>—Provides basic teaching tips, new teaching methodology ideas, and forums for teachers to share. Download software and participate in chat sessions. Features educational resources on the Web, with new ones added each week.

The Teachers' Network—<http://www.teachnet.org/>—Bulletin boards, classroom projects, online forums, and Web mentors are featured, as well as the book, *Teachers' Guide to Cyberspace*, and an online, 4-week course on how to use the Internet.

Teacher Talk Forum—<http://education.indiana.edu/cas/tforum/lesson.html>—Electronic lesson plans from Indiana University's Center for Adolescent Studies cover a variety of topic areas.

Curriculum Sites

Classics for Young People—<http://www.ucalgary.ca/~dkbrown/storclas.html>—A growing number of children's literature classics are out of copyright and are among the books available in full text here.

Education Place—<http://www.hmco.com/hmco/school/School.html>—Houghton Mifflin's home page contains activities for students, parents, and teachers, which include weekly author interviews and child-written book reviews. Has links to excellent education topics and organizations with synopses of research (for instance, phonics instruction).

Electronic Field Trip to the United Nations—<http://www.pbs.org/tal/un/>—This trip to the UN includes seeing the UN in action, classroom activities, and links to other sources.

The Exploratorium—<http://www.exploratorium.edu/>—Here is a hands-on interactive learning experience that covers a broad spectrum of subjects.

MECC on the Internet—<http://www.mecc.com/>—MECC's page includes a demonstration of a variety of MECC software, including Oregon Trail.

NASA Spacelink—<http://spacelink.msfc.nasa.gov/home.index.html>—This aeronautics and space resource for educators contains a variety of space travel information, including travel throughout the galaxy with information and images.

The Nine Planets—<http://seds.lpl.arizona.edu/billa/tnp/>—This planetary tour through the solar system has sound and video clips and links to related sites.

Project Gutenberg—<http://www.promo.net/pg/>—At this site there is an ongoing attempt to make the texts of public domain books

and other materials available on the Net. The listings are provided by author and by title.

Scholastic Network—<http://www.scholastic.com/>—Here is a selection of Scholastic products, including Global Community, Magic SchoolBus, contests, Scholastic publications, and new school-home Software Clubs for Grades PreK-8.

SchoolNet Ocean Site—<http://schoolnet2.carleton.ca/english/manuals/virtualprod/ocean/>—This site offers educators resources for developing a thematic unit on oceans with links to many interesting sites.

The Science Learning Network—<http://www.sln.org/>—This collection of museum sites includes movies, teachers' projects, news, and links to other science education material.

The TeleGarden—<http://www.usc.edu/dept/garden/>—Interact and view a remote garden filled with living plants. Members care for the garden through a robot arm.

Texas Center for Reading and Language Arts—http://www.tenet.wsu/teks/language_arts/—The Center, an example of a state site, offers a wide range of resources and contact information for Texas teachers and teacher educators.

Virtual Tourist—<http://www.vtourist.com/webmap/>—This geographic directory connects you to all of the World Wide Web servers in the world.

Virtual Whales—<http://fas.sfu.ca/cs/research/projects/Whales/>—Here is an example of a virtual learning project: the feeding behavior of Pacific humpback whales.

Volcano World—<http://volcano.und.nodak.edu>—Study historic and live volcanoes worldwide. There are activities for children and adults, and lesson plans for teachers.

Media Sources

CNN Interactive—<http://cnn.com/>—The latest news, including pictures and archival links, is available here, along with the Infoseek search engine.

National Public Radio—<http://www.npr.org/>—At this site you can hear NPR's daily reports using RealAudio.

PBS Online—<http://www.pbs.org/>—Here you will find PBS programming, stations, and teacher resources (for example, The Donner Party or Pyramids: Inside Story).

We highly recommend that you review our Web site for expanded information and our other product lines. We are continually updating and adding links to our Web site in order to offer you the most usable and useful information that will support and expand the value of your *Annual Editions*. You can reach us at: <http://www.dushkin.com/annualeditions>.

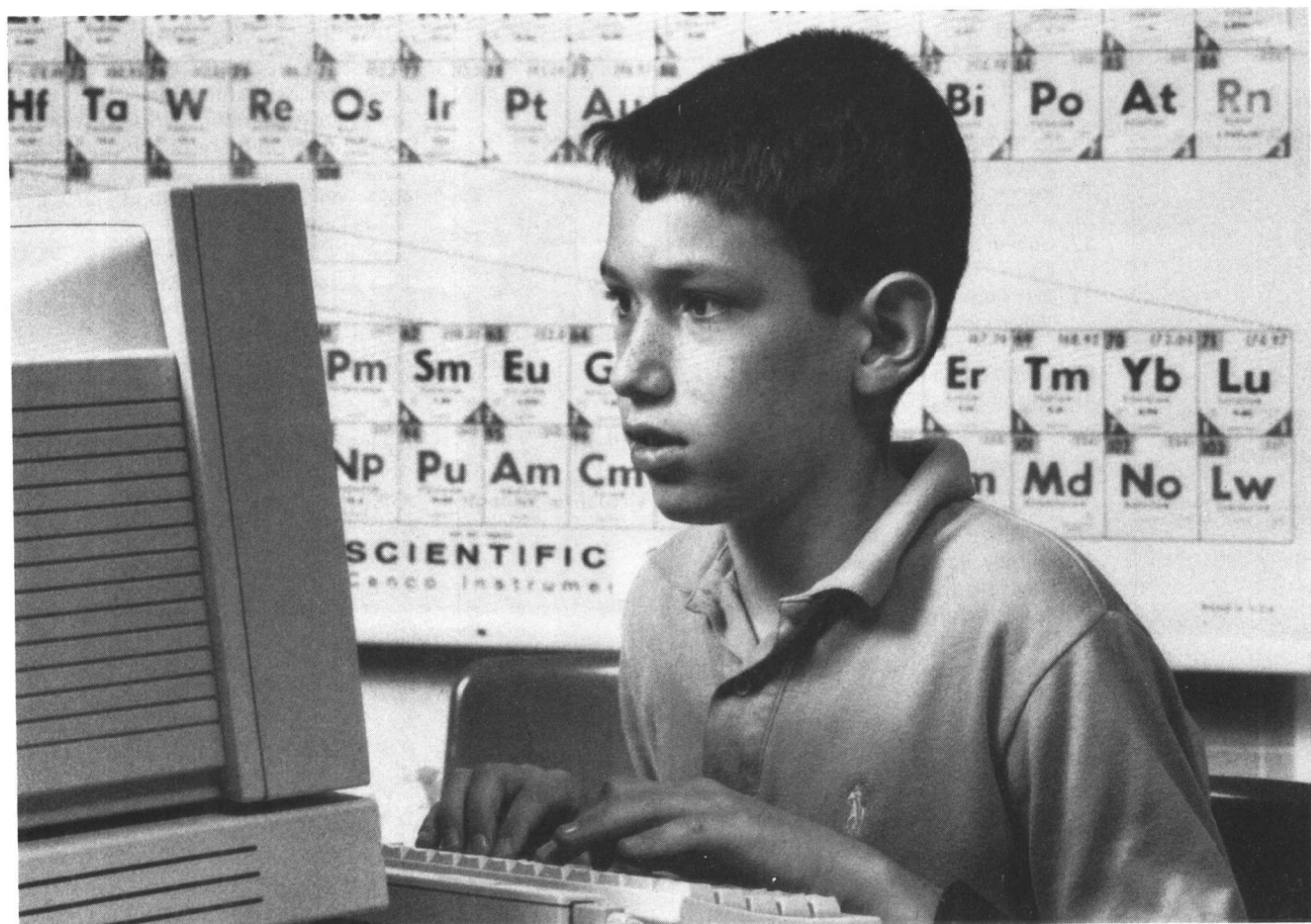
Topic Guide

This topic guide suggests how the selections in this book relate to topics of traditional concern to students and professionals involved with computers in education. It is useful for locating articles that relate to each other for reading and research. The guide is arranged alphabetically according to topic. Articles may, of course, treat topics that do not appear in the topic guide. In turn, entries in the topic guide do not necessarily constitute a comprehensive listing of all the contents of each selection.

TOPIC AREA	TREATED IN	TOPIC AREA	TREATED IN
Acquisition	11. NAEYC Position Statement 13. Software Evaluation 15. Instructional Applications of Computer Games	Development	18. Dimensions of Knowledge Support System 19. Interactive Video Cases 22. Converting Traditional Multimedia Kit 23. 21st Century Classroom-Scholarship Environment 25. Multimedia and Cultural Diversity 40. Seven Principles for Good Practice in Distance Learning 42. Challenge of Distance Education
Application	3. Modern Land of Laputa 10. Design and Application of Teaching Software 12. Children's Computers 14. Where Computers Do Work 28. Making Most of Slow Revolution 29. Coming Ubiquity of Information Technology 39. Distance Learning's Explosion on the Internet	Distance Learning	16. Structuring Telecommunications 33. Journey into Unknown 38. Distance Learning, Internet, and World Wide Web 39. Distance Learning's Explosion on the Internet 40. Seven Principles for Good Practice in Distance Learning 41. Teaching at a Distance 42. Challenge of Distance Education 43. Factors in Determining Rural School Readiness to Use Distance Learning
CD-ROM	22. Converting Traditional Multimedia Kit 25. Multimedia and Cultural Diversity	Evaluation	10. Design and Application of Teaching Software
Cost Effectiveness	21. Interactive Multimedia 41. Teaching at a Distance	Future	1. School Reform 2. System 2000 4. Education Wars 5. 21st Century Classroom 23. 21st Century Classroom-Scholarship Environment
Curriculum	1. School Reform 6. Unfilled Promises 7. Interactivity and Computer-Based Instruction 11. NAEYC Position Statement 14. Where Computers Do Work 25. Multimedia and Cultural Diversity 31. Mad Rushes into Future 32. Response to Douglas Noble	Goals	28. Making Most of Slow Revolution
Design	5. 21st Century Classroom-Scholarship 7. Interactivity and Computer-Based Instruction 8. Relevance of HCI Guidelines 9. Designing Interactive Learning Environments 10. Design and Application of Teaching Software 23. 21st Century Classroom-Scholarship Environment 26. Strengthening the Visual Element 28. Making Most of Slow Revolution 40. Seven Principles for Good Practice in Distance Learning 42. Challenge of Distance Education	Inference Engine	41. Teaching at a Distance
		Information	1. School Reform 4. Education Wars 21. Interactive Multimedia 28. Making Most of Slow Revolution 29. Coming Ubiquity of Information Technology

TOPIC AREA	TREATED IN	TOPIC AREA	TREATED IN
Instructional Design	<ul style="list-style-type: none"> 7. Interactivity and Computer-Based Instruction 8. Relevance of HCI Guidelines 9. Designing Interactive Learning Environments 10. Design and Application of Teaching Software 26. Strengthening the Visual Element 28. Making Most of Slow Revolution 40. Seven Principles for Good Practice in Distance Learning 42. Challenge of Distance Education 	Software	<ul style="list-style-type: none"> 9. Designing Interactive Learning Environments 10. Design and Application of Teaching Software 11. NAEYC Position Statement
Internet	<ul style="list-style-type: none"> 24. Video to Desktop 28. Making Most of Slow Revolution 30. Computing Our Way to Educational Reform 33. Journey into Unknown 34. Traveling the Internet in Chinese 35. Ready Reference on Internet 36. Monster Job! 38. Distance Learning, Internet, and World Wide Web 39. Distance Learning's Explosion on the Internet 	Teacher Education	<ul style="list-style-type: none"> 16. Structuring Telecommunications 17. Six Stages for Learning to Use Technology 18. Dimensions of Knowledge Support System 19. Interactive Video Cases 20. Stage Well-Designed Saturday Session 27. Factors Facilitating Teacher's Use of Computer Technology
Multimedia	<ul style="list-style-type: none"> 18. Dimensions of Knowledge Support System 19. Interactive Video Cases 21. Interactive Multimedia 22. Converting Traditional Multimedia Kit 23. 21st Century Classroom-Scholarship Environment 24. Video to Desktop 25. Multimedia and Cultural Diversity 41. Teaching at a Distance 	Telecommunications	<ul style="list-style-type: none"> 6. Unfilled Promises 30. Computing Our Way to Educational Reform 36. Monster Job! 42. Challenge of Distance Education
Networking	<ul style="list-style-type: none"> 16. Structuring Telecommunications 17. Six Stages for Learning to Use Technology 28. Making Most of Slow Revolution 33. Journey into Unknown 34. Traveling the Internet in Chinese 35. Ready Reference on Internet 36. Monster Job! 37. Tips & Tricks For K-12 Educational LANs 38. Distance Learning, Internet, and World Wide Web 39. Distance Learning's Explosion 	Tools	<ul style="list-style-type: none"> 13. Software Evaluation 21. Interactive Multimedia 24. Video to Desktop and Classrooms 29. Coming Ubiquity of Information Technology 40. Seven Practices for Good Practice in Distance Learning
		Video	<ul style="list-style-type: none"> 19. Interactive Video Cases 22. Converting Traditional Multimedia Kit 24. Video to Desktop and Classrooms 26. Strengthening the Visual Element
		Videodisc	<ul style="list-style-type: none"> 19. Interactive Video Cases
		Virtual Classroom	<ul style="list-style-type: none"> 5. 21st Century Classroom

Introduction



There is a conflict growing within the education establishment. The forces driving the Information Age are colliding with educators who are resisting change. The onrush of telecommunication technologies is forcing edu-

cators to understand and tentatively accept these new technologies and their impact. What has happened is that the telecommunications infrastructure has grown to include computers, broadcast, cable, and other electronic