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ABSTRACT

Electronic publications are flooding the market. Some of these publications are created specifically for the electronic environment, but many are conversions of existing material to electronic format. It is not worth the time and effort merely to publish existing material in electronic format if no value is added in the conversion process. The processes by means of which value can be added include: the addition of various media such as graphics, sound, animation, and video; the inclusion of tests, games, and guided tours; the possibility of integrating a number of electronic publications; sophisticated access methods by means of hierarchical structuring, navigational aids, and hyperlinking; and sophisticated full-text search facilities. These ways to add value can be grouped together as either related to content or related to the structure of information. Publishers should take care to develop a user-friendly interface, which is both aesthetically pleasing and functional in terms of visual aspects, and gives easy access to the information. An electronic publication should be evaluated on various levels, such as content, and also technological aspects such as structural properties, the various methods provided to gain access to the information, and visual aspects. Meaningful integration of all these elements is essential for the development of a successful electronic publication. (Author/SWC)

Added value in electronic publications

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Abstract: *Electronic publications are flooding the market, be it on diskette, CD-ROM or the Internet (in addition to the many informal publications on the Internet). Some of these publications are created specifically for the electronic environment, but many are conversions of existing material to electronic format.*
It is not worth the time and effort merely to publish existing material in electronic format if no value is added in the conversion process. The processes by means of which value can be added include:

- *the addition of various media such as graphics, sound, animation and video;*
- *the inclusion of tests, games and guided tours;*
- *the possibility of integrating a number of electronic publications;*
- *sophisticated access methods by means of hierarchical structuring, navigational aids and hyperlinking; and*
- *sophisticated full-text search facilities which assist the user with, inter alie, the use of Boolean operators.*

The above-mentioned items can be grouped together as either related to content or related to the way in which the information has been structured. Publishers should furthermore take special care in developing a user-friendly interface, which is both aesthetically pleasing and functional in terms of visual aspects and which gives easy access to the information.
An electronic publication should be evaluated on various levels, viz. content, as well as technological aspects such as structural properties, the various methods provided to gain access to the information, and visual aspects. Meaningful integration of all these elements is essential for the development of a successful electronic publication.

Keywords: Electronic publishing, value adding, hypermedia, multimedia, full-text searching, document structuring.

1. Introduction

The general availability of computers to the public and the phenomenal increase in computing power on the desktop are revolutionising access to information. Applications software such as wordprocessing, spreadsheets, graphics editing and database applications is commonly used. With menu driven systems and graphical user interfaces, ease of use has increased tremendously. 'The growing power of computers makes it easier to "hide' the true complexity of operations from users' (Ref 1). Computer literacy amongst the general public is also increasing at an unprecedented rate and many people now have access to powerful microcomputers at the office as well as at home.

Distribution of information via CD-ROM is becoming commonplace. Even three or four years ago CD-ROM publications were mainly aimed at information specialists, and therefore included primarily reference or bibliographic databases with only a limited number of full-text databases. This situation is now rapidly changing in that many software houses and publishers are beginning to exploit the end-user market by publishing books, journals, etc. which are primarily aimed at the end-user on CD-ROM. Many of these publications are created specifically for the electronic environment, but many are conversions of existing paper-based publications to electronic formats.

The possibility of multimedia publishing has brought a great stimulus to this market. Proper lay-out, good quality graphics, etc. enable software houses and publishers to produce the equivalent of a coffee table book on CD-ROM, with a number of added facilities such as easier access to the information through full-text searching and hyperlinking.

Any user of these new products, be it end-user or information specialist, has to judge whether the electronic publication offers any features which are not available in a paper-based equivalent, i.e. whether any real value has been added in the conversion process from printed to electronic publication, or in the creation of a new electronic publication.

The traditional library environment should carefully take note of these new developments, especially since there is an increasing demand that these products be made available in libraries. Librarians should therefore be able to judge the usability of these products, and be able to make recommendations as to whether items should be bought for the library and how these products can be used. A new element of evaluation is therefore brought in: publications cannot be judged solely on their content and general appearance, but also on how effectively information technology has been employed in creating a publication that is superior or inferior to an equivalent paper-based publication. If libraries and librarians do not offer these publications and a knowledgeable judgement on their usability, this function will be taken over by outsiders, and the library is in great danger of being side-lined in the information process. This necessitates a change in the attitude of librarians and information professionals, as already indicated by Feldman (Ref 2):

> 'If libraries do not address changing patterns of information use, then others will. [...] More than ever before, imagination, insight, understanding of new media, and enthusiasm for the process of ongoing change are going to become essential ingredients to effective librarianship.'

In this paper a number of processes by means of which value can be added in electronic publications are discussed, and the discussion is illustrated with examples taken from a wide range of electronic publications.

There are various ways in which value can be added to an electronic publication, viz.:

- the addition of various media such as graphics, sound, animation and video;
- the inclusion of tests, games and guided tours;
- the possibility of integrating a number of electronic publications;
- sophisticated access methods by means of hierarchical structuring, navigational aids and hyperlinking; and
- sophisticated full-text search facilities which assist the user with, inter alia, the use of Boolean operators.

When existing information products (books, articles, dictionaries, etc.) are converted to electronic format, the developers should take care that the electronic publication is not only an electronic edition of the existing paper format but that value is added in the conversion process to make the electronic publication more useful than the paper original. When a new publication is written especially for the electronic environment, the same care should be taken to make full use of the functionalities available within this environment.

2. Value-adding through adding multimedia

Because of the processing abilities of computers and larger storage media such as CD-ROM, etc. the traditional alphanumeric data is increasingly being supplemented by graphics, animation, sound and video. Multimedia — the integration of the previously mentioned data types — is now generally available on the average desktop PC, and it is safe to say that computing is becoming multimedia.

This new possibility opens up the way for every publisher to add multimedia elements to electronic publications. In many cases this is done very effectively. However, in some cases the usability of the multimedia clips can be questioned and the addition of these clips seems to be no more than a gimmick. One very often gets the impression that the clips were added simply because they were available, or because the publishers wanted to show their ability to add the various media. This is especially the case in multimedia encyclopaedias and similar publications, where the choice of multimedia clips very often seems to be totally random and no motivation is offered for the inclusion of specific clips (or the exclusion of others).

Sound, animation and video are usually available 'on demand', i.e. the reader can click on a button to activate the clip. A control bar which enables the reader to pause, stop or rewind the clip and which should indicate his/her progress through the clip should be available. Very often there are unfortunately no control bar, no option to stop a clip and no indication of where the reader is in the clip. One sometimes also finds that publications or sections of publications are introduced with long audio, animation or video sequences before the reader is presented with the actual material where an active choice can be made as to which information will actually be consulted. These methods of presenting multimedia information are not to be encouraged — the reader needs to be in control of the information space at all times.

2.1. Graphics and photo quality images

Graphics and photo quality images have been standard in many paper-based publications for many years. These features have only recently become available in electronic publications and most multimedia publications now include numerous images to supplement the text material. This is mainly due to the higher quality monitors that can display true colour effectively, and compression techniques such as JPEG compression and fractal compression by means of which file sizes can be reduced dramatically.

High quality graphics can be found in all electronic encyclopaedias, many Microsoft publications in the Microsoft Home series, as well as numerous other publications. Graphics are reproduced in full colour with remarkable detail and are equivalent to any printed in paper-based publications. One of the best examples of photo quality images is *Microsoft Art Gallery*, which contains the full collection of the National Gallery in London.

2.2. Audio clips

Audio clips are used in many different ways to enhance electronic publications. Unfortunately the addition of these clips seems arbitrary in many cases, especially in encyclopaedias, where the authors have often added a small random selection of sound clips, such as a few lines from a well-known speech by a politician, short musical clips from well-known works of composers, animal sounds, etc. These clips are usually so brief that they have extremely limited value.

Sound may also be totally useless in terms of the information it conveys in cases where it functions only as a background feature. In some of the Microsoft Home publications, for example, sound is very often played in the background to create an eerie atmosphere without the sound having any real bearing on the information being presented on screen: it is merely 'entertaining' (or could even be distracting to the serious reader). In these publications there fortunately is an option to turn the sound off.

In many other cases, however, sound is used very effectively.

Some dictionaries, for example, have a sound button which can be activated so that the word is pronounced; this is the case in the *American Heritage Dictionary* which forms part of *Microsoft Bookshelf*, as well as Macmillan's *Dictionary for Children* and Dorling Kinderley's *My First Incredible Amazing Dictionary*. In the *Dictionary for Children* sound is also used to explain the meaning of words; for instance, in the case of 'applause' a standard textual definition is given, together with a button which may be activated to let the reader hear what 'applause' sounds like.

In story books for children, for example the Living Books series, sound is also used very effectively (see below).

The best examples of the use of sound can be found in *Microsoft Musical Instruments*, a number of publications explaining great classical works (such as *Microsoft Multimedia Beethoven*, *Microsoft Mozart*, *Microsoft Stravinsky* and *Microsoft Schubert*) and some language-teaching CD-ROM publications.

Microsoft Musical Instruments, for example, contains descriptions of musical instruments from all over the world, together with sound clips of each of the instruments, as well as descriptions of various types of orchestra and accompanying sound files. There are usually at least two sound clips associated with each instrument, viz. a short passage played on the instrument as well as the range of individual notes of the instrument; the name of the instrument can also be pronounced. Figure 1 gives an example from *Microsoft Musical Instruments*, showing a single instrument with the 'sound box' activated; note the small buttons in the form of a speaker which can be clicked to listen to or stop the sound clip.

In the publications explaining classical masterpieces the accompanying text is richly interspersed with sound files. Sound files may either be midi files (synthesised sound) or direct links to the CD-Audio version of the music, with the reader often given the choice to hear either the midi file or the full orchestra. Sound can illustrate inter alia theme variations and the use of various instruments; often interesting points in the score are illustrated by giving the sheet music which can then be played in either midi format, or directly from the CD-Audio, as in Figure 2, taken from *Microsoft Multimedia Beethoven*. In Figure 3, also taken from *Microsoft Multimedia Beethoven*, the text scrolls on as the music, played from the CD-Audio, progresses; the words of Schiller's 'Ode an die Freude' change along with the music and the reader has the option of showing the words of the hymn in either German or English. The reader also has the option to pause the music at any time and to link to the 'Art of Listening'.

2.3. Animation and video

Animation can be used to illustrate any real life situation or process where video would provide too much detail. This is done very effectively in especially encyclopaedias such as *Microsoft Encarta*, Compton's *Interactive Encyclopedia*, the *New Grolier Multimedia Encyclopedia*,and so on.

Video is still fairly restricted in its application because of the computing power needed to decompress and show video on screen, as well as the size of video files. At present video is shown in eighth or quarter screen size windows, running at up to 25 or 30 frames per second, without the use of any additional hardware, in formats such as AVI (Video for Windows), Apple QuickTime and MPEG.

Especially animation and video files should have a standard control bar which allows the reader to play, pause or replay the video or animation sequence (as discussed above).

In the Living Books Series published by Brøderbund (e.g. *Grandma and Me*, *Arthur's Teacher Trouble* and *The Tortoise and the Hare*) sound, graphics and animation have been combined to provide a brilliant learning environment for children. In each case it is possible to choose to have the text appear and read in English or Spanish (or even Japanese in some cases); the reader also has the option of only having the text read or to play inside the book. If the reader chooses to play inside the book, the active page is read, after which the reader can click on any word to hear the word again. Most graphic elements in the book are active, i.e. the reader can click on a graphic and it is animated together with a sound file. Sound can be either the spoken word (adding extra story information), sound effects or music. In Figure 4 a page from The Tortoise and the Hare is reproduced. After the text has been read, the reader has the opportunity of clicking on any of the animals, which then produces an animated sound sequence; for example, the trio of birds produces a short close harmony trio, the beaver produces a short 'rap' sequence, the frog plays bass guitar on the flamingo's legs, etc.; when the page is turned, all the instruments perform together.

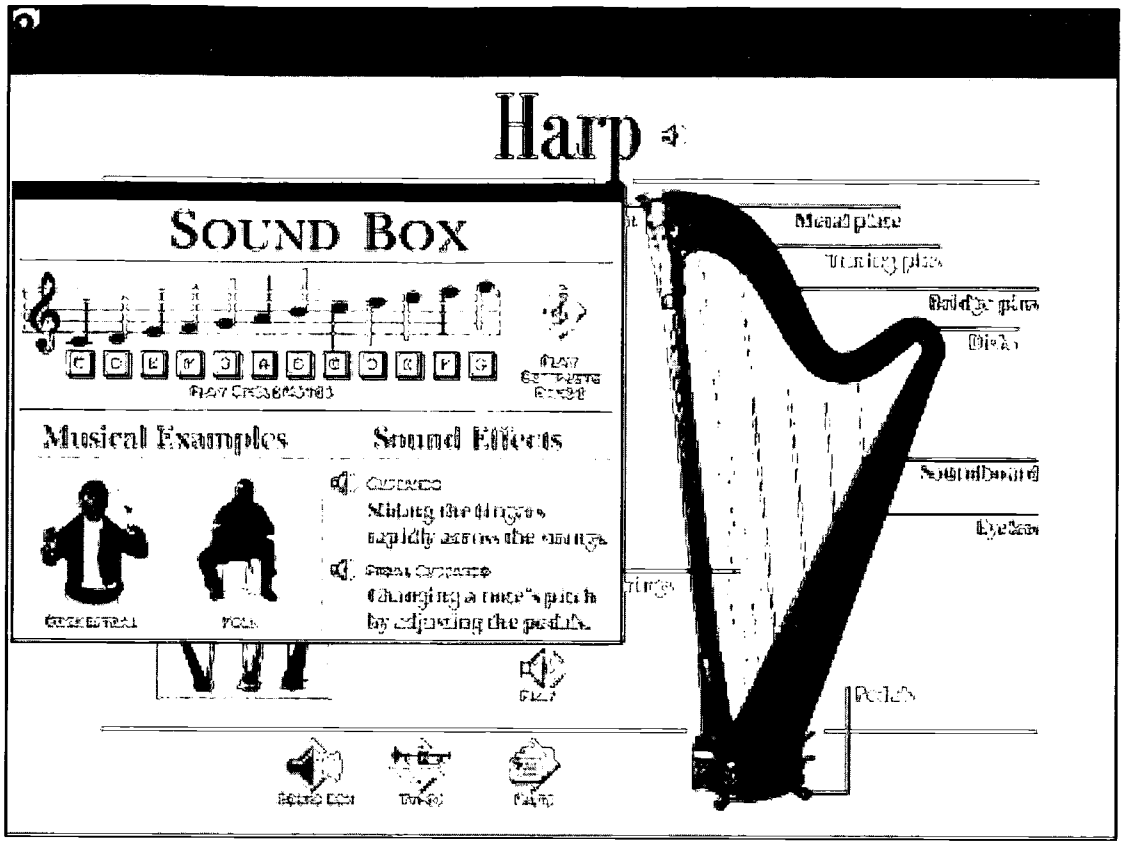

Figure 1: A musical instrument with sound box activated from *Microsoft Musical Instruments*.

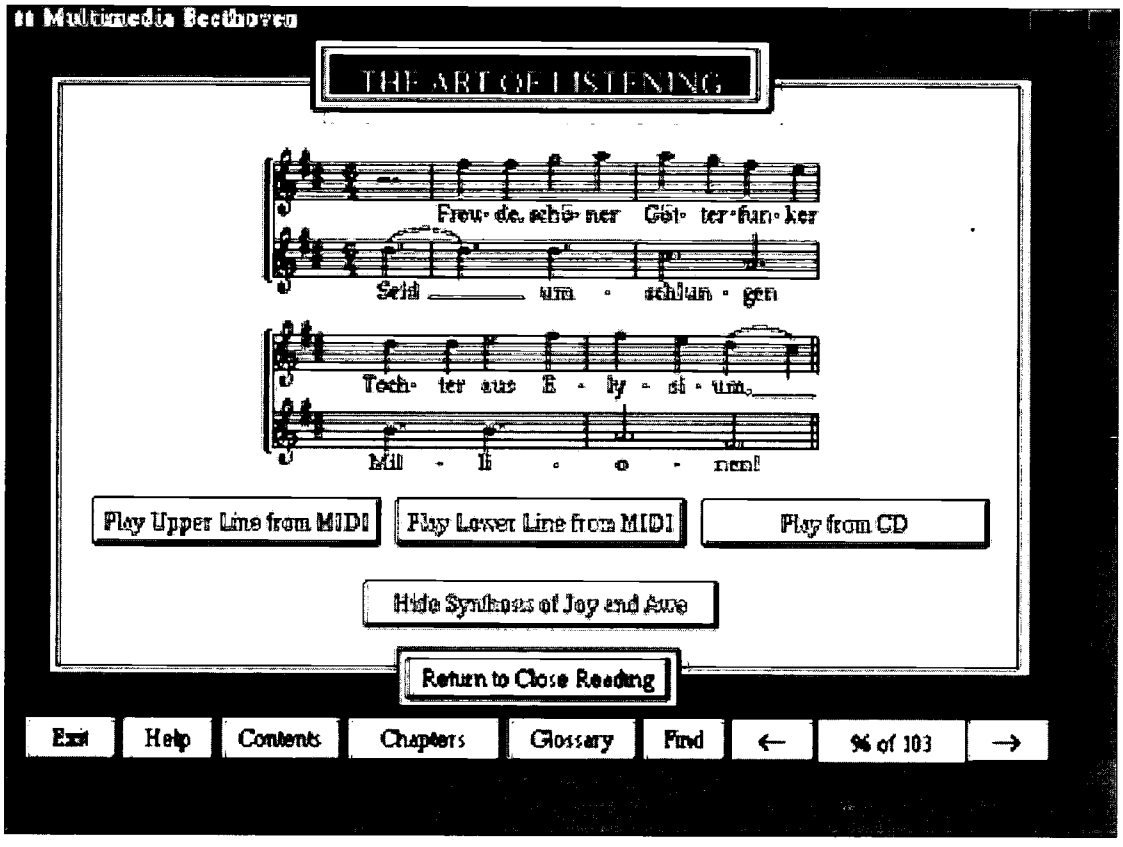

Figure 2: A section of the score from *Microsoft Multimedia Beethoven*.

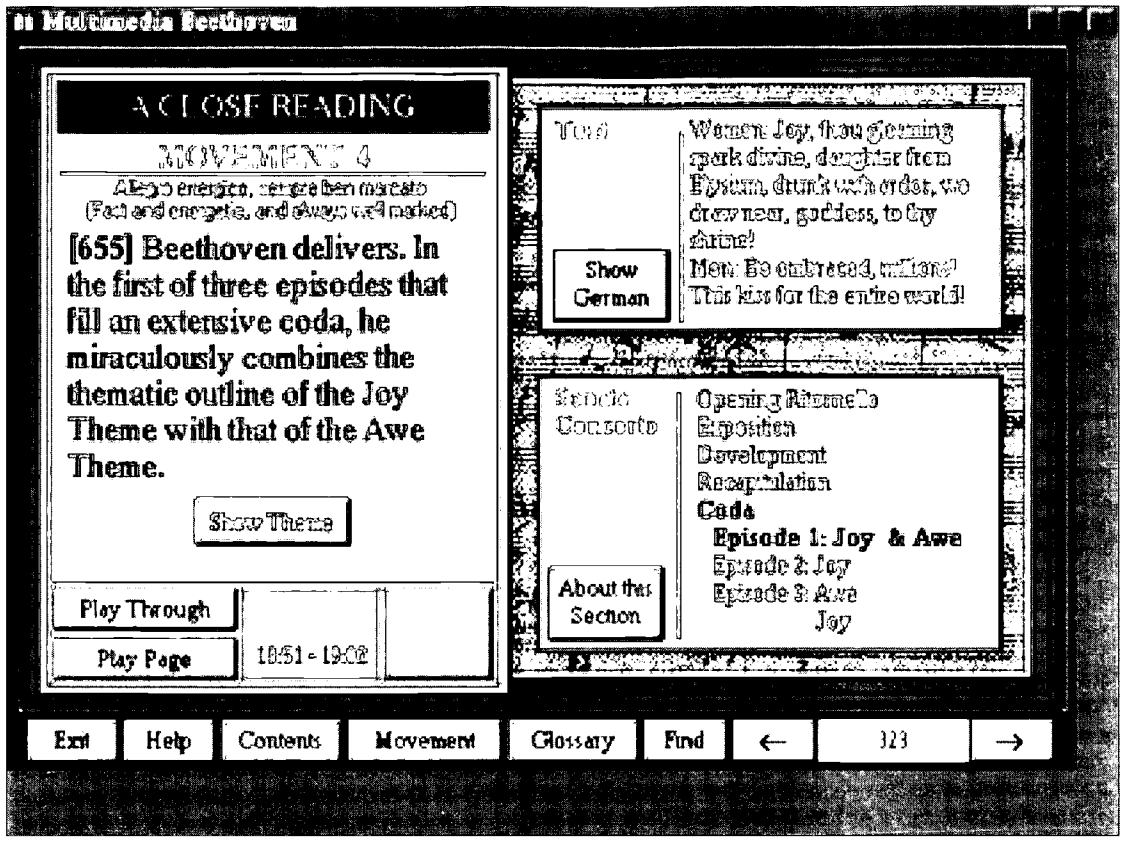

Figure 3: A close reading from *Microsoft Multimedia Beethoven*.

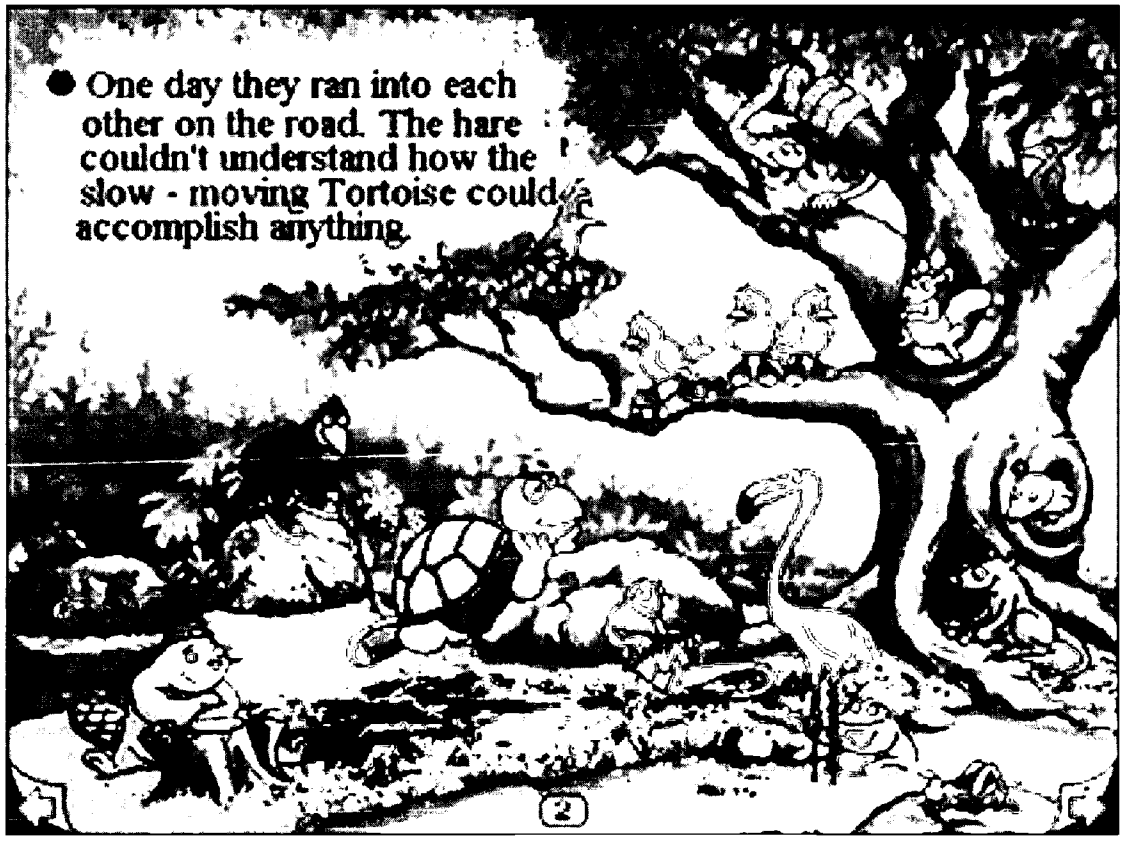

Figure 4: A page from *The Tortoise and the Hare* (Living Books series, published by Brøderbund).

One can only expect that more and more multimedia will be added to electronic publications in future, especially when larger storage media become freely available, such as Digital Video Disks (DVD). On the Internet it is becoming easy, and indeed very common, to add animation sequences to documents by means of Java. Since Java programming is platform independent and fairly easy to do, many pages now have animation added to them — very often only gimmicks indicating that the creator of the page has the know-how to do Java programming and the animation adds no value to the publication. The reader should, once again, evaluate the usefulness of the multimedia that has been added by making sure that value has in fact been added to the publication, and that multimedia has not merely been incorporated because the technology was available to do so.

3. Value-adding through the inclusion of tests, games and guided tours

Tests and games can be added at any point in an electronic publication, for example in any section of the publication or at the end. Games may have a purely recreational function but should be structured in such a way that they keep the reader's attention, as well as test his or her knowledge of the subject. Testing can take the form of multiple choice questions, form fill-in, typing single words or short sentences, etc. Proper feedback and references to the place in the text where the problem is discussed should be given, as is done in, for example, the Mindmaze in *Microsoft Encarta*(1996). Tests should comply with the standards for testing in computer based education, which is a separate, complex subject with a detailed literature. This will not be discussed any further; cf., for example, Alessi & Trollip (1991) and Dean & Whitlock (1992) (Ref 3) for details.

Guided tours provide readers with an easy option of navigating through an electronic publication. Instead of having to make choices of which links to follow, the tour guide takes the reader on a predefined tour through the publication. This is obviously against the principle of the reader being in control of the information space, since the only control the reader has is the ability to interrupt the tour at any given point. In a number of the Microsoft Home publications, e.g. *Microsoft Ancient Lands* and *Microsoft Dinosaurs*, the tour guides also provide spoken comments on the textual information, thereby providing additional information not available in the text version of the publication. Very often these comments are purely anecdotal, but sometimes essential additional information is provided by the tour guide; not accessing the information with the aid of the tour guide would therefore deprive a reader of the these comments.

Guided tours are sometimes also used to give an overview of how a publication works. By means of such a tour the reader can find out how to make use of all the possibilities in the publication. If this type of tour is essential to enable a reader to find information in the publication, it could be that the structure and functionalities of the publication are not sufficiently transparent.

4. Value-adding through integration of databases

An electronic publication can be read (or queried) as a separate database, but the possibility also exists to integrate various publications by means of hyperlinks between related information in the individual publications.

A well-known example is *Microsoft Bookshelf 1996–1997*, in which eight publications are integrated, viz. an encyclopaedia, atlas, world almanac, dictionary, thesaurus, two volumes of quotations and a book on the Internet. Each of these publications can be read independently, but links between the various publications provide a much richer information environment than the eight publications taken individually. It is for instance possible to look at a map and with the click of a button access information in the world fact book, and from there link to the encyclopaedia, etc. The rich web of hyperlinks within each single publication and between the various publications allow the reader to access the detail and variety of information required for a specific task. The Internet book in *Microsoft Bookshelf* provides the reader with access to information on the Internet, and numerous URLs are provided by means of which the reader may obtain additional information on practically any aspect via the World Wide Web, newsgroups, etc. Updated information can also be downloaded from Microsoft's Web server. *Microsoft Bookshelf* therefore integrates these eight publications with the practically unlimited information space of the Internet.

Biblical text databases such as *BibleWindows* and *BibleWorks for Windows* contain Hebrew, Greek and Latin texts of the Bible as well as various translations; some also contain morphological databases of Hebrew and Greek words, that is databases in which all words in the Hebrew and Greek texts are parsed. The morphological databases can be queried independently (usually by means of a set of menus and forms that can be filled in to simplify the construction of a search significantly). In addition to this the morphological databases are linked to the Hebrew and Greek text databases: by selecting a word in the Hebrew or Greek text, the morphological analysis is displayed. Double-clicking on a word in *BibleWorks for Windows* opens a window which displays the morphological analysis of the word, as well as an optional dictionary entry; cf. Figure 5 for an example.

Links to semantic databases — simple word lists or state-of-the-art lexica — are also possible. For instance, *BibleWindows* contains links to an electronic version of the Greek-English lexicon of Louw & Nida (1988) (Ref 4). Each publication, viz. the text databases and the lexicon, can be accessed separately. The dictionary can therefore be used as a standalone dictionary for standard use. However, selecting a word in the Greek text database allows the possibility of looking up the relevant word automatically in Louw & Nida; cf. Figure 6 for an example of *BibleWindows* with a link to the Louw & Nida lexicon. *BibleWindows* uses its own (proprietary) database formats and

search engines in the text databases, but, through morphological analyses of texts and hyperlinking, access to the Louw & Nida lexicon which is programmed in FolioViews is automatic. For more details see Bothma 1994 (Ref 5).

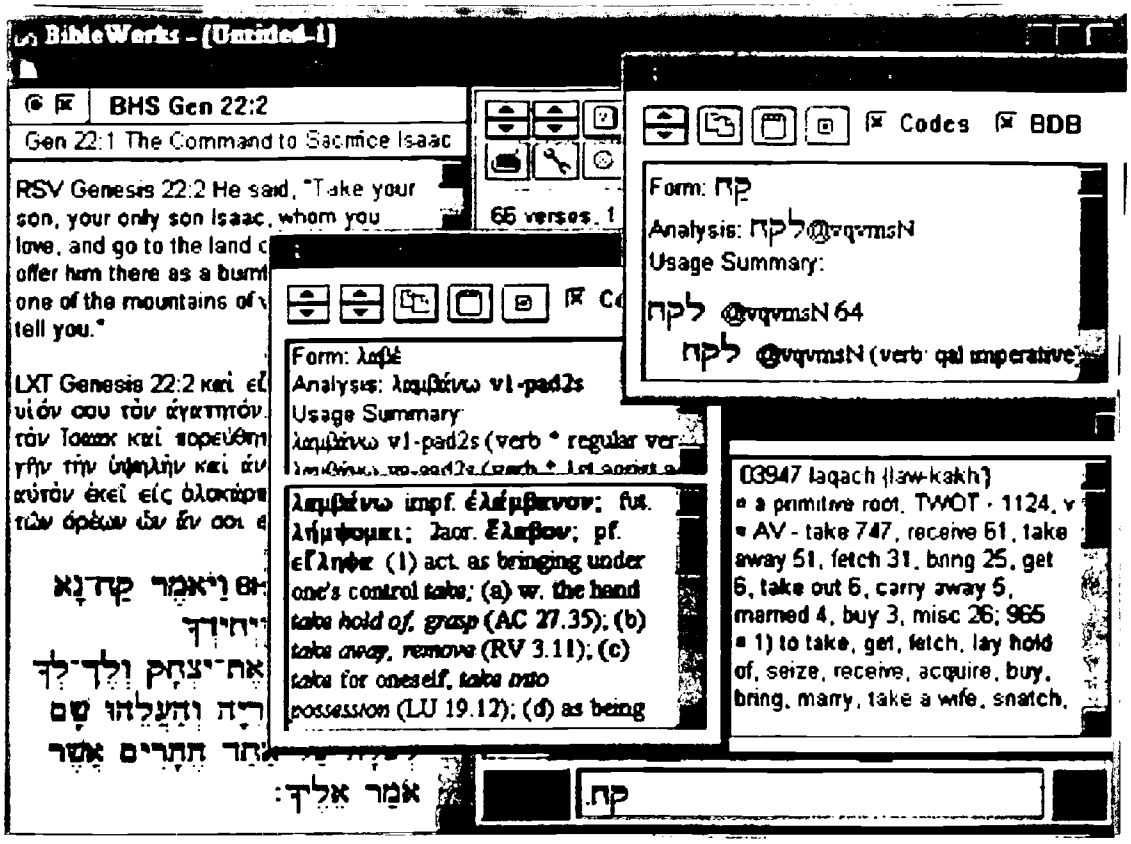

Figure 5: Hebrew and Greek morphological analyses in *BibleWorks for Windows* (published by Hermeneutika).

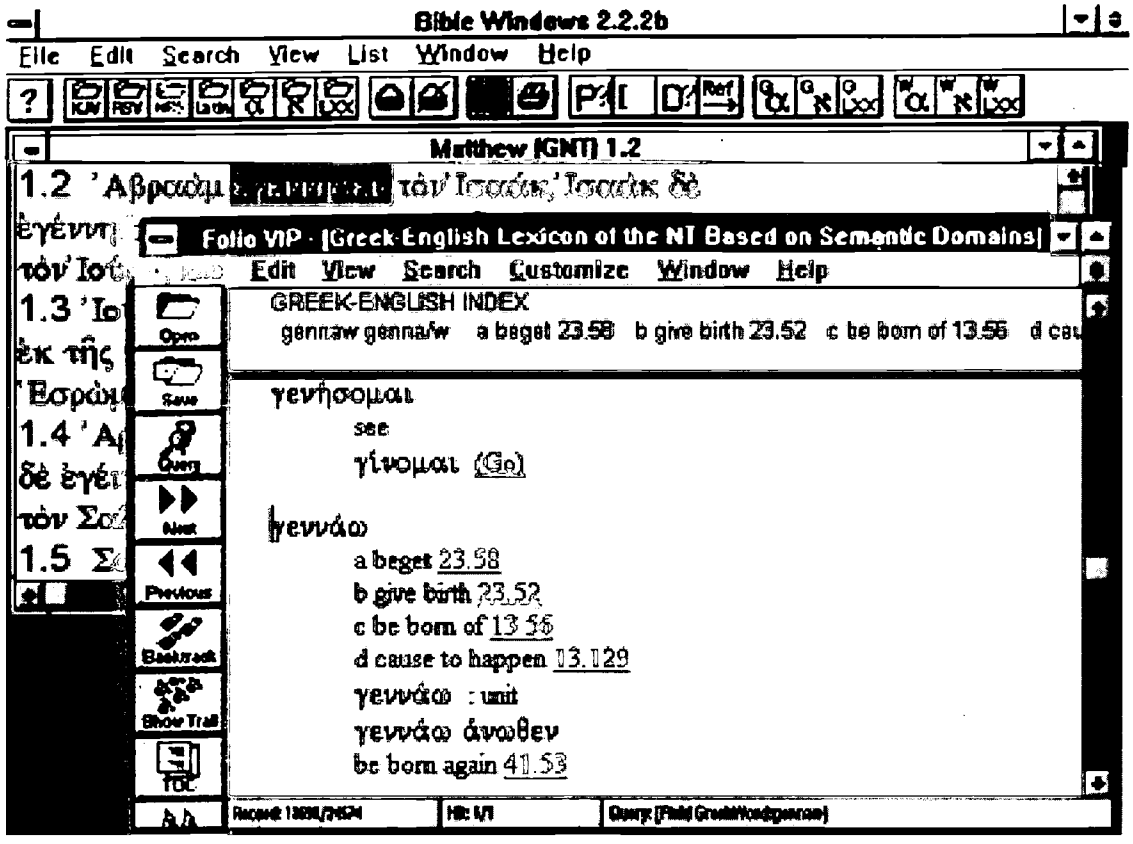

Figure 6: Linking *BibleWindows* to the Louw & Nida lexicon (published by Silver Mountain).

5. Value-adding through improved structuring

5.1. Hierarchical structuring of information

Electronic publications can be structured hierarchically in terms of the macro level and/or the micro level.

At the macro level this implies that, at the top level, the reader is usually supplied with a number of choices; selecting any of these would take the reader one level lower in the hierarchy, where a series of further selections is presented, until the required information is displayed, be this an article in an encyclopaedia or a specific chapter or paragraph in a book. This is commonly used in the Microsoft Home series (for example *Ancient Lands*, *Dangerous Creatures*, *Musical Instruments*, *Dinosaurs* and *Ocean*) and the Dorling Kindersley multimedia publications (such as *The Way Things Work*, *Encyclopedia of Science*, *Stowaway!*, and *The Ultimate Human Body*).

If an entry in especially a dictionary or encyclopaedia is long, a microlevel hierarchical structure is often also supplied. This means that the article can be collapsed to an outline of the headings and subheadings of the various paragraphs in the article, or that these headings can be extracted to a separate window. By selecting any of the headings, the full text of the paragraph is displayed. These techniques are employed very effectively in *Microsoft Encarta*, where proper paragraph headings clearly indicate the contents of the paragraph, and *Microsoft Cinemania*. In the *Oxford English Dictionary* this technique is unfortunately employed very ineffectively, because of the lack of proper headings.

A combination of macro and micro level hierarchical structuring occurs when the reader is presented with an electronic table of contents which can be expanded or contracted; this table of contents is then linked directly to the full-text. The screen is divided into a table of contents section and a full-text section; by clicking on any item in the table of contents the reader directly moves to the relevant passage in the full-text; cf. Figure 7 for an example taken from the*Text Encoding Initiative Guidelines P3*.

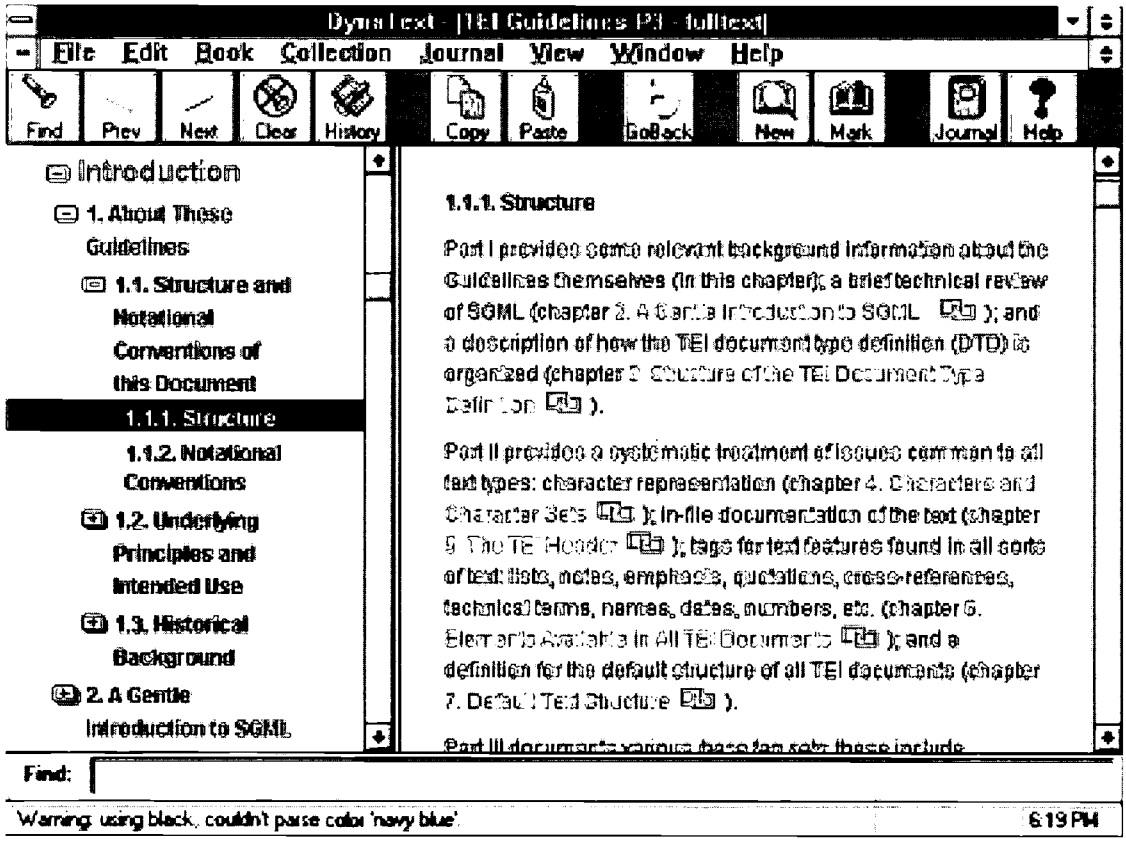

Figure 7: Electronic table of contents linked to the content in the TEI Guidelines P3(electronic version published by Electronic Book Technologies).

5.2. Hyperlinking to related/associated material

Many electronic publications support hyperlinking between a word/phrase or paragraph and related materials. This can be implemented in two ways, viz. by explicit referral and by embedded links in the text.

Users can be referred to related material explicitly by means of a reference list listing related material at the end of an article, or a 'See also/Related articles' button.

Embedding links in the text to related material implies that the reader may at any stage acquire related or explanatory material on demand. This means that the reader can choose which trails of information he or she

would like to follow and the information can be accessed in a non-linear, non-sequential manner (Ref 6).

Embedded links are usually indicated by means of some or other typographical convention. The text of the embedded link may be displayed in another colour, in inverse video, in a specific typeface or underlined, or a combination of these features. Most Microsoft publications use a second colour together with underlining; full underlining indicates a cross reference to another article, whereas broken underlining indicates glossary information available in a pop-up window.

Embedded links need not necessarily be indicated, and especially in dictionaries all terms can act as the anchor point of an embedded link. By selecting a term in a dictionary the reader is then taken automatically to the lemma of the selected term. In the *Oxford English Dictionary* this is done by selecting a term and then activating the button 'Xref', and in Macmillan's *Dictionary for Children* clicking with the right mouse button on any word takes the reader to the lemma of that word.

5.3. Navigational aids

Readers can browse (or navigate) through the information by means of the above-mentioned hierarchical structure or by following links. Various navigational aids (Ref 7) to help the reader maintain an idea of where he or she is in the electronic publication are usually also available, such as:

- a backtrack facility by means of which one can retrace the path one has followed through the information;
- a 'home' button which enables the reader to go to the opening screen of the publication in one step;
- a history facility which can display a list of all the sections that have been accessed; and
- electronic bookmarks which are user-defined.

Absence of such devices can easily lead to the user getting lost in hyperspace.

Hierarchical structuring of information, hyperlinking to related information and navigational aids enable readers of electronic publications to find relevant information (the correct information at the detail required) much easily and much more efficiently than in paper-based equivalents. The possibility to do full-text searching further enhances an electronic publication.

6. Value-adding through full-text search facilities

Using an index is the main method of locating information in a printed book (in addition to the table of contents). It is usually constructed on the basis of predefined terms and contains only selective references to the text. It is therefore limited in terms of completeness, both with regard to the list of search terms as well as with regard to the exhaustiveness of a specific search. Adding full-text search facilities in an electronic publication can vastly improve access to information. Full-text searching implies that the full text of the publication is searched for the specified term(s), resulting in a comprehensive list of occurrences of the term(s).

Searches for a single word can be done, as well as for phrases. Boolean searches are supported, i.e. words and phrases can be combined with the logical operators AND, OR and NOT. The use of wildcards and truncation is usually also possible, as well as the use of proximity operators.

An electronic publication supports searches not possible in the equivalent paper-based publication. Paper-based dictionaries and concordances allow users the possibility of single word look-up, according to the alphabetical structuring of the publication. An electronic dictionary such as the *Oxford English Dictionary*, however, allows searches on the etymology of words, quotation searches, author and title indexes, etc. in addition to full-text searching; cf. Figure 8 for an example.

How full-text search features are implemented differs from publication to publication. In some cases a command line interface is employed, in others a menu-driven search construction. Some programs even allow the user to select the search method best suited to the specific user, for example in the *English Poetry Database* published by Chadwick-Healey.

Command line interfaces can be fairly complex to the average end-user. One example will suffice. In *BibleWorks for Windows* — a concordance program containing various translations of the Bible as well as the texts in Hebrew, Greek and Latin — users can do complex Boolean searches combined with truncation and proximity operators. To search for any derivative of 'faith' occurring within two verses of any derivative of 'work', and this combination occurring within two verses of 'Jesus' or 'Christ', one has to enter the following command at the command line (Ref 8): *(.faith* work*;2).2(/jesus christ)*.

This is too complex for the average user since not only does one have to understand the principles of Boolean searching, but one would also have had to learn a difficult command line interface (which differs from program to program) in order to be able to construct a valid search command. Consequently most publications tend to offer various types of help menus to construct full-text searches.

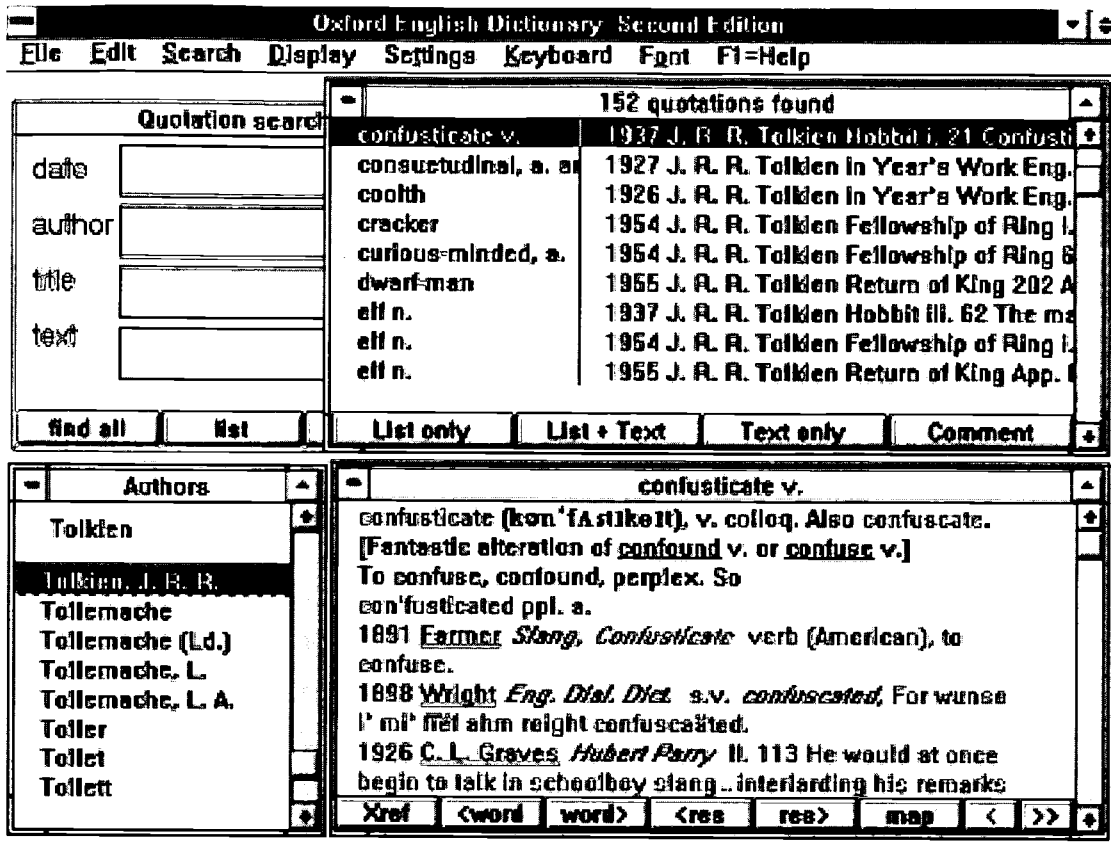

Figure 8: Quotation search on authors in the *Oxford English Dictionary*.

6.1. Help facilities to construct full-text searches

The full-text search facilities discussed in the preceding section make access to information in electronic publications much more sophisticated than is possible in equivalent paper publications. However, to construct Boolean searches with proximity operators and so forth can be fairly complex and publishers should provide help screens to simplify the process. Again there is no standardisation in the help interface of different publications, and the menus sometimes vary from a simple list that provides the option to specify a number of search terms and select AND or OR as operators, to highly sophisticated menus which can do searches across various fields or search wizards, by means of which the search can be built up by answering a number of questions.

Figure 9 provides an example from the *Andromeda Interactive Space Encyclopedia* which offers a fill-in list to specify the search terms and a pull-down menu to specify AND or OR, as well as the possibility to specify proximity in terms of the word range within which the specified terms must occur.

In *Microsoft Encarta* various other help facilities are available to construct a search. In addition to the primary search term(s) (combined with Boolean operators), it is for example also possible to define the broad category which has to be searched, the date range (or precise date), the locality, etc.; these features are available by clicking on the various buttons on the search screen, which then activate a sub-menu; cf. Figure 10 for an example. The program could also assist the reader in filling in the forms by means of a search wizard. *Microsoft Cinemania 96*offers similar features by means of which a very complex search strategy can be formulated.

It is quite evident that full-text search facilities provide much more sophisticated access to information than is possible by means of an index and a table of contents in a paper-based publication.

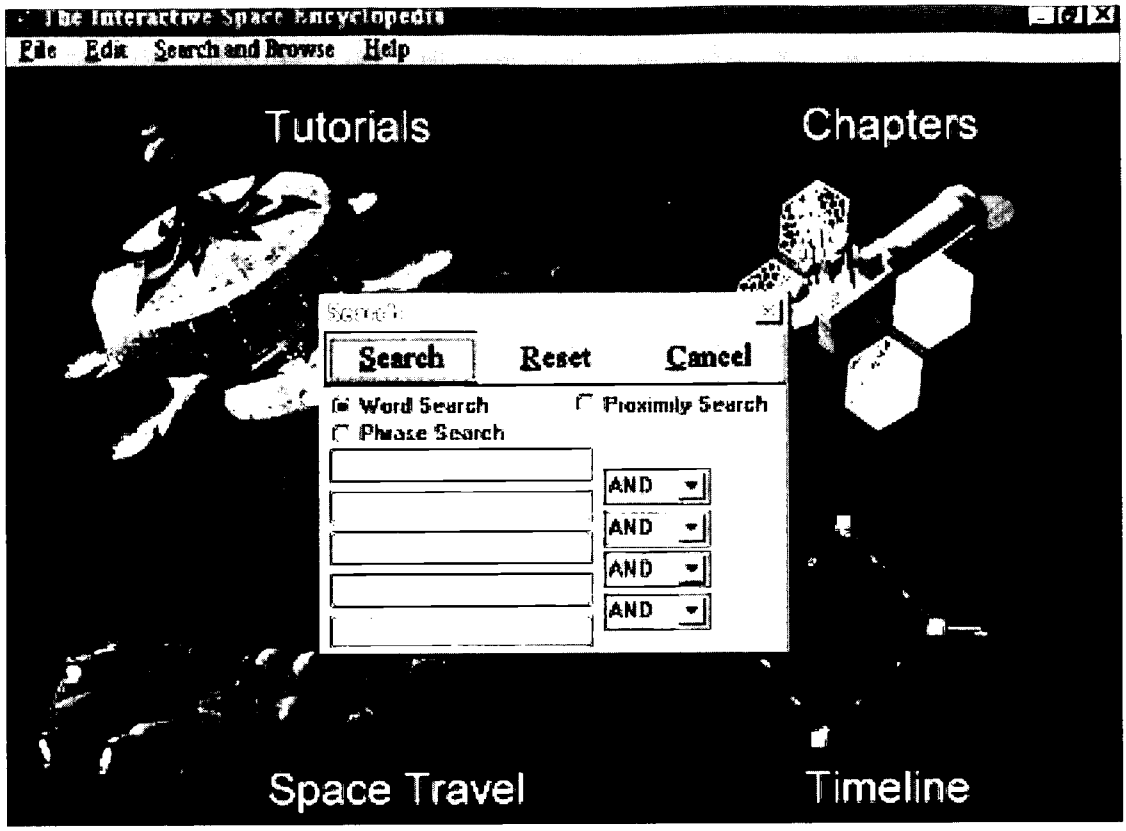

Figure 9: Help to create Boolean searches in the *Interactive Space Encyclopedia* (published by Andromeda Interactive).

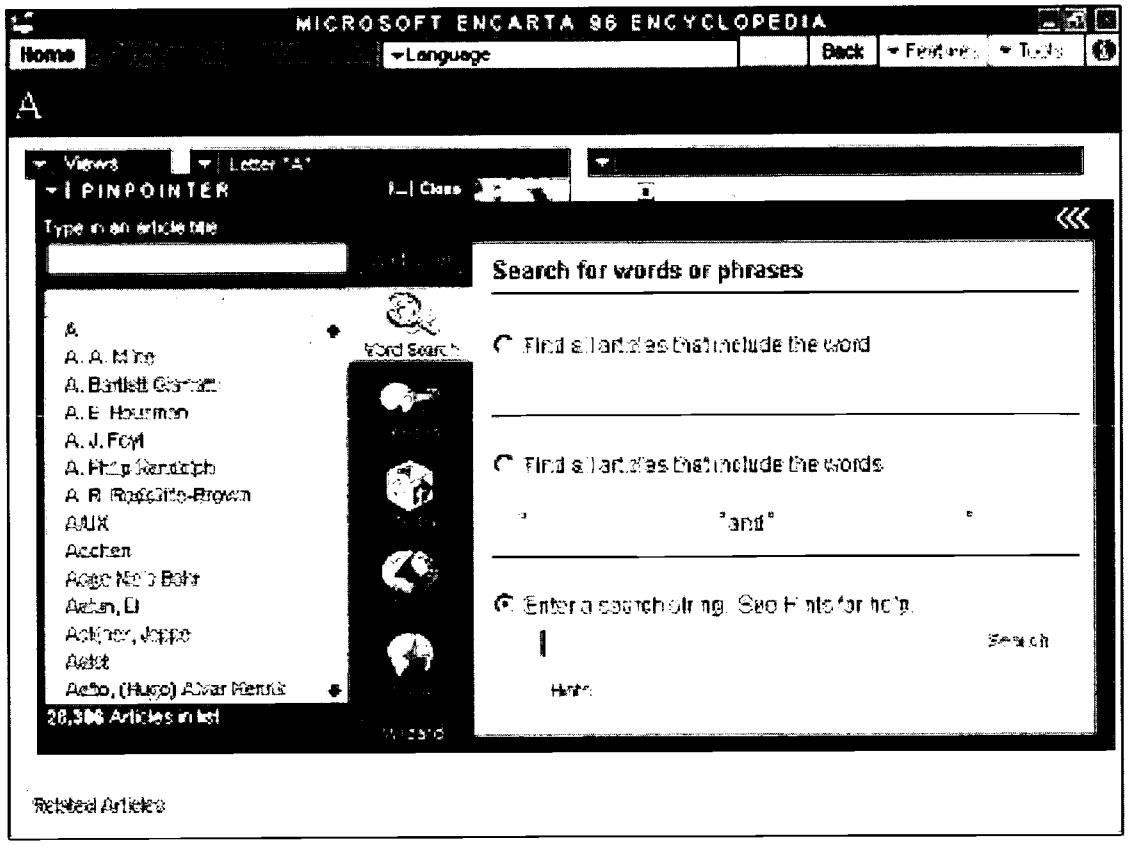

Figure 10: A screen showing some of the search facilities in *Microsoft Encarta 1996*.

7. Conclusion

Obviously not all methods of adding value to electronic publications are relevant in all cases. It is for instance not logical to add sophisticated search facilities to a story book for children; similarly, the addition of sound and animation may not be relevant in an electronic publication of the classics of English literature.

It is, however, important that all readers — end-users, information scientists and librarians alike — should know *how* value can be added in electronic publications, to enable them to judge whether any features that have been added to an electronic publication make the publication more useful than an equivalent paper publication, or whether these features are only gimmicks which have been added because the technology is available.

The perception very often exists that electronic information sources are of a higher quality than paper-based information sources. This is not necessarily true. It has to be stressed that every electronic publication should be evaluated on various levels, viz. the level of content, as well as technological aspects such as structural properties, the various methods provided to gain access to the information, and visual aspects. The best interface, design and value-adding technologies cannot make a publication useful if the content is not sound, i.e. correct, complete, up-to-date, relevant, etc.: technology cannot improve bad content. On the other hand, if the content is good but technology has not been implemented in the optimum way, the publication would suffer. This obviously brings a whole new dimension to the work of anyone who has to design or evaluate publications.

All readers should be aware that many excellent electronic publications are available, but that there are also many titles which are but poor imitations of quality electronic publishing.

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[6] Hypertext and hypermedia are very powerful methods by means of which information can be organised. For more details cf., for example, Nielsen, J. (1995) *Multimedia and Hypertext. The Internet and Beyond*, AP Professional, Boston; McKnight, C., A. Dillon and J. Richardson (1992) Hypermedia, *Encyclopedia of Library and Information Science*, vol. 50, Supplement 13, Marcel Dekker, New York, pp. 226–255; McKnight, C., A. Dillon and J. Richardson (1991) *Hypertext in Context*, The Cambridge Series on Electronic Publishing, Cambridge University Press, Cambridge.

[7] Providing sophisticated navigational aids are standard organisational devices in hypertext; for additional navigational aids cf., for example, Nielsen, J. (1990) Navigating through hypertext, *Communications of the ACM*, **33** (3), 297–309 and the items cited in Ref 6 above.

[8] There is unfortunately also a disadvantage to this type of concordance program: no morphological analysis or tagging of the English is done and the user searching for 'go' and its derivatives, such as 'goes' or 'going', will have to use a wildcard (e.g. 'go*'), but will then also find any other word beginning with 'go' such as 'God', 'gods', 'gospel', etc., while not locating occurrences of 'went', which will have to be entered separately.

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