A piece of software called *HyperCard* has recently been introduced for Macintosh computers. A somewhat related piece of software, called Guide, has been available for about a year. *HyperCard* has received a lot of publicity and, generally speaking, rave reviews. Is this all hype? Or do we really have an important new product?

The roots of *HyperCard* are actually quite old. In the late 1960s, Ted Nelson introduced the idea of Hypertext. He envisioned a book in which the level and detail of presentation was somewhat under control of the reader. For example, the reader could ask for more or less detail on a topic, or a different reading level. A computer system could provide this versatility.

The cost of providing people access to computer-based Hypertext materials in the late 1960s or early 1970s was prohibitive. But this is certainly no longer the case. Roughly speaking, the price-to-performance ratio of computers has improved by a factor of about 100 over the past 16 years. We expect a similar rate of improvement over the next 16 years.

The concept of a reader being able to change the nature of materials being presented has been in general use for quite a while. After all, isn't that what a database, a spreadsheet, or a graphics package does? It is easy to direct a database program to present certain information and to present it in a specified format. It is easy to direct a graphics package to show a variety of representations of a given set of data. CAI materials have some of the characteristics of Hypertext.

But these examples do not represent the key ideas of Hypertext, whose focus is on a new type of representation of traditional textual materials. *HyperCard* is designed to facilitate the development of written materials, graphics, and videodisc materials in which the order and nature of presentation is substantially under reader control.

Imagine, for example, being able to use a mouse to click on any word in a text and immediately getting a dictionary definition of the word, perhaps with an accompanying picture. Imagine being able to request additional information on any topic presented, and being led along a path of deeper and deeper exploration of the topic. These are capabilities that *HyperCard*, with an appropriate combination of videodisc and software/courseware materials, can provide.

*HyperCard* is both an authoring and a presentation system. That is, it can be used to develop materials, and it can be used to read materials developed by others. Hypertext raises a number of important educational issues. For example:

1. While a conventional printed book can be browsed and/or read in manners other than front to back, most people think of a book in terms of its fixed presentation order and using it in a front-to-back mode. Therefore educators will have to help students learn to read Hypertext. How does one read a book in which much of the content is in some sense hidden from view? What does it mean to have read a book when one has actually looked at only a small fraction of its materials?
2. How does a person learn to write Hypertext? Authors have conventionally learned to write through a combination of reading a lot, practicing, and studying the writing process. It appears to me that it will be a long time before we have a reasonable number of people who are good at writing Hypertext.

3. The manual that accompanies *HyperCard* suggests that one probably wants to have at least two megabytes of memory when developing *HyperCard* materials, and that a hard disk is highly desirable. Relatively few current Macintosh installations have two megabytes of memory and a hard disk. A typical conventional 400-page novel takes about a megabyte of computer storage space. It is evident that an equivalent Hypertext, with graphics, could easily be 5 to 10 times as long. The inadequacies of 800K disks and most current microcomputers are obvious.

4. College students grow used to the idea of using a highlighter and making marginal notes in their books. Generally, precollege students are prohibited from helping themselves in this way. When material is in a computer, highlighting and making marginal notes becomes a whole new ballgame. Few educators and students know how to make effective use of this aid to learning.

5. A hardcopy book has easy portability. Hypertext adds one more advantage to having portable computers. It seems evident that schools will eventually have to grapple with the issue of providing students with portable computers. This will be difficult, since most schools have not yet provided students with calculators that they can carry home.

   It is obvious that hardcopy books will be with us for many years to come. But I believe computer-based Hypertext will gradually make inroads. Hypertext represents a powerful new idea. When combined with computer assisted instruction, computer graphics, databases, spreadsheets, and videodiscs, it represents an entirely new object with capabilities far beyond those of conventional books.

   Of course, current implementations of Hypertext are just the tip of a gigantic iceberg. The total amount of information in computerized databases is growing very rapidly. The number of full-text information retrieval systems is growing rapidly. Networking is becoming more common. I envision that eventually students will have access to a Hyperbook trillions of bytes in length, with daily changes made to many millions of these bytes. A significant part of a student's school activities will center around accessing, processing, and using information from this Hyperbook.

   The idea of having routine access to a computer system that can help process the information in a Hyperbook and provide other aids to problem solving seems mind boggling to me. But I suspect such facilities will be routinely available to many workers 10 years from now. Thus, our schools need to begin to prepare students for life in such an environment. Current computer systems are adequate to begin to prepare students and educators to deal with Hyperbooks. I view this as an exciting and fun exciting challenge to our educational system.
Retrospective Comment 8/26/08

Just for the fun of it, today I did a Google search of HyperCard. I got about 653,000 hits. The first two were: