

FROM DIGITAL DIVIDE TO DIGITAL OPPORTUNITY. Appu Kuttan and Laurence Peters. *Lanham, MD: The Scarecrow Press, Inc., 2003, 190 pp., \$54.95, cloth; \$43.95, paper.*

ABSTRACT. This article reviews the book *From Digital Divide to Digital Opportunity*, by Kuttan and Peters (2003). After providing a brief summary of the authors' backgrounds, the reviewer presents a systematic overview of the book's six chapters and accompanying CD. She concludes with an overall assessment of the book content as it relates to issues of equity and social justice. [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2003 by The Haworth Press, Inc. All rights reserved.]

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Drawing from their extensive experiences from both public and private sectors, Dr. Appu Kuttan and Dr. Laurence Peters present a clear and comprehensive discussion of the complex issues surrounding the digital divide. They also provide well-researched and practical solutions to the technological inequity that has divided and threatens to continue to divide nations and the world into groups of haves and have-nots.

Appu Kuttan is the founder and chairman of CyberLearning, a national education foundation. He has achieved national and international renown through his work as a management and education systems innovator as well as authorship of many innovative concepts and books.

Laurence Peters is the director of the Mid-Atlantic Center on Technology in Education Consortium at Temple University. The center is federally funded and provides technical assistance to school districts and states. He previously served as a senior policy advisor at the U.S. Department of Education, specializing in helping to bridge the digital divide. He is the author of many articles pertaining to educational technology issues.

The book is organized into six complementary, yet separate chapters addressing various aspects of the complex digital divide. The six chap-

ters are preceded by a preface which is an overview of the authors' involvement with digital divide problems, programs, and solutions in the United States and around the world. A CD containing two appendices with extensive resources and references accompany the book.

In the first chapter, the authors define the digital divide within the U.S. and global political and economic environments. Starting from a very succinct definition of the digital divide as "the gaps in technology, access to technology (specifically the Internet), education, and technology training between and within specific populations" (p.3), the authors compare some opposing perspectives on the issue and convincingly argue that the digital divide has become a pressing civil rights issue as it most negatively impacts women, minorities, and other traditionally disadvantaged groups in the United States.

They use well-researched data to argue that the digital divide has formed an "information underclass" and threatens to create "cyberghettos." They posit that the digital divide will not be bridged by simply connecting classrooms and libraries to the Internet. Among the barriers that hinder the access to and use of the Internet, the authors list usability issues, lack of education, and government regulatory barriers. They indicate that many of the 50 % of the U.S. adult population who are "unwired" report that the Internet is difficult and confusing. Internet access and use are also significantly impacted by a person's educational level, with more education correlating with more access. Also, fewer Internet backbone hubs are built outside of larger business and population centers because of restrictive government regulations.

The authors argue that even Internet access alone is a complex and multifaceted issue. It is defined by access to broadband connections, which provides wealthier households with faster Internet connection while areas with higher concentrations of minorities and lower income residents are left with little or no high-speed access. Access to computers and Internet devices is another obstacle that will cause racial minorities, the poor, and the uneducated to lag behind with potentially debilitating consequences in a society defined by emerging "information appliances, digitally delivered services, and an omnipresent information technology infrastructure" (p. 19). The authors also argue that there is a "content divide" as access to online content is hindered by lack of local information, literacy and language barriers, and lack of cultural diversity. They add that the problem is compounded by the fact that women and minorities, especially African Americans, Hispanics, and Native Americans, are grossly underrepresented in information technology and employment.

The authors close the longest chapter in the book by highlighting the data-based impact of the digital divide on low-income citizens, racial and ethnic minorities, rural communities, seniors, the disabled, and women, thus raising a major issue of pervasive inequity in the distribution of and access to information technology.

The authors address the urgency of the digital divide in the second chapter. First, they draw an impressive parallel between the current "Internet revolution" and the Industrial Revolution of the nineteenth century, which transformed society and the economy by allowing formerly disadvantaged people to achieve social and economic advancement in a relatively short time. They argue that, with proper training in and better access to information technology, minorities, women, and the poor will rise to new realms of education and political power.

Second, the authors contend that, unlike the Industrial Revolution, the rapid expansion of information technology will divide the haves and have-nots into diverging groups, leading "today's information-poor" to become "tomorrow's information-impooverished." They classify new technology participants into five categories spread along the adoption/diffusion continuum: innovators, early adapters, early majority, late majority, and laggards. They indicate that women, seniors, less educated people, and those in the lower socioeconomic bracket are at higher risk of late adoption of information technology.

The authors also make a very important distinction between the Internet and other technologies such as the telephone and television. Unlike the latter, effective use of the Internet requires complex and complicated literacy prerequisites. The Internet also offers greater rewards to expert users. Moreover, the ever-changing nature of the Internet complicates the digital divide.

They conclude the chapter by discussing serious implications of the digital divide on the future of economic development and the health of democracy in the United States. They explain that "the Internet is evolving into an alleged enabler of the democratic process" (p. 68) by providing access to knowledge and information as well as through the prospect of online voting. They warn that if the current shortage of information technology workers continues, high-skill, high-wage jobs could migrate from the U.S. to other countries.

Chapter three focuses on the digital divide in U.S. schools. First, the authors argue that computers and the Internet positively impact student learning, especially when used to supplement the traditional curriculum, to facilitate cognitive development, to enhance students' active and constructive learning, and to make individualized distance learning

possible. They posit that research suggests that technology can positively impact students' achievement and motivation to learn.

Second, the authors present the glaring facts of the digital divide in U.S. schools and classrooms. They indicate that even through the number of classrooms connected to the Internet rose by over 400 % (from 3 to 63 %) between 1994 and 1999, disquieting technological inequity remains between suburban and rural schools, and between wealthy and poor schools.

Third, the authors outline five major challenges of the digital divide in U.S. schools: (a) the majority of the teachers lack the necessary skills to incorporate technology into their teaching; (b) many teachers are still unsure of the rightful place of technology in the curriculum; (c) many rural communities lack the means to access the fiber optic networks of long-distance carriers even when these pass nearby; (d) educators' belief systems about technology and its potential to alter traditional static ways of teaching; and (e) lack of necessary and sufficient technical support personnel.

Next, the authors provide an overview of the federal government's efforts to bridge the digital divide in U.S. schools. They indicate that the E-Rate program, created by the Telecommunication Act of 1996 to subsidize the cost of basic and long-distance phone service and Internet access for schools and libraries, reduced the technological inequity between wealthy and poor schools. However, they question the program's ability to substantively narrow the divide since it does not cover the cost of software, hardware, maintenance, professional development, and access to fiber optic networks of long-distance carriers.

They also highlight four technology initiatives developed by the Department of Education. The Technology Literacy Challenge Fund enables the state to help poor schools integrate technology into the curriculum so that all students can become technologically literate. The Star Schools program aims at using telecommunications to improve instruction in mathematics, science, foreign languages, literacy skills, and vocational education and to serve such populations as the disadvantaged, illiterate, limited-English proficient, and individuals with disabilities. The Preparing Tomorrow's Teachers to Use Technology (PT3) program awards three types of grants to support innovative teacher-preparation program improvements. The Technology Innovation Challenge Grant Program supports local communities' efforts to use technology to meet their students' educational needs.

Fifth, the authors propose workable solutions to the digital divide in U.S. schools. They stress that policymakers have mostly overlooked the

crucial compounding effects of family income, ethnicity, and poor schools and failed to invest in more training for teachers and students' families, and to provide incentives for effective use of technology. They attribute the inequalities faced by minorities in the high-tech job market to the digital divide in education.

The authors suggest three main approaches to bridge the digital divide in U.S. schools:

1. creating statewide integration approaches that would make technology an important ally for the academic standards movement;
2. developing community-level strategies aimed at increasing access to computers and the Internet in poor households and schools;
3. establishing national standards that would provide incentives to place curriculum materials online, as well as inspire and support standard-based reform.

Finally, the authors describe four case studies of programs that U.S. schools could utilize as models to bridge the digital divide locally, regionally, and nationally: (a) The Boston Computer Clubhouse employs adult volunteer members to provide access to the latest computer technology and cultivates underserved young people's individual interests by allowing them to design and create their own projects. (b) The Appalachian Center for Economic Networks project trains students to become skilled computer consultants. (c) The NetDay Project in Detroit's Empowerment Zone provides technology resources and professional development opportunities to struggling school districts in Detroit. (d) The United Kingdom's National Grid for Learning (NGFL) is an \$80-million project whose purpose is to improve the quality of the educational system and to support the need to wire every school to the Internet. It serves as an Internet portal with linked sites that allow teachers and students to locate needed quality sites and digital content to advance academic standards.

In chapter four, the authors use detailed data that by now the reader has come to expect in order to paint a clear and quite troubling picture of the global digital divide. They first analyze the international digital divide. They note that, while the wealthiest nations have only 20% of the world's population, they hold 86% of the world's income and 91% of the world's Internet users, thus concluding that "the international digital divide is a byproduct of the global economic divide between rich and poor countries" (p.109). They add that language further complicates the

digital divide as English is used in about 70% of all Web sites even though it is spoken by less than 10% of the world population.

The authors then explore the intranational digital divide within countries in Africa, Asia, the Indian subcontinent, the Middle East, Eastern Europe, Western Europe, and Latin America. According to the data, in these respective parts of the world, the Republic of South Africa, Hong Kong, Sri Lanka, Israel, Estonia, Norway, and Chile have the highest Internet penetration rates while Nigeria, Vietnam, Bangladesh, Egypt, Yugoslavia, Spain, and Cuba have the lowest. They reiterate that education, income, gender, age, and location (rural versus urban) are the most common factors impacting the digital divide.

The authors close the chapter with a discussion of the digital divide and the solutions that have been developed to address it in Australia and Canada, two of the four nations with the highest Internet penetration rates in the world (the other two are Singapore and the United States). They highlight the similarities between the Australian and Canadian and U.S. digital divides and describe examples of policies and programs for those two countries that could serve as workable models for the United States.

Australian government models that the United States may consider are the Networking the Nation program, which upgrades regional, rural, and remote telecommunications; the Department of Transport and Regional Services' Rural Transaction Centers program, which establishes community access centers in small, rural communities; the Education and Training Action Plan for the Information Economy, which funds an Information Technology and Telecommunications Skills exchange; the Computers for Schools project which donates surplus government computers to schools; the Model of School Teacher Professional Development project, which identifies successful pre- and in-service information technology professional development programs and facilitates the sharing of information about effective practices; and the Farmwide Internet Access for All project, which provides local-call Internet access, training, and relevant services to communities that need such access.

Canadian models that the United States may consider adopting are the First Nations School Net program, which provides Aboriginal schools with high-speed internet connections via satellite; the Generations Can Connect program, which connects seniors and youth in communities throughout Canada; the Community Access Program, which provides affordable public access to the Internet and the skills to use it effectively; the Canada's SchoolNet program which supports the integration of information technology in education; and the Voluntary Sec-

tor Network Support program, which provides computer equipment, Internet skills development, and support to voluntary organizations.

The authors highlight the performance of Singapore, which holds the best Internet penetration rate in the world. They attribute this special achievement to the fact that the country has one of the most compact, affluent, and literate populations and because its government has made bridging the digital divide a national priority. Worthy of emulating are the Singapore government's initiatives to give every Singaporean over the age of five a free e-mail address and personal Web site, give 30,000 low-income families surplus government computers with free Internet access as well as basic computer and Internet training, and to use community technology centers and public kiosks to provide free high-speed Internet access to the public. The Singaporean government has also made the Internet indispensable to its citizens by placing almost all government services and agencies online.

In the fifth chapter, the authors discuss the four primary policy options that have been suggested to bridge the digital divide. These clearly portray the different perspectives on the issue. The proponents of the free market contend that letting the basic laws of supply and demand run their course will fix the problem without government interference. They illustrate three ways that the market is bridging the digital divide by making computer and Internet access affordable and readily available. Those who advocate for government action argue that the digital divide is a pressing social and economic problem that must be addressed with the use of federal, state, and local funds as well as federal, legal, regulatory, and tax policies. The authors give examples of federally funded programs, federal regulations and tax policies, as well as state and local government action that have been designed to bridge the digital divide in the United States.

The proponents of philanthropy and community action believe that corporations, civic organizations, foundations, and individuals will act upon the digital divide once they realize that it is a pressing public policy issue. Several examples of individual and corporate philanthropy and of community-based organizations working to resolve the problem are described. Yet other people argue that private/public partnerships like Plugged In of East Palo Alto, California, and PowerUp will be sufficient to close the digital divide.

In the sixth and final chapter of the book, the authors draw three important conclusions:

1. a comprehensive, strategic approach is critical to unveiling the causes of and developing solutions to the digital divide;
2. the laws of supply and demand alone cannot explain the unequal access to technology;
3. all segments of the population will not be able to take advantage of the digital revolution unless effective information technology training and quality education are made accessible.

After a brief overview of the previous five chapters, the authors present an implementation strategy for closing the digital divide. They argue that the digital divide may indeed become a digital opportunity in as much as it offers the disadvantaged and underserved a historic chance to “leapfrog ahead and gain parity.”

They recommend their own CyberLearning or TTCM (Teacher/Training-Technology-Courseware/Content-Motivation) as the only holistic cost-effective approach to resolving the digital divide problem. Focusing on Courseware/Content, they insist that effective e-learning programs must have high-quality course materials at a low cost, be available in languages other than English, be interactive, provide human support, and be built upon a coherent framework.

They finish with a description of ten steps to bridging the digital divide: (a) analyze needs, (b) define objectives, (c) gather information, (d) build coalitions, (e) define goals, (f) identify resources, (g) raise funds, (h) develop an implementation plan, (i) evaluate the results, and (j) continue to improve the program.

The book has an accompanying CD, which contains 59 pages of relevant resources covering 43 grants/funding programs, 144 organizations, 13 technology donation programs, and 116 national and international resources. The CD also contains 80 pages of references from books, reports, articles, Web sites, listservs, conferences, speeches, and others.

The book is in many ways a reality check as Kuttan and Peters skillfully lead the readers through detailed and intricate data that place them face to face with the truth about technological inequity in the United States and the world. In a way, the authors emerge as champions of—or at least advocates for—equity and social justice because through their meticulous exploration of the digital divide, they force the readers to confront many of the sociocultural realities that negatively impact various forms of inequity and social injustice for people of color, women, people with disabilities, and poor people. Thus, they deliver an important message which goes beyond the digital divide.

The TTMC approach that the authors recommend as the best approach to deal with the digital divide is sound and promising. However, it has very little relevance in countries that do not even enjoy the benefits of universal primary education, where the majority of the citizens are only preoccupied with daily subsistence and are by all measures totally functionally illiterate. How can anyone who has never owned a book even dream to own or use a computer? It seems, then, more logical that in most less developed nations, issues of educational access and basic functional literacy should be addressed before venturing to deal with the problem of information technology literacy.

Overall, the book is well organized and readable. Each chapter opens with one or more quotes by well-known authors, policymakers, or world leaders, thus setting the tone for the chapter message. A concise summary of the content is also provided at the beginning of each chapter, which keeps the reader focused on the purpose of the chapter.

The authors made the book's message accessible to all readers including those who may be interested in the issues of the digital divide without possessing the technical jargon and expertise that is often required in order to understand most books in specific technical fields like technology. They did so by keeping the technology jargon to the bare minimum, and using everyday language throughout the book. The book has the potential to inspire anyone who is looking for possible ways to address the problem of the digital divide.

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