ELECTRONIC PUBLISHING : EMERGING TRENDS

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Abstract

Describes the electronic publishing concepts and their applications in scientific publishing. Highlights the electronic publishing technologies and the products that have given electronic publishing a prominent position in the marketplace. Consolidates the trends emerging in the field of electronic publishing in the background of factors affecting both its promotion and inhibition.

Introduction

Electronic publishing, like all other types of publishing, is concerned with dissemination of information for public sale or use. Recent changes in the supporting hardware base – particularly personal computers with reasonable screen resolution of 70–100 dots per inch (dpi) and laser printers with reasonable screen resolution of 300–600 dpi – have enabled widespread application of electronic publishing concepts. It allows traditional publication to be done better and has introduced a new medium not possible before.

From Stone Carving to Electronic Publishing

The history of printing technology is fascinating. The earliest documents were carved in stone, scratched in wet clay or drawn on parchment or matted fibres. Invention of the printing press and movable type allowed reductions in the cost of production of books and made archival knowledge available to an ever expanding audience. This was further facilitated through the development of offset printing using photographic plates. Composition was done at a special multi-font typewriter or a special photocomposer that placed images on paper. This composed text, together with drawn graphics, is then pasted up to form pages and photographed to make the plate for printing either by offset press or by simply copying the paste-up material using a copier.

Advent of Electronic Publishing

The information content of a document goes far beyond the simple text and graphics which it contains. How information is presented is not less significant. It is here that the new technologies are having a major impact. Everything is handled using a computer. Tools have now emerged to support the development of documents and their maintenance. The

personal computer equipped with a visual text editor has replaced the typewriter in any environment where documents are created. The ability to manipulate text without having to rekey it has revolutionized the way documents are created. Likewise, tools for the preparation of illustrations make the job of creating a mixed-media document simpler. Pages are laid out using the computer's memory rather than paper, scissors and glue. The benefits are twofold : the document is typeset with added information due to the presentation format at a cost commensurate with that of a text-only typewritten document.

Components of Electronic Publishing

The term 'electronic publishing' is generally used to signify the use of computers in the production of printed publications and also in the sense of distribution of information using computers and telecommunication technologies. But electronic publishing is a more radical service than either document delivery or information. It is a form of publishing where the computer network becomes the primary medium of creation, storage and distribution of information.

The application of the above electronic publishing concepts in scientific publishing has been considered here to illustrate the phenomena involved. The process of technical publication, in its broad sense, leads from gathering of information during research and development to its appearance in a journal. This process usually consists of four crucial steps : manuscript preparation, electronic submission, printing, and electronic distribution.

Manuscript Preparation

Systems for manuscript preparation have become quite sophisticated. When coupled with high-resolution laser printers, they help produce results of professional calibre. When coupled with low-cost, medium-resolution laser printers, they provide a creditable desktop printing facility. The approach to manuscript preparation involves embedding format commands in the source file of a document which is prepared with any simple text editor; the source file can be given as input to a formatter program that generates a file of printer commands; the printer program takes that file and a file of fonts, and prints the documents. The formatter program takes care of margins, selection of fonts, centering, indenting, pagination, paragraphing, spacing between words and justification of lines, hyphenation, and footnotes.

Electronic Submission

Electronic submission, the second crucial step, refers to the transfer of a manuscript electronically from author to editor, from editor to reviewer, or from editor to publisher. The file must be stored in a standard text code (e.g. ASCII) that can be read by different computers; it can be transferred on a floppy disk, over a telephone connection, or over a network. Some WYSIWYG (What You See Is What You Get) editors store format information as non-ASCII codes in the source file, in many cases preventing their transmission over phone connections and networks. Nevertheless, within a few years, all format codes will be an important medium of manuscript transfer.

After the networks are in operation, a major obstacle is lack of standards for describing documents and their components. How are paragraphs, sections, fonts, tables, charts, graphs, citations, and the like to be represented? How many markup languages – the name for description languages in the publishing trade – should publishers support and editors allow? Even today, in the absence of standards, many publishers are pleased to receive a copy of a source file; all they need to do is manually strip out the format commands and insert their own. Often called 'capturing the author's keystrokes,' this saves work and removes the possibility of errors that normally occur when the publisher retypes the manuscript.

Printing

Printing, the third crucial step, involves the use of formatters' output to drive devices ranging from 'letter quality' dot matrix printers to laser printers and phototypesetters. The patterns of small dots impressed on paper by a dot matrix printer are too coarse to produce aesthetically pleasing documents. The more sophisticated laser printer consists of a microprocessor, a memory for holding fonts and the data to be printed, and a 'marking engine'; the marking engine uses a laser to imprint images on paper, the laser's control signals coming from the microprocessor rather than from an optical scanner. The manufacturers of printers have been interested in standardizing the languages in which printer input (formatter output) is expressed. The most common example in the United States is PostScript.

Electronic Distribution

Electronic distribution means dissemination of the contents of journals by electronic means rather than on printed paper. No refereed journal or commercial magazine is now distributed electronically.

In what ways might electronic distribution be practical? A facsimile with a resolution of 300 dpi sent over a 1,200-baud telephone link with ten-to-one image compression would take 2-3 days of continuous transmission, amassing a long-distance phone bill of about $830. If the magazine were described in a markup language, it could be transmitted in 2 hours (phone bill about $30) and could be converted to printed copy by a receiving computer within a few hours. Who would pay these connect charges or hardware costs, when a printed copy can arrive in the mail for $1?

A more practical approach proposed is based on electronic queries by subscribers. The subscribers would, at their convenience, connect to the publisher's computer and examine tables of contents and abstracts; they could then order either printed or electronic version of articles, of interest to them.

Growth of Electronic Publishing

The existence of a large, and numerate, computer-owning population is what makes possible many of the recent advances in electronic publishing. As a matter of fact, the growth of electronic publishing is the result of several diverse factors coming together. On the more positive side, these include improvements in computer power, reduced storage costs, improved and cheaper telecommunication facilities, and better and cheaper terminal design. That these factors coincide with the publishing industry facing higher labour costs, a shortage of skilled staff, poor industrial relations and a vastly increased output of information is another important consideration.

Though advances in hardware and publishing technologies have a major role, it is continuing advances in telecommunication which have made possible much of the recent growth in electronic publishing. This includes both improvements in the public switched networks and the arrival of dedicated data networks. This is also an area where electronic publishing undoubtedly benefits from advances really directed at other, and more wealthy, sectors of industry. Many of the telecommunications developments are aimed at areas like banking, airlines, insurance companies, etc, with potential advantages for the publishing industries.

Electronic Publishing Technologies

The base technologies of electronic publishing are diverse and this is true for the products that result from their application. Over the years, combinations of computing, communication and publishing technologies have been used to generate products falling into one of the following four main categories:

- broadcast non-interactive services (e.g. teletext, cable television);
- interactive services (e.g. videotext, online, some cable television services);

- discrete products (e.g. video discs, video cassettes, computer software, database subsets on disc); and
- others (e.g. the electronic journal, hybrid products like videopatsearch).

Teletext

Teletext comprises one-way broadcast narrow-band services delivered via use of the VBI (vertical blanking interval). In function, the broadcast teletext signal is carried on five or six blank lines (the VBI) at the start of each television frame. Teletext information is stored in the frames, and for technical reasons each library of up to 200 pages is cycled continuously. Users wishing to access the service use a numeric keypad to indicate the pages required, and these are displayed at the next print in the cycle.

Videotex

Videotex system functions by using the television set as a display terminal, while linking it to a computer via a conventional telephone line. Information is stored on the host computer, with one or more frames making up a page of information. The pages contain both text and graphics, and users can select subsequent pages by observing a numbered list of options on the screen and pressing the desired number on a keypad (menu selection). Viewdata is a less commonly used term covering videotex systems delivered exclusively by telephone line.

Teletex

This term refers to the combination of word processing and telex, where information is exchanged among terminals using a common business letter format at a transmission speed of 2,400 bits per second (which is nearly 50 times faster than the telex operating speed of 50 bits per second). Teletex is often considered a part of the videotex/teletext phenomenon, because it also brings together computerised information systems for a mass market, especially business community or the automated office.

Online

Online computer-based information services probably comprise the most mature market sector of electronic publishing. It forms a fundamental part of the information infrastructure in most developed countries. In an online system, the user approaches a database via telecommunication link between his terminal and the database. The micro-computer terminal provides interaction between them. The user can search for a specific information by narrowing down his search through descriptors and index terms. In the case of full-text databases, one can get full text besides the usual citations in a normal database. The user can also have the display on a dumb terminal and use telephone or telex for sending his query.

Electronic journal

An electronic journal is the one where the writing, editing, refereeing and distribution of an item are carried out without any paper intermediaries. Much of the drive for the electronic journal comes from the concern within the scientific community over current pressures on conventional publishing. The interest in the electronic journal is spurred mainly due to the literature, literature scatter, the cost of publication, delays in disseminating research information through conventional channels and added pressures on library budgets. This is a full text delivery system and differs from conventional bibliographic databases available online only in the nature of material being carried.

As can be seen, the links between many of these products are at best feeble Despite the comprehensive nature of such a list, electronic publishing is essentially in its infancy. Many of the products covered are transitory – as distinct from transient – and are clearly the forerunners of far more sophisticated services. Such an

example is broadcast teletext, which will be surely replaced in time by far more sophisticated services using full channel delivery mechanisms, either broadcast or more probably via cable networks. Even bibliographic databases online, among the most successful and stable of the strictly information technologies in electronic form, are evolving quickly.

Problems in Electronic Publishing

While the potential of electronic publishing has been recognized for some time, it is now becoming clear that many of the products will take longer for commercialisation than had been anticipated initially. As we progress, it is becoming increasingly clear that technology alone will not determine the rate of progress in electronic publishing. Other factors, including economics, user acceptance and a commitment to established products and services, will hamper the progress. It is also noticeable that where market for rapidly emerging electronic products exists, like software, pre-recorded video cassettes and even teletext, these are not really in direct competition with the printed equivalent.

Lack of Hard Market and User Information

The lack of hard market and user information highlighted by the electronic document delivery sector tends to be a major problem for those involved with electronic publishing. It is also one of the factors that has delayed progress, as many of the larger companies are understandably unwilling to invest without a clear indication of the potential market.

Higher Costs

Publishing has traditionally been regarded as an easy-entry industry. This is less true of many electronic publishing sectors where initial hardware, marketing and support costs tend to be high. In video particularly, start-up costs are high and this has prevented many conventional publishers from entering the market. Even in more established information services areas, like secondary publishing and online, launching a new product now involves major expenditure before any returns are forthcoming.

Absence of Standards

The absence of proper guidelines and standards in many areas is a major disincentive, both to corporate investment and purchases by individual end-users. In some hardware areas, there has been a willingness by companies to switch manufacture from one product to another with scant regard for users who may be locked into an earlier system.

Legal Implications

Outside the product standards area, electronic publishing has major legal implications for which solutions are not easy to find. Copyright, privacy, trans-border data flow and many other problems are thrust into limelight by a technology capable of handling vast quantities of information at unprecedented speed. The whole electronic publishing area is littered with legal problems which demand a solution. Delays and uncertainties in the legal area will undoubtedly have an impact on the speed with which many electronic publishing products reach the marketplace.

Conclusion

While many publishers turned to electronic publishing in the 1970s seeking some sort of panacea for the economic and industrial problems they then faced, it is now becoming increasingly clear that this form of publishing offers no easy solutions. In fact, it is a very complex area where few companies are currently making money and the cost of entry is often very high both in terms of capital investment and skilled staff.

The impact of electronics and modern computer technology on the creation and publication of written information has thus just begun to be felt. One can safely predict that

the paperless offices are far away. In fact, the reverse could be expected; more and more people will be publishing more and more material on paper. The information glut will continue to expand. The new electronic media would not replace paper, but augment it by providing more efficient and effective access to information. And when that information is found, a paper copy will be made.

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Knowledge is proud that he has learned so much; wisdom is humble that he knows no more.

William Cowper

Books are good enough in their own way but they are a mighty bloodless substitute for life.

RL. Stevenson