Beyond the Book in Education

Robert McClintock

(From *CD-I – The Future*, Proceedings of a conference in San Francisco, May 11-13, 1987. This paper gives the text of remarks to a full conference session on "Education – will the talking book speak up?" The conference was a trade conference on the prospects of CD-I, compact disk, interactive, a variant of CD-ROM technology that never became fully established in the marketplace.)

Abstract

The book, a most successful product, will not be easily displaced in education. CD-I will develop as an educational product if effectively integrated into larger systems that serve cultural functions distinctively different from those of print. Direct, visual indexing through images is the key to creating that alternative.

1 Defining the Problem

"Education -- will the talking book speak up?" As an academic, safely wrapped in the mantel of the non-profit sector, I can decode this genteel question into its hurly-burly meaning --"Will the talking book turn a profit in the education market?"

Can money be made through high technology in education, and if so how? Is there a market for CD-I in education and what is its shape and structure? These are the questions about which I want to speak and I am going to argue something of a paradox, namely this -- should entrepreneurs bind their imaginations in developing CD-I products for education by existing market realities, they will lose bundles of money and add another example to that depressing string of proclaimed pedagogical revolutions that were to be wrought by new technologies but that somehow never happened. Should innovators, in contrast, recognize that the odds are heavy against the exploitation of education as an easy market, one that merely awaits plucking, they may look beyond immediate market realities and develop highly profitable tools for use in education, highly profitable in the economic sense because they prove highly profitable in the intellectual and pedagogical sense.

2 An Anecdotal Beginning

Let me begin with a simple observation drawn from the life experience of a real person. In her late seventies, my mother developed macular degeneration, an incurable form of near blindness which leaves her unable to drive or read. Up till then, she had been rather an anti-intellectual, someone who neither liked to read nor much cottoned to people who spent a lot of time reading and talking about it. Once blind, however, she discovered the Recording for the Blind services. The talking book spoke up for her. Now in her mid eighties, she is not exactly bookish, but she is very well read, getting her current events, not from the radio, but from *Newsweek,* slaking down a couple books a week, discriminating in her selection of them and reflective, even argumentative, in her response.

My point -- the talking book has spoken up, loud and clear, although it is not exactly what we mean here, assessing the future of CD-I, by the "talking book." But the talking book, in the sense actualized through the recordings for the blind, can help put us on the right track, a path which leads to the recognition how very difficult it will be to find sufficient cultural space in which to develop what we who want to develop the future of CD-I mean by the talking book. If developers of CD-I and related technologies come to that recognition, we may do the things sufficiently radical to create that needed cultural space for powerful, profitable innovations to be developed. Otherwise, I fear, our hopes will be high and our achievements limited.

3 A Reflective Extension

Most of the magnificent innovations of the past hundred years in communications have consisted of new technologies that have spread easily into empty cultural spaces. The telephone did not need to displace any established technology as it achieved universal adoption. Radio was something new, as were moving pictures, and phonograph recordings. Television was sufficiently different from radio that its spread has had little effect on the numbers of radios that we use, although undoubtedly it changed listening habits and the mix of the content broadcast, as it also forced change in the place of the movies in popular culture. All these technologies were able to spread into adoption easily, quickly, seemingly inevitably, because the cultural space into which they moved was essentially empty.

When we ask the talking book, our talking book, to speak up, we must realize that the situation differs significantly from the ones pertaining in these great paradigmatic innovations. Radio easily spoke up, however faintly at first, because it was the only thing of its kind. Our talking book has difficulty speaking up because it is surrounded, in contrast, by an utter din especially in education, where information sources are anything but scarce. The tried and true printed book is an incredibly successful product. The printed book is, in the ecology of manufactured products, what humans are in the ecology of living species, the most ubiquitous, adaptable, successful of the higher orders. Books were the first mass-produced consumer durable and they remain the most successful.

Books are so much a part of everyday life that we forget to observe how thoroughly they have spread through our culture. I admit to bias on this matter, but I would venture the claim that printed books are the most successful manufactured product so far invented. Books are made in an incredible variety, in vast numbers, and generally they satisfy their users and far outlast most other so-called durables. They are inexpensive; distributed efficiently through networks that reach into all parts of society. Great educational effort initiates people to their use, making and sustaining a most stable market for them. Let the point sink home -- think of the inventory of your personal belongings. Do you own more separate items of clothing, or more books, magazines, and the like? Are there more dishes in your pantry than books in your den? Some will answer in favor of books and others in favor of clothes and dishes, but either way recognition that each of us takes a multiplicity of books for granted will heighten our awareness that books have attained and maintained an omnipresence in our lives. Books and their peripherals have an immense functional presence in our lives and in this sense the book has an overwhelming installed user-base.

With that installed user-base, the book has attained a remarkably well -developed user-interface. Virtually everyone knows how to boot it up by opening, how to turn its pages from front to back, how to scan the lines from left to right and top to bottom. It seems dumb to think about these elementary operations of using books, except that precisely the analogous operations are the very operations that many, many people find difficult and perplexing in using electronic information technologies. I come from Manhattan where the phone book is thick, and if one were to formalize the algorithm according to which even the very uneducated look a number up, one would find it to be a very sophisticated binary search algorithm that nearly everyone can quite easily generate in action, usually without a moment's thought.

Not only are books comparatively very user-friendly, on an absolute scale of quantitative information theory, they are remarkably powerful, gee-whiz systems. The scale of information that can be stored and retrieved electronically through personal computers and the like amazes us at times: five-hundred-fifty megabytes on a little CD-ROM! Too rarely do we describe the book to ourselves in similar terms. My personal library has stored in it over 15 gigabytes of consciously, personally selected information, any part of which I can retrieve with an average seek time of something on the order of one minute. The system is one that I have been able to assemble incrementally and affordable within the limited means of an academic salary and it contains intellectual resources that far exceed my stamina and concentration, however Faustian my curiosity may be. Do I need our talking book, CD-I, when my printed books are

already serving me so well? And this question that I ask myself as an academic is a question that the whole educational establishment must put to the purveyors of CD-I and other information technologies. Where will these new resources fit among the very useful tools we already enjoy?

If with CD-I in education, entrepreneurs propose to produce marginally better products for increments of existing markets, they will step by step loose large sums of money, for they will be going up against a formidable, entrenched competing medium. There is presently a huge investment of capital and human resources in the printed book in education. Education as it currently exists is by, for, and through the book. I think it would be very, very difficult to substitute our talking book for that printed book. I think it will prove much more difficult to do that, for instance, than it will prove to substitute metric weights and measures for our present system of weights and measures, and that is no easy substitution, however great good sense it makes. Our talking book should keep silent, which is another way to say that our product needs to be something significantly different from the book, something that spreads easily into universal use because it is not simply a marginal improvement on existing media, but something fundamentally different from them.

4 Some Concluding Suggestions

What is it that can be produced that is fundamentally different from the book? What sort of product can be produced for education that we can easily, quickly, seemingly inevitably incorporate into our activities without its having, head to head, to displace the book? This is one of those important questions that can only be answered, if it can be answered at all, in practice. "Here it is, folks, the better mousetrap -- place your order now." Alas, I'm not ready yet to answer this question in practice, so all I can do is offer up some opinions, some suggestions, about what sort of product, if we can make it, might succeed.

First off, I suggest that developers resist the unconscious assumption, derived from the way books work, that what needs now to be developed is a set of titles, works, items, scaled roughly to the sizes of cultural performances that seem natural to us. Books and the cultural items linked to books, plays, scores, and the like, have a scale that is hard to make exactly explicit but that seems nevertheless to hold throughout cultural history. The *Iliad* and *Odyssey,* the *Orestia,* Plato's *Republic* and Aristotle's *Metaphysics,* Augustine's *Confessions* or those of Rousseau, Aquinas' *Summa,* Dante's *Divine Comedy* and Chaucer's *Canterbury Tales,* Shakespeare *Hamlet,* Milton's *Paradise Lost,* Bizet's *Carmen,* and on and on, all seem loosely but powerfully to define a natural scale of cultural creation. Even Rabelais' *Gargantua* is gargantuan only topically; substantially it is not at all out of scale and rather a typical representative of a "full-scaled cultural work."

To better grasp the point I want here to make, let us think ourselves back in time just about exactly one hundred years and imagine ourselves a group of architects meeting to discuss the future of GI-E: glass plus iron with elevators. One might then in discussing the prospects of GI-E have alluded to all the history of building construction up till then and most convincingly implied that a natural limit on the height of buildings held through all the examples of architecture with nothing but a few ceremonial structures going higher than a hundred feet or so, and those exceptions rising only for symbolic purposes to a few hundred feet at most. That is exactly how the great majority of informed architects thought in 1887 and that is why the Eiffel Tower was such a sensation in 1889 when it arose high over Paris, becoming the only architectural structure known popularly for the person who designed it.

GI-E is suggestive for our purposes, not only because it broke through a seemingly natural scale, but because it points to the importance of systems integration as the real locus of innovation. CD-I is not the whole system, and don't forget that. It properly should be seen at most as a part, a component, in a much more complicated system. CD-I is rightly something like the E for elevator in GI-E architecture. By itself, not one of the new materials and equipments introduced into architecture over the past hundred years or so -- iron and steel structures, plate glass and sheath walls, light insulation, electric lighting, central heating and air conditioning, elevators and escalators --redefined the possibilities of architecture. Integrated together as a system, however, they make twentieth-century building design radically different

from the building design of all prior centuries. CD-I is not *the* system, but a component of it, one that if properly integrated with others will make it possible to change the scale of cultural creation and to develop educational tools that are fundamentally different from those associated with the printed book.

If, however, as I argued above, the book is still a preeminently successful product, where is the opening through an alternative system can spread? To find that we need to look at what the book, the ensemble of printed materials, does not do that might be done. If we can find what the book does not do and integrate a system to do that well, then we can perhaps create an educational tool that will spread powerfully and ineluctably into universal practice.

Culture consists in the storage and retrieval of information. Culture is humanity's externalized brain, the storehouse of experience and know-how, hopes and aspirations. The book has achieved its incredible success as a product because it is the most powerful tool of storage and retrieval that has yet been invented. The printed book, especially, has worked astoundingly well as a means of storage and retrieval because the printed book has been susceptible to indexing and cataloging in unrivaled ways. Let me venture a definition of what the book is, in its broadest sense, relative to this central cultural function of storage and retrieval. The book writ large is that extended system of information storage and retrieval that uses the *written word* as its base system of coding, allowing information to be stored and mediating the retrieval processes used to access it on demand.

If the book is that system in which the written word serves to store information and to empower the selective retrieval of it, then a significant alternative to the book will use some other medium than the written word as the basic medium of storage and retrieval. Now, where do we stand on this? Are there alternatives to using the written word as the basic medium for storage and retrieval? To answer this question well and to understand the problem that we face, we need to distinguish between storage and retrieval. We have become quite adept at storing information in many ways other than the textual. Much of twentieth-century communications innovation has centered on the development of technologies for storing information in non-textual form and disseminating it directly through auditory and visual means. Thus we have lots of recordings and lots of images, still and moving, at our beck and call.

Retrieval is a different matter, however. Take the instance with which we started these reflections. My mother's talking books do not provide her with a useful talking catalog. Instead, she has to get someone who is not blind to go through the printed catalog of talking books with her and it is one of the dimensions of the resource that she finds irksome and problematic, for it leaves her dependent in subtle ways on other people's tastes and preferences. Again, this is a small but emblematic example. We habitually use printed sources to mediate our retrieval of information, even when the information itself is stored and presented in non-printed form. Thus *TV Guide* is a most successful printed publication; a movie section of ads and reviews accounts for the sale of many, many daily papers; and as the practice of viewing films through video rental services grows so does the market for books giving people helps in selecting from the anthology of available films. To find any given picture that one may have seen here or there, one needs to know the appropriate written words that might describe it and then find well-indexed collections of pictures and use those printed indexes to locate the picture one wants. Sound and image are thus encapsulated so far beneath the hegemony of the printed word.

If one wants to create a powerful market for educational tools that differ significantly from those of print, one needs to invent systems of selective retrieval that are independent of the written word. Human vision is a tremendously acute organ for selecting significant information. Sight and hearing have both evolved as the organs that allow intelligent beings to respond decisively, selectively, to opportunity and danger. Sight, especially, is a preeminently selective capacity, adapted to be continually surveying the surroundings, looking for intimations of significance that demand attention, that attract involvement. Writing is a system of visual recognition and retrieval of information. As, virtually, the only such system, it has been tremendously effective, adaptable, capacious with respect to what can be stored through it and highly responsive with respect to what can be retrieved from it. But writing is, when all is said and done,

a very indirect way of using sight to store and retrieve information, one that brings with it an immense overhead, the careful decoding of symbols seen into words heard.

Is writing the only way, the best way, to mediate the intelligent retrieval of information? I think we are in the process of discovering how to directly index information visually so that we can point at what we see in order to see more about it. CD-I will be a central component in storage and retrieval directly through images, without dependence on the mediation of the written word. If we do discover how to index information and ideas directly in this manner, the talking book will not speak up, but, with much greater effect, something beyond the book will shine forth.