Educating the First Digital Generation
Recent Titles in
Educate US

Terry A. Osborn and David Gerwin, Series Editors

Portrait of a Profession: Teaching and Teachers in the 21st Century
David M. Moss, Wendy J. Glenn, and Richard L. Schwab, editors

Language and Cultural Diversity in U.S. Schools:
Democratic Principles in Action
Terry A. Osborn, editor
To my late grandfather, Archie (P. H.)
To my wife, Barbara (V. A.)
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It is a rare week in which an issue in education fails to make headlines in the United States. Parents, policy makers, educators, and taxpayers have a stake in the developments regarding schools and schooling. Though the public is increasingly sophisticated in its understanding of the intricacies of education, however, popular media venues offer little opportunity for an in-depth treatment of the relevant points related to the vital decisions that are made in boardrooms, classrooms, homes, and voting booths. *Educate US* is a series presenting a comprehensive discussion of issues in a forum that minimizes technical jargon as it explores the various facets of the problems and potential in U.S. education. The authors and contributors to this series are those whose concerns about the health and welfare of education in the United States are translated into activism. Scholarship is not merely about the gaining of expertise; it includes an inherent component of advocacy. The nature of education in a democracy requires one to take a well-advised position and then to let one’s voice be heard. This activity is at least as important as—in many ways so much more vital than—the technical aspects of the scholar’s craft.

Language and culture are at the heart of the educational process in a democracy. Equity and justice in education necessitate a full understanding of the nature of language, cultural mediation, and schooling. The authors in this text, therefore, introduce the reader to some of the pressing issues of today. The contributors help in fulfilling the more ambitious goals of the series, expanding the dialogue to include all of us who, as participants in a democracy,
must make reasoned choices when we elect officials, support causes, and to-
gether shape the future of public education. Make no mistake, the world of
public schooling, as is true for our democracy, is not a fait accompli. We make
and remake our future collectively every day.

To participate in a meaningful and beneficial way, therefore, we all must
recognize that deeper than questions of election year politics, accountability,
and slogans, many decisions regarding education are essentially moral in na-
ture. Choices that seem expedient or fit ideologically charged models designed
to appeal to the masses may nevertheless be harmful to our society, and ulti-
mately our children. If *Educate US* convinces series readers to weigh choices
in that vein, it will have achieved its purpose. Living in a time of daily concerns
related to homeland security and prosecuting numerous wars, we would do
well to remember the words of Mark Twain, “It is curious—curious that physi-
cal courage should be so common in the world, and moral courage so rare.”
Curious, indeed.

*Terry A. Osborn and David Gerwin, Series Editors*
Acknowledgments

*Books will soon be obsolete.*

—Thomas Edison (1913)

Obviously if Edison had been correct, this book would not exist. But this book would also not exist without the assistance, encouragement, and support we have received from numerous people. Without the students and teachers, who generously gave up their time to talk with us and share their experiences of using today’s technologies in and outside of the classroom, there wouldn’t be a book. We appreciate them allowing us to tell their stories in the pages that follow. Their insight, candor, and knowledge were priceless. So too was the participation of Laurie Lipper, James McConnaughey, and Lee Rainie. We are most grateful to the Center for Information and Research on Civic Learning and Engagement (CIRCLE) and its financial support for a survey of the first digital generation’s Internet usage patterns. Survey data were important to this book’s triangulated methodology, and the Pew Internet and American Life Project’s publicly available data were great secondary resources. Data don’t analyze themselves, so we extend special gratitude to the hard work of our student assistants. Christopher Cox played an invaluable role in analyzing the CIRCLE data, and we are most grateful to Leigh Suggs who provided assistance in researching the issue of new technologies and cheating.

In closing, this obviously would not be a book without the people at Praeger Publishers. We particularly wish to thank Elizabeth Potenza, David Gerwin,
and Terry Osborn—the editors for this book and the Educate US series—for their belief and interest in telling the story of Educating the First Digital Generation.

P.H and V.A
Introduction: Technology in the Classroom, from Chalk and Slate to the Web

Dates and events chart all our lives. The launch of the IBM 5150 in August 1981 not only created a benchmark for personal computing but also marked the birth of a new generation, a generation that would grow up and socialize in a digital environment—America’s first digital generation. While computers had been around for decades, Americans’ usage of the technology took off with the arrival of affordable, personalized microcomputers. The importance of this event was succinctly captured when one year after the 5150’s launch, a computer adorned the cover of *Time* magazine as the editor’s choice for “Man of the Year.” Proliferation in adoption and usage was quick. In the field of education, for example, more than 100,000 computers were in America’s schools by the spring of 1982, and by 1985, “92 percent of all secondary schools had at least one machine available for instruction.” Throughout the 1980s Americans embedded computers into every aspect of their lives, so much so that on the eve of *Mosaic*, the first Web browser—and the second event that delineates our first digital generation—there were some 67 million computers in the United States.

April 22, 1993, is the date marking the second technological event key in defining the digital generation, the release of *Mosaic*, a code that facilitated the propagation by the public of the World Wide Web (www). At the time of *Mosaic*’s birth, only 8 percent of U.S. households had computers with a modem, and the Web was not the four billion pages strong it is today. In June 1993, the Web encompassed a mere 130 Web sites, and by year’s end, that number had risen to 623. In addition, America’s knowledge of the Internet was limited.
In 1993, only 22 articles about the Internet appeared in the New York Times; today, thousands of Internet-related stories covering a vast range of topics are deemed “all the news that’s fit to print.” Furthermore, a year after Mosaic’s release, the first survey to tackle America’s awareness and usage of the Internet found that only one-third of Americans had heard of the Internet, while only 7 percent of Americans had used it. By the time Microsoft’s Internet Explorer 1.0—the commercial face of the Web browser—was launched in 1995, there was one computer for every three people. And today, terms like online, dot.com, Web site, cyberspace, to Google, Internet, and its diminutive, the Net, are now part of America’s lexicon. There are now 230.4 million computers in use in the United States, accounting for just over 25 percent of the world’s computers and providing access for the 197.8 million American Net users.

These figures not only reveal an incredible technological and behavioral phenomenon; they also define a generation, America’s first digital generation. By any measure, the above technologies are embedded within the fabric of American life—the way we shop, do business, obtain information, communicate with others, and, increasingly, educate our youth. These new technologies, or, more precisely, our use of these technologies has changed American society. For many Americans, computers and other new digital-integrated technologies were accommodated later in life, after their formative school years. For America’s digital generation, however, such technologies were not perceived as being new; they were just there and assimilated during childhood. Whatever one’s vantage point—parent or child, teacher or student—no aspect of modern society has been left unchanged by our collective adoption of these digitalized technologies, including our educational system. The institution of school, the act of learning, and the art of teaching have all changed. The question is, how have they changed? This book addresses the how question, investigating the impact society’s newest technologies—from the birth of the affordable personal computer in 1981 to the public opening of the so-called information superhighway in 1993—are having in K–12 education. We examine the educational experience of individuals born between 1981 and 1993 and, by so doing, explain how society’s adoption patterns of new technologies, such as computers and closed-circuit television cameras, has brought both solutions and challenges into America’s contemporary classroom, for students and teachers alike. While indicators, such as economic growth and volume of sales, may succinctly illustrate the economic effect new technologies are having on U.S. society, their impact on education and our nation’s first digital generation is somewhat more difficult to discern. For example, what is the educational impact of 87 percent of American 12- to 17-year-olds being online?
Or, viewed the other way, what is the impact of 13 percent of teenagers, or about three million, not using the Internet? Or, what is the educational impact of those teenagers with home access: 47 percent have dial-up service, and 51 percent report having broadband? Figures alone do not hold the answers. The opinions and experiences of teachers and first-digital-generation students must be discerned.

Unraveling the impact that new technologies have already had, and continue to have, on our digitized generation and their teachers is a complex task. For one thing, although the average school day is 6.7 hours long, our children are surrounded by these and older technologies 24/7. We must consider how the digital generation uses technologies and their level of access both in- and outside of school. Like education, the work reported in this book extends beyond the school’s walls. We investigate how, and equally importantly why, students and teachers use a particular technology in a certain way. For example, why and how does today’s student turn to the World Wide Web (www) for information? Sarah, one of the first-digital-generation members we spoke to for the purposes of this book, reported using the Web instead of visiting her school library in order to research a school project on the Renaissance. In the coming chapters, through our conversations with students like Sarah, K–12 teachers, and policy experts, such questions are addressed. For now, raising such questions acknowledges that our understanding of the impact these technologies are having on our educational system has been like a low resolution digital image. In this book, we provide a higher resolution image, specifically clarifying those pixels that concern the education of America’s first digital generation.

Before stating the book’s core argument though, we explain our conceptual framework. Since no single theory exists among researchers, our argument and investigation would lack clarity without first providing the context of our analysis. Thus, we begin by situating America’s contemporary technological change within its historical context, illustrating the experiences that other once-new technologies had on U.S. society and its educational system. Such a historical context is essential if we are to avoid chronocentricity, the all too common belief of successive generations that the particular new technology driven by their own adoption and experience with it—the telegraph, radio, television, or now, computers and the Internet—is the best thing to happen to the world since the invention of sliced bread. Moreover, we need to appreciate and understand what is really new about today’s technologies and the challenges America’s teachers and our youth face because of their technological adoption and usage. Second, we detail the theoretical context. Here,
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ambiguous terms such as *impact* and *Internet* are clarified. The use of such words and how they are understood can all too quickly act as barriers to understanding. We seek to breech such barriers and, hence, at the outset provide a rubric for our readers. Third, we denote the book’s methodological context, our adaptation of Claude Fischer’s “user heuristic” model, and the book’s sociopolitical approach. Finally, with our contexts of analysis in place, we conclude this introductory chapter by detailing the core argument, providing an overview of the interviewees, and an outline of the book’s structure.

**BACK TO THE FUTURE: THE STORY OF TECHNOLOGY AND EDUCATION**

Just as Michael J. Fox’s character, Marty McFly, does in *Back to the Future*, we must travel back in time in order to understand how our contemporary lives and experiences came about. The story of information technologies transforming American society and education is not new. With our adoption of each new technology, the familiar chronocentric cry of America being in the midst of an information revolution is heralded by media pundits, politicians, policy makers, and the public alike. “There is, of course,” writes Larry Cuban in *Teachers and Machines*, “a danger in viewing everything as a passing fad,” though. Our endeavor here is to illustrate both the euphoria of past generations marveling at their new technologies and the reality of each technology’s impact on American life and schooling. Such a story is by now a very old, well-told yarn. Successive generations have proclaimed how a new technology—or if not explicitly stated, their use of that technology—changed their lives and American society. Today, the story, while a revised edition, is being retold as we narrate the change wrought by current new technologies, notably information communication technologies (ICTs)—cell phones, the Internet and computers. To comprehend society’s contemporary digitalized appearance, while avoiding the chronocentrism and hype of cyberpunditry, we undertake a deliberative examination of America’s technological and educational past. We journey back in time, not in a DeLorean time machine like Marty McFly, but by flicking through the pages of history, examining how other once-new technologies changed American education and society. We ask, more generally, what is really new about our contemporary digital image? We begin to discern the coexistence of old and new technologies in our schools.

The act of flicking through the pages of history is itself possible because of a once-new technology—the Gutenberg printing press—and it is with books that our revised edition of past technologies begins. The book is “the
oldest new technology in education,”¹⁸ and as Paul Saettler in *The Evolution of American Educational Technology* writes, “a prime development in the history of conveying the instruction that complex and advanced-technology cultures needed.”¹⁹ The pioneers of book technology some five hundred or so years before were probably perceived as challengers to the status quo by their colleagues—just as our society has labeled teachers who incorporated the Internet into their classroom instruction in the last decade.²⁰ The book, or even more simply the printed page, provides educators with organization and format for subject matter. It was this attribute that attracted Johann Comenius, a monastic teacher, to the printed word for instruction. As Paul Saettler explains, Comenius found in the printed book “the opportunity to organize subject matter in an optimum sequence, making it possible to teach several hundred pupils at once.”²¹

Printed matter has obviously changed since the days of the Gutenberg press and Comenius, but such adaptation merely illustrates the flexibility of the book as a technology. In short, it is its flexibility that has sustained the book as an educational technology. We can describe the book as consisting of hardware and software; perhaps most important is the adaptability of the pages, as a software, to present multifarious subject matters. More sophisticated publishing methods in the early to mid-nineteenth century facilitated greater flexibility, and “educators enthused about the production of more books and their wide distribution.”²² Books were, and are, also inexpensive and reusable. The books most widely used in U.S. schools are textbooks, which are “commonly prepared and employed as complete instructional packages.”²³ These methods of book use increased between the World Wars as “great stress was placed on devising materials that would meet and excite the interests of an increasingly diverse body of students.”²⁴

As well as flexibility, “books have greater portability and interactivity” than other newer technologies, such as television.²⁵ As David Cohen notes,

> *even when an entire class uses the same book, the technology is quite flexible. Each student can read at his own pace, with few queuing problems. Readers can flip back and forth for particular points, or review, with great ease. Books can be carried around and used at the student’s discretion, read for hours at a time, studied in bits on subways and buses, or put aside for consultation with a teacher.*²⁶

Its portability, flexibility across subject matters, and cost effectiveness in production and reusability, has sustained the book as an educational technological aid.
Chalk and slate, another old technology like the book, remains a favorite of today’s teacher. It was in the early nineteenth century, fueled by hopes of greater economies of scale—a driving force common throughout America’s educational history—that chalk and slate entered the American schoolhouse. As Paul Saettler observes, “during the 1806–1853 period [schools] used slates, sand tables, wall charts, and chalkboards to achieve mass education at low cost.” The goal was to mass-teach via the new mass media of the chalkboard; however, as Saettler goes on to say, “the mechanical recitation method lost favor because little attention was given to individual students.” While the personal slates of students may be gone, replaced by newer, even more efficient and flexible technologies, the chalkboard, or its younger cousin the whiteboard, still hangs at the front of America’s classrooms today.

Moreover, much of the structure of the classroom setting as we know it today—rows of student desks facing a chalkboard and a teacher’s desk—“were standard features of urban classrooms at the turn of the [twentieth] century” when film entered the American classroom. Even though Charles Duell, Commissioner of U.S. Patents, in 1899, reportedly exclaimed that “everything that can be invented, has been invented,” film’s first educational encounter occurred in 1910 with the decision of a school board in Rochester, New York, to adopt films for regular instructional use. A year later, Thomas Edison, the Ken Burns of his day and one of the first producers of instructional classroom movies, released a series of educational films about the American Revolution for classroom audiences. Edison, obviously impressed by film’s educational potential proclaimed in July 1913,

books will soon be obsolete in the schools. Scholars will soon be instructed through the eye. It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in ten years.

Teachers of the day, though, did not share Edison’s optimism. As Paul Saettler claims, “film machines were expensive,” especially in their early years, upkeep was high, and the films themselves were not cheap. Furthermore, as Larry Cuban suggests, teachers lacked the skills to effectively use the hardware, and teachers had difficulty selecting a film that would slot seamlessly within a class’s content. However, the introduction of sound to film in the late 1920s prolonged film’s school years so much so that by 1931, “twenty-five states had units in their departments of education devoted to films and related media.” Determining how often educational films were used is difficult, as Larry Cuban discovered in his analysis of film usage in America’s schools, but
the evidence suggests that “most teachers used films infrequently in class-
rooms.” 37 Compared to the book and the chalkboard, film lacked flexibility, 
portability, and cost effectiveness.

The next technology of yesteryear was radio. Radio lifted the nation out of 
the “humdrum of every day” life, 38 and made Americans “feel together, think 
together, live together”—the latter embodied politically by President Roose-
velt’s fireside chats. By 1952, more people spent “more time tuned in to radio 
than on anything but work and sleep.” 39 The educational promise of radio 
was soon noticed and endorsed by the federal government with the U.S. Com-
missoner for Education, Dr. John J. Tigert, writing in 1924 that “[t]he school, 
the library, and the newspaper are usually ranked as the three great educa-
tional agencies. The radio promises to take its place as the fourth.” 40 The first 
school to adopt radio as an instructional technology was Haaren High School 
of New York City in 1933, but others quickly followed suit. 41 In the classroom, 
“the central and dominant aim,” as Benjamin Darrow explained in his 1932 
book Radio: The Assistant Teacher, was “to bring the world to the classroom, to 
make universally available the services of the finest teachers, the inspiration 
of the greatest leaders . . . and unfolding world events which through the radio 
may come as a vibrant and challenging textbook of the air.” 42 Radio’s initial 
adoption was plagued by high costs and complaints of poor reception, but by 
the 1930s, such transmission and economic concerns had been addressed, so 
much so that “securing a receiver for each school, and even each classroom 
was not a problem.” 43 By the 1930s, many states and broadcasting companies, 
notably Ohio and the Columbia Broadcasting System, had established Schools 
of the Air. 44 The proliferation of instructional radio was short-lived, though, 
having its heyday in the early to mid-1930s. With the outbreak of World War II, 
interest and development in instructional radio came to a grinding halt, and 
by 1943, a Federal Communication Commission report found “radio has not 
been accepted as a full-fledged member of the educational family.” 45 After the 
war, while the nation recovered, instructional radio did not, never achieving its 
status as the fourth educational agency that Tigert had prophesized less than 
20 years before.

After the Second World War, America’s attention turned to television, 
which in the 1950s “conquered the nation with blitzkrieg” 46 and assumed its 
position beside, or in place of, the radio within the American home and Amer-
ica’s schools. Television’s potential for instructional education was broadcast 
loudly, not by teachers, but by policymakers who saw yet again an opportunity 
to find an economy of scale in a new technology. As Levenson and Stasheff 
exclaimed, both “radio and television provide the classroom with windows
on the world, with magic carpets that transport pupils to other lands, to other sections of their own land, and to new and different climates of opinion and culture.” Furthermore, as Darrow hypothesized, “when the eye and the ear have been remarried in television then we shall indeed be challenged to open wide the school door.”

The first educational noncommercial station door opened on May 25, 1953, when KHUT in Houston, Texas, began broadcasting. Other doors quickly opened, and by 1955, 16 noncommercial educational stations were on the air. Instructional television, unlike radio, received substantial private and governmental assistance. Larry Cuban, for example, credits the Ford Foundation and its Fund for the Advancement of Education with underwriting the technology’s adoption. As Cuban says,

*without Ford Foundation sponsorship, classroom video probably would have remained chic gimmickry. . . . While radio and film received scattered support from public and private agencies, few technological innovations have received such a substantial financial boost from a private organization as classroom television did throughout the 1950s and early 1960s.*

Instructional television also obtained governmental support, most notably in 1962 with a congressional appropriation of $32 million for the U.S. Office of Education to develop classroom television, and “by 1971, over $100 million had been spent by both public and private sources.”

Despite the level of expenditure, television’s incorporation into teaching was for the most part limited. Only one U.S. school district, American Samoa in the South Pacific, for example, relied totally on television. This reliance was due not to televised instruction being better, but to a teacher shortage in Samoa, which, as Lyndon Baines Johnson noted on a trip to the Pacific Island, “Samoa has met . . . through educational television.” Some contiguous U.S. school districts did rely heavily on television, notably, Hagerstown, Maryland, but such reliance, while innovative, was supplemental. However, for the majority of baby boomers, television’s usage at school was limited not because of any technological difficulties that plagued early film and radio educational efforts, but rather, as Cohen found, many teachers decided to just allow the television to languish in classroom storage closets rather than incorporating the medium into their teaching.

While the hardware was not fully utilized in schools, television was welcomed at home. Levenson and Stasheff, for example, report that a survey of Chicagoans in 1952 found that “94 percent of children aged ten and older