

# LEARNING TECHNOLOGIES

*Multimedia Publishing*

## CREATING ELECTRONIC BOOKS

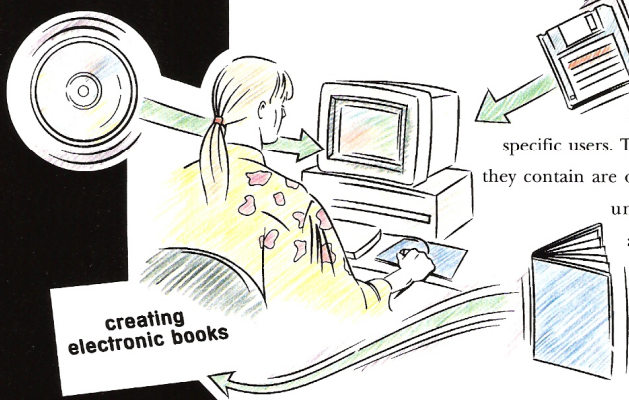
### The Background

Books are an established part of our culture, used for study, reference, leisure and entertainment. Three basic types of medium are used for their publication, each with different properties: paper, magnetic disc and optical disc. 'Conventional' books, published on paper, have undoubted attractions, but also present limitations. They are 'unreactive'

in that they cannot change their sequence or respond to the individual requirements of specific users. The text and pictures which they contain are of a similarly static nature, unable to incorporate animation, motion pictures or sound effects.

### The Solution

Books published on magnetic and optical media are now often referred to as 'electronic books', to distinguish them from their conventional counterparts. They overcome the static limitations of texts, but require a suitably designed 'information - delivery environment' to access the information. This may take the form of a conventional computer workstation which is fitted with peripheral devices to read the information; or may be a pocket-sized portable device such as the 'Data Discman' system manufactured in Japan. One of the advantages of electronic books is that the information which they



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contain is in digital form, so it can be processed by a computer and transmitted over a telecommunications network. This information can thus be easily shared and duplicated with minimal cost. The book's pages may also be made reactive and dynamic, increasing adaptability and offering the potential for a truly 'multimedia' publication.

Depending on the type of information they embed and the facility they make available, electronic books can be classified into nine fundamental categories: text books, static picture books, moving picture books, talking books, multimedia books, hypermedia books, intelligent electronic books, telemedia books and cyberspace books.

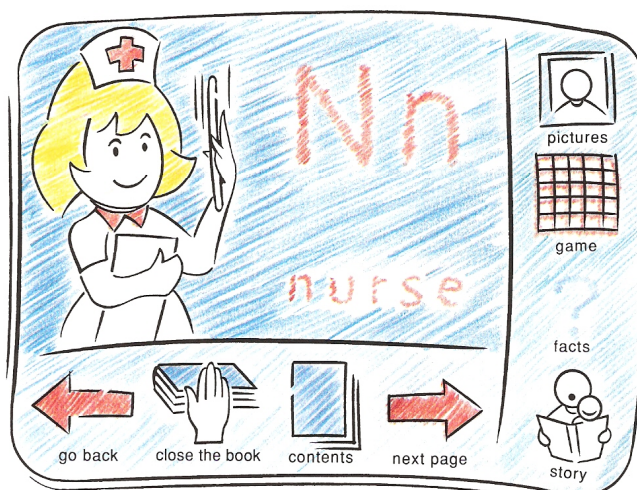
In 1990 the Employment Department funded a two year project based at the University of Teesside's School of Computing and Mathematics, to explore the use of digital optical storage media for the publication of electronic books. There were two main objectives. The first was to

formulate a set of design guidelines which would help in electronic book production, paying particular attention to the role of end-user interfaces. The second was to assess the potential of electronic books as a mechanism for the distribution of interactive training and learning resources for use in distance education and flexible learning environments.

### The Format

Two basic types of digital optical storage media were explored - rewritable and read-only. The rewritable optical disc storage facility was used primarily for experimental work involving the prototyping of electronic books prior to their publication. The books themselves were published using Compact Disc Read Only Memory (CD-ROM), allowing the incorporation of text, sound, high-quality static pictures and slow-motion (partial screen) digital video.

The project involved an evaluative study of a range of commercially available electronic



book publications, as well as the design, production and controlled evaluation of a number of in-house productions. Three different types of in-house electronic book demonstrator were produced during the course of the project, one example each of a hypermedia book ('An Electronic Book for Early Learners'), a multimedia book ('Screen Design for Computer-based Training'), and an intelligent electronic book (a 'Static Picture Book with Audio Narrations'). Each demonstrator, published on CD-ROM, was designed to explore a different aspect of electronic book production.

During the course of the project, it was found that two basic types of design guidelines are needed to facilitate electronic book production. The first forms a set of high level design models, while the second constitutes a set of recommendations relating to end-user interface design, the organisation of information on CD-ROM, and the effective creation of access stations for use with electronic books.

The most important finding was deemed to be the set of three high level models, referred to respectively as the 'conceptual' model, the 'design' model, and the 'fabrication' model. The conceptual model is intended as an orientation tool for the users of electronic books. The other two models describe architectural and procedural issues respectively, and are intended for designers and producers of electronic books.

## **The Benefits**

The part of the project which explored the potential of electronic books for the delivery of learning and training materials showed some particularly interesting results. Two basic approaches were found to be feasible - the use of CD-ROM for the bulk delivery of (possibly multilingual) computer based training (CBT) and computer assisted learning (CAL) resources for access via individualised, stand alone electronic book delivery stations; and the use of CD-ROM in conjunction with telecommunications facilities to support distance learning. This would involve the use of tele-tutoring, electronic mail and computer conferencing. Two international distance learning projects using this aspect of the research are currently being studied.

The major outcomes from the project have been an extensive range of publications and conference presentations describing various aspects of the work that has been undertaken. Seminars have been given in a range of international venues, including the USA, Canada, Bulgaria, France, Italy, the Netherlands, India and Moscow.

The overriding benefits for the University's Interactive Systems Research Group have been the experience of publishing multimedia information on compact disc and the initiation of other PhD research proposals and development projects which will take this work further into the future.