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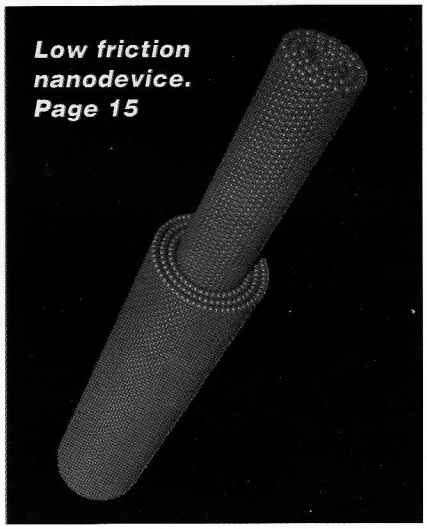
ARTICLES



DEPARTMENTS

BOOKS

WORLD TRENDS & FORECASTS

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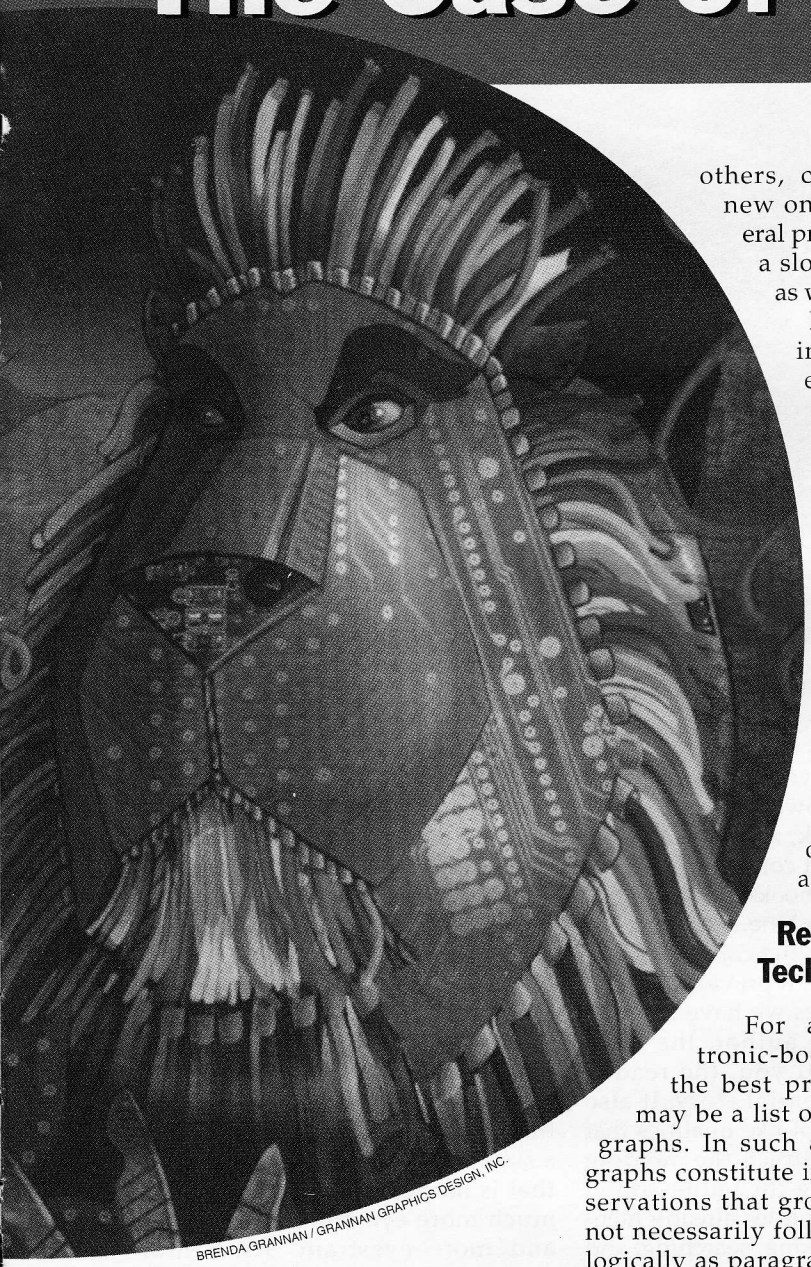
The Case of the E-Book



BRENDA GRANNAN / GRANNAN GRAPHICS DESIGN, INC.

nology itself, the goals of the technology, and the effects of the technology.

What technology shall we assess? Let's say that the object of your interest is an electronic book. The e-book is a splendidly mysterious and engaging technology to consider because of its wild-card status. It continues some traditions, modifies others, creates entirely new ones, and in general promises to wreak a slow havoc on life as we know it.

It is up to you to investigate the e-book's nature, goals, and impacts and ultimately to decide what kind of contribution it will make to education, business, and society in general. So, concentrating on this relatively new technology, let's revisit the three facets of technology assessment.

Revisit the Technology Itself

For assessing electronic-book technology, the best presentation tool may be a list of bulleted paragraphs. In such a list the paragraphs constitute independent observations that group well but do not necessarily follow one another logically as paragraphs in an essay are supposed to. Bulleted paragraphs—as short as possible—keep us focused on the electronic book as an artifact that is both tool and machine, with characteristics of involvement, extension, limitation, capacity, and dependability:

• **Features.** The concept of a virtual, "intelligent" book is not new. Many teachers use online, downloadable textbooks or hyperbooks. The limitations inherent in hyperbooks appear in hindsight to have made e-books inevitable. Because hyperbooks download directly to the reader's hard drive, portability can be a problem. The reader who wishes to use the hyperbook in more than one location must carry around a portable computer.

The e-book is much lighter and more durable than a laptop, and it focuses on doing just one thing: being a book. It approximates a conventional paper-based book, substituting the screen for the page. You, the reader, can turn pages, refreshing the screen with new data, but you can't spread out several full pages side by side or physically tab pages for purposes of cross-referencing. That is not a problem when you read a bound book, whose pages can be easily bookmarked, but it can be an impediment if you wish to read project reports or technical data.

To compensate, the e-book offers not only bookmarking but also the value-added processing capabilities of searching and cross-referencing within and outside of the text. It also allows you to personalize data by making notes, amending the text with pictures and other media, and changing fonts and font sizes to improve readability.

An e-book can store many books simultaneously. That lets you do quick cross-referencing while reducing the overall bulk and weight of the conventional books you would otherwise need to handle. You will be able to take your personal library with you wherever you go.

• **Hardware.** The electronic book is made of plastics and microcircuitry, with a range of finishes expected to be available, from punk to profes-

AWAD AWAD / AFP PHOTO

Palestinian readers share the latest news. E-books could impact society by replacing a cheap commodity with a relatively expensive one, by increasing eyestrain due to poor resolution, and by inducing readers to spend more time online.

sional. Whereas conventional book technology works under almost any conditions so long as the reader has light to see by, an electronic book depends on a power source and technical support. The average reader can't fix it as one might repair a torn page, so the technology requires outside maintenance. Like such gadgets as the Walkman and the portable CD player, this technology encourages repurchasing. Depending on the e-book's price and the heft of your pocketbook, you may choose to throw it away and buy a new one rather than trying to have it fixed.

• **Software.** Paper-based books are complete entities; they are software wedded to hardware, to paraphrase communications expert Paul Levinson in *The Soft Edge.* But because they are complete, books are also static. Electronic books are more dynamic, like a Nintendo machine. You don't need to keep reading the same old text. Much as you can change the Nintendo game you're playing, you can buy and download new texts into your e-book, as well as purge old ones without contributing them to a secondhand bookstore.

• **Tool and machine.** An electronic book is an interesting combination of tool and machine. It provides the mechanical qualities we have come to expect from an author, the techniques that lead you, the reader, through a sequential story. It also provides very tool-like qualities that allow you to direct the reading process by using the value-added processing capabilities already mentioned: bookmarking, searching, and cross-referencing.

• **Reader extension.** The electronic book extends us in many of the ways a paper-based book extends us. By preserving forever the voice and views of an author we probably won't meet, an author who lives far away or died long ago, both kinds of book extend our eyes and our ears. But the e-book adds a fluidity and adaptability that is quite new. It allows us to interact with contemporary authors via e-mail—and maybe even have an influence on the next books they write. And electronic fiction can be programmed with nonpresumptive branching so that the reader can easily determine the turns of plot as well as a book's ending. That can solidify and expand the partnership between author and reader, blurring the lines between the two.

• **Physical stress and training.** Like any computer screen, the electronic book forces the reader to forgo a static, high-resolution page for one that is harder to see and demands much more eye muscle to work—and more eyestrain. After four decades of wretched screen technology, we are still waiting for the research-and-development people to rescue our eyes from this hazard. And what untold havoc will gripping a hard e-book wreak on our hands and bodies that gripping a paperback doesn't? As for training, while the operation is fairly self-

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Charting Technology's Effects

Every technology brings us both gains and losses. Using a T-balance is a good way to demonstrate this truism.

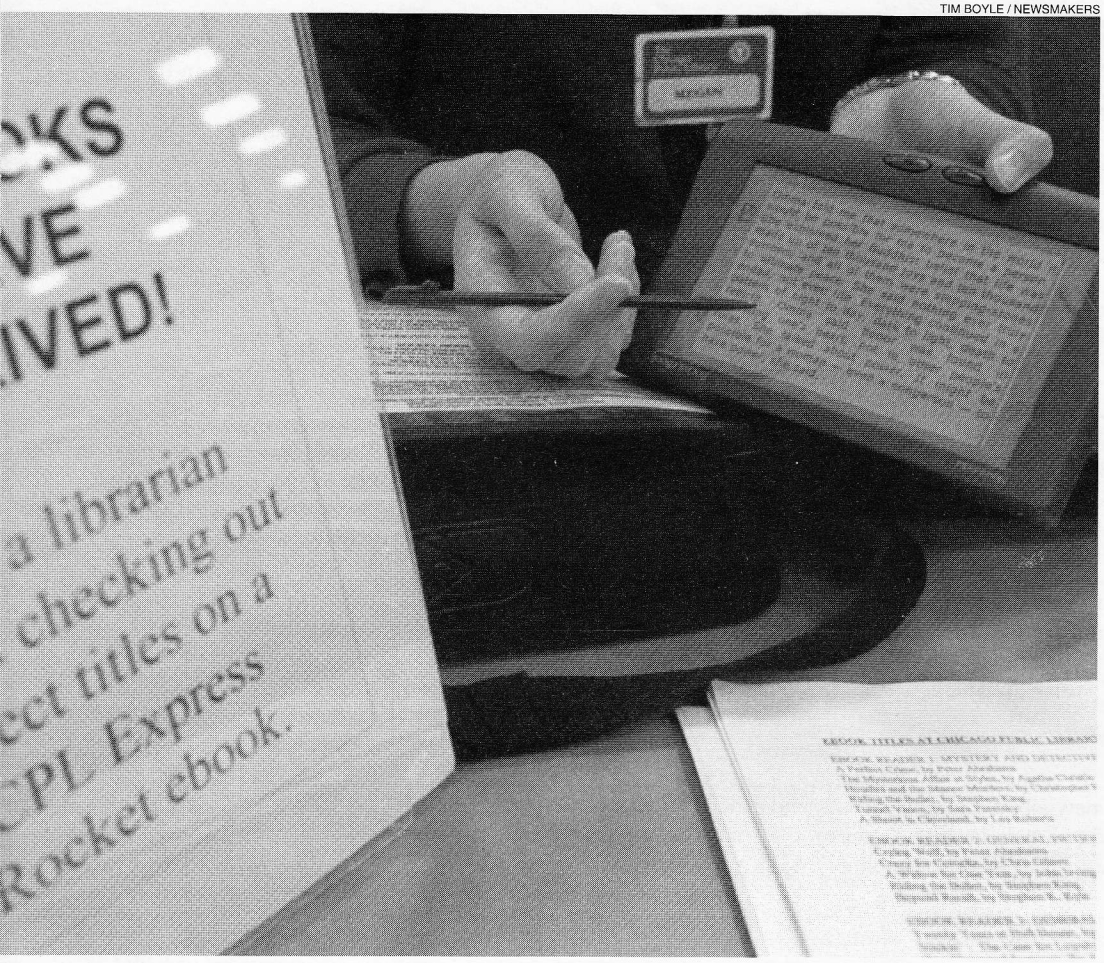
A simple T-balance has countering statements on each side of a T-shaped divider. To examine the effects of electronic-book technology, we will use a value-added T-balance of sorts, with a trait column to the left of the T-balance.

In the trait column we list the key impact areas relevant to e-book technology. In the T-balance we list advantages of e-book technology (left-hand column) and its disadvantages (right-hand column) in these impact areas.

There is a great deal of overlap among the areas, and the assignment of aspects of the technology to one trait versus another is often arbitrary. But the structure of the T-balance will help in achieving your goal as an investigator for the Science and Technology Administration: sorting out and synthesizing the multitude of issues that surround the e-book and communicating the results effectively to others. —*Jason Ohler*

TRAIT	ADVANTAGES	DISADVANTAGES
The environment	E-books save lots of paper and many trees; reduce the physical space that now holds printed books, making it available for other uses; greatly diminish the resource-intensive infrastructure supporting printed books.	E-books create toxic waste byproducts in producing semiconductors; encourage obsolescence that produces a plethora of nonbiodegradable electronic trash; greatly increase the resource-intensive infrastructure needed to support them.
The human body	E-books amplify and extend our eyes, ears, and nervous system; reduce the burden of carrying heavy printed books.	E-books increase eyestrain due to poor resolution; may induce muscle problems due to gripping.
Social relationships	E-books on networks make reading a collaborative experience; popularize chat groups about books.	E-books replace a relatively cheap commodity with an expensive one, limiting access to those who can afford them; encourage theft.
Work	E-books create new jobs for writers, artists, and others who create and produce texts and graphics; provide new opportunities in e-book technology and in self-publishing.	E-books displace workers in print book production; threaten workers and management in traditional publishing.
The self	E-books enhance self-sufficiency through self-paced, self-guided learning with new navigation and annotation tools; encourage self-exploration of ideas and concepts; personalize the reading experience.	E-books sacrifice the depth of printed books for the breadth of electronic options; may prove to be just another electronic distraction—Nintendo for the reading addict.
Power structure	E-books, made of bits rather than atoms and thus more fluid than paper-based books, accelerate book swapping; provide more reader control, with a diminished probability of censorship; reduce the broadcast feature of printed books by enhancing reader interaction. Publishers may respond with technologies that make sharing difficult; some may offer e-book club memberships as a friendlier alternative.	E-books make data so fluid that sharing becomes easy, copyright becomes elusive, and compensating authors becomes difficult; greatly reduce the role of traditional publishers; limit the "right to e-read" to those who can afford it.
Education	E-books require readers to be trained to operate the hardware and optimize the features, to think more associatively and less sequentially, and to read more cooperatively and less individually.	E-books may force institutions to play catch-up if they don't foresee the technology's impacts; may create social dissonance as a result of incompatibilities in information processing practices within and outside educational environments; may replace equal distribution of textbooks with privileged use of the new technology based on family resources.
Other cultures	E-books are potentially more adaptable than printed books to different modes of thought and different reading styles; could have built-in translator and culture-specific annotations.	E-books have an initial cost that will prohibit readers in developing economies from using them, thereby reinforcing the have/have-not social structure; may homogenize views of producing cultures and consuming cultures.
Future technologies	E-books of the future could offer greater support by online services, screens with better resolution, book bodies made of more flexible material that bends the way paperbacks do, special finishes to approximate the tactile sensation of holding a book, multimedia features.	E-books promise future enhancements that ultimately will make sequential reading obsolete.

TIM BOYLE / NEWSMAKERS



Getting back to basics with electronics: The Chicago Public Library is using Rocket eBooks to promote reading among youngsters who are already enthusiastic video game players.

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explanatory, using e-books properly requires at least some training, and you must add this need into the equation.

Before ending your revisit to "the technology itself," you might want to consider a conundrum that applies to the electronic book as it does to computerized reading in general. Being a conundrum, it has no easy answer.

Were we meant to read *Walden* in a linked environment, darting from Henry Thoreau's text to Ralph Waldo Emerson's reactions to it, then to a biography detailing Thoreau's living expenses during the period he was writing *Walden,* then on to who knows where else before returning to the original text—if, indeed, we ever get back to it? Does this procedure do harm not only to Thoreau's intent but also to our understanding of his message? Or will such interactions increase our understanding and enrich our *Walden* experience?

A Second Look at Technology Goals

If, as the psychologist Abraham Maslow said, the world looks like a nail to someone with a hammer, what does it look like to someone with an electronic book? What behaviors are implicit in this new medium?

The medium of the printed book reshaped so much of humankind's experience of the world that Marshall McLuhan and many other communication theorists dedicated their lives to explaining the phenomenon of literacy and its implications. To them, embedded in books, irrespective of content, was a cultural shift in which individual, silent reading replaced group storytelling, forcing literate cultures into a linear, visual world and away from a holistic one in which the omnipresent senses of touch, smell, and hearing dominated. The result was our detribalization, the fragmentation of society into individuals, and the coalescence of cultures around linguistic bases, which we call nations.

Surely many of the qualities of the book will rub off on its electronic offspring. But what is different about electronic books? What additional inherent biases can we see?

- **Associative reading.** Electronic books will be built so as to optimize navigation features. And because the e-book lets us link and cross-reference, we will do so. We will feel compelled to explore and grow into the medium's capabilities. That means we will begin to read and think associatively rather than sequentially—I link, therefore I am. The very nature of book reading will change. Readers no longer will be led by an author on a predetermined route but will participate actively, even guiding the process.
- **Theft.** We will feel possessive about e-books. They will require protection from theft until they become as inexpensive as paper-based books. When was the last time you locked your car because you were afraid someone would steal your book?
- **Book buying.** Our book-buying practices will change dramatically. Many e-book texts may even be free for the downloading—as long as we are willing to accept the advertisements that come with them. These ads will be pointcasted, their content based on the nature of the text, the personal data we feed to the online book provider, or both. We may lose our ability to separate commercial from artistic concerns while gaining almost unlimited access to texts on the Web. But libraries may make

commercial-free books available online for short periods, after which they become unreadable; that would render the overdue library book obsolete. For publishers the challenge will be to package the text with Web links, associated books and resources, author biographies, even directions for buying related items.

• **Time shift.** Using electronic books will increase the amount of time we spend online and reduce the time we spend browsing in bookstores and sipping espresso at adjoining cafés.

• **Legal issues.** E-books will bring new ethical and legal concerns. No one considers it illegal to lend paperback books to friends who can't afford to buy their own. But what if the books are electronic? New discussions will emerge about who owns information and who must pay for it.

• **Flexibility.** Public and private bookshelves will continue to house traditional books that are aesthetically pleasing and whose content is enhanced by print: atlases, art books, and others requiring high resolution. Leisure books, textbooks, and manuals will go electronic. Schools, businesses, and others that routinely buy books with short half-lives will start using e-books as soon as it becomes feasible to do so. In this way they will not only save money and warehouse space but also gain flexibility in the adoption of reading materials. E-books will finally make textbooks available for just-in-time learning.

• **Multiple use.** How we interpret our electronic books will depend on their features. The technology could replace not only our printed books but also our daily planners, phone directories, and paper-based notebooks. I began carrying a notebook 18 years ago to record the flow of activities in my professional life and now have a box full of notebooks. The electronic book, if it doubled as a writing pad, could reduce this weighty collection to a single storage disk. With the addition of minimal computing abilities, such as Web searching and word processing, the e-book could become all the computer most people need, making the work world far less desk-based and much more mobile. With sound, video, large fonts, and other features it could be a useful technology for physically challenged persons.

The Judgment

As investigators for the Science and Technology Administration, having duly weighed the electronic-book technology itself along with its goals and its effects, we must now render our judgment. Is the e-book worthy of our approval for purchase and use?

Yes, we grant the electronic book our approval. It offers opportunities to share and personalize reading in ways that hold a great deal of promise for education, self-directed learning, and the physically challenged. And it promises to save a precious resource: trees.

Our approval, however, is contingent on its meeting these requirements:

First, the e-book must be made as biodegradable and recyclable as possible.

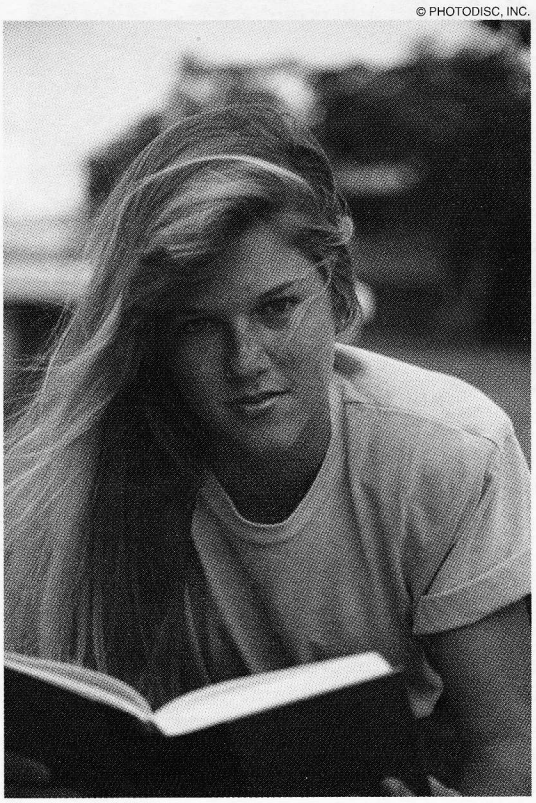
Second, it needs to be designed so as not to foster eye fatigue or muscle problems.

Third, e-book manufacturers must support efforts to provide their products to public libraries and developing countries so that persons who can't afford them can use them.

Fourth, schools and businesses need to support training efforts to optimize people's use of e-books while preserving the depth and strengths of printed books.

The case of the e-book shows that mastering the skill of technology assessment has the potential to improve society's technological literacy overall, providing content mastery, technological dexterity, social awareness, and perhaps even wisdom. I hope we will come to view the technologically literate individual as one who knows when to use technology and when not to use it, one who understands that the technologies connecting us to new opportunities disconnect us from others.

We live at the beginning of a new era of learning. We can redefine what it means to be educated in bold, new ways. We can decide on the kind of community we want and then create technology to support it, rather than the other way around. □



In a traditional printed book, readers are led by an author on a predetermined path. Electronic books could change the nature of this process, enabling readers to use navigation tools in order to customize the experience of reading.

About the Author
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