The discursive construction of the user of CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools as a social and a literate subject

by

Lucy RESNYANSKY

BA (Linguistics), MA (Social Philosophy), Novosibirsk State University (Russia)

A thesis submitted for the degree of

Doctor of Philosophy in Education

School of Education, Division of Education, Arts and Social Sciences

University of South Australia

February 2005

Table of Contents

Chapter One Introduction 1

1.1 Being educated in the information society 1

1.2 Electronic encyclopaedias and Internet search tools 4

1.3 Purposes of research 8

1.4 Research questions 8

1.5 Thesis structure 9

Chapter Two Sociocultural educational studies of information and communications technologies 13

2.1 Introduction 13

2.2 Technology as a sociocultural construct 14

2.3 The discursive construction of technology, education, and children 21

2.4 Children's uses of technology: different subjects – different effects 27

2.5 The effects of technology upon literacy and subjectivity 30

2.5.1 Expanding definitions of literacy 31

2.5.2 The changing nature of textuality and subjectivity 35

2.5.3 Software products as pedagogical sites 38

2.6 Educational studies of electronic reference products 43

2.7 Conclusion 49

Chapter Three Discourse as a theoretical tool in educational research 51

3.1 Introduction 51

3.2 Discourse in social research 52

3.2.1 Discourse as an object of social research 53

3.2.2 Discourse as a theoretical tool in social research 54

3.3 Discourse in educational research 57

3.4 Objects of research 62

3.5 Critical discourse analysis 65

3.6 Conclusion 72

Chapter Four Critical discourse analysis of electronic reference products: Methodology 74

4.1 Introduction 74

4.2 Corpus 75

4.2.1 Corpus of review websites 75

4.2.2 Corpus of products 77

4.3 The objects of analysis 79

4.3.1 The software review website 80

4.3.2 The CD-ROM encyclopaedia 82

4.3.3 The online encyclopaedia 86

4.3.4 The Internet search tools 88

4.4 Analytic tools and methods 92

4.4.1 Ideational meaning 93

4.4.2 Images of literacy 95

4.4.3 Subject positioning 100

4.4.4 Interdiscursivity 104

4.4.5 The information unit and the spatial semiotics of layout 105

4.4.6 The hierarchy of hypertext 108

4.4.7 The modality of image and the sociocultural code 111

4.5 The analytic scope of the research 114

4.6 Conclusion 117

Chapter Five Being informed in the age of information: The discursive construction of the CD-ROM encyclopaedia and its consumers on software review websites 120

5.1 Introduction 120

5.2 Searching the Internet for review websites 121

5.2.1 Search queries and search results 121

5.2.2 Review website description 125

5.3 The review website 131

5.3.1 Homepage and site map: constructing the visitor 133

5.3.2 Indexes: constructing the reviewed products 147
5.3.3 About Us: the reviewer, software evaluation and evaluation forms 155
5.4 The CD-ROM encyclopaedia review 167
5.4.1 The genre of the CD-ROM encyclopaedia review 167
5.4.2 The reviewer and the review reader 170
5.4.3 The CD-ROM encyclopaedia 173
5.4.4 The CD-ROM encyclopaedia buyer and user 178
5.5 Conclusion 182

Chapter Six Powerful technology – empowered user? The discursive construction of the user in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools 185
6.1 Introduction 185
6.2 The CD-ROM encyclopaedia 187
6.2.1 Information on the CD-ROM packaging 188
6.2.2 The power of CD-ROM technology 190
6.2.3 Empowering learners and students 195
6.2.4 The power of popular discourse on technology 202
6.3 The CD-ROM user 204
6.3.1 Economic status 205
6.3.2 Nationality 208
6.3.3 Age 213
6.3.4 Subject positions 221
6.3.5 Constructions of the user: from packaging to interface 234
6.4 Empowered on the Internet 236
6.4.1 Online encyclopaedias and their visitors 236
6.4.2 Internet search tools for children and their users 241
6.5 Conclusion 243

Chapter Seven The virtual literacy classroom: The discursive construction of literacy and the user as a literate subject 246
7.1 Introduction 246
7.2 Images of literacy – images of the literate subject 249

7.2.1 Images of literacy technologies and literacy cultures..... 249
7.2.2 Images of encyclopaedias on packages, main menus and homepages..... 254
7.2.3 The interface images of literacy 260
7.3 Project Creation.....268
7.3.1 Maximedia Instruction Guide..... 269
7.3.2 Project Creator..... 284
7.4 Information searching 293
7.5 Reading an encyclopaedia article.....309
7.6 Conclusion 316

Chapter Eight Conclusion 320

References..... 334

Appendix A CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools 367
Appendix B Children's software review websites, educational resources websites, and the websites of publishing companies and online stores 369
Appendix C Reviews of CD-ROM encyclopaedias 371
Appendix D CD-ROM encyclopaedias reviewed on the World Wide Web 373

List of Figures

Figure 3.1 Critical discourse analysis: stages, dimensions, foci 68

Figure 3.2 Critical discourse analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools: objects of analysis 71

Figure 4.1 Review website: types of texts 81

Figure 4.2 CD-ROM encyclopaedia: types of texts 83

Figure 4.3 Online encyclopaedia: types of texts 87

Figure 4.4 Internet search tools: types of texts 89

Figure 4.5 Images of literacy 96

Figure 4.6 Webpage layout 107

Figure 5.1 *DiscoverySchool.com*: the website structure 131

Figure 5.2 *SuperKids*: the website structure 132

Figure 5.3 *DiscoverySchool.com*: homepage 134

Figure 5.4 *DiscoverySchool.com*: site map 136

Figure 5.5 *SuperKids*: homepage 139

Figure 5.6 *The Review Zone*: homepage and site map 141

Figure 5.7 *The Review Zone*: advertising links 144

Figure 5.8 *Sun Bunnies Boutique* 145

Figure 5.9 *DiscoverySchool.com*: indexes 148

Figure 5.10 *SuperKids*: subject index 150

Figure 5.11 *The Review Zone*: subject index 151

Figure 5.12 The Review Zone: alphabetical index 154

Figure 5.13 *SuperKids*: review page 168

Figure 6.1 *Webster's Concise Interactive Encyclopedia*: packaging 189

Figure 6.2 Usage of numbers, extra graphics and colour in description of software features 192

Figure 6.3 *Microsoft Encarta Reference Suite 2001 – Australian Edition*: learning and technology 195

Figure 6.4 *Microsoft Encarta Reference Suite 2001 – Australian Edition*: the front cover and the back cover 209
Figure 6.5 *Microsoft Encarta Reference Suite 2001 – Australian Edition*: the inside cover 212
Figure 6.6 "Encarta Researcher": the hypertext structure 221
Figure 6.7 The "Encarta Researcher Getting Started" interface 223
Figure 6.8 "Encarta Researcher": the "Write" interface 226
Figure 6.9 "Encarta Researcher": the report writing tool interface 228
Figure 6.10 "Encarta Researcher": the "Report Writing Guide – Produce" text 230
Figure 6.11 Online information services' network: fragment 237
Figure 6.12 *BritannicaOnline*: homepage 240
Figure 7.1 The *Learning Links* categories: images of the constituents of literacy events 251
Figure 7.2 The *Webster's Concise Interactive Encyclopedia* subject menu: images of literacy technologies 253
Figure 7.3 Encyclopaedia's images on CD-ROM packaging 255
Figure 7.4 Encyclopaedia's images in CD-ROM main menus 257
Figure 7.5 The images of *Encyclopedia.com* 259
Figure 7.6 The interface images of literacy 261
Figure 7.7 *Animals, A Multimedia Encyclopedia*: the main menu 264
Figure 7.8 The *Yahooligans!* homepage: images of literacy technologies 265
Figure 7.9 *Maximedia School Project No 2* CD-ROM: examples of images 273
Figure 7.10 Finding information: visual representation 278
Figure 7.11 Finding a picture: visual representation 280
Figure 7.12 Project writing: visual representation 282
Figure 7.13 *Webster's Encyclopedia of Australia 2000*: "Project Creator" 285
Figure 7.14 *Webster's Encyclopedia of Australia 2000*: "Print" 288
Figure 7.15 Search icons 294
Figure 7.16 *Webster's Encyclopedia of Australia 2000*: the media search options 296
Figure 7.17 *Webster's Encyclopedia of Australia 2000*: the search tool's structure 300
Figure 7.18 *Webster's Concise Interactive Encyclopedia*: the Boolean search tool 302
Figure 7.19 The "Australian Aborigines" project: search results 304
Figure 7.20 *Ask Jeeves for Kids*: the natural language search tool 307
Figure 7.21 The multimedia CD-ROM encyclopaedia article 310

Figure 7.22 *Animals, A Multimedia Encyclopedia*: the article interface.....311
Figure 7.23 *Animals, A Multimedia Encyclopedia*: the "Quokka" article.....314
Figure 7.24 *Animals, A Multimedia Encyclopedia*: the "European Anchovy" article.....315

List of Tables

Table 4.1 The objects of analysis: products, types of texts, and analytic foci 91
Table 4.2 Analytic tools (1): Construction of social and literate subjects 113
Table 4.3 Analytic tools (2): Interaction, legitimisation and naturalisation of discourses.....114
Table 5.1 Search queries and search results.....124
Table 6.1 Product prices and system requirements costs.....207
Table 6.2 "Encarta Researcher": the multiplicity of texts, practices, user identities and subject positions 233
Table 7.1 "The Main Menu" text: transitivity and modality.....271
Table 7.2 "The Main Menu" text: information and images.....271
Table 7.3 The "Creating Your Project" text: transitivity 275
Table 7.4 The "Projects Roll-up" text: transitivity and modality.....292
Table 7.5 The "Projects Roll-up" text: the user and the tool.....292
Table 7.6 The "Search Roll-up" text: transitivity and modality.....298
Table 7.7 The "Search Roll-up" text: the user and the tool 299
Table 7.8 The information searcher: multiple constructions.....300

Summary

In the information society, Information and Communications Technologies (ICTs) are having a major impact on education – its institutions, its goals, and ways of teaching and learning. This impact is becoming more significant due to the increasing technologisation of the home, the growing domestic use of computer and ICT-mediated educational and entertaining products, and the early engagement of children into digital culture, mainly through electronic games. Interactive multimedia technology is claimed to improve learning by increasing students' motivation and creating a richer and more interesting teaching and learning environment; by providing quick and easy access to information and knowledge; and by providing a possibility for better acquisition of information literacy and communicative skills. However, such claims are not always based on thorough and systematic educational and pedagogical assessments of ICT-mediated products that are offered to contemporary children and students.

This study aims to contribute to an exploration of ICTs as 'education providers' and as sites/practices of the production of social and literate subjects in the information society. It also aims to contribute to the development of educators' agency in relation to ICTs. The study focuses on one group of ICT-mediated products: encyclopaedias published on CD-ROMs and available online, and children's Internet search tools. These products and services are offered to the public as educational aids for children and school students. Public and educational thinking about these products is shaped by the conceptions developed within such fields as information and library science and information systems design. Within these fields, these products are typically constructed as reference works and as digital technologies of information storage and retrieval. In this research, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are approached as instances of computer-mediated pedagogical (discursive) practice. They are made 'visible' as pedagogical practices of subjectivity formation and literacy education.

The exploration of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices constitutive of their users focuses on two issues: the discursive construction of the contemporary child/student as a sociocultural subject and the discursive construction of literacy and the user as a literate subject. This exploration is preceded by an analysis of a broader discursive context (represented by children's software review websites) that may affect educators' and parents' thinking about CD -ROM encyclopaedias, about their children and students users, and about being a teacher or a parent in the information society.

The analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices of the production of social and literate subjects contests the dominant construction of these products and services as powerful technologies that empower their user. The analysis shows that CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools are, firstly, selective of their users. The intended 'every' user is someone who belongs to a rather well-situated social and economic group and is socialised into a particular literate culture. Secondly, these products tend to present the advantages of computer-mediated technologies of information storage, access and presentation as automatically providing educational success, better learning, and higher school achievements. Children and students are constructed as technology users having needs and interests generic for software users of all generations and occupations. Thirdly, these products do not provide equal access to the literacy skills associated with the most advanced literacies. In order to benefit from the literacy education provided by these products, the child/student user needs access to experts and to cultural capital. However, these prerequisites are not made explicit in the products or in the products reviews available from children's software review websites. Rather, they are made almost unthinkable by presenting these products as powerful technologies and the user as a subject empowered by these technologies.

Declaration

I declare that this thesis is the result of my own research, that it does not incorporate without acknowledgement any material submitted for a degree or diploma in any University and that it does not contain any materials previously published, written or produced by another person except where due reference is made in the text.

Lucy Resnyansky 23 June 2005

Acknowledgements

I would like to express my great appreciation to my supervisor Professor Barbara Comber who has supported me throughout this project and helped me to complete this study. I also thank Jenny Barnett, Phil Cormack, and, in particular, Helen Nixon, for their valuable contributions to the writing of this thesis. Hilary Janks, Bill Green, and Colin Lankshear, who read my papers, I thank for their useful and inspiring feedback. I express my gratitude to Cate Poynton for introducing me to systemic functional linguistics and critical discourse analysis. A special thank you goes to Sue Myburgh who supported me when I most needed it. I am also grateful to Jane Kenway, Bruce Johnson, Peter Willis, and Greg Restall for their friendly attitude towards my research. I thank my family, friends, and my colleagues for their understanding, encouragement and help.

Chapter One Introduction

1.1 Being educated in the information society

In an information society, Information and Communications Technologies (ICTs) have created new challenges for education by introducing dramatic changes in modern workplaces, lifestyles, and social interaction. The information society is characterised by a multimodal communication environment; the availability of multiple information resources; cultural and language diversity; and a shift from the production of goods to the production of services and knowledge (Castells, 1996; Gee, Hull, & Lankshear, 1996). These changes have entailed a reconsideration of what it means to be an educated and a literate member of society. In order for an individual to participate in social and political life and to occupy a position in the workplace, a range of new skills and abilities is required. It has been argued that people have to be able to deal with a textual environment created by ICTs, to access information networks, to function across the boundaries of cultures and languages, and to think critically (Cope & Kalantzis, 2000; Kress, 2003; Lankshear, 1997; Lankshear & Knobel, 2003; New London Group, 1996; Queensland Government, 2000).

ICTs are not only affecting the requirements for being an educated citizen, but are also changing educational institutions and settings, teaching and learning practices, and pedagogical subjects. Educators and education researchers have become conscious of the fact that "the world is changing all around us, and that our students, our children, are arguably already living and learning in the future, although not necessarily in the context of the nation's classrooms" (Green & Beavis, 1998, p. i).

The range of educational stakeholders in the information society includes not only governments, teachers and parents but also the producers of ICTs and ICT-mediated educational and entertaining products (Bigum & Green, 1993; Kenway, 1995; C. Luke, 2000). The development of educational technology as an industry has led to the

redistribution of the functions of teachers, parents, and government structures, with technology producers becoming sources of authority, 'true' knowledge, and control in education (Bigum & Green, 1993; Bigum & Kenway, 1996a; Davis & Botkin, 1994; Kenway, 1995; C. Luke, 2000).

The ICT industry has created a number of challenges for the system of education developed for industrial societies by claiming that it is able to provide better education at home (Kenway, 1995). In the 1980s and 1990s, the issue of ICTs and education was discussed in terms of replacing school by virtual schooling (see, for example, Tiffin and Rajasingham (1995) on a techno-enthusiastic scenario of the future of schooling). Today, this scenario seems to be exaggerated. Schools have survived and are gradually integrating ICTs in teaching practices. The ICTs industry now presents itself not as competing against the traditional institution of schooling but as offering genuine help to students, parents, and teachers. Interactive multimedia technology is claimed to improve learning by increasing the students' motivation and creating a richer and more interesting teaching and learning environment; by providing quick and easy access to information and knowledge for everyone; and by contributing to the acquisition of more advanced literacy and communicative skills.

The representatives of the ICT industry inform the educational community that their goal is to answer the needs of their 'end users' – students, teachers, and parents. In magazines addressed to educators and parents, the representatives of the industry present their activity, goals and products as similar to those in the educational field. This is in tune with the industry's philosophy captured by the notion of a user-friendly, or 'invisible' (Norman, 1998), technology. Within this philosophy, the producer's goal is to create technological products that would fulfil the needs of a great variety of users and would not require much effort or any specific skills from the user.

However, some educators and educational researchers believe that making technology 'invisible' results in the educational community uncritically accepting a technologist vision of ICTs (Chadwick, 2002; Haas, 1996; Selfe, 1999). It is argued that educators need their own vision of technology, a vision that would be shaped by the concerns of educators rather than by the concerns of programmers, media specialists, web designers, and marketing and public relations specialists (Gilding, 1998; Kenway, 1995; Rodenburg, 1999). It is also argued that educators need to be able to assess ICTs in terms of their broad social and cultural implications and in terms of pedagogical views, philosophies, and concepts built into them (Bigum & Green, 1993; Burbules & Callister,

2000; Gee, 2003). Not only those products designed specifically for computer-assisted learning and instruction should be made objects of sociocultural educational research. A similar task should be undertaken in relation to computer and video games (Beavis, 2000a; Gee, 2003) and to ICT-mediated products of broad educational significance, such as electronic encyclopaedias (C. Luke, 2000), which are the objects of study in this thesis.

This task is becoming particularly important due to the increasing technologisation of the home and the growing domestic use of ICTs for educational purposes. According to the data published by the Australian Bureau of Statistics (Australian Bureau of Statistics, 2003), the proportion of Australian households with access to a computer at home increased from 44% in 1998 to 66% in 2003. Among households with children under 15, the proportion is higher: from 63% in 1998 to 85% in 2003. The percentage of Australian households with access to the Internet at home has increased from 16% in 1998 to 53% in 2003. The increase was even more significant among households with children under 15 years of age: from 20% in 1998 to 68% in 2003.

The computerisation of the home and the early engagement of children with the digital culture, mainly through electronic games, has resulted in the formation of significant differences and gaps between school literacies and the use of technology in the school setting and those technology-mediated literacies and uses of technology which are available to children outside the school setting (Comber & Green, 1999a; Lankshear, Bigum, Durrant, Green, et al., 1997; Queensland Government, 2000). The emergence of a parallel education industry has created such issues as unequal distribution of resources; the division between the information rich and the information poor; and unequal access to the information and knowledge of a different quality (Kenway, 1995). An assessment of the possible impacts of ICTs requires taking into account existing social and economic inequities and cultural diversity as resulting in unequal access to material and cultural resources (Bruce, 1999; Burbules & Callister, 2000; Kling, 1996; Lankshear & Knobel, 1997a, 1997b).

There might be a significant difference between the knowledge, skills, and abilities that are required in order to be a member of the information society and the knowledge, skills and abilities that can be acquired in the process of using ICTs. As Lankshear and Knobel (1997b) argue, ICTs may contribute to the acquisition of different literacy skills and abilities. Therefore, as Comber and Green (1999a) put it:

> IT needs also to be understood as decidedly 'non-neutral', in both respects, in the sense that it is inevitably transformative, amplifying, emphasising and enabling certain possibilities and reducing or shifting the focus away from others. This is as true at the level of the classroom and the school as it is of larger, more inclusive social formations. Appropriate social and educational assessments of the application of new technologies need therefore for such factors to be reckoned explicitly into account. (Comber & Green, 1999a, pp. 37-38)

This thesis aims to contribute to the understanding of ICTs as non-neutral by studying a group of ICT-mediated products that are used for educational purposes in schools and homes. Specifically, it aims at an exploration of CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools as being "transformative, amplifying, emphasising and enabling certain possibilities and reducing or shifting the focus away from others" (Comber & Green, 1999a, p. 37).

1.2 Electronic encyclopaedias and Internet search tools

Since their appearance in 1984, CD-ROM encyclopaedias and other reference sources published in CD-ROM format have been marketed quickly and have gradually replaced print reference works in libraries, schools, colleges and professional institutions (Schamber, 1988). The educational status of CD-ROM (and, later, online) encyclopaedias is based on the foundation of the unquestionable educational significance of encyclopaedias (see the history of encyclopaedia in "Encyclopaedia", 2001). For example, CD-ROM encyclopaedias are offered to the public as sources of information and knowledge, as tools facilitating information access, as "a great 'homework helper' for those school projects" (*Webster's Encyclopedia of Australia* [Packaging], 2000)[1], and even as a "friendly, likeable teacher who loves their subject and has a genuine desire to share it with you" (*The Encyclopedia of Great Artists* [Packaging], 1995).

[1] The titles of CD-ROMs in this thesis are distinguished by italics: for example, *Hutchinson Multimedia Encyclopedia*, 1997. Full details of each CD-ROM are provided in "References". Where a text on the CD-ROM packaging is being referred to, the title of the CD-ROM includes the word 'packaging' in brackets: for example, *Hutchinson Multimedia Encyclopedia* [Packaging], 1997. Where a particular text or program within a CD-ROM is referred to, the text heading or the program title are provided in double quotation marks and are preceded by the CD-ROM title in italics: for example, *Webster's Encyclopaedia of Australia 2000*, "Project Creator".

The producers of CD-ROM encyclopaedias offer their products to the widest possible audience. These products are marketed for use everywhere and by everybody:

> Great reference tool for every home! (*Who Did What in Australia* [Packaging], 1999)

> Every important event in our history since 1788 is chronicled in this major reference work, making it an essential resource for every Australian home. Students and parents, in particular, will find this CD-ROM invaluable for homework and school projects. (*What Happened When in Australia* [Packaging], 1999)

> This ultimate reference library for your home, your family, and your office! (*Hutchinson Multimedia Encyclopedia* [Packaging], 1997)

Reference CD-ROMs, including encyclopaedias, can be bought in specialised software shops, newsagencies and museum shops. They can be ordered at schools from book clubs or purchased online. Many CD-ROM encyclopaedias can be purchased at a low cost. For example, the *Maximedia School Project* CD-ROMs and the *Animals, A Multimedia Encyclopedia* CD-ROM can be bought for $9.95. The *Hutchinson Multimedia Encyclopedia* and *Webster's Concise Interactive Encyclopedia* CD-ROMs are a little more expensive ($14.95) but still quite affordable in comparison, for example, to *Microsoft Encarta Reference Suite 2001 – Australian Edition* ($199). On the other hand, *Microsoft Encarta Encyclopaedia* and some other encyclopaedias are available on the Internet for free.

Internet search tools (Internet search engines and Web directories) have also become part of the contemporary educational environment (Shenton & Dixon, 2003). There is a plethora of search tools for children and students on the Internet: *Yahooligans!*, *Ask Jeeves for Kids*, *Fact Monster*[2] and many others. In order to get an idea of the number of children's Internet search tools, one may go to a search engine guide, such as *TekMom Search Tools for Students*, *Kids Search Engines*, or *Ivy's Search Engines for Kids*, "the

[2] The titles of Internet search engines and websites in this thesis are distinguished by italics: for example, *Google*; *Yahooligans!*. The reference in text does not show the date and/or Internet address (a uniform resource locator (URL)). Full details of each website are provided in "References". The websites' URLs provided in "References" are links to the start pages for the websites. Where a particular text or page within a website is referred to, the text heading or the page title are provided in double quotation marks and are preceded by the website title in italics: for example, (*Google*, "GameZone's KidZone!", 2004).

largest specialized search engine guide for children, containing about 80 engines" ("Guides to Search Engines for Children", 2004).

There are Internet search tools aimed at children and families and search tools aimed at students from elementary to high school. There are small Web directories designed specifically for helping with school assignments (for example, *Learning Links*) and large Web directories that contain sections designed in order to help users acquire information relevant to their schoolwork or to entertainment (for example, *Yahooligans!*). There are search engines that help students find educational sites that focus on particular subjects (history, science, and others) or provide access to general reference works (encyclopaedias, dictionaries, maps). Children's Internet search tools are offered to the public as enabling students to search the Internet in a safe environment. They are marketed as services "designed primarily to serve the needs of children, either in focus, or by filtering out sites that some parents and teachers might find inappropriate for kids" (Sullivan, 2004).

Being a group of ICT-mediated products widely used for educational purposes by children and students (or being offered as educational aids), CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are not so frequently explored in terms of their broader pedagogical effects. This may be explained by the fact that they seem quite 'plain' in comparison to virtual reality, role-playing games, and networked communities – the traditional objects of postmodernist and poststructuralist studies of ICTs' transformative effects upon subjectivity, power, and society (see, for example, Jones, 1995, 1998; Star, 1995; Turkle, 1995). Why make CD-ROM encyclopaedias, online encyclopaedias and Internet search tools an object of a study that belongs to the field of sociocultural educational research and aims to inform educators' understanding of the broad social and cultural implications of ICTs? Why explore a CD-ROM encyclopaedia which is believed to be the same encyclopaedia only published in electronic format, or a children's Web directory which is a collection of websites thoroughly filtered and carefully selected by adults?

This study is based on the idea that CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools can and must be explored and assessed in terms of their effects on their users' subjectivity and literacy because they are not neutral in either respect. Even the most comprehensive encyclopaedia, the most objective collection of 'pure' facts is a product of its time, is embedded in a particular context, and

may affect the user's subjectivity by offering particular and partial constructions of reality, social identities and values:

> For instance, a quick look through any of today's most popular CD-ROM encyclopaedias (for example, Microsoft's *Encarta*) shows how limited entries on, for example, 'Australia' or 'Aborigines' are; how ideas are connected by lateral links and pathways which exclude other knowledge options; and how the software in fact 'teaches' the user-learner certain cognitive mapping strategies. Many of these bestselling American-authored encyclopaedias are in use in Australian schools and households. But even Australian-authored educational CD-ROMs reproduce the same old tired narratives on, for instance, bushrangers framed in mythologies of male heroes, and narratives of colonialism framed in mythologies of settlement instead of invasion. (C. Luke, 2000, p. 71)

There is empirical data about children's use of these kinds of ICT-mediated products. This data indicates sufficient grounds for questioning them as a source of the notion of literacy. For example, according to a study conducted by Downes (1998), children use images from reference CD-ROMs and the Internet mainly for the purposes of designing and decorating a page rather than for adding meaning to the overall text. Data of this kind raises a question of where this pattern of literate activity might come from. There may be a lot of contributing factors, including the influence of school and children's sociocultural background. However, should we not also ask whether technology is, in itself, one of these factors? Should we not ask how the technology might impose this pattern by offering to the child user particular notions of what it means, for example, to create a school project? So far, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools have not been objects of a study aiming to answer these questions. In spite of the fact that there is a rather substantial body of writing about these products (see Chapter Two), they can still be considered examples of ICT-mediated educational products that are 'invisible' to educators. Or, rather, only one side of them has been shown to educators so far: that of being multimedia reference sources and computer-mediated tools of information storage, access, and retrieval.

In this thesis, I intend to uncover the other side of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I intend to approach them as pedagogical discursive practices that contribute to the production of social subjects and that may impact

upon contemporary students' access to the knowledge, abilities, and skills required in the information society, along with other multiple and heterogeneous discursive practices, such as family talk, books for early reading, curriculum, instruction, evaluation, textbooks, school report cards, classroom talk and teachers' everyday talk.

1.3 Purposes of research

The present research has two purposes. My first purpose is to contribute to the understanding of the social and cultural implications of ICTs. I do this by investigating one group of ICT-mediated educational products – CD-ROM encyclopaedias, online encyclopaedias and Internet search tools – as constitutive of their users' subjectivities and as affecting users' access to the literacies required in the information society.

My second purpose is to contribute to the development of the critical educational vision of ICTs and to increasing educators' agency in relation to them. I do this by offering a critical analysis of the discursive constructions of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools and their users in these products and in the information sources that are available to teachers and parents on the World Wide Web (WWW). My analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices of subjectivity formation and literacy education aims to provide an alternative to the dominant view of this group of ICT-mediated educational products as information sources, computer-mediated technologies of information storage and retrieval, and multimedia instructional technology.

1.4 Research questions

The study is informed by a social theory of discourse and uses the methodology of critical discourse analysis. It aims at an exploration of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursively constructed and as practices of the discursive production of social and literate subjects; a critical analysis of the offered constructions as being selective and as shaped by particular groups' interests and views; and an explication of the ways in which selective and socioculturally specific constructions are presented as legitimate, neutral, and natural in computer-mediated texts. The study aims at answering the following research questions:

- What constructions of the CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools are offered to educators, parents, and children and student users?
- How is the intended user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools constructed as a social subject?
- How is the user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools constructed as a literate subject?
- Do CD-ROM encyclopaedias, online encyclopaedias and Internet search tools help users acquire literacies required in the information society?

1.5 Thesis structure

This thesis consists of eight chapters. In Chapter One, "Introduction", I outline the issue to which this study aims to contribute, provide a rationale for choosing the object of research, and formulate my research purposes and questions. I locate this study within those educational studies of ICTs that focus on the sociocultural implications of the growing usage of ICT-mediated products by children and students both for educational purposes and for entertainment. The overarching purpose of this research is increasing educators' agency in relation to ICTs. In my understanding, this requires that the educators are able to approach ICT-mediated products as socioculturally specific pedagogical practices, rather than as neutral technological tools.

This means that educators need to be able to deconstruct and critically analyse visions of ICTs that are offered in the multiple discursive practices comprising the information field of contemporary educators, parents, and students. This also means that educators are able to critically examine and assess ICT-mediated products as being selective of subject content and pedagogical theories and philosophies, as excluding or disadvantaging some users, and as encouraging users to conform to the producers' visions of the user and the reality embodied in software products. Such assessment is needed in order for educators to resist the dominant – overenthusiastic and deterministic – educational and popular discourses on ICTs, and to understand how ICTs may affect different subjects' access to education, knowledge, and literacy. I suggest that both these purposes can be covered by the concept of critical technological literacy.

It is important that the critical technological literacy project is realised as an exploration of specific ICT-mediated products rather than theoretical speculations on the nature of digital technologies and/or critical deconstruction of grand myths and narratives shaping technology. I consider my thesis an attempt to realise this project by studying a group of ICT-mediated products (CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools) as discursive constructs and as practices of the discursive construction of their user as a social and a literate subject. These products are typically approached as reference works and/or technologies of information storage and access. In this thesis I try to make them visible as pedagogical discursive practices that may contribute to the construction of contemporary children and students (as well as parents and teachers) as social and literate subjects.

In Chapter Two, "Sociocultural educational studies of information and communications technologies", I provide a review of selected studies of ICTs. I focus on those studies that aim to understand: how does the proliferation of ICT-mediated products affect various groups' access to education? How does the using of ICTs affect learning and literacy? Why do educators need their own vision of ICTs? How to develop such vision? I show that within the broad field of educational studies of ICTs focusing on these issues, different objects and processes are studied and different methodologies are employed. The objects of research may be: media coverage of issues relating to ICTs, education and children; children's actual uses of technology; computer games; and literacy teaching software. The research methodologies vary from critical discourse analysis to ethnographic research. I discuss how exploration of particular objects and processes has contributed to an understanding of ICTs as a sociocultural phenomenon and to an understanding of the challenges and changes created by ICTs. I also discuss how these studies can inform critical assessment of ICT-mediated products as educational sites and pedagogical practices.

In Chapter Two, I also provide a review of existing educational studies of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I do not aim at summarising research findings that relate to the educational effects of these products. Rather, the purpose of my review is to reveal a gap in educational studies of these ICT-mediated products. CD-ROM encyclopaedias, online encyclopaedias and Internet search tools have been studied mainly within an instructional approach. Within this approach they are explored as digital technologies of information storage, access and presentation. I argue

that these products are still 'invisible' as socioculturally specific educational phenomena and pedagogical practices.

In Chapter Three, "Discourse as a theoretical tool in educational research", I outline the concept of discourse as an object of social research and as a theoretical tool for studying the social. I then discuss the role of discourse as a theoretical tool in educational research. A theory of discourse enables educational researchers to explore various pedagogical phenomena as having a sociocultural (rather than a psychological) nature and to show their connection with the broader socioeconomic and cultural context. It enables researchers to critically assess diverse discursive practices (represented by textbooks, classroom talk, talk on playground, educational policy documents, media and popular texts, and so on) as practices of the social production of pedagogical subjects and as arenas of social change and ideological contestation. Applying critical discourse analysis enables educational researchers to reveal the subtle but persuasive means of this production, which is necessary to know in order for educators to be both critical and constructive. Based on this outline of the research issues and research foci in educational studies informed by a theory of discourse, I discuss how CD-ROM encyclopaedias, online encyclopaedias and Internet search tools can be approached as objects of educational research and critical discourse analysis. I also discuss how critical discourse analysis enables me to reach the overarching purpose of this research. This purpose is to contribute to the educators' agency in relation to ICTs via exploring a particular group of ICT-mediated products as being discursively constructed and as being constitutive of their users.

In Chapter Four, "Critical discourse analysis of electronic reference products: Methodology", I develop my research methodology. I start with describing the corpus of children's software review websites, CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools selected for this research and outline my selection criteria. Then, I describe each group of products as discursive practices represented by computer-mediated texts. Finally, I develop tools for the critical discourse analysis of computer-mediated (multimodal, interactive and hyperlinked) texts. The tools are used in three analytical chapters.

In Chapter Five, "Being informed in the age of information: The discursive construction of the CD-ROM encyclopaedia and its consumers on software review websites", I explore a segment of the broader discursive context in which the consumption of CD-ROM encyclopaedias may be embedded. This includes websites that may be used by teachers and parents in order to know more about CD-ROM encyclopaedias. I analyse

three types of children's software review websites – commercial, independent, and official (educational) – in order to consider constructions of reviewed CD-ROM encyclopaedias and their intended consumer. My main purpose in this chapter is to explore how texts located on the Internet may contribute to the construction of contemporary teachers, parents, and students as consumers of ICT-mediated products.

In Chapter Six, "Powerful technology – empowered user? The discursive construction of the user in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools", I explore these products as discursive practices contributing to the proliferation of particular discourses on technology and education. I reveal the implicit constructions of the products and their intended user and critically analyse the offered constructions.

In Chapter Seven, "The virtual literacy classroom: The discursive construction of literacy and the user as a literate subject", I approach CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools as discursive practices of 'teaching' literacy. I examine the images of literacy in these products and reveal what these images imply about the user. I also examine how the user is taught to perform such literacy-related activities as project creation, information searching, and reading an encyclopaedia article. I critically analyse the constructions of literacy and the implied construction of the user as a literate and a cultural subject in order to assess these ICT-mediated products as educational practices that may be selective of their intended user. My analysis of these products as 'literacy classroom' also aims at the assessment of the claims that the users of ICTs acquire literacies required in the information age in the process of using ICT-mediated products.

In Chapter Eight, "Conclusion", I discuss the main conclusions drawn from this study. I also make suggestions relating to the practical applications of my research findings and outline directions of further research that may draw upon those findings and upon the methodology developed in this thesis. I consider this thesis part of a wider project aiming at making social sciences contribute more to public knowledge (see Willinsky, 2000, 2001). This thesis' overarching purpose is to contribute to our better understanding of the ICTs' impact on education and on our lives.

Chapter Two Sociocultural educational studies of information and communications technologies

2.1 Introduction

The object of study in this thesis is a group of ICT-mediated products that are used for accessing information and designed primarily for school students; yet, I do not focus on their content. One of my purposes is to examine them as pedagogical practices capable of affecting users' literacy; yet, these products are not literacy teaching software. I argue that it is necessary to make CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools 'visible' – in spite of the fact that they are offered everywhere and to everybody. My purpose is to examine these products as discursive practices of subjectivity construction and literacy education rather than as reference sources and/or tools of information storage and access.

In this chapter, I explore studies which discuss the broad sociocultural implications of ICTs and inform educators' agency in relation to ICTs. My aims are:

- to establish the place of this research within the educational studies aiming at an exploration of the broad social and cultural implications of ICTs;
- to establish the place of this research within the educational studies of ICTs informed by a social theory of discourse; and
- to reveal a gap in the educational studies of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools.

This chapter consists of six main sections. In section 2.2, I outline studies of technology informed by the social constructivist theory of technology and by postmodernist theory. I focus on those works that establish a link between changing views of ICTs, an educational understanding of what to teach about ICTs in schools and what the educational effects of ICTs might be. I then turn to the sociocultural educational studies of ICTs. In section 2.3 I provide a selective review of the studies of the discursive

construction of ICTs, education and childhood. I also review those works whose authors argue that educators need to exercise more agency in relation to ICTs and discuss the need to develop a critical technological literacy.

My particular focus when reviewing educational studies of ICTs is how ICTs affect education, learning, and literacy. I distinguish between those educational studies that aim to understand ICTs' effects in terms of the changing goals of education (I focus on the changing models of literacy for the information age) and those studies that aim to understand how the use of ICTs can affect the users' subjectivities and their acquisition of literacy. In sections 2.4 and 2.5 I provide a review of those studies that have been conducted in order to assess the technoenthusiastic claims relating to the construction of ICTs as an educational solution. These are studies that aim to explore the children's use of ICTs in specific sociocultural and economic contexts, and that emphasise the importance of this context as determining to a certain (and quite substantial) degree the effects of ICTs. After highlighting the importance of the context in which ICTs are used and, in particular, the importance of access to cultural capital, I turn to the studies of ICTs' effects upon subjectivity and literacy informed by a post-structuralist theory of discourse.

In section 2.6, I provide an overview of the mainstream educational studies of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I use this overview in order to argue that these products most often remain invisible for critical educational thinking. The literature review is summarised in section 2.7.

2.2 Technology as a sociocultural construct

Technology can be conceptualised as a thing-in-itself that is developing according to its own laws, as a neutral augmenting tool. Technology can also be conceptualised as a sociocultural construct shaped by the ideas and values of social groups involved in its production and consumption. Thinking about ICTs as a neutral tool is one of the most powerful traditions of thinking about new technologies in education (Burbules & Callister, 2000; Selwyn, 2002; Thumlert, 1997). ICTs are often perceived as just another way of doing "what we used to do, better, faster, or more economically" (Burbules & Callister, 2000, p. 16). The idea of the neutrality of technology is interconnected with the functionalist and technoenthusiastic discourses that embrace the implementation of new technologies in educational institutions. As Thumlert argues:

> Positioned as a learning and teaching 'resource', technical innovation is welcomed as a means to enhance the functional and communicative contexts into which it is placed, yielding such logistical virtues as increased 'accessability', 'acceleration' and 'flexibility', as well as 'maximized productivity'. And conceived in this setting as an educational resource or tool, the aura of value-neutrality that surrounds scientific-technological research and design is replicated during the integration of invention into educational practice and discourse…. Call it what you will – 'cyberspace', 'the information superhighway', or 'hyperm edia' – the recent compression of digital telecommunications, broadband broadcasting and personal computing into a common digital format has been celebrated with a great deal of optimism in various educational sectors. (Thumlert, 1997)

The widespread use of ICTs in teaching and learning, both within and outside educational institutions, requires the overall effects and challenges of technology for education to be understood (Lankshear & Knobel, 2003). It is necessary to understand more "about their multipl e effects (intended or not); their specific benefits for particular kinds of learners; their impact on the access and equity issues for learners who do not benefit from them; and so on" (Burbules & Callister, 2000, p. 16). Educators should be aware of the sociocultural character of technology and should assess critically the competing concepts and views of technology suggested to educators (Bigum & Green, 1993; Burbules & Callister, 2000; Haas, 1996; Selfe, 1999; Snyder, 2000).

Such an understanding can be informed by the concept of technology developed within social constructivist studies of technology (Bijker, Pinch, & Hughes, 1987; Feenberg & Hannay, 1995; Latour, 1987; MacKenzie & Wajcman, 1985; Woolgar, 1991). Social constructivist theories of technology differ according to their position in relation to the distinctions between the social and the technical (Brey, 1997). Strong social constructivism (Woolgar, 1991) explains technological change only through reference to social practices, including the processes of interpretation and negotiation by social groups. Mild social constructivism (MacKenzie, 1990) studies the way in which social factors shape technology, while not rejecting a role for non-social factors in technological change. This approach also studies how technology's properties and effects can be attributed to social biases or politics built into or embodied by these technologies. Actor-network theory (Callon, 1987; Callon & Latour, 1992; Latour, 1987, 1996) studies networks of human actors and natural and technical phenomena.

Different social constructivist approaches share the idea that technology allows for different interpretations of its functional, social and cultural, and even technical properties. What technology is depends upon its interpretation as constructed by relevant social groups. Therefore, the question of the 'relevance' of certain groups is becoming particularly important. Social constructivism was sometimes criticised for focusing only on those groups involved in the construction of technology directly, while those social groups which are impacted by technology are ignored. Consequently, political biases and power struggles in technological choice were ignored as well (Winner, 1991). It has been suggested that more attention should be paid to the groups consuming technology (Cawson, Haddon, & Miles, 1995; Kling, 1992).

Cawson et al. (1995) examine the development of innovative information technologies as shaped by the producers' views of the consumer, consumer preferences and the future uses of those technologies. Their research findings indicate that producers start with the potential of technology rather than with the real needs of the consumer and try "to spot any ways in which a technological opportunity might be taken up" (Cawson et al., 1995, p. 269). Innovative ideas are generated mainly by the staff with technical insights. Cawson et al. argue that the way in which technical staff members envisage scenarios of the potential consumption of technology is a source of design constraints. The developers, when trying to conceptualise the potential consumption of future products, imagine their own households, although often their class background and technical training are different from those for whom they are developing new products.

Researchers of instructional software design have also argued that technology is shaped by technologists while the consumer is largely ignored or is constructed by designers in their own image. It has been argued that designers make their assumptions about the use of software in learning mostly out of habit, relying on their own folk psychology rather than on educational theories (Eraut, 1988; MacGregor, 1993; Moran, 1981). The idea that the development of technology is driven more by its creators rather than the users' needs is also discussed in the context of debates about approaches to Web design. Some 'Web authorities' and 'interface gurus' started to advocate for a more useable and practical design of websites, arguing that websites should not be overloaded with heavy graphics. For example, Nielsen (2000) argues that, in many cases, a company's website reflects the ideas and approaches of advertisers who aim to produce something glossy. Other participants of the debates quite often talk about Web design as being led by

the designers' own tastes and/or artistic ambitions (Mayhew, 1992; Preece, Rogers, & Sharp, 2002).

There are two different ways of studying technological products as shaped by particular groups' ideas of how, by whom, and for what purposes these products will be used. Some researchers focus on technological designs as embodying particular visions of the technology's users and, therefore, as stimulating conformity to this vision. Such an analysis is based on the metaphorical description of technology as a text that is 'read' differently by different actors (Akrich, 1992; Grint & Woolgar, 1995; Woolgar, 1991). Other researchers argue that these differential readings are also influenced from the 'outside', that they are shaped by discourses surrounding a technology (Pfaffenberger, 1992). In the latter case, researchers focus on the discursive constructions of technology and reveal partial interests and values that shape these constructions, for example, in a market-driven media discourse.

In the case of ICTs, the idea of a combination of both research perspectives seems to be particularly fruitful due to the ICTs' special positioning in the media, marketing, policy, and public discourse (Armitage, 1999). This approach allows researchers to revise and critically assess available claims and images of technology, to reveal the contradictory character of the available constructions of technology, and to understand the roles of different groups involved in the production and the implementation of technology. However, the majority of critical studies of ICTs focus on discourses *around* technology. See, for example, a critical analysis of the neoliberal discourse of technology in Armitage (1999); an analysis of the myths of the increasing technological society in Recio (2001); and a critical analysis of discourses on communication technology in Young (2003). Armitage interprets the development of the neoliberal discourse of technology as the development of a new class ('virtual class') and argues that it is necessary to challenge the pronouncements of this class by multiple social subjects ranging "from school kids and students disenchanted with the increasing replacement of education by mere technocratic information, to disaffected computer industry workers, or simply local communities seeking control over their own technological environments" (Armitage, 1999). Recio adopts the view of the computer science professional and assesses what he calls 'the discourse of IT and Artificial Intelligence' surrounding computers. Recio argues that the mainstream discourse of IT does not reflect the views and the interests of computer science professionals and suggests that "computer scientists must challenge the discourse which is used to represent them by business and scientific interests" (Recio, 2001). Young focuses

on the broadcasting policy debates in Canada and Europe at the end of the last century and outlines and critically analyses three major discourses that were dominant in those debates: discourses of technological determinism, technological democracy and technological nationalism.

Below, I focus on two examples of a more multifaceted study of technology as a sociocultural construct in Rushkoff (1999) and Turkle (1997). Rushkoff (1999) reconstructs the development of the Internet and the World Wide Web (WWW) and shows how the sociocultural construction of these technologies has been shaped by different groups and their discourses. Initially, Rushkoff argues, the Internet was conceptualised as a communication medium. In the 1990s, with the wide implementation of the WWW, thinking about the Internet obtained an economic perspective. This perspective was reinforced by the concept of the information age, which provides a theoretical framework for rethinking the essence and the content of the Internet, and for changing the perception of the Internet from a communications medium to a broadcast medium. In this way, the supremacy of commercial content over social contact has been affirmed:

> The trick would be to change the perception of the Internet as a communications medium to a broadcast medium, which meant convincing users that our interactions with one another were less important than the data we could download and the things we could purchase with our new equipment. Accordingly, the work of futurists like Alvin Toffler and Marshall McLuhan was mined for models and concepts that could reframe our understanding of what was happening to us. That's how Information Age became the label to describe the communications breakthrough. Previously, the users themselves had been the content of the Internet. Now, it would be "information". (Rushkoff, 1999)

It is of particular importance, Rushkoff argues, that the concept of the Information Age entails the notion of online interaction as exchange. It is true that cybertheorists, like Negroponte (1995), have made a special point of the fact that in online interaction the nature of exchange is different because it is not material atoms we exchange but immaterial bits of information, units of data rather than physical objects. This does not contradict the idea of the Internet as a set of information that could be accessed. On the contrary, it supports this idea. In this way, cybertheorists have contributed to the process of the

commodification of the Internet – because "anything that can be accessed can be given a price tag" (Rushkoff, 1999).

Rushkoff argues that the economy-orientated set of notions about the Internet and the World Wide Web (WWW) have been introduced and used in order to give "traditional entertainment companies, salespeople, and advertisers an Internet they could at last understand" (Rushkoff, 1999), and use for their profit. The process of the re-conceptualisation of the Internet is a process of a redistribution of power and influence over what once was constructed as an interactive mediaspace, a shareware universe. Power and influence have shifted from Internet participants – mainly researchers and university students – to marketeers. In order to make this shift necessary and possible, the Internet had to be represented as an incomprehensible, opaque, and dangerous place that is impossible or undesirable to be navigated without expert support, help, and protection.

Turkle (1997) studies a general cultural change in the understanding of computers as affected by computer professionals and as affecting the educators' understandings of the purposes of technological literacy education. She examines the changing discursive constructions of computer technology and the technology (hardware and software) itself as embodying particular and partial visions of the computer, its user and its uses. In the 1970s and 1980s, in a 'culture of calculation', as Turkle calls it, computers were thought to be transparent. Professionals saw them as giant calculators – what happened inside them could be mechanically unpacked. Programming was conceptualised as a technical activity, the rules of which were clear. Computers then required the user to issue forth exact instructions. The culture of calculation and understanding the computer as transparent has changed due to the development of the graphic user interface. In 1984, Apple introduced the Macintosh computer that incorporated the first opaque interface, the desktop. The Macintosh desktop, with its interactive objects and dialogue boxes, introduced a new way of thinking about the computer, primarily in terms of the manipulation of the surface simulation. People's experience with the computer has also changed: now people do not command computers but enter into a conversation with them. These changes were reflected by shifts in the understanding of some basic notions related to computing, such as the notion of transparency:

> In 1980, most computer users who spoke of transparency were referring to a transparency analogous to that of traditional machines, an ability to "open the hood" and poke around. But when the users of the Macintosh talked about its

> transparency, they were talking about seeing their documents and programs represented by attractive and easy-to-interpret icons. They were referring to an ability to make things work without needing to go below the screen surface. Today, the word "transparency" has taken on its Macintosh meaning in both computer talk and colloquial language. In a culture of simulation, when people say that something is transparent, they mean that they can see how to make it work, not that they know how it works. (Turkle, 1997)

For children who have been socialized into the culture of simulation, Turkle argues, computing has more to do with simulation, navigation and interaction than with calculation and rules. Their understanding of the computer is not based on the image of a giant calculator any longer. This change in understanding 'the computer' has also entailed a change in educational thought, specifically, in understanding what to teach in order to help students acquire 'computer literacy'. Generally computer literacy is understood as establishing an empowering relationship with the computer. Originally, the goal was to teach what is inside the computer, how it works and how to program it. In the 1980s, computer literacy was identified with teaching how to program and the general impact and effects of such teaching were discussed as the effects of computing on thinking (see Bigum, 1987; Papert, 1980). Educators were concerned with such questions as: Would teaching programming teach something important or turn children into linear thinkers? Programming languages were the focus of educators' attention. For example, Papert (1980) argued that the process of writing programs in Logo (a programming language) would teach children to think. In the 1990s, argues Turkle, the notion of computer literacy shifted from teaching what a computer is to teaching about the application software that can be run on it. A major concern became entering the workforce, which requires functional fluency with word processors, spreadsheets, databases, search engines; knowledge of the functions of a disk drive or a CD-ROM drive; and knowledge of how to run simulations. Educators discuss not the effects of computers on thinking but the place of educational software and simulations in the curriculum (Turkle, 1997).

Sociocultural and postmodernist studies of technology have shown that different and sometimes conflicting groups participate in the construction of technology. The study of technology as a sociocultural construct can be conducted in two directions: an investigation of technology as being constructed in discourse; and an investigation of technology (technological products) as embodying the ideas, views and values of particular

social groups, mainly those of technology developers. In the following section, I turn to the educational studies of ICTs informed by the concept of technology as a discursive construct.

2.3 The discursive construction of technology, education, and children

The technologisation of the contemporary life is reflected in academic, public, and media discourses that provide constructions of technology, education, and children (Comber & Green, 1999a; Kenway, 1995). A critical analysis of these constructions is an important direction in the sociocultural educational studies of the technologisation of contemporary homes and schools. These constructions are analysed in order to understand the sociocultural changes that have been generated by the technologisation of life and, in particular, by the use of 'new' ICTs at home and at school. In this section, I provide an overview of the selected studies of the discursive construction of technology, education, and children and identify those discourses that shape the mainstream public and educational thinking about ICTs, children, and education. I also discuss the potential contribution of these studies to the development of educators' agency in relation to ICTs.

Children and technology: hopes, anxieties, and new identities

Various discursive practices (media, academic writing, and educational policy documents) have been analysed in order to reveal the major issues, assumptions, tensions and contradictions surrounding the implementation of ICTs in homes and educational institutions (see, for example, Bingham, Valentine, & Holloway, 1999; Buckingham, Scanlon, & Sefton-Green, 2001; Comber & Green, 1999a; Kenway, 1995; Nixon, 1998, 1999; Selwyn, 2000, 2002; Valentine, Holloway, & Bingham, 2000). For example, Selwyn (2000, 2002) has studied the discursive construction of the National Grid for Learning (the Labour Government's initiative in the UK) as a 'panacea' for educatio nal problems. Selwyn mapped those forces shaping this construction and has argued that it may extend and reinforce existing power configurations in education. Bingham et al. (1999) have critically analysed discourses that have shaped the notion of 'cyberkids' in the popular, policy, and academic literature. This analysis suggests that stories of children and the Internet offer two polarised constructions of children (as technologically competent and as being at risk) and that these constructions are embraced by a major narrative of technological determinism. These stories assume "that the world can be unproblematically

divided into 'things' (on the one hand), and 'the social' (on the other), such that 'cyberspace' (a network of 'things') can be understood to 'impact' on society, effecting changes within it" (Bingham et al., p. 657). Kenway (1995), Nixon (1998) and Buckingham, Scanlon, and Sefton-Green (2001) have examined discourses employed in order to sell computers and other technological products as educational media to children and schools. They have shown how media hype, promotional claims about ICTs' educational value, and images of techno-families are used in order to present ICTs as tools that provide educational success.

The process of the technologisation of the contemporary home has been considered a factor contributing significantly to the changing concepts of the family, home, and childhood in post-industrial societies (Ennew, 1994; Postman, 1982; Sefton-Green, 1998; Silverstone & Hirsch, 1992; Ward, 1994). Electronic technologies have been studied as factors that restructure activities inside and outside the home and thus change the family home, the relationships between children and adults and between the home and the society. In Silverstone and Hirsch (1992), for example, computers are discussed in relation to changing patterns of work; in relation to definitions of public and private; and in relation to entrepreneurial culture and parents' educational aspirations for their children. Sefton-Green (1998) and Sefton-Green and Buckingham (1998) argue that the discursive constructions of the child in contemporary society closely link children, technology, education and entertainment. Murdock, Hartmann and Gray (1992) suggest, the history of the 'domestication' of the computer has been shaped by four changing discourses, offering competing definitions of its potentialities and pleasures:

> the discourse of self-referring practice in which the machines appeared as a space for creative activity and problem-solving; the discourse of 'serious' applications related to the schoolroom and workplace; the discourse of games-playing and fun which presented the micro as another screen-based entertainment facility; and the discourse of righteous concern for the welfare of the young. (Murdock et al., 1992, p. 157).

In spite of apparent differences, all these discourses are rooted in the same set of hopes and fears about science and technology: a utopian belief in the efficacy of technological invention, or the dystopic visions of technology (Ross, 1991; Steedman, 1995). Also, they are rooted in traditional discourses of childhood:

> Indeed children (or youth) and new technology are terms which are often yoked together in discussions about the nature of contemporary social change, precisely because they both embody similar teleological assumptions about growth, progression and development which underpin late modern society. However, neither of these narratives are without their contrapuntal alternatives. Western constructions of childhood have oscillated between views of the child as savage and innocent; pure and tainted; ignorant and intuitive. Similarly the new technologies … are also described in terms of binary oppositions. Thus, they are fragmenting contemporary society, yet uniting it; they are destroying education or re-making it; they are transforming culture and communication or merely conferring privilege on a few. (Sefton-Green, 1998, pp. 1-2)

Public debates about technology are shaped by two opposite constructions of children and technology.[1] On the one hand, children are conceptualised as icons of growth and development. The new ICTs are seen to offer similar hopes of transforming the contemporary society into a better one. For example, in government initiatives, such as the connection of schools to the Information Superhighway, the conjunction of children and computers is presumed to offer hopes for a better future (Kenway, 1995). On the other hand, children are conceptualised as passive and vulnerable, which entails popular anxieties about children and technology. These anxieties focus mainly on the dangers of the Internet and computer games (Sefton-Green & Buckingham, 1998).

There is yet another trend in the construction of children and ICTs. It is a trend to re-construct children (and students) by offering them new identities. For example, a number of researchers have pointed out that in the media and marketing discourses around technology, as well as in the theoretical speculations about the information society (see Negroponte, 1995), children and students are constructed as consumers or clients (Haddon, 1988; Kenway, 1995). It has also been argued that the national identity of young people is subsumed in a new global culture and a global consumer network (Bigum & Kenway, 1996b). This construction has been interpreted as reflecting major social and cultural changes, such as the invasion of the consumer culture into other domains of social life:

[1] See, in particular, Bingham, Valentine, and Holloway (1999) and Valentine, Holloway, and Bingham (2000) on the bipolar constructions of children and technology.

> Students as clients/consumers of education and as educational commodities themselves is a conceptual development of recent times. It is our view that it maps onto wider redefinitions of childhood and youth which have emerged with the growth of consumer culture and media culture more generally and that it represents another stage in the history of childhood. (Kenway, Fitzclarence, Collier, & Bigum, 1996, p. 1)

Other researchers point out that contemporary children and students are constructed as having entirely new identities. For example, Nixon (1998, 1999) argues that being a member of technoculture is one of the identities that the media offers to contemporary youth. Nixon shows that the media constructs children as different from older generations and as undifferentiated in relation to new ICTs. However, the critical analysis reveals that this media construction of young people as members of the technoculture is hiding traditional social and cultural differentiation in terms of class and gender.

Similarly, the discursive construction of contemporary children and students as members of a new literacy culture hides traditional inequities and differences. Contemporary children and students are constructed as members of a new (post-print, multimedia, digital) literacy culture while teachers and parents are constructed as members of an 'old' (print) literacy culture (Green, Reid, & Bigum,1998; Lankshear & Snyder, 2000). This construction establishes a new relationship between teachers and students. Students are constructed as being more competent in 'new' literacies than their teachers, because the digital generation can master new media more easily. Teachers, the print-oriented generation, are further behind; they are overloaded with 'obsolete' literacy skills developed during the age of print. A paradoxical situation emerges: the print-oriented generation has to teach the digital generation. Acceptance of these polarised constructions in terms of their 'surface' value can result in new challenges for the students' access to knowledge and literacy. For example, it does not encourage educators to think about how to productively use different literacies (oral, print-based, and technology-based) that students may bring into the classroom (Downes, 1997; Queensland Government, 2000). This may also result in teachers' overemphasising students' abilities to operate on a technical level rather than involving them in more sophisticated computer-mediated literacy and social practices (see Lankshear and Knobel (2003) for a detailed discussion of the new educational challenges and ineffective pedagogical practices resulting from the generational and cultural divide in relation to ICTs).

Educators' agency in relation to ICTs

Studies of the discursive construction of ICTs are an important part of the broader process of the development of educators' agency in relation to ICTs. These studies help educators realise that the implementaion of ICTs in schools and homes is shaped by particular groups. For example, Kenway (1995) has explored the constructions of the Information Superhighway in the media and marketing discourse and revealed the range of different interests and values implied in these constructions. Kenway argues that popular understandings of the Information Superhighway are constructed by a group of 'cultural mediators'. This group includes: journalists; representatives of the various industries involved; experts who usually come from university research centres associated with science, technology and communications; enthusiasts of innovative technology and computers; and governments.

The cultural mediators are involved in such activities as writing consumer guides, providing commentaries and critique, promises and predictions, and so forth. Therefore, their roles are central in the market exchange as they help consumers, including teachers and parents, to understand and consume technology (Kenway, 1995). The cultural mediators do not always aim to provide serious and professional assessments of the educational quality of new software. Journalists usually do not know much about education and those who are treated in the press as experts in education software are usually specialists in marketing and market communication. Nevertheless, the constructions of ICTs suggested by the cultural mediators may be very authoritative and persuasive, partly due to the discursive techniques that are employed in the media coverage of ICTs and education. According to Kenway, the dominant genre in the media's reportage of education and technologies are: excited pronouncements about new software; placing attractive images of children around the screen; engaging tales about children's travels in cyberspace; and stories from teachers whose lives were changed due to the use of computer technology.[2]

Due to the potential effects of the discursive constructions of ICTs on the perception and implementation of ICTs in educational practice, it is necessary to critically examine discourses, narratives and myths shaping ICTs and education in various discursive practices. Critical scholars of ICTs and education have argued that educators need to adopt a more active, critical and reflective position in relation to technology (Bigum & Green,

[2] See also Nixon (1999) about using similar means in family computer magazines in order to construct an image of young Australians as members of technoculture.

1993; Burbules & Callister, 2000; Haas, 1996; Selfe, 1999). Part of this process is a critical analysis of the discursive construction of ICTs that frames the use of computers in education, and, in particular, an analysis of the construction of ICTs in relation to educators. The construction of ICTs in education is shaped by different discourses and informed by different cultural narratives and myths. These discourses, narratives and myths may imply opposite visions of the future of education, schooling, teaching, and learning: from the disappearance of the traditional institutions of education developed in the industrial society to the successful implementation of ICTs in the practices of virtual schooling (Bigum & Kenway, 1996a; Burbules & Callister, 2000). However, the relationship between ICTs and education is constructed similarly even within opposite discourses. ICTs are constructed as a source, a cause, and an agent of change while educational institutions, educators, and students are constructed as passive recipients of the innovative and radical changes coming from the ICTs field.

As Haas (1996) argues, the possibility that educators (in this case teachers of English) will adopt a more active position in relation to technology is considerably restricted due to the dominance of the two major myths – that technology is transparent and that technology is all-powerful. The transparency myth implies that writing is not changed by the medium (the computer) and, therefore, makes any critical inquiry into technology unnecessary. This means that technology becomes invisible for educators. The all-powerful technology myth is typically accepted within the scholarship in computers and communication, for example, in the works of Landow (1992) and Poster (1990). According to Haas, this scholarship contributes significantly to the uncritical acceptance of the logic of technological determinism by educators. Haas analyses the rhetoric used in mainstream talk about computer technology in English studies – represented, for example, in the works of Lanham (1993) and Hawisher and Moran (1993). The argument about technology and humanities is based on assumptions about the agency of technology and the uniqueness of computer technology. Haas argues that a wide proliferation of these assumptions leaves very little space for human agency in general, and for specialists in humanities in particular.

Focusing on the role of literacy educators in a technology-driven educational policy, Selfe (1999) argues for the necessity to approach critically the major cultural narratives of technology supporting the technologist and the humanist myths of technology. Selfe argues that uncritical acceptance of these major cultural narratives and myths contribute to the implementation of narrow technicist concepts of literacy, the

inequity of literacy education and even to the illiteracy in the USA. Rather than taking for granted technicist claims of technology as a panacea for literacy teaching or humanists' ignoring technology, Selfe argues, literacy educators should be able to approach technology as a cultural formation. This means that educators should be able to analyse the cultural narratives, myths, and discourses that shape educational policies, such as the discourse of the Information Superhighway.

As Kenway (1995), Haas (1996), Selfe (1999) and others (Burbules & Callister, 2000; Comber & Green, 1999a) argue, a re-examination of the mainstream discourses about technology is a necessary task for educators who adopt a critical stance. A critical re-examination of the discursive constructions of ICTs that are offered to educators and students in the discourses of scholarship, media, and advertising is only part of the process of the development of educators' critical understanding of ICTs. The development of a critical understanding of ICTs also requires that technology itself is assessed as capable of affecting subjectivities and literacies, as providing more benefits to some and disadvantaging others. It is this understanding, as Honeycutt (1997) argues, which is crucial in order to help educators control technology.

In the following section, I provide an overview of sociocultural studies of ICTs that approach the ICTs' child and student users with the awareness that they belong to different social and cultural groups. Within these studies, the focus is on particular children's actual uses of technology as embedded in particular social, economic, and cultural contexts and institutional settings.

2.4 Children's uses of technology: different subjects – different effects

Studies of actual uses of technology by different subjects and in various economic and sociocultural contexts have been conducted in order to reassess the rhetorical claims about the transformative effects of the new ICTs in general and their beneficial effects on children (Downes 1998; Furlong, Furlong, Facer, & Sutherland, 2000; Lankshear & Knobel, 1997a, 1997b; Sefton-Green & Buckingham, 1998). Sociocultural studies of the children's use of technology are based on the idea that technologies enter into "already existing socially constructed worlds" (Furlong et al., 2000, p. 93) and, therefore, the use of the new ICTs depends on the conditions into which the technologies are introduced (Furlong, 1995; Furlong et al., 2000; Sefton-Green & Buckingham, 1998; Tobin, 1998).

Within these studies, the focus is on the social contexts into which technology is introduced; on the learners' actual engagement with new technologies as part of their routine social lives including their lives at home and their actual use of new ICTs; and on unequal access to new ICTs and ICT-mediated learning networks as determined by both economic and sociocultural diversity (Downes, 1998; Knobel & Lankshear, 1998; Lankshear & Knobel, 1997b).

Studies of children's uses of computers and ICT-mediated products have demonstrated that these uses may be affected by children's gender and age (Downes, 1998; Furlong et al., 2000). For example, Furlong et al. report that boys have a greater interest in skill and strategy games when compared with girls; girls use computers at home usually for completing homework, writing, and looking things up on the Internet. Furlong et al. suggest that children's uses of ICTs and the ICTs' educational effects may also be affected by the fact that children have a perspective on ICTs that differs from that of their parents and teachers. Parents usually consider the computer to be a valuable educational resource for their children while for many young people the computer is a source of entertainment and fun.

Children's age and gender mainly affect their preferences for particular products and the purposes for which they use computers (Downes, 1998; Furlong et al., 2000). In terms of the effects of ICTs on literacy-related and creative activities, gender and age seem to be less important. Rather, the educational effects of ICTs are significantly determined by children's diverse access to cultural capital. For example, Lankshear and Knobel (1997b) argue that children's differentiated access to a broader literacy culture at home can affect the character of their computer-mediated literacy activities. It can affect whether the computer is used simply as a writing tool for text formatting and layout, or the computer is used as a mediator of textual production understood in terms of grammar, textual structure, genre and culture.

The importance of children's access to cultural capital means that access to a computer and the Internet is not the only issue that has to be taken into account by educators committed to the equity of education and social justice. Since the mid-1990s, the computer has been constructed as a necessary investment in children's education and the purchase of a computer by schools and by households with children considered a priority (Furlong et al., 2000; Livingstone & Bovil, 1999). The sociocultural educational studies of children's uses of ICTs have demonstrated that wider access to computers and networks does not necessarily mean that everybody who has access to ICTs will benefit equally from

this access. Therefore, providing better and more equal access to ICTs should not be made the only goal of educational policies. Such access should be considered only as one condition for providing more equal access to the education required in the contemporary society. This idea has been formulated, for example, within the debates about educational policies, such as the US Technology Literacy Challenge, policies that intend to solve the problem of unequal opportunities in relation to technology and literacy by predominantly spending money on the new and newest technologies (see Lankshear & Knobel, 1997b). Equally important elements of proper education in the information society, Lankshear and Knobel argue, are good quality curricula and pedagogical encounters with new technologies and literacies.

Differential access to cultural resources includes access to both technological expertise and the broader traditions of cultural production and literacy. For example, Sefton-Green and Buckingham (1998) provide a number of observations about children's uses of creative software, such as Clip-Art and Stereomaster. They have identified different practices of using creative software in artistic and musical production, from the practice of producing creative works from scratch to the practice of using pre-prepared blocks. According to this study, children prefer to manipulate existing images from a bank of illustrations stored in Clip-Art and to mix music in Stereomaster by using prepared snippets of sound rather than to create original pieces. Sefton-Green and Buckingham suggest that the students' preference for 'off the shelf' uses of software rather than authoring original material may partly be a function of age. These empirical findings may also be explained by the students' and the researchers' different understanding of creativity. The important fact was that the students confined themselves to "a limited and somewhat superficial manipulation of the more obvious pre-given options made available by the programmes" (Sefton-Green & Buckingham, 1998, p. 72). The researchers note that there are no technological limitations for adding original material to the banks of images or sounds. What is really important in terms of determining creative digital production, Sefton-Green and Buckingham argue, is access to the broader cultural capital of which access to technological expertise is only a part. They argue that children:

> still need access to the conventional repertoire of competencies and aptitudes if they are to produce more complex or meaningful work. When compared with older technologies like crayons and paper, the computer can appear to give a degree of polish to one's work; but this is clearly rather different from developing a facility

with the forms and conventions of a given mode of expression. (Sefton-Green & Buckingham, 1998, p. 75)

Sefton-Green and Buckingham (1998) point out the importance of children getting access to technological expertise as well as broader cultural capital. They see the family and peer circles as the main sites of children's socialisation into a particular culture of creative production. However, they do not consider technology itself as yet another channel or site of the children's socialisation into a particular culture of creative production. This can partly be explained by the researchers' overarching purpose: they argue against the logic of technological determinism which explains the transformative effects of technology by its intrinsic qualities, and which is used in order to justify rhetorical claims about technology as bringing solutions to the problems of educational failures, illiteracy, and so on. Sefton-Green and Buckingham argue that the results of their observations of children's use of creative software challenge the rhetorical claim that computers can transform young people into creative cultural producers. However, their study does not prove that technology is neutral either. The fact that the child users of software for creative production did not show high creativity could partly be caused by the software itself. For example, the software could affect the children's understanding of creativity by offering specific definitions of the creative production and the product.

2.5 The effects of technology upon literacy and subjectivity

The studies of children's actual uses of ICTs have cautioned educators against a reliance on technology as a solution to teaching and learning problems, a reliance that has been stimulated by rhetorical claims in media and some theoretical works. These studies have shown that the effects of ICTs on children's learning and literacy may differ, which is explained by children's unequal access to cultural capital resulting from the economic, social and cultural diversity and inequity. These studies have shown the importance of the broader context in which the uses of ICTs are embedded. However, the importance of this context does not mean that ICTs are neutral. Rather, ICTs should also be explored as part of this context. In this section, I focus on studies that explore ICTs as having multiple effects on literacy and subjectivity. I start with an outline of how ICTs have changed concepts and models of literacy.

2.5.1 Expanding definitions of literacy

The list of literacies required in the information age is constantly growing, starting with computer literacy (information technology skills) and information literacy, and covering the new kinds of the ICT-mediated textual formations and communication: such as digital literacy, visual literacy, multimodal literacy, hypertextual literacy, online literacy, Internet literacy, Web literacy, and so forth (see, for example, Green & Beavis, 1998; Kress, 2003; Lankshear & Knobel, 2003; LoBianco & Freebody, 1997; New London Group, 1996; Snyder, 1997).[3] Some concepts and models of new literacies emphasise the skills relating to the use of a computer as a literacy tool. Some emphasise the ability to master different modes and systems of representation and communication. Others focus on the abilities and skills required in order to produce and consume texts, information, and knowledge in the hypertextual and networked environment. In this section, I briefly outline the concepts of new literacies. My outline is mainly informed by multidimensional models of literacy and new literacies (Green, 1988; Lankshear, 1998; New London Group, 1996; Queensland Government, 2000); concepts of multimodal literacy (Kress, 2000a, 2000b, 2003); and the sociocultural and critical analysis of new literacy technologies and literacies (Lankshear & Knobel, 1998, 2000, 2002; Peters & Lankshear, 1996). Following the above mentioned studies of new literacies, I distinguish between the following broad approaches in the conceptualisation of new literacies: operational; medium-oriented; mode-oriented (semiotic); and sociocultural.[4]

According to the operational concept of literacy, the priorities of literacy education in the information age are formulated in terms of the acquisition of computer literacy and information technology skills (see, for example, Sharpe & Dieter, 1999; Turkle, 1997). Within an operational model of the new literacy, the major impact of ICTs on literacy is seen in that the instruments of literacy activities have been changed (from pen and paper to keyboard and computer screen). Accordingly, being a literate member of the information society means being able to operate the computer as a literacy tool, being able to break the code of computer commands and options represented in the form of icons of the graphic user interface, and being able to use search engines.

[3] A number of writers have noted that these terms are problematic (e.g., Lankshear & Knobel, 2003).
[4] There are overlaps in these ways of thinking about literacy, particularly those which emphasise mode and media and which are brought together in the multiliteracies model (New London Group, 1996).

Concepts of new literacy that have been informed by postmodernist literary theory and by the studies of computer-mediated communication and postmodernist studies of hypertextuality (Bolter, 1991; Johnson-Eilola, 1994; Joyce, 1995; Landow, 1992, 1997; Tuman, 1992) can be identified as medium-oriented. They link the changing notion of literacy with the development of communication media from orality to writing, print, and computer-mediated communication. These concepts focus on the nature of computer-mediated textual production and consumption and, in particular, on the changing nature of text, reading and writing in the digital medium. Computers and the Internet have made texts open to unlimited reproduction, easy transformation, and endless intertextual connections; text has been turned into hypertext, in which the boundaries between reading and writing have been blurred. It has been argued that being hypertextually literate means being able to create meaningful links between texts, to select and combine information from multiple sources, and to provide multiple explanations rather than a linear argument (Palumbo & Prater, 1993; Slatin, 1990; Tuman, 1992). See also Snyder (1996) for a comprehensive review of the concepts of hypertext and their implications for literacy teaching, learning and curriculum.

The mode-oriented (semiotic) concept of new literacy is based on an understanding of the twofold nature of the semiotic phenomena as a unity of the physical appearance and the meaning (the signifier and the signified), with an implied idea of the non-neutrality of the signifier in relation to the signified. Within this semiotic approach, literacy for the information age involves the knowledge of the possibilities and the restrictions of different modes as resources of meaning making – see Kress (2000a, 2000b) on multimodality and design. According to these views, the major impact of electronic media on literacy is the shift from linguocentrism to multimodality. Therefore, being a literate member of the information society means being able to master different modes of representation – linguistic, visual, audio and multimodal (Cope & Kalantzis, 2000; Downes & Zammit, 2001; Lo Bianco & Freebody, 1997; New London Group, 1996; Queensland Government, 2000; Zammit, 1999). Apart from possessing the mechanical skills of coding/decoding multiple systems of representation, being multimodal/multimedia literate means being able to understand the possibilities and limitations of every mode of representation in terms of its capability to create or transform meanings (Kress, 2000a, 2000b; Lemke, 1998).

The concept of multimodal literacy is intertwined with the concept of literacy as a social, cultural and critical practice (identified here as a sociocultural concept of literacy). Critical literacy, in particular, is an important aspect of the literacy required in the

information age. It has been argued that individuals need abilities and skills in order to critically approach multimodal representations and the hypertext (Burbules & Callister, 2000; Lankshear & Knobel, 1998; Queensland Government, 2000; Zammit, 1999). For example, critical hypertextual reading is an ability to question the connections provided in the hypertext, make one's own connections, and "to interrogate the silences or absences of the Internet" (Burbules & Callister, 2000, p. 33).

Within the sociocultural approach, the notion of literacy is extended to include high-order symbolic activities relating to the production, promotion, and consumption of information and knowledge in the networked environment and the use of new technologies in literacy education (Gee, 2000; Lankshear, 1997; Lankshear & Bigum, 1999; Lankshear & Knobel, 2002; C. Luke, 2003). This notion of literacy is informed by the concepts of networked society and knowledge society as based on the production and exchange of knowledge and information rather than material goods, and by the concept of attention economy (Castells, 1996; Gershenfeld, 1999; Johnson, 1997; Lyotard, 1984; Wertheim, 1999). In the attention economy, information is in an over-saturated supply (Adler, 1997; Goldhaber, 1996, 1997, 1998; Lanham, 1994; MacLeod, 2000). In order to succeed in the attention economy, people need not only to be able to access information but also to be able to turn information into knowledge; not only to be able to produce information but also to be able to attract attention to it. Definitions of attention-effective literacies are offered in Lankshear and Knobel (2000, 2003). Lankshear and Knobel argue that, as people devote increasing time and energy to pursuing attention by using ICTs, literacy education may require teaching and learning how to use ICT-mediated products for gaining and maintaining attention.

I do not aim to analyse the models of new literacies in this section since it is beyond the scope of this study. As Lankshear and Knobel (2003) argue, it is not so important to categorise new literacies. What is really important is understanding how the educational system responds to the challenges created by new literacies: "we think the most important point is to try and get the larger issues onto the educational agenda, since many attempts to respond to 'the new' in education seem to us not to go far enough" (p. 24). Therefore, I finish by identifying some issues and problems that arise from the necessity to properly address these new literacies.

These issues and problems have been identified on the basis of research projects involving an exploration of school practices, case studies of children's uses of ICTs, and generalisations relating to the changing cultural, textual, and technological contexts in

which the contemporary children are situated (see, for example, Comber & Green, 1999a, 1999b; Gee, 2000, 2003; Green, Reid, & Bigum, 1998; Kress, 2003; Lankshear, 1997; Lankshear & Knobel, 2003; Lankshear & Snyder, 2000). Generally, these issues and problems can be formulated as relating to the following areas: the contemporary agenda for literacy education (what kind of literacy should be taught in schools); the interplay between new ICTs, new literacies, and the traditional institution of schooling; and the search for new pedagogies integrating the ICTs in literacy education.

Some researchers discuss how the educational (and, in particular, literacy teaching) agenda should be changed due to the fact that children develop new literacy skills, mainly in the process of playing computer and video games or in the process of browsing the Internet (Gee, 2003; Green, Reid, & Bigum, 1998; Kress, 2003). For example, Kress argues that the school's current agenda should become more inclusive and stop prioritising the traditional (linear, linguocentric) literacy. This literacy involves reading that requires concentrated attention over an extended period of time and differs from the 'new' reading intertwined with getting information from the visual mode, with making strategic decisions, and, above all, with the physical control of computer devices. According to Kress, the schools' focus on the traditional literacy is one of the causes of children's objection to it since the new kind of reading seems to him more aligned with what the children will need further in life. Kress notes that the traditional literacy:

> has benefits and rewards, and that it is and will remain essential at times. But such a form of reading now needs to be taught as a specialised task, not as ***the*** form of reading that defines what reading is. In my view, the objection of young (and especially male) readers to the school's agenda stems from there.[5] (Kress, 2003, p. 174)

Another problem that is being discussed in the studies of new literacies is how valuable the new literacy skills and abilities are (Kress, 2003; Lankshear & Knobel, 2003; Queensland Government, 2000). However, as Lankshear and Knobel (2003) note, it is

[5] This quotation may refer to yet another interesting issue, which is the gender difference as a factor that may affect the acquisition of new literacies. The quotation should not be read as implying that young females may be less proficient in new literacies. Rather, it shows the necessity to explore this issue in a more systematic way, which may involve a substantial body of case studies. Following the pattern established in Kress (2003) and Gee (2003), who refer to observations of their children, I can contribute by stating (from observing both my daughter's and my sons' literate behaviour) that I could not notice any difference in terms of their desire and ability to deal with the multimodal world of communication.

possible to point out several new literacies that are highly placed in the contemporary culture but are not properly accounted for in the school practices of literacy teaching as well as in educational policies. The main issue, therefore, is how formal schooling can respond to the demands and challenges of teaching new literacies. Lankshear and Knobel argue that teaching new literacies may often be subverted to and distorted by old purposes, concepts, and conditions. Referring to previous studies, Lankshear and Knobel point out the most typical features of subverting the new to the old:

> Many researchers have identified the 'old wine in new bottles' syndrome, whereby long-standing school literacy routines have a new technology tacked on here or there, without in any way changing the substance of the practice. Using computers to produce neat final copies, or slideshow presentation software for retelling stories, are obvious examples. (Lankshear & Knobel, 2003, p. 29)

According to Lankshear and Knobel (2003), the reason why this subversion of the new to the old is happening when schools attempt to integrate new ICTs and teach new literacies is that the underlying institutional characteristics of school have not been changed. Other researchers also point out that it is necessary to think about re-examining both the routine practices of schooling and pedagogical metaphors surrounding literacy and new ICTs (Comber & Green, 1999a; Green, Reid, & Bigum, 1998) and provide examples of an engaged and meaningful integration of the new media in literacy teaching (see, for example, Beavis, 2000a, 2000b; Comber & Green, 1999b; Thomson & Comber, 2003).

The issues outlined refer mainly to the changes of the broader context in which the integration of new ICTs and teaching new literacies are embedded: the literacy education agenda, the routine institutional practices of schooling, and the broader pedagogical approaches and metaphors. Yet another issue is how ICTs themselves can contribute to the acquisition of new literacies and whether they can inform educators' search for new pedagogies. Researchers argue that those may be pedagogies that differ significantly from the formal pedagogies involved in teaching literacy in schools.

2.5.2 The changing nature of textuality and subjectivity

The new ICTs and the Internet in particular have been theorised as changing the nature of textuality and subjectivity. Within the studies of ICTs shaped by postmodernist theory,

computer-mediated textual formations and communication are interpreted as sites or locations of a new – postmodern – kind of subjectivity/identity (Turkle, 1984, 1995). They also represent the realization of a new kind of social and power relationships, either those characterized by a more enhanced democracy, freedom and equity or those of a new order of discipline and power.

The idea that new ICTs have changed the nature of subjectivity and power is intertwined with the idea of the changing nature of reading and writing in a computer-mediated and hypertextual mode (Bolter, 1991; Joyce, 1995; Landow, 1992, 1997; Tuman, 1992). Computer-mediated reading is understood as a co-production or co-creation of text rather than a passive consumption of a ready-made product that is determined by the author's intentions and the text structure (Hager, 1993; Joyce, 1995). This understanding is captured in a theory of 'the death of the author' and of the authorship and readership as intertextual phenomena (Barthes, 1979, 1993). In the studies of computer-mediated communication and hypertext, blending is a key word used for understanding the processes of textual production and consumption: reading is rewriting; the boundary between the author and the reader is fragile and illusional; the text loses its integrity and is embedded in an interaction with other texts. It has been argued that new ICTs have a potential to eliminate the author's power by blurring the boundary between the author and reader, and by making it possible for the reader to exercise more control over the text. The reader can also materialise his/her reading or perception of the text by providing her own versions of the text, creating new hypertextual links, and so on (Heim, 1987, 1993; Joyce, 1995; Landow, 1992, 1997).

The postmodernist theory of textuality has been used in literacy education to re-examine some of the basic units of teaching writing and composition and for rethinking teaching, learning, and curriculum (Snyder, 1996). Literacy education has been informed by the postmodernist notions of reading as active meaning making understood mainly in terms of the creation of meaningful links between texts (Lanham, 1993; Tuman, 1992). It is also informed by a notion of writing as a process of selection and combination of information from multiple sources. This kind of writing requires the ability to provide multiple explanations rather than a linear argument (Palumbo & Prater, 1993; Tuman, 1992). Within postmodernist theory, the writer (author) is understood as a bricoleur who constructs an individual text out of fragments (Landow 1992). The hypertext reader is conceptualised as a browser, user or co-author (Slatin 1990). A reader-browser deals with text in a way that is governed by curiosity, pleasure, or momentary interests. Reading of

this kind can be described as 'wandering' through the area, and paths of reading are chosen mainly intuitively. Such reading can be rather efficient, in particular if it is supported by a mechanism that allows the reader to retrace his/her steps. A reader-user deals with text in a way that is governed by clearly defined purposes. The reader-user seeks specific information rather than is 'just looking' at what is there. He/she must be able to clearly define his/her purposes and to locate required information. A reader-coauthor is actively involved in text production by creating new texts or by linking the text to other texts.

The concept of ICTs as changing the nature of subjectivity and power relations is also informed by a communication tradition (Peters & Lankshear, 1996) in the philosophy of technology and in literacy studies (Bolter, 1991; Goody, 1968, 1986; Havelock, 1986; Landow & Delany, 1993; McLuhan, 1962; McLuhan & Powers, 1989; Ong, 1982; Poster, 1990; Thompson, 1995; Ulmer, 1992). This tradition identifies various periods of human history according to epochal communication technology breaks such as a movement from orality and face-to-face communication to writing and print and, further, to computer-mediated communication (Peters & Lankshear, 1996). Within this tradition, a channel of information transmission is considered to be non-neutral in relation to interpersonal connections (McLuhan, 1962; Ong, 1982). This approach tends to explain the effects of technology on individuals and cultures by the nature of communication media (orality, print, and electronic medium).

The argument that ICTs change subjectivities and lead to the development of new (postmodernist) literacy abilities and skills is based on the assumption that reading and writing of electronic texts is an unmediated activity. The transformative effects of ICTs on subjectivity and literacy are seen as being caused by the essential qualities of the computer-mediated mode of communication. These qualities are defined in the physical categories of space, time, and (im)materiality (see, for example, Negroponte, 1995). It may be argued, however, that the experience of computer-mediated reading, writing, information searching and access, communication, and virtuality is not given immediately to the user of ICTs. Dealing with digital information is mediated by the computer interface and its specific elements, such as toolbars, menus, and so on. The experience of hypertextual reading is mediated by hypertextual and navigation links. The experience of information searching is mediated by the interfaces of search engines, and so on.

Because the user's experience is mediated, the effects of ICT -mediated products on subjectivity and literacy are to be explained not only by some 'objective' features of ICT -mediated communication and textual production and consumption (as these features have

been formulated by computer scientists, telecommunication specialists, or postmodernist literary scholars) but by the features of those mediational means as well. Mediational means are not neutral (Wertsch, 1991). They structure the experience of using computer-mediated products. For example, Burbules (1997) argues that hypertextual links direct the reader of a hypertext quite rigorously within the paths designed by the producer of the hypertext. Johnson-Eilola (1997) argues that, depending on the features of the interface design, either a modernist or a postmodernist worldview can be acquired in the process of a child's engagement with the computer-mediated textual environment. Some interface designs contribute to the development of a modernist worldview based on linearity, genealogies, tradition, and rules; others contribute to the development of the postmodernist worldview that values navigation, constructive problem solving, and dynamic goal construction.

2.5.3 Software products as pedagogical sites

In different stages of the history of using computer technology for educational purposes, educational researchers focused on different computer technologies and educational areas. For example, instructional computing and tutor software – knowledge-based systems for computer-assisted instruction and computer-mediated learning – were made an object of studies aiming to challenge the myths that surrounded computers in schools and to develop a critical-cultural perspective on computer technology and its use in education (Bigum & Green, 1993; Olson, 2000).

For example, Olson (2000) argues that teachers should look critically at programs developed for computer-assisted learning, and ask what educational practices and values are promoted by the technology. Bigum and Green (1993) approach the process of using technology in literacy education as the interaction of different discursive fields that is characterised by the technology industry's colonisation of education. They demonstrate the necessity for literacy educators to develop a critical-cultural perspective not only on literacy but on technology as well, and reveal the selected and selective nature of the concepts of literacy and literacy pedagogy built into the literacy teaching software.

Bigum and Green argue that literacy tutoring software is not a neutral technological product but one that is shaped by representatives of the ICTs industry, and is selective in terms of what specific literacy approach is reproduced in those products and, therefore, offered to students. Bigum and Green further argue that the computer is not a value-free

means of delivering literacy skills, and insist that a particular literacy pedagogy is built into the tutor software. Therefore, bringing technologies to bear on literacy pedagogy is not a process of bringing in disinterested knowledge. As Bigum and Green explain, a clear definition of what/whose concepts of literacy and literacy pedagogy are built into tutor software is important for understanding the possible role of educational computing in a competition involving three different discourses of literacy – functional literacy, cultural literacy, and critical literacy. According to these authors, the use of tutor software contributes more to the implementation of the model of functional literacy and prescriptive literacy pedagogy in schools.

Bigum and Green (1993) also suggest interpreting the practice of instructional computing in terms of the interaction of two discursive fields – education and industry – "each of which is thoroughly imbri cated in the maintenance and renewal of social power and the structured forms of privilege and subordination which characterise our society" (Bigum & Green, 1993, p. 24). The application of instructional computing to literacy pedagogy entails the penetration of the industrial discourse of computing into the field of education, which, in turn, contributes to the process of changing the discourse of education in general and to the enforcement of the industrial discourse on education specifically. Bigum and Green suggest that this involves the colonisation of education by the corporate purveyors of hi-tech products. This colonisation of education is 'materialised' in the changing discourses of educators. For example, as Bigum and Green note, the reviews of hardware and software written by teachers do not differ from the reviews written by computer magazines reviewers.

Bigum and Green (1993) focus only on tutoring software with its explicitly identified teaching purposes and with its more or less transparent pedagogical philosophy and instructional methods and tools. The development of rich multimedia educational and entertaining products and the WWW has made it necessary to critically examine not only special tutoring software but also a broader range of ICT-mediated products that are used by children in and out of schools and across the curriculum, as well as those products that are used for entertainment, such as computer and video games (Beavis, 2000a; Gee, 2003; Knobel, 1999). These products differ significantly from the software developed for computer-assisted learning. An investigation of such products' educational effects requires that researchers re-examine their traditional views of what is educational and, in particular, stop evaluating ICT-mediated products mainly in terms of the educational content that is delivered in the electronic medium (Gee, 2003).

This idea has a very important implication. It enables the educational researcher to suggest that any ICT-mediated product can be examined in terms of its educational effects. For example, Knobel (1999) argues that some computer games such as SimCity can contribute to the players' acquisition of critical literacy by encouraging them to perceive language as a sociocultural phenomenon. In his study of computer and video games, Gee (2003) suggests that they can socialise contemporary children into particular traditions of thinking and literacy, thus contributing to their education, although the games may not deliver a content that is valuable in a traditional academic sense.

Gee (2003) explores the theories of learning embedded in children's computer and video games. This exploration is based on the idea that thinking and literacy (reading) are sociocultural rather than cognitive phenomena. Thinking and literacy are parts of particular social and semiotic domains. Gee suggests that, in order to adequately approach computer and video games as educating rather than as entertaining, it is necessary, firstly, to start thinking about learning and knowing as processes of the active entering of a particular semiotic domain, which Gee defines as "a lived and historically changing set of distinctive social practices" (p. 21). Gee compares the theories of learning embedded in games and school teaching and learning and argues that:

> If the principles of learning in good video games *are* good, then better theories of learning are embedded in the video games many children in elementary and particularly in high school play than in the schools they attend. Furthermore, the theory of learning in good video games fits better with the modern, high-tech, global world today's children and teenagers live in than do the theories (and practices) of learning that they see in school. (Gee, 2003, p. 7)

According to Gee (2003), the pedagogies embedded in good games open a possibility of active learning and critical learning. Active learning involves "*experiencing* the world in new ways, forming new affiliations, and *preparation* for future learning" (Gee, 2003, p. 23). Critical learning involves, apart from active learning, the ability to approach a particular domain at a meta level and to innovate in the domain. Computer and video games allow children to experience the world in new ways. They educate children through affiliating them with members of particular (and diverse) semiotic domains rather than through delivering content. This kind of pedagogy provides resources that may be used for future learning and problem solving in several related domains. Also, games

position the learner/player as a producer, for example, by enabling the player to choose among difficulty levels or to extend a game and create new environments in which the game may continue. The games provide the possibility for the players to customize their learning experience and to become producers rather than consumers. Video games "incorporate a powerful learning principle that fits well with inquiry-based classrooms" (Gee, 2003, p.194) and, also, they enable young people to experience a more intense affinity group than they may ever do in school.

Due to the limitations of this literature review, I cannot discuss this work in more detail. To sum up, I see the significance of this innovative study of new technologies in that, on the one hand, it opens new horizons for educators seeking more proactive and critical pedagogies and shows that computer and video games can be a rich source of innovative pedagogical approaches. On the other hand, this work sets new 'landmarks' in the field of the educational studies of ICTs by showing what questions to ask about ICT-mediated products. In the context of this research, the most important implication of Gee's (2003) work is that ICTs should not be approached in terms of the content they deliver but, rather, should be interrogated as social practices and embodied pedagogies.

Apart from constituting their users as literate subjects, ICT-mediated products are also constitutive of their users as social subjects. During the 1990s a number of studies were conducted on computer games and game-like educational CD-ROMs as contributing to the formation of young people's subjectivities (Alloway & Gilbert, 1997; Beavis, 2000a; Bigelow, 2001; Fuller & Jenkins, 1995). These studies draw upon cultural studies, media studies, feminist and literary studies and explore the texts of ICT-based products as participating in the formation of personal and cultural identities (Beavis, 2000b). This direction of ICTs studies draws upon general theories of symbolic control and cultural production and the discursive formation of identity (Bernstein, 1990, 1996; Bourdieu, 1991; Bourdieu & Passeron, 1977; Foucault, 1983) and upon the studies of media as providing subjects with the constructions of reality, social identities and values (Buckingham, 1998; Giroux, 1994; Kellner, 1995; C. Luke, 1996a).

The discursive construction of subjectivity in ICT-mediated products is studied through an investigation of the role of stories and representations in shaping young people's subjectivities, particularly in relation to power and gender. The focus of such studies is on the discourses that are at work in the stories and representations, mainly in computer games. For example, the representations of violence in some computer games are seen as suggesting hegemonic and non-reflective discourses of masculinity (Alloway &

Gilbert, 1998). Other researchers question the dominant role of the content, narrative action and characters as affecting subjectivities. They argue that, unlike in traditional literary narratives, their role in computer games is less significant than the game's narrative form or structure. Fuller and Jenkins (1995) suggest that a computer game approached as a text should be compared not with literary narratives but with the sixteenth and seventeenth century New World voyage documents and that the player is more interested in navigation, mapping and opening up of new spaces and screens rather than in narrative action. Consequently, characters are just mediators between the player and the world created in the game. The key role of the game structure – in comparison to the narrative action and characters – does not mean that such games do not construct the player in some way – in fact, they do, constructing the user mainly as an explorer, coloniser or conqueror.

Research into the new ICTs' effects on children's subjectivities does not focus only on computer games and such textual elements and features of the games as narrative action and form, images and characters. Recently, children's websites have become an object of research as well. For example, Sefton-Green (2002) offers a textual analysis of the Children's TV website. He focuses on the role of interactivity in the construction of the child-viewer as an online consumer and a member of the community of Children's TV viewers. According to this research, interactive websites enable their creators to construct the child viewer not only via suggested representations of the TV show's characters but also via constant reinforcement of the identity of the preferred, or 'ideal, visitor to the Children's TV website. There are no explicit representations of the ideal visitor's identity on the website. Rather, the ideal visitor is constructed in the process of 'interactive' communication in which the visitor is involved. For example, the website offers a series of questions or choices which construct the visitor as either a new or a frequent visitor and, consequently, the visitor is constructed as a (present or future) member of a community. Interactive websites also construct the user as a participant in social interaction. They offer a specific notion of interactivity. Sefton-Green argues that the notion of interactivity offered to the users of children's interactive websites is different from the notion previously used in the communication theory. In communication theory, interactivity was conceptualised in terms of a viewer's control over the program or narrative. For example, the viewer exercises control over a TV program when he/she can select characters or ends from a menu of choices. This kind of interactivity, often celebrated by the proponents of new ICTs, presupposes an active role for the viewer or reader. On interactive websites, interactivity means just an opportunity for the visitor to enter into a dialogue with the

producer, write a letter, send a drawing, or enter competitions. Here, interactivity means to be involved in a kind of social relationship structured by the producer.

The outlined studies of ICT-mediated educational and entertaining products have shown that these products may embody learning theories and pedagogies, which should be approached by educators both critically and constructively. They may also offer socioculturally specific constructions of users' identities and subjectivities, may contribute to the acquisition of different literacy skills, and may socialise children into particular knowledge communities. In this way, the ICTs may contribute to the production of social and literate subjects. It has been shown that both educational (tutoring) and entertainment software products, such as computer and video games, can be approached as pedagogical sites. However, as the next section suggests, reference electronic products are yet to be made an object of sociocultural educational research.

2.6 Educational studies of electronic reference products

Since the early years of using CD-ROMs, educators have thought of a CD-ROM (Compact Disk-Read Only Memory) mainly as a non-print technology capable of providing a vast range of resources, such as databases, encyclopaedias, and other reference sources. The technology known as CD-ROM was introduced in 1984, two years after the introduction of audio CDs (Schamber, 1988). This technology was very suitable for publishing reference sources. For example, one of the earliest products published on a CD-ROM – Grolier's Electronic Encyclopedia – was the entire Academic American Encyclopedia (20 volumes) packed onto a single CD-ROM (Kister, 1998). The products were designed for being used by library and information specialists, researchers, and educators (Kister, 1998).

In the educational literature, electronic (CD-ROM and online) encyclopaedias and Internet search tools are studied mainly within the studies of instructional technology informed by cognitive science and psychology. In the studies of instructional technology, electronic encyclopaedias are explored as information resources delivered in the electronic mode. The focus is on the ability of such information delivery technologies as the CD-ROM or the Internet to provide a vast range of resources for the individual learner, resources that include encyclopaedias and databases, sound and picture collections, and animations (Hedberg, 1989). Also, they are approached as examples of hypermedia, or multimedia, systems (Pellone, 1999; Pham, 1998). This perception of reference works

published in CD-ROM format has been informed by cognitive science, information science, and instructional design. The instructional technology studies focus on the challenges and new possibilities created by the CD-ROM and, later, the Internet as hypermedia technologies for instruction and resource-based learning (Oliver & Herrington, 1995). These studies employ particular concepts of information, learning, and teaching. For example, information is understood in terms of the mode of its presentation and communication: visual, aural, verbal, numerical, and so on. The dominant concept of learning is resource-based learning. The main issue is that of accessing resources; and the model of learning is that of using a personal workstation that allows access to as many resources as possible or, rather, to as many resources that exist.

> As the learner sits at his or her personal workstation, retrieval software can allow access to encyclopedias, research databases, sound libraries, newspaper clippings, picture collections, photographic collections, software libraries, and computer-based instruction including animated sequences. Major publishers are releasing important works through this medium and are thus providing a unique resource for the individual learner. (Hedberg, 1989, p. 56)

The majority of educational studies on electronic encyclopaedias and Internet search tools focus on content and software features (see, for example, Jonassen, 1996; Kenney, 1997; McDonald, 1998; Singer, 1993). Also, these studies focus on the educational use of reference CD-ROMs and online encyclopaedias in the school setting, mainly in the library. These studies are sometimes even accompanied by detailed plans of lessons, with clearly formulated instructional goals and performance objectives, structured teaching and learning activities, and recommended assessment methods (Becker, 1991; Berger & Kinnell, 1994; O'Bannon, 1997). The main issue in relation to electronic encyclopaedias and other reference software is what skills are needed in order to access the information (Oliver & Perzylo, 1994; Oliver, 1996; Olsen, 1995). Within this approach, the child is constructed – explicitly or implicitly – as a user of technology, usually as a 'naïve user', who is evolving into a more competent user capable of data search and retrieval.

An example of how electronic encyclopaedias and Internet search tools are approached in the sources addressed to teachers is found in P. Gardner (1997). Here, the discussion of reference works published in the CD-ROM format is placed under the heading 'Electronic learning tools'. The author explains that students need to be taught

how to use those tools, as they are taught to use other tools, such as a pencil or a crayon. Gardner provides a lesson plan introducing a CD-ROM encyclopaedia to students. According to the plan, the teacher should emphasize such features of the CD-ROM encyclopaedia as the (large) amount of information that it contains, the speed of a search engine, and the multiplicity of the modes of information presentation:

1. Display the volume of the encyclopedia mentioned above and ask the class if they know what it is and what kind of information can be found in it. Talk about how one searches for information in it. Pick the subject of space exploration and have one of the students see how *quickly* they can find the information. Have him/her tell the class *how much information (text, pictures)* there is on the subject.
2. Using large screen projection options on page 23 or with groups on the computers, introduce the electronic encyclopedia to the class. Show them how to use the title, keyword, timeline, and *media search* tools. Use the title search tool to search for space exploration. Tell the class *how many pages of text* there are on the subject. Show *all the media* (e.g. photographs, sounds, video clips, animation) that is linked to the article. (P. Gardner, 1997, p. 154) (Italics added).

In the above quote, the CD-ROM encyclopaedia is constructed as a reference source in terms of its content. It is also constructed as a technological tool, in terms of the capabilities of the CD-ROM as a technology of information storage, in terms of the power of an automated search engine, and in terms of the capabilities of the multimedia (or hypermedia) technology of information presentation. This construction is informed by two intertwined concepts: the concept of CD-ROM as a technology of information storage and retrieval; and the concept of electronic reference work developed within the fields of information and library science and the publishing industry (see Armstrong & Large, 1990, 1991; Sader & Lewis, 1995). Within these two fields, a concept of 'electronic reference works' has been developed. This concept highlights the physical (temporal and spatial) aspects of access to information sources. As tools for information storage and access, electronic reference works are praised as having a number of advantages, which are particularly valuable for a scholar. In comparison to their print counterparts, electronic reference works are claimed to be less time consuming; they enable the user to reach

information sources located all over the globe; and their use involves such 'simple and easy' actions as installing a CD-ROM, logging onto an online encyclopaedia website or going to a Web directory. However, those issues that may be of primary concern for a scholar are not necessarily of primary concern for school students or teachers.

Electronic encyclopaedias and Internet search tools have been conceptualised as information sources, tools for information access, and the media for information communication and representation. These concepts make certain (in partiular, sociocultural and critical) directions of an educational study of these products less likely than others. I now discuss the limitations imposed by the dominant concepts of electronic encyclopaedias and Internet search tools as affecting subjectivity and literacy.

I start with an examination of a strategy that is implied by the concept of electronic encyclopaedias and Internet search tools as information sources. The texts of information sources seem to be the obvious objects of discourse analysis aiming to understand the possible effects of electronic encyclopaedias on subjectivity formation. Focusing on these texts, however, means that only encyclopaedias stored on a CD-ROM or available online can be investigated, while a vast group of products available to contemporary students are left beyond the scope of research. These are products that function only as the gates to the information on the Internet, such as encyclopaedic portals, Web guides and Web directories.

In order for a reader or viewer to be affected by those representations of him/herself and the reality offered in a text, he/she must be involved in an engaged reading and viewing (Janks, 1997). There are different views of how reading and other literacy activities in the electronic mode differ from those in the print mode. For example, Burbules (1997) points out the proliferation of non-reflective and non-critical kinds of reading, such as surfing, consumer and game-like orientation toward information. Alternatively, Rushkoff (1997) argues that contemporary 'children of chaos' possess the ability to inspect, evaluate, and discard a screen of data immediately. This means, however, that they are not engaged in linear reading but skim information on different levels and simultaneously. According to some other researchers, children may use encyclopaedic articles and other informational sources from CD-ROMs and the Internet mechanically, without engaged reading (see Downes, 1998). Taking this into account, encyclopaedia articles (or other reference sources) published in the electronic format may not be those texts that are most likely to affect the user's subjectivity. In addition, the view of electronic encyclopaedias as information sources encourages focusing on the content and, therefore,

does not allow the researcher to overcome a print-oriented tradition of educational research. Meanwhile, as Gee (2003) argues, the print-oriented approach is inadequate to the task of studying ICT-mediated products. It has been argued (Burbules & Callister, 2000; Gee, 2003; Knobel, 1999) that, in order to assess the educational and pedagogical impact of ICTs, researchers should take into account not only the educational content delivered in a computer-mediated mode but other features of ICT-mediated educational and 'edutaining' products as affecting their users' subjectivities and literacy.

If the research focus had been shifted from the articles, what else is there in electronic reference products to explore? In this thesis I suggest that the focus may be on the discursive practices that mediate the consumption of information sources and the use of the tools for information searching, access, processing, and presentation. These practices are multiple and diverse. For example, the usage of electronic reference products is embedded into the broader discursive context which is composed of various promotional and informational texts. These products are talked about in popular computer magazines available in newsagencies and in public libraries. They are talked about in the publishing companies' leaflets distributed among teachers, students and parents. They are talked about in the ICT magazines addressed to teachers, school librarians, and school managers. They are talked about in analytical articles, products' reviews and advertisements published on the websites of freelance technology writers, on the websites of universities and educational departments, and on the websites of online stores and publishing companies. All these sources create a discursive context that contributes to the public's understanding of what electronic encyclopaedias and Internet search tools are, why consumers need them, and how they should be used. Simultaneously, this discursive context contributes to the production of contemporary children and parents, students and teachers as consumers of ICT-mediated educational products in general and of electronic encyclopaedias and Internet search tools specifically. In this thesis, I investigate one particular part of this context represented by the texts located on children's software review websites and on the home pages of online encyclopaedias and children's Internet search tools.

Apart from texts *about* these products, the user encounters texts in the process of using electronic encyclopaedias and Internet search tools. For example, the user may encounter help texts. These texts instruct the user how to conduct searches, retrieve information, produce literacy artefacts, and so on. Similarly to the majority of promotional texts, the instructional texts are addressed directly to the user and intentionally construct the intended consumer/user of the products. Also, the help texts provide instructions on

how to use these tools in order to perform certain literacy-related activities. Therefore, these texts can be considered discursive practices of literacy teaching. For all these reasons, I find it necessary to make these – seemingly marginal – texts an object of analysis.

The production and consumption of information in the electronic format is always mediated by tools for information searching, retrieval, and presentation (Marchionini, 1995). These tools are represented by such texts or, rather, textual formations, as menus, database indexes, website maps, toolbars, search windows and dialog boxes, and navigation and hypertext links. In the information design literature, menus, toolbars, links, and so on are conceptualised as 'tools' (Reiss, 2000). For example, the menu – a list of choices – is a tool that provides access to specific programs, features, and tools. The toolbar buttons are tools that enables the user to perform certain actions, such as search, edit, and so on. The main feature and advantage of an electronic reference product is the availability of search tools. Usually, search tools are discussed in terms of the capabilities of their search engines, such as speed, and in terms of the skills that are required in order to use a particular search engine. Navigation links are tools used in order to provide access to specific programs, options, and websites. Hypertext links are elements of content and serve as tools which facilitate access to specific parts of the document represented in a hypertext format.

In this research, all these tools are approached as discursive practices constitutive of the represented objects and of the user. For example, menus and toolbars are approached and analysed as instances of discourse (texts) constituting the user and the product rather than as tools that enable the user to navigate and operate the product. The interfaces of search tools in electronic encyclopaedias and Internet search tools are approached as texts that construct the concept of a search and the user as a searcher. Hypertext and navigation links are approached as constructing fields of knowledge by offering a particular categorisation, and by establishing relationships between different elements of the hypertext and between different sections of the database or websites. Being interactive structures, all these 'tools' can be approached not only as texts that offer particular representations but also as instances of a communicative exchange, that is, as positioning the user as a participant in social interaction and offering a specific experience of the pragmatic use of language.

2.7 Conclusion

In this chapter, I have outlined two concepts of technology: the concept of technology as a neutral tool and the concept of technology as a social construct. Adopting a social constructivist concept of technology enables researchers to explore technological products as being shaped by particular groups' envisioning of the products' users and of the contexts of their use. In the field of educational studies of ICTs, the social constructivist concept of technology informs researchers who argue for the necessity of the development of critical technological literacy and who aim to understand the broad sociocultural implications of ICTs.

My review has outlined critical studies of the mainstream discourses on ICTs, education and children. These studies have shown that the educational discourse on technology is often characterised by an uncritical acceptance of the logic of technological determinism, with the following two implications. ICTs can be constructed as a neutral tool whose effects depend on how they are used. They can also be constructed as a solution to all educational problems. The mainstream educational discourse on technology is merging with the popular and the media discourses on technology. Within these discourses, ICTs are constructed as something that either empowers human beings or makes human life and culture submissive to the logic and laws of technological development. The ICTs producers and vendors, and the politicians and media are promoting their own interests by encouraging educators and parents to accept the view that ICTs are necessarily beneficial to everybody.

I have discussed sociocultural studies which interrogate the technoenthusiastic claims via examining children's actual uses of computers and ICT-mediated products in specific contexts and settings. These studies show that the educational effects of ICTs may be different for different groups of users/students, and that these effects depend significantly on the sociocultural contexts of the uses of ICT-mediated educational products and learning tools. I am particularly interested in the idea that, in order to benefit from using ICT-mediated products, the user needs access to cultural capital. The literature review has also shown that ICT products themselves should not be ignored. Rather, they should also be explored as part of this context. It is the purpose of this study to explore and to show the non-neutrality of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. I aim to explore how they may contribute to the construction of

contemporary children and students as sociocultural subjects, and may affect their users' access to the literacy required in the information age.

My literature review has demonstrated that an assessment of ICTs' effects on subjectivity and literacy can be successfully conducted when ICT-mediated educational (and entertaining) products are approached as discursive practices. Such studies have been conducted in relation to some groups of computer-mediated technological educational products such as literacy teaching software and computer-mediated games. CD-ROM encyclopaedias, online encyclopaedias and Internet search tools have not yet been studied as discursive practices constitutive of their user as a sociocultural and a literate subject. As I have shown in the review, educational thinking about these products may be shaped by visions uncritically borrowed from such fields as information and library science. As a result, these products are approached as neutral technological tools that facilitate access to information and/or as information sources. The emphasis is made either on their technological features (the storage capacity, the search engine power, and so on) or on the educational (academic) content. I have argued that both perspectives impose restrictions on the study of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as contributing to the users' literacy education and subjectivity formation. I have suggested that such a study is possible if CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are approached as discursive practices constitutive of the literate and social subjects. My purpose in the next chapter is to provide a theoretical foundation for the investigation of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as pedagogical discursive practices.

Chapter Three Discourse as a theoretical tool in educational research

3.1 Introduction

In Chapter Two, I argued that multiple and contested constructions of ICTs are offered to contemporary educators and students, children and parents. These constructions may affect educators' and the public's understanding of the educational role and effects of ICTs. In order to exercise more agency in relation to ICTs, educators must be able to critically assess ICTs and ICT-mediated products. I have outlined those educational studies of ICTs that explore ICTs in order to understand: who benefits from ICT-introduced changes of education sites, authorities, and providers; who is disadvantaged; and whether the usage of ICTs results in contemporary students having better access to the most advanced and powerful knowledge and literacy. In such an exploration, different objects can be studied and different methods can be employed. I locate my study within the educational studies that share this agenda and that are conducted within an approach informed by a social theory of discourse.

In this chapter, I show that such research can be usefully informed by the concept of discourse developed in critical social theory. My purposes are:

- to consider how the concept of discourse helps approach CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools as sociocultural phenomena;
- to understand how the concept of discourse can inform an examination of CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools as constitutive of their users' subjectivities and literacy; and
- to discuss how this analysis may help educators exercise more agency in relation to ICTs.

This chapter consists of four main sections. In section 3.2, I outline different approaches to discourse as an object of social research, and show how the concept of discourse is used as a theoretical tool for studying the social production of reality, subjects, power and knowledge. In section 3.3, I explore how the concept of discourse is used as a theoretical tool in educational studies of the social construction of subjects through multiple discursive practices, including those located outside traditional educational institutions and varying from classroom to family, and from textbooks to media. In section 3.4, I suggest how CD-ROM encyclopaedias, online encyclopaedias and Internet search tools can be approached as objects of educational research informed by discourse theory and critical discourse analysis (CDA). In section 3.5, I discuss how I apply a model of CDA to the study of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools, and explain how this analysis can inform educators' agency in relation to ICTs. In the conclusion, I summarise my theoretical approach, formulate my research foci, and define the objects of analysis.

3.2 Discourse in social research

In social research, discourse is associated with the paradigmatic change in social science that is sometimes referred to as 'the linguistic turn' (Burman & Parker, 1993; Derrida, 1978; Lash, 1991). The linguistic turn was manifested by changes in the epistemological orientations of social sciences, their methodologies, and their objects of research (Lash, 1991). It was the turn from positivism to interpretivism and constructionism, and from the dichotomic studies of an 'objective' social reality and 'subjective' psychological phenomena to the studies of language and discourse as constitutive of the social reality and subjectivity (Burman & Parker, 1993).

In this chapter, I do not aim to provide a comprehensive account of the paradigmatic shift in social research that has resulted in making language and discourse a primary object of analysis. Rather, my purpose is to identify those concepts of discourse that have informed my study. In this section, I distinguish between discourse as an *object* of social research and discourse as a *theoretical tool* for an analysis of the social (the production of social order, reality, power, and subjects). I briefly outline two different approaches to discourse as an object of social research, and then I focus on discourse as a theoretical tool. I discuss three aspects of discourse as a theoretical tool here: discourse as

a tool that enables social researchers to establish a connection between everyday institutional practices and larger social, historical, and cultural processes; discourse as a tool to explain the production of power, subjects, and social order; and discourse as a tool to study social change and ideological struggle.

3.2.1 Discourse as an object of social research

There are two different concepts of discourse in social research. These concepts have been informed by different theories of language and by different social theories.

Discourse: language use per se

One concept of discourse has been informed by the structuralist theory of language as an autonomous semiotic system. It is the concept of discourse as language use per se, as a sample of spoken or written language that is approached as a realisation of an interaction between the participants of communication. Discourse as language use has been made an object of the studies of everyday activities, social interaction, and social psychology that employ methods of ethnomethodology and conversation analysis (Atkinson & Heritage, 1984; Benson & Hughes, 1983; Cicourel, 1973; Garfinkel, 1967, 1986; Schegloff, 1987).

Discourse: a condition/effect of social structure and a social practice

Another concept of discourse – discourse as a condition, and an effect, of social structure and as a social practice – is informed by the post-Marxist and post-structuralist social theories and, particularly, by the theoretical insights of Foucault (1966, 1972, 1973, 1977), and by the theories of language as a sociocultural phenomenon (Bakhtin, 1981, 1984, 1986; Halliday, 1978, 1985a, 1985b; Voloshinov, 1986). Not all these authors necessarily use the term *discourse*. For example, Voloshinov and Bakhtin use such terms as *social language* and *voice* in order to capture the connection of language with the social. Halliday uses *register* in order to capture the connection of language with particular fields and activities in which it is used (see Lemke (1995) for a more detailed comparison of terms). This concept of discourse has been further developed and applied in critical discourse analysis, social semiotics, and the sociocultural studies of language and cognition (Fairclough, 1989, 1992; Gee, 1992, 1996; Hodge & Kress, 1988; Janks, 1997, 1998, 2000; Knobel, 1999; Lemke, 1990, 1995; A. Luke, 1995; McHoul & A. Luke, 1989).

As an object of social research informed by the above-mentioned critical and sociocultural theories, discourse can be approached as twofold (Fairclough, 1992, 1993; Gee, 1996; A. Luke, 1995; McHoul & A. Luke, 1989). Firstly, discourse is a socio-historically specific system of knowledge and thought, a large-scale ideological formation, a rhetorical construct. Secondly, discourse is an instance of 'language use conceived as social practice', using Fairclough's (1993) expression. In order to distinguish between these two aspects of discourse as an object of social research, discourse analysts suggest using terminological pairs. For example, Gee (1996) suggests using such terms as *Discourse* and *discourse*, where *Discourse* (with a capital *D*) refers to a system of ideas, values, norms, and patterns of behaviour, and *discourse* (with a small *d*) refers to one of its dimensions – language.[1] Fairclough (1992) suggests using such terms as *a discourse/s* and *discourse* for referring to these two objects. The distinction between these two aspects of discourse has become a focus of special attention within critical discourse analysis, an approach aiming to inform the critical and transformative action of social subjects in relation to discourse.[2]

Although they focus on different aspects of discourse, both social theorists and critical discourse analysts share the idea of the sociocultural nature of discourse. They understand discourse as (1) a worldview or a system of knowledge shaped by certain social and institutional practices; (2) a condition and practice of the social production of subjects, power relations, and objects of knowledge; and (3) a practice of the interaction of social groups and an arena of power and ideological struggle. Following, is an outline of how this multifaceted concept of discourse has informed studies of the social. I anchor this outline within Foucault's works that provide an example of the most systematic use o f the concept of discourse as a theoretical tool for investigating how power and knowledge work at the production and the reproduction of society, culture, institutions, and social subjects.

3.2.2 Discourse as a theoretical tool in social research

In his works, Foucault emphasises the irreducibility of discourse to both language (the system of signs) and speech (the use of language), and argues that the purpose of the social studies of discourse is:

[1] For a more detailed discussion of Discourse/discourse in Gee's works, see Lankshear and Knobel (1998).
[2] I turn to this issue in more detail in section 3.5.

> [no longer] treating discourses as groups of signs (signifying elements referring to contents or representations) but as practices that systematically form the objects of which they speak. Of course, discourses are composed of signs; but what they do is more than use these signs to designate things. It is this more that renders them irreducible to the language (*langue*) and to speech. It is this 'more' that we must reveal and describe. (Foucault 1972, p. 49) (Italics in original)

As Foucault's works have shown, discourse is a powerful tool for studying social phenomena as being constituted in social practices. Foucault (1966, 1972, 1973, 1977) questions and problematises psychiatry, clinical medicine, grammar and other fields of knowledge. Foucault conceptualises them as discourses (rather than as ahistorical systems of ideas and objective truths) and explores them as having been developed within particular institutional settings and shaped by particular social and professional practices (see, in particular, such Foucault's works as *The Birth of the Clinic* (1973) and *The Order of Things* (1966)). Also, Foucault studies discourses as constitutive of subjects, power relationships, and the objects of knowledge. Discourse is constitutive of social subjects and power relationships by offering specific subject positions and by authorizing subjects to talk or depriving them of speaking. Discourse is constitutive of objects of knowledge by highlighting or silencing objects and by prescribing what can and cannot be said about them.

Understanding discourse as effects of social, professional, and institutional practices, views, and traditions enables social researchers to analyse discursive constructions as non-neutral, as shaped by particular groups' values, interests, and practices. Social researchers can ask not only *what* discourses are employed in a specific institutional setting but they can also interpret a selection of particular discourses as a manifestation of the role of particular groups in the formation of a given object, field of knowledge or an institution. The concept of discourse as constitutive enables social researchers to investigate how reality and social subjects are constructed and re-constructed in a mundane textual practice and how social order and power are reproduced in these practices (see Smith, 1993, 1999). In these studies, discourse is approached as the material form of power.

Discourse as the material form of power has become a particularly useful theoretical tool because of the changing nature of social reproduction and forms of power in modern society (see Foucault, 1983). The increasing importance of the

discourse/language in social transformations is theoretically supported by the idea of the significance of ideology for modern social reproduction (Fairclough, 1992). The concept of discourse as constitutive of social subjects and power relations enables social researchers to investigate how the relations of power are produced and maintained when there is no direct realisation of power (Lemke, 1995).

Furthermore, the concept of discourse is used as a theoretical tool for studying social interaction and sociocultural changes (Fairclough, 1992; Janks, 1995; Lemke, 1995; Voloshinov, 1986). These studies are also informed by the concept of interdiscursivity developed in the works of Voloshinov (1986) and Bakhtin (1981, 1984, 1986). In Voloshinov's and Bakhtin's works, the central issue is the issue of the multiplicity and interaction of discourses (languages, voices). Both thinkers approach texts as instances of discourse interaction, an interaction that they interpret as a manifestation of the interaction of social groups and ideological and power contestation. Bakhtin and Voloshinov offer concepts that identify the two ways in which discourses may interact: namely, the concepts of dialogical and monological discourse interaction. In the works of Bakhtin these concepts are elaborated in the philosophical and social theoretical planes, while Voloshinov offers a set of analytical tools to examine texts as instances of the interaction of discourses characterised by particular attitudes towards other discourses.

The concept of interdiscursivity enables social researchers and critical discourse analysts to examine social change as manifested by the interaction of discourses. Fairclough (1992) emphasises the 'articulatory struggle' as a specific feature of the discursive construction of the social. There are constant struggles and articulations of the orders of discourse; boundaries between discourses and their social and institutional domains are shifting; and new discourses are constituted through the change of boundaries between previous discourses. The concept of interdiscursivity enables the researcher to ask and explore how particular discourses are made dominant (hegemonic), and how they interact or compete with each other. Such an analysis can be used for an explication of the ways in which given power relationships are encouraged to be perceived as natural and legitimate, and particular constructions of subjects and the objects of knowledge as neutral and universal.

Within the studies of the social informed by critical and sociocultural theories, discourse is conceptualised as being: socially constructed; constitutive of subjects, knowledge, and power; and an arena of social interaction and change. In different fields of social research – philosophy and the history of ideas (Foucault, 1966, 1972, 1973, 1977),

sociology (Potter, 1997; Smith, 1993, 1999), education studies (Kamler, Comber & Cook, 1997; C. Luke, 1989), and others – this concept has been used as a theoretical tool for studying the production of social institutions and objects of knowledge; the production of social subjects; and the production of social order and power. In the following section, I focus on educational studies informed by the outlined concept of discourse.

3.3 Discourse in educational research

In educational research, a social theory of discourse has been applied to the study of diverse educational settings and contexts: teacher education, the construction of school knowledge and curriculum, systems of surveillance and moral regulation in schools and in classrooms, textbooks, and teachers' and peers' talk. In these studies, the concept of discourse is used as a theoretical tool enabling educational researchers to establish the connections between studies of local educational settings and broader social and cultural contexts; to extend the boundaries of educational research beyond specialised educational settings and pedagogical practices; and to inform the issues of the equity of education and social justice.

A social theory of discourse enables educational researchers to shift from an understanding of educational and pedagogical phenomena as decontextualised cognitive-psychological phenomena to understanding them as historical and cultural specificities shaped by the prevailing social norms and interests and tied in with socio-political contexts. For example, the discourses of reading pedagogy have been studied as being influenced by political, economic and ideological forces (A. Luke, 1991). Childhood, reading, pedagogical subjects, and literacy have been approached as sociocultural constructs (Comber, 1997; Cormack, 2004; James & Prout, 1990; Jenks, 1982; Kamler, Maclean, Reid, & Simpson, 1994; Qvortrup, Bardy, Sgritta, & Wintersberger, 1994; Tyler, 1993; Walkerdine, 1984).

It has been argued that the focus of educational research has shifted "from a concern with behaviour, skill and mind to discourse as a constitutive pedagogical category" (A. Luke, 1995, p. 7). Such a shift is intertwined with an extension of the concept of pedagogy and with a growing attention to discursive practices situated within as well as outside specialised educational institutions. The following school-situated discursive practices creating the educational environment of contemporary students have

been investigated: classroom 'talk-around-text' (Austin, 1997; Kamler & Woods, 1987; A. Luke, 1994); the teachers' everyday talk and school report cards (Comber, 1996, 1997, 1998); books for early reading (Baker & Freebody, 1989); and curriculum and school textbooks (Christie, 1997; Cormack & Comber, 1996; deCastell, A. Luke, & C. Luke, 1989; Rothery & Stenglin, 1997; Veel & Coffin, 1996).

Within feminist and critical pedagogy, the critical sociology of education, and the Foucauldian approach to the study of childhood and education, educational and non-educational settings have been approached as discursive practices in which the students' identities and subject positions are constructed discursively, and in which discourse works as a practice of making children subjects of classification and regulation (see Baker & Luke, 1991; Comber, 1996; Cormack, 2004; Gee, 1992, 1996; Gore, 1993; Kamler et al., 1994; Kamler et al., 1997; A. Luke, 1994; C. Luke, 1989, 1996a; Tyler, 1993). It has also been shown that discursive constructions affect pedagogical strategies and teaching practices, which may result in inequity and social injustice. For example, Comber (1997) has shown that the construction of 'the disadvantaged child' shaped by a managerialist discourse creates limits and possibilities for both students and teachers.

In order to explore the broader range of discursive practices that may affect subjectivity construction, educational scholars have turned to the discourses of the family, playground, media, and popular culture. These studies employ an expanded conception of pedagogy (Bourdieu & Passeron, 1977; Giroux, 1994; Kellner, 1995; C. Luke, 1996b, 1996c; A. Luke & C. Luke, 1994).

Studies informed by an expanded notion of pedagogy and by a social theory of discourse have made a significant contribution to studies of the social construction of subjectivity. An important realm of contemporary life – the media – has been analysed as a discursive practice of subjectivity formation. The view of the media as a pedagogical discursive practice has connected the formation of subjectivity and identity with a broader sociocultural context rather than with formal teaching and learning in educational institutions such as the school (A. Luke & C. Luke, 1994). As C. Luke (1996c) argues,

> From infancy, most children are immersed in the texts of popular culture. The texts and artifacts of popular culture frame children's understanding of the world and of themselves, of narrative, heroes and heroines, gender and race relations, cultural symbols, values, and social power. (C. Luke 1996c, p. 167)

Attention to discourse in educational research has been stimulated by a changed historical and demographic context in Western societies (A. Luke, 1995; C. Luke & A. Luke, 1995a). In the changed context, the concept of discourse has become particularly useful in studies that aim to answer the 'classical' questions of sociology and psychology of education: "Who succeeds and who fails in schools? How and why?" (A. Luke, 1995, p. 5) by highlighting students' unequal access to economic, cultural, and symbolic resources (see, for example, Gee, 1992, 1996; A. Luke, 1994). These studies are informed by the concept of discourse as a 'tacit theory' of what counts as a normal person and the right ways to think, feel and behave (Gee, 1996). Discourses are matrices of social identities. Different individuals have access to different discourses. Gee distinguishes between 'primary discourses' and 'secondary discourses'. Primary discourses are those to which people are apprenticed early in life during their primary socialisation as members of particular families; these discourses constitute our first social identity. Secondary discourses are those to which people are apprenticed as a part of their socialisation within the local, state, and national groups and institutions outside the early home socialisation (such as schools). Access to certain discourses provides more advantages than access to others (Gee, 1996; Hasan, 1996a).

Within the scope of the studies of literacy education informed by the sociocultural theories[3] of literacy, cognition, language, education, and learning, the discursive practices located outside educational institutions have been made an object of literacy research. Within these studies, literacy is approached as a sociocultural construct shaped by the practices, values, and ideologies of particular groups. The sociocultural nature of literacy has been explicated through ethnographic or cultural research of literacy traditions and values in different cultures and communities (Barton & Hamilton, 1998; Barton & Ivanič, 1991; Heath, 1982a, 1982b; Martin-Barbero, 1993; Street, 1993).

In studies informed by social semiotics and functional linguistics, the sociocultural nature of literacy has been revealed by examining the norms of the scientific, academic, and other literacies as determined by the practices, institutions, and disciplines in which those norms have been developed and used (Christie & Martin, 1991; Hasan & Williams, 1996; Lemke, 1990, 1998). For example, Lemke (1998) argues that the linguocentric model of literacy (an understanding of reading and writing as the consumption and production of a linear verbal narrative) has been developed in humanities. It does not

[3] See Bernstein, 1996; Bourdieu, 1991; Bourdieu & Passeron, 1977; Carrington, 2001a; Gee 1992, 1996, 2001; Hasan, 1996a, 1996b; Street, 1993, 1995; Wertsch, 1992.

reflect the nature of literacy practice in scientific classrooms where meaning making involves the consumption and production of non-linear multimodal semiotic structures.

It has been studied how literacy-related concepts (text, reading, writing, and so on) are constructed in multiple and heterogeneous discursive practices in schools and homes (Gee, 1992, 1996; Hamilton, 1999; Heath, 1983; A. Luke, 1994). Research has revealed that all these practices contribute to the formation of literacy and literate subjects by directing students' attention to particular content and text structures, by providing norms about what it means to read, write, and discuss a text, and by providing implicit or explicit definitions of what it means to be a literate member of the society. In these studies, the institutions and practices of literacy education are approached as both selected and selective, as facilitating access to the most valuable literacy skills and abilities to some and as disadvantaging others (Gee, 1992, 1996; Hasan, 1996a; Street, 1993, 1995). Social subjects' access to a particular literacy culture/tradition and the social mechanisms of the reproduction of particular literacy cultures are the focus of literacy researchers committed to educational equity and social justice. As Lankshear (1998) argues, the mastery of varying literacies in contemporary society is associated with a differential access to social and personal goods. Therefore, access to particular literacies has "serious implications for agendas of access, equity, and inclusive education" (Lankshear, 1998, p. 363).

Literacy researchers (Carrington, 2001b; Gee, 1992; Heath, 1993; Kale & A. Luke, 1990; A. Luke, 1994) have argued that in diverse and changing societies the home is becoming an important site whose impact on the construction of the literate child should be taken into account. It has been shown that some home constructions of literacy can differ from those associated with the notion of literacy in the middle class, white, Anglophone tradition developed around the print text, and that some literacy experiences available to children in their families can differ from those that are valued in school (Hasan, 1996a; Heath, 1982b).

When literacy is understood as a set of conventional practices and interpretative patterns which function in the society as means of social power and regulation, the questions are: who selects literacy for whom and how are particular literacies (patterns of reading, writing, and so on) delivered to members of the society? From a sociocultural perspective, it is important to understand which or whose literacies are privileged or marginalised, who benefits or is disadvantaged due to the socially, economically and ideologically driven selection of literacy traditions, who authorises the 'hierarchy' of literacies, how the particular constructs of literacy and the literate subject are made

'natural' or how they are contested. Literacy researchers have investigated the role of various groups – social, commercial, professional, political, cultural – in the processes of the selection, authorisation and distribution of literacy traditions in society (Gee, 1992, 1996; Knobel, 1999; Kress, 1997; A. Luke, 1997). In the context of the present research – research into the construction of the literate subject in the products of an electronic publishing industry – the views of the areas of influence of such a group as publishers (see A. Luke, 1997) are of particular interest.

A. Luke (1997) explores the impact of the publishing industry on education and literacy. He argues that, since the first half of the twentieth century, this industry has played an important role in reconceptualising the textbook as a commodity. This has been a great cultural shift in comparison to the previous centuries of textbook production when textbooks were conceptualised within a moral discourse or the discourse of nation building (see C. Luke, 1989). Regarding the publishing industry's influence on literacy, it cannot be denied that the producers of books have some influence upon literacy patterns and practices due to their direct involvement in the selection of books for an intended audience. This is because texts may affect the interpretative practices of their readers (A. Luke & Kapitzke, 1994). However, as A. Luke argues, the interpretative practices (what students do with the texts and how they do it) have been influenced more by the changing paradigms in education and the discourses of school and classroom than by the publishers through selecting books.

It is not clear if the same can be said about the role of the producers of ICT-mediated products, for example CD-ROM encyclopaedias and online encyclopaedias. These products are composed not only of texts that are to be read, understood, and interpreted according to the patterns encouraged by the texts themselves or according to the patterns that have been acquired by users elsewhere, at school or at home. These products themselves offer explicit literacy instructions (for example, they instruct how to create a project) and provide tools for performing literacy-related activities, tools that are, simultaneously, discursive practices that may contribute to the understanding of these activities. In this study I aim to examine their potential influence upon literacy. I suggest that a CD-ROM encyclopaedia can be approached as a 'virtual classroom' or 'artificial teacher' although it may not look like those picturesque images of the classroom of the future that are provided in technoenthusiastic scenarios (see, for example, Tiffin & Rajasingham, 1996).

In this section, I have situated my study of CD-ROM encyclopaedias, online encyclopedias and Internet search tools within educational studies informed by a social theory of discourse. I have situated my study within studies of educational and pedagogical phenomena as historical and cultural specificities that are constructed in discourse and within studies of various discursive practices – from classroom talk to media – that may affect children's and students' subjectivities and their access to literacies. In the following section, I turn to the construction of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as an object of educational research informed by the critical social theory of discourse.

3.4 Objects of research

In this section, I discuss how the concept of discourse informs my understanding of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as objects of educational research. This understanding is informed by three questions.

The first question relates to how discourse/texts works in the production of subjects. There are several ways in which social subjects are constituted in discourse: by offering representations of identities and subjectivities; by offering constructions of reality; and by positioning the subject in terms of power. Accordingly, my analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of the production of social subjects requires an examination of:

- the offered constructions of subjects' identities and subjectivities;
- the offered constructions of reality; and
- the subject positions established in discourse/text.

The second question relates to how to study them as social practices of the production of literate subjects. I ground my study within studies of the constructions of children as literate subjects and as subjects of literacy pedagogy in various institutional settings (see Comber (1997) for an example of such analysis) and within the studies of the discursive construction of literacy and literacy-related activities, artefacts, and tools (see Hamilton (1999) for an example of such analysis). Accordingly, my analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of the production of literate subjects requires an examination of the offered constructions of the

user as a literate subject and a member of a literate culture; and the offered constructions of literacy and literacy-related notions.

The third question relates to how to analyse CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as selective pedagogical practices that are inclusive/exclusive of certain groups of users. I ground my study within studies conducted in critical linguistics and critical discourse analysis informed by such concepts as 'intended' or 'ideal' reader and engaged/unproblematic reading (Janks, 1997). Accordingly, my analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as selective pedagogical practices involves:

- an explication of who is constructed as the intended user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools; and
- an interpretation of these constructions as potentially problematic or disadvantaging for some groups of users.

The use of the concept of discourse as constitutive of social subjects enables me to approach CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as a selective pedagogical practice. This can be done by an explication of the particular and partial nature of the offered constructions of the intended user's identity and by interpreting them as inclusive/exclusive of some user groups. Also, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools can be approached as practices of literacy education (teaching and learning) that can advantage some users and disadvantage others, by offering constructions of literacy that certain groups may find problematic. The use of the concept of discourse as a field of knowledge shaped by the views, values, ideologies, and practices of particular groups enables me to approach the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as selected, culturally specific and socially constructed pedagogical practices or sites, by explicating which/whose discourses are presented in the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools.

An analysis of the relationships of domination between discourses enables me to interpret CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as 'arenas' or sites of the interaction of social groups. They can also be interpreted as sites of sociocultural changes in the educational field manifested by the presence and the domination of particular discourses. I aim to reveal the ways in which particular and partial, culturally specific and ideologically loaded, discourses and discursive constructions

of literacy and the user are presented in these products as universal, natural and neutral. Also, critical discourse analysis enables me to approach CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as contributing to the unequal interaction between the ICTs industry and the educators as education providers. I accomplish this by showing how CD-ROM encyclopaedias, online encyclopaedias and Internet search tools make themselves invisible for critical assessment.

The concept of discourse enables me to explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive constructs and as discursive practices rather than as technological tools. It enables me to focus not on the texts of encyclopaedias and other reference sources stored on CD-ROMs or available on the Internet, but on: the texts that encourage using CD-ROM encyclopaedias, online encyclopaedias and Internet search tools in educational purposes; the texts that mediate the usage of these products; and the texts that instruct the users how to do it.

I do not suggest that the content of CD-ROM encyclopaedias and online encyclopaedias or other information sources that can be accessed on the Internet should be neglected. Indeed such investigations must be informed by a specific research question (for example, an investigation of the construction of gender in particular products), which is beyond the scope of this study. My purpose in this research is to make CD-ROM encyclopaedias, online encyclopaedias and Internet search tools visible as discursive practices of subjectivity formation and literacy education. I see my major goal as the explication of the generic features of these practices and those means that are employed in ICT-mediated discursive practices for the naturalisation of the offered constructions of subjectivity and literacy.

Having constructed CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as objects of sociocultural educational research, I now turn to the construction of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as objects of critical discourse analysis. In the following section, I explain how critical discourse analysis informs the general purposes of the present research, and discuss how the present research can contribute to the development of a critical stance towards ICTs.

3.5 Critical discourse analysis

The kind of social research informed by critical social theory and, in particular, by the works of Michel Foucault, aims to investigate what subject positions are made available to social agents and to explain these particular subject positions as grounded in the existing relations of power and dominant ideologies. Foucault's theory of discourse explains how power operates through mundane discursive practices. It explicates the power-knowledge networks that shape the formation of the institutions and subject positions and, in this way, informs the subjects' thinking of themselves as effects of social structures and historical conditions. This does not mean that Foucault's theory of discourse encourages an uncritical acceptance of the offered subjects' positions. On the contrary, Foucault's analysis of discourses as being socially constructed has offered social researchers a model of the critical re-reading of discourses, a re-reading that is characterised by irreverence towards claims of truth and that aims to disrupt taken-for-granted claims and statements (Comber, 1997). This model of research has been realised in a research practice that is covered under the umbrella of critical discourse analysis.

> Critical Discourse Analysis (CDA) is a practice that endeavours to explain the relationship between language, ideology and power by analysing discourse in its material forms. For CDA theorists, the word 'critical' signals a focus on the role played by discourse in establishing and maintaining relations of domination. (Janks, 1998, p. 195).

In this definition of critical discourse analysis, Janks points to its key characteristics: it is a social practice; it focuses on the role of discourse in the (re)production of power and ideology; and it has discourse in its material form – text – as an object of analysis. Due to its focus on the materiality of discourse, critical discourse analysis opens more possibilities for agency in relation to discourse as it shows not only *what* discourse does but *how* discourse works (Janks, 1997, 1998; Fairclough, 1992).

Critical discourse analysts aim to understand how discourse is linked to asymmetries of power, unequal access to resources, and maintaining political and economic interests. They also reveal how discourse works as "a means for the naturalisation and disguise" (A. Luke, 1995, p. 10) of power relations, versions of reality,

and subjectivities. By enabling social subjects to see those ways and means in which discourse legitimises and naturalises power relations, versions of reality, and subjectivities, CDA contributes to generating agency:

> In its constructive moment, critical discourse analysis sets out to generate agency among students, teachers, and others by giving them tools to see how texts represent the social and natural world in particular interests and how texts position them and generate the very relations of institutional power at work in classrooms, staff rooms, and policy. (A. Luke, 1995, p. 10)

Critical discourse analysis is a research practice that may transform the analysed practices and potentially reposition the research subjects in more powerful ways (Comber, 1996; Fairclough, 1992). Critical discourse analysis as a transformative social action has been applied in the educational setting within such interrelated projects as critical pedagogy (Gore, 1993; Kamler, 1994, 2001), critical language awareness (Clark, Fairclough, Ivanič, & Martin-Jones, 1988; Janks, 1995), and critical literacy (Lankshear & McLaren, 1993; Muspratt, A. Luke, & Freebody, 1997). In critical pedagogy, the main issue is to understand how critical analyses of texts can be translated "into pedagogy that is accessible; that can equip teachers to deal with complex issues of gender, race and class and position students as active investigators of cultural and social meanings" (Kamler, 1994, p. 129). Critical language awareness is an educational project that aims to help students become aware that their practices as producers and consumers of texts are shaped by social forces, interests, power relations and ideologies. Critical literacy refers to a particular kind of literacy activity within the classroom. It involves the development of a standpoint and is based on a particular understanding of the social in terms of unequal access to and contestations over resources – both material and discursive. In critical literacy classrooms, students learn to approach texts as encoding ideologies which advantage some but disadvantage others through offering selected constructions of reality and the reader.

Such applications of critical discourse analysis as critical language awareness and critical literacy may suggest that the only realisations of critical discourse analysis that take place in the educational field are those of teaching students to critically read texts and construct alternative versions. How, then, can my research – research that does not involve human subjects and/or working in an educational setting – be considered an example of

social action? I believe that a study such as mine can still inform educators' agency in relation to ICTs by explicating which/whose discourses have been employed in the discursive practices that are offered to students and children as part of the usage of ICT-mediated products. It can also do this by showing the means that are used for representing the offered constructions as being legitimate, neutral, and natural. I investigate how particular constructions of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are presented as legitimate and natural in the discursive practices that mediate their consumption, and how the particular constructions of literacy and its users' subjectivities are presented as legitimate and natural in the discursive practices that are intertwined with the usage of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. In this way, I intend to make CD-ROM encyclopaedias, online encyclopaedias and Internet search tools visible as social practices that contribute to the production of social subjects (parents, teachers, children) and to the reproduction of dominant ideologies, power relations, and versions of reality. My work is consistent with the goals of those critical discourse analysts whose research is governed by the idea of the importance of the local and the particular, for example:

> Critical discourse analysis can be productive and positive work, which can contribute, in Foucault's terms, to people seeing that they are 'much freer than they feel' (Foucault, 1988, p. 10). My intention here is not to offer yet another illustration of the docile subject in the face of managerialist discourses, but to provide active analysis of how and where such discursive practices insinuate themselves in the minute details of everyday life and so to suggest how and where resistance happens. (Comber, 1997, p. 390)

My study draws upon the linguistic and semiotic analyses informed by critical social theory (Hodge & Kress, 1988; Kress & van Leeuwen, 1990; Lemke, 1995; van Dijk, 1993) and, in particular, upon Fairclough's (1992) model of critical discourse analysis. My scheme (see Figure 3.1) of critical discourse analysis of texts draws upon the model suggested in Fairclough (1992) and further developed in Janks (1997).

According to the model suggested by Fairclough, there are three dimensions of critical discourse analysis: the 'text' dimension, the 'discursive practice' dimension, and the 'social practice' dimension. Each of the three dimensions (text, discursive practice, and social practice) relates to a particular analytic stage: 'description', 'analysis', and

'interpretation' (J anks, 1997). The descriptive analysis of a text focuses on the meanings created in the text; on the linguistic means used for the construction of these meanings; and on the text's generic features.

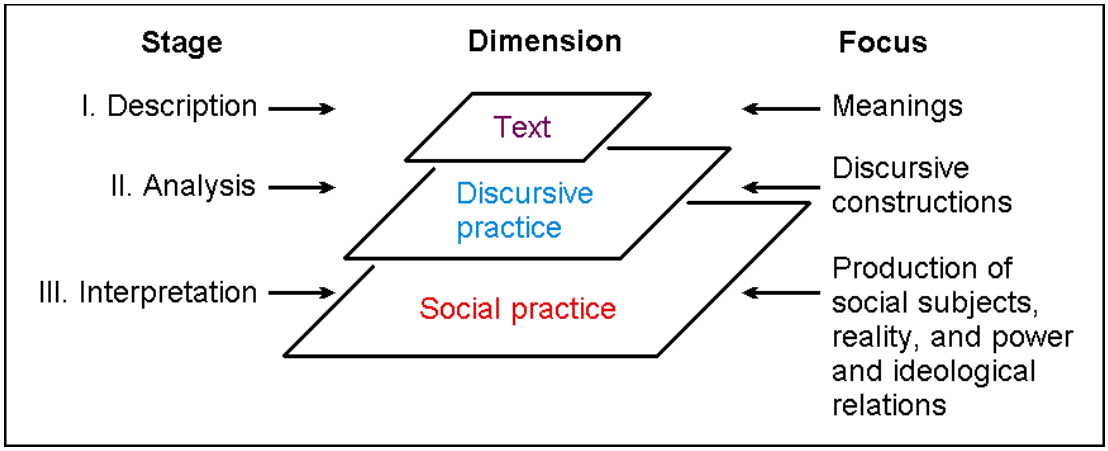


Figure 3.1 **Critical discourse analysis: stages, dimensions, foci** [4]

The analysis of text as a discursive practice means that the text is approached as being embedded in the processes of its production, distribution and consumption (understanding and interpretation). This analysis may focus on: the narrow situational contexts; and on the broader, institutional and sociocultural, conditions of textual production, distribution, and consumption. Fairclough (1992) argues that textual consumption should be investigated as being affected by the cognitive and sociocultural background and the resources of text consumers (see, for example, Janks (1997) for such an analysis). However, the analysis of texts in the discursive practice dimension does not necessarily require an examination of the actual processes of textual production, distribution, and consumption. It may focus on the text itself as keeping the 'traces' of text production and on the 'keys' of its consumption.

> [T]here are specifically 'sociocognitive' dimensions of text production and interpretation, which centre upon the interplay between the members' resources which discourse participants have internalized and bring with them to text

[4] This scheme of critical discourse analysis of texts draws upon the model suggested in Fairclough (1992) and further developed in Janks (1997).

> processing, and the text itself, as a set of 'traces' of the production process, or a set of 'cues' for the interpretation process. (Fairclough, 1992, p. 80)

In other words, the analysis of textual production and consumption can still be conducted when only text is at the researcher's disposal. In this case, the focus is on the traces of text production (intertextuality); the manifestations of the interaction of discourses (interdiscursivity); and the cues of its consumption (the means of legitimisation and naturalisation of the offered discursive constructions and the employed discourses). This analytic possibility makes Fairclough's model of critical discourse analysis particularly useful for my research, as it does not involve an investigation of the actual processes of the production, distribution, and consumption of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools.

The analyses of the text and the discursive practice dimensions provide data for the interpretation of texts as instances of social practice. When a text is approached as an instance of social practice, it is interpreted as being a product (effect) of the existing social order and social relations of power, and as having the reproductive and transformative effects upon the systems of knowledge and belief, social relations, and social identities (Fairclough, 1992).

Fairclough's model aims to resolve two major methodological issues within the studies of discourse informed by critical social theory. One of these issues is establishing a connection between a close analysis of the meanings created in the text and the social, cultural, economic, and political context (McHoul & A. Luke, 1989). Fairclough's three-dimensional model enables the social researchers of discourse to analyse texts as manifestations of power relations, sociocultural changes, and ideological struggle. Such an analysis centres upon the concepts of ideology and, especially, hegemony – "a mode of domination which is based upon alliances, the incorporating of subordinate groups, and the generation of consent" (Fairclough, 1992, p. 9). Hegemonies are produced, reproduced, contested and transformed in discourse. The structuring of discursive practices is a form of hegemony whereby this structuring is naturalised and widely accepted. Fairclough suggests that an investigation of the discursive change in relation to sociocultural change can be conducted within a framework that combines the concepts of intertextuality and hegemony. An analysis of texts in terms of which prior texts are drawn upon and how they are articulated helps understand how the discursive event stands in relation to hegemonies and

the ideological struggle: whether it is contesting existing hegemonic relations or it is accepting them for granted.

Another methodological issue that has informed Fairclough's model is the distinction between discourse as a mode of representation and discourse as a mode of action. Discourse as a mode of representation is studied within various applications of discourse analysis informed by critical social theory, such as critical linguistics and social semiotics (see, for example, Hodge & Kress, 1988). According to Fairclough (1992), these studies have successfully demonstrated how language and other semiotic resources are employed in texts as a means of reproducing power inequity, social stereotypes, and dominant ideologies. However, Fairclough criticises these studies for ignoring the dynamic aspects of discourse and claims it necessary to combine critical social analysis with the analysis of discourse as a mode of action. His model of critical discourse analysis aims at approaching texts as embedded in the processes of their production, distribution, and consumption, and as being re-shaped and re-interpreted in these processes. As Kamler (1996) summarises Fairclough's approach,

> To the extent that it is possible to generalise, there has been a tendency for linguists to isolate the analysis of texts from the analysis of institutional and discoursal practices in which texts are embedded; and for discourse analysts, whose disciplinary base is outside language and linguistics, *not* to engage in textual analysis, a situation compounded by the fact that existing models of textual analysis are not always relevant to illuminating their concerns. For Fairclough, however, discourse analysis always involves the analysis of how texts work within sociocultural practice. The strength of his approach is that it maps three different forms of analysis onto one another: (1) analysis of spoken or written language texts; (2) analysis of discourse practices (how those texts are produced, consumed, and distributed); and (3) analysis of sociocultural practice. (Kamler, 1996, p. 1)

The outlined model enables me to study CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursively constructed; as discursive practices constitutive of their user as a social and a literate subject; and as sites of ideological contestation manifested through the interaction and naturalisation of discourses. Figure 3.2 shows these three objects of a critical discourse analysis of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools.

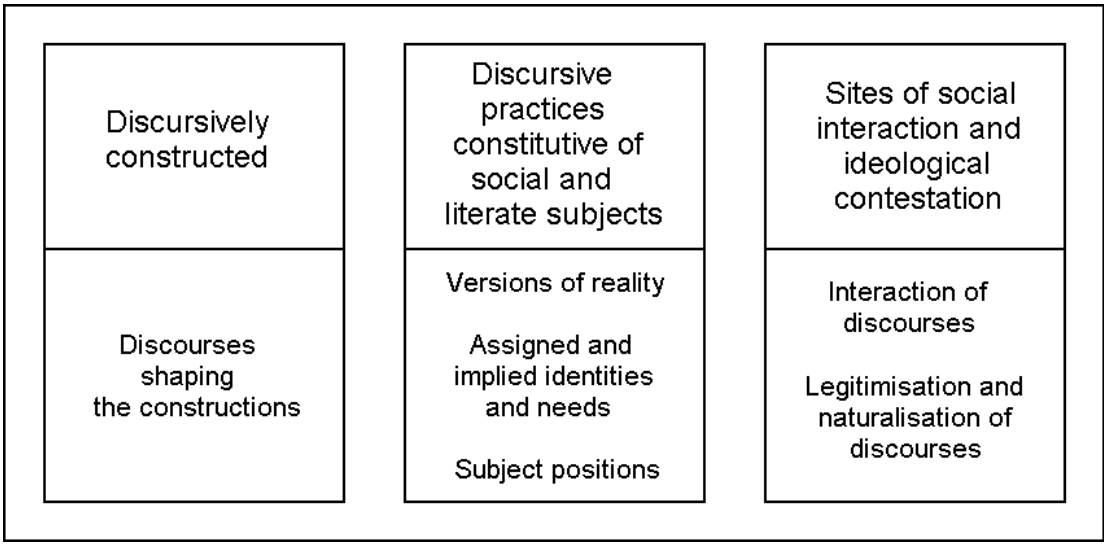


Figure 3.2 **Critical discourse analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools: objects of analysis**

My analysis requires using two sets of analytic categories: (1) categories for an analysis of the constructions of products and their users; and (2) categories for an analysis of the interaction, legitimisation, and naturalisation of the offered constructions and the discourses that shape these constructions. These two sets of categories are used in different stages of analysis (as shown in Figure 3.1). The former set of categories relates to the text dimension of critical discourse analysis. These categories include ideational, interpersonal, and textual meanings (Fairclough, 1992; Lemke, 1995). I describe them in further detail in Chapter Four, focusing on analytic methods and techniques. The latter set of categories relates to the discursive practice dimension of critical discourse analysis. These categories include intertextuality and interdiscursivity. According to Fairclough (1992), interdiscursivity is a concept that enables discourse analysts to approach text as a manifestation of the interaction of discourses and to interpret this interaction in terms of ideological and power interaction between social groups. Intertextuality refers to the material realisation of that interaction; intertextuality is interdiscursivity as materialised in the text.

I use these two sets of categories in order to examine texts as offering discursive constructions of reality, social subjects and social relations, as a realisation of the interaction of discourses, and as instances of the naturalisation and the legitimisation of

particular and partial discursive constructions. I then use the obtained 'data' in order to interpret CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of the production of social subjects and as sites of social interaction and ideological contestation.

3.6 Conclusion

In this chapter, I outlined discourse as an object and a theoretical tool in studies of the production of social institutions and reality; the production of social and literate subjects; and the production of social order and power relations. I focused on educational research informed by discourse theory and showed that making discourse an object of research and using discourse as a theoretical tool enables educational researchers to approach educational and pedagogical phenomena as connected to broader socioeconomic, cultural, and ideological contexts, and to extend the focus of educational research over discursive practices located outside the traditional institutions of education and pedagogy.

To study CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as objects of educational research informed by discourse theory means to approach them as being discursively constructed and as constitutive of social subjects. The concept of discourse enables me to explore the following. It enables me to explicate the discourses that are employed in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools for the construction of the user as a social and a literate subject and to interpret them as being shaped by particular groups' practices, ideologies, and values. It also enables me to explore CD-ROM and online encyclopaedias and Internet search tools as sites of ideological contestation manifested by interaction, legitimisation and naturalisation of selected discourses.

The use of the concept of discourse as a theoretical tool for studying the social enables me to approach CD-ROM and online encyclopaedias and Internet search tools with the following questions:

1. *What discourses shape the constructions of the CD-ROM encyclopaedia, the online encyclopaedia and children's Internet search tools?* Answering this question will inform my exploration of these products as social constructs rather than as neutral technological tools.

2. *How is the user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools constructed as a social subject?* Answering this question will inform my exploration of these products as pedagogical discursive practices that may contribute to the subjectivity formation of contemporary children and students (as well as teachers and parents). More generally, it will help make these products visible as yet another site of the production of social subjects and to critically question them as being selective practices.
3. *How are literacy and the user as a literate subject constructed in the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools?* Answering this question will inform my exploration of these products as yet another provider of literacy education and a discursive practice of literacy socialisation and literacy instruction. This may help educators' critical assessments of these products.
4. *How are the offered constructions presented as legitimate, neutral and natural?* Answering this question may inform the development of educators' agency in relation to ICTs by showing, firstly, the non-neutrality of the analysed products and, secondly, by revealing those specific discursive means that are used in practices represented by computer-mediated texts.

In this chapter I have also discussed how I can use the model of text-oriented critical discourse analysis suggested by Fairclough (1992). Adoption of critical discourse analysis as a theoretical approach for studying CD-ROM encyclopaedias, online encyclopaedias and Internet search tools enables me to situate this study within a particular direction of sociocultural educational research; to identify my research objects and foci; and to use analytic models and categories developed by other researchers. However, the majority of critical discourse analysts and educational researchers, whose work I draw upon, explored discursive practices represented by 'traditional' – written or spoken – linguistic texts and images. In order to apply this approach to an analysis of discursive practices represented by computer-mediated texts, additional development of these tools is necessary. I explain how I approached this task in Chapter Four.

Chapter Four Critical discourse analysis of electronic reference products: Methodology

4.1 Introduction

In Chapter Three, I have explained how I understand CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools as objects appropriate to educational research conducted within the approach of critical discourse analysis. However it is not immediately obvious which texts should be analysed in order to examine electronic reference products as discursively constructed, for example, in software reviews, and as discursive practices of the production of social and literate subjects. The purpose of encyclopaedias and Internet search tools is providing access to factual knowledge. They do not normally offer or, rather, are not expected to offer constructions of the child, the student, or literacy and the literate subject. This makes the identification of the texts for an analysis a specific methodological task. The analysis of these texts requires methods and tools that enable me to reveal relational, hidden, and implicit constructions offered in computer-mediated texts.

In this chapter, I develop a methodology to study review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices of the construction of social and literate subjects. My aims are:

- to describe the corpus of CD-ROMs and websites selected for analysis;
- to describe the specific texts selected for examination;
- to develop analytic tools and methods; and
- to outline the analytic scope of the research.

This chapter consists of five main sections. In section 4.2, I describe the corpus of websites and CD-ROMs selected for analysis, outline the selection criteria, and explain how examining the corpus enabled me to satisfy my research purposes. In section 4.3, I describe children's software review websites, CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools as my objects of analysis. The tools

and methods for the critical discourse analysis of computer-mediated texts are assembled in section 4.4. I outline existing analytic tools developed in critical linguistics, systemic functional linguistics, social semiotics, and textually-oriented discourse analysis and discuss how these tools can be used for analysing multimodal, interactive and hyperlinked texts as instances of social practice of the production of social and literate subjects and as sites (arenas) of ideological contestation and sociocultural change. The analytic scope of this research is outlined in section 4.5. In section 4.6, I summarise the methodology of the critical discourse analysis of software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools.

4.2 Corpus

My corpus includes: (1) children's software review websites that publish reviews of CD-ROM encyclopaedias, and (2) CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools. In this section, I describe the websites and CD-ROMs selected for analysis within these two groups, and outline my selection criteria.

4.2.1 Corpus of review websites

My construction of a corpus of review websites began with searching the Internet for reviews of CD-ROM encyclopaedias. I used the *Google* search engine in order to search for websites that provide information about CD-ROM encyclopaedias for children and students. This search resulted in a rather long list of links to three types of websites:

- review websites that specialise in publishing reviews of children's educational and entertaining products, including software products;
- educational resources websites that function as small Web directories which offer links to selected websites, including review websites; and
- the websites of online stores and publishing companies that provide links to software review websites.

In order to study how CD-ROM encyclopaedias and their intended users are constructed, I decided to focus on the software review websites. I made a list of children's software review websites that were most likely to be visited by somebody who uses

Google in order to find reviews of CD-ROM encyclopaedias. I suggested that such websites should be listed among the first search matches provided by *Google*, and decided to restrict my list to the first thirty entries. As many other large Web directories, *Google* selects documents on the basis of the similarity of terms that appear in the query and documents. However, the order in which *Google* presents the results of search is determined not by the frequency with which the query term appears in a document but by the quotation index of documents (Fensel, 2001). Therefore, the fact that a website or a document is presented among the first matches in the list of *Google's* search results shows that this website is being frequently directed to by other sources on the Web.

The criterion of frequency enabled me to significantly narrow down my search. The further development of my selection criteria was governed by the general purpose of this research, which is studying the review websites as instances of sociocultural change and ideological contestation. Therefore, I selected websites representing different institutions and practices. This selection was informed by an existing typology of information sources on the Internet. There are different types of information sources (websites) on the Internet: business and marketing websites, information websites, news websites, personal websites, and so on (Alexander & Tate, 1999; Branham, 1997). This typology is made according to websites' affiliation and spo nsorship. For example, business and marketing websites are sponsored by commercial enterprises. They are promoting and selling products and services. Information websites present factual information as a public service. They are either free of advertising or the advertising is clearly indicated. Governments or educational institutions sponsor the majority of information websites. News websites provide information on current affairs. Personal websites are created by individuals. Those websites that are not sponsored by commercial or governmental structures are considered as independent.

I suggest that different types of websites (commercial, official, and independent) could be considered as instances of the discursive practices located within different institutions (industry, education department, family) and shaped by those institutions' goals (marketing, informing, teaching, child rearing). Therefore, an analysis of different types of websites may help reveal the discursive constructions of the reviewed products and their child/student users that characterise different social and institutional practices. Such an analysis can also reveal whether there is a difference between different institutions in terms of the discourses that they employ for the construction of ICT-mediated educational

products and their users. In order to conduct such an analysis, I decided that my corpus needed to include review websites of three types:

- commercial websites, such as *DiscoverySchool.com*. These are websites sponsored by advertisers, owned by software publishing companies and selling products online;
- educational (official) websites, such as *Way Cool Software Reviews*. These websites are affiliated with educational institutions, government education departments and universities and are not supposed to promote products;
- independent websites, such as *The Review Zone*, and *SuperKids Educational Software Review*. These are websites that claim to be independent since they are either free of advertising or do not accept advertising for the products they review.

Having applied the outlined criteria, I obtained a list of seventeen children's software review websites that published reviews of CD-ROM encyclopaedias and that represent three types of information sources: commercial, educational/official, and independent (see Appendix B). The list included websites that were most likely to be visited by someone looking for information about CD-ROM encyclopaedias on the Internet. These websites were visited in 1999 and 2002, and twenty-three reviews of CD-ROM encyclopaedias were gathered for analysis (see Appendix C).

4.2.2 Corpus of products

In this thesis, I examine three groups of products that are offered to contemporary children/students as educational aids: encyclopaedias and other reference works published in the CD-ROM format; encyclopaedias available online; and children's Internet search tools. The corpus of products for analysis was established in two stages.

Stage 1

A general picture of the CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools available in the market was established. The sources of data were: the websites and catalogues of companies publishing and distributing reference works on CD-ROMs; educational resources websites; and children's software review websites. The data gathered during the first stage was examined in order to categorise CD-ROM

encyclopaedias, online encyclopaedias and Internet search tools according to their producer/publisher; generic subdivisions (encyclopaedias, reference materials for school projects; collections of images); thematic coverage (general encyclopaedias, encyclopaedias focusing on particular subjects); and price. Based on software reviews, a list of the most popular or the most promoted products was made (see Appendix D).

Stage 2

Products for a detailed examination were selected. The selection criteria were shaped by the purposes of this research. One of the purposes of this research is to study computer-mediated (multimodal, hypertext, and interactive) discursive practices of subjectivity construction and literacy education. This line of inquiry is based on the idea that the mode in which literacy teaching takes place or by which it is mediated can emphasise or can hide certain meanings of literacy-related concepts. Therefore, my first selection criterion was the use of different semiotic resources (linguistic, visual, multimodal) in the products. Another purpose of this research is to study ICT-mediated educational products as affecting the users' access to the literacy required in the information age. Therefore, my second selection criterion was the availability of tools for producing literacy-related works (projects and reports). The third purpose of this research is to explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as educational discursive practices that may be selective of their users and that may contribute to the (un)equal access to the literacy required in the information age. I aim to reveal who the intended user is of the products that are marketed as affordable and beneficial to everybody and to critically assess what kind of literacy is offered in the most affordable products. Therefore, the third selection criterion was the distribution of the products on the price scale.

The application of the above mentioned criteria has resulted in a corpus of products that have had no particular limitations in terms of their origin, their generic subdivisions and thematic coverage, or their target audiences. In terms of the products' origin, the corpus includes products manufactured by Australian and/or international companies. In terms of generic subdivision, the corpus includes mainly general encyclopaedias and non-specialised children's Internet search tools. In terms of target audiences, the products selected for analysis were not closely tied to a particular educational setting or target consumer group. The corpus includes CD-ROM encyclopaedias, online encyclopaedias and Internet search tools that can be used at school and at home, and address a broad audience including upper primary students, junior secondary students, adult learners, and

entire families. The corpus comprises: reference CD-ROMs produced by Australian and overseas companies that could be purchased in Adelaide's shops and newsagencies in 1999-2001; and online encyclopaedias and Internet search tools that could be accessed in 2001-2004 (see Appendix A for a list of purchased CD-ROMs and accessed online encyclopaedias and children's Internet search tools).

The corpus of products selected for a more detailed analysis has been narrowed according to the purposes of this research. This corpus includes products that: use different semiotic resources (linguistic, visual, multimodal); employ different types of search tools (Boolean search and natural language search); and offer tools for producing literacy artefacts (projects and reports). The majority of the selected products are those that could be purchased for less than $15 from supermarkets and newsagencies or were available free online.

To sum up, the corpus of products selected for critical discourse analysis includes: children's software review websites; CD-ROM encyclopaedias; online encyclopaedias; and children's Internet search tools. The children's software review websites are examined as part of a discursive context in which the consumption of CD-ROM encyclopaedias may be embedded. CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are explored as discursive practices of the production of social and literate subjects. In line with the critical discourse analysis approach adopted in this thesis (see Chapter Three), the objects of analysis are texts located on the selected websites and CD-ROMs. In the following section, I describe review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as objects of such an analysis.

4.3 The objects of analysis

It is not easy to clearly identify the objects of discourse analysis even when a discourse analyst has such texts at his/her disposal as newspaper articles (Fairclough, 1992; Janks, 1997). It is a more difficult task when a researcher investigates the discursive practices of a particular institution represented by multiple and heterogeneous texts that are interconnected and intertwined in various ways (Comber, 1996). The identification of an object of analysis always involves the researcher's interpretive resources. In this section, I offer my interpretation of a review website, a CD-ROM encyclopaedia, an online encyclopaedia, and an Internet search tool as objects of discourse analysis. I describe the

different types of texts that may be encountered in these websites and CD-ROMs and explain how their analysis enables me to explore my research questions.

4.3.1 The software review website

My purpose in this thesis is to explore software review websites as part of the discursive context contributing to educators' and parents' thinking about CD -ROM encyclopaedias and their child/student user. In order to do this, I examine several types of texts that might be encountered by visitors to educational and children's software review websites. These texts might be encountered both in the process of searching the Internet for reviews of CD-ROM encyclopaedias and in the process of visiting those websites. These are:

a. search queries formulated by the user when using Internet search engines or Web directories, the obtained lists of search results, and the descriptions of review websites attached to the links;
b. texts that are displayed on the homepages of software review websites;
c. site maps and product review indexes;
d. texts displayed on the 'About Us' and similar pages; and
e. texts of software reviews (see Figure 4.1 on next page for a range of examples).

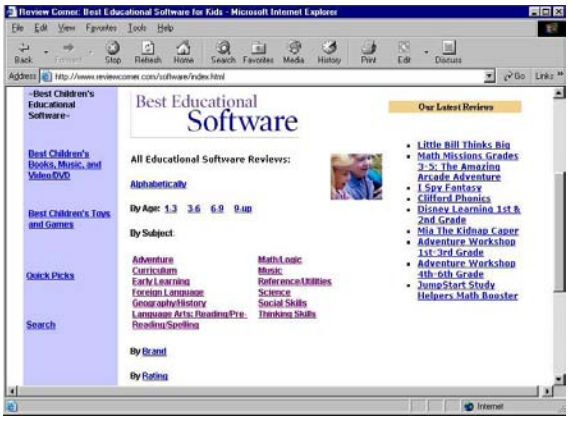
These texts have different functions (Bokarev, 2002; Reiss, 2000). The search queries are needed in order to find information on a particular issue. The search results (search matches and their descriptions) help the information searcher decide which information sources (in this case websites) to use. The homepage texts represent the website content. These texts have to catch the visitor's attention, help the visitor orientate oneself on the website, and convince the visitor that the given website is a reliable source of information. Sometimes homepages also fulfil public relations goals, such as community building. Site maps and indexes are considered to be just tools that are used by website visitors in order to navigate the site and find a product review. The 'About Us' and similar pages inform the visitor about the website's authors and the software evaluation methods. The texts of software reviews describe the reviewed products, evaluate the software, inform the reader about software testing, and formulate recommendations to the intended buyer and user.



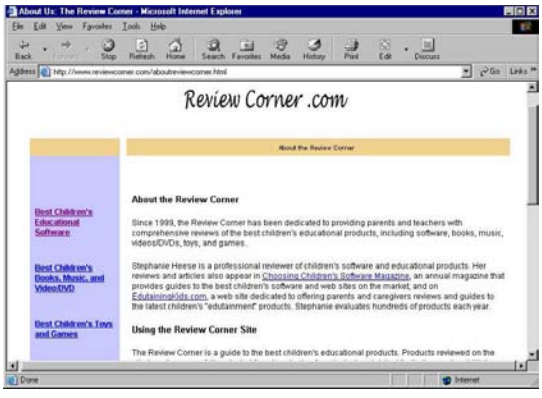
(a) Text of search query and search results



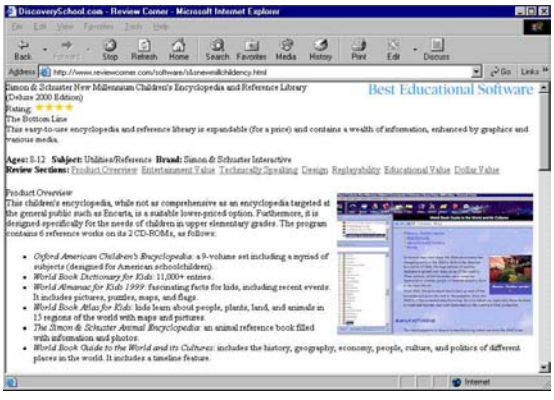
(b) Homepage texts



(c) Software review indexes



(d) Texts on 'About Us' page



(e) Text of a CD-ROM encyclopaedia review

Figure 4.1 **Review website: types of texts**

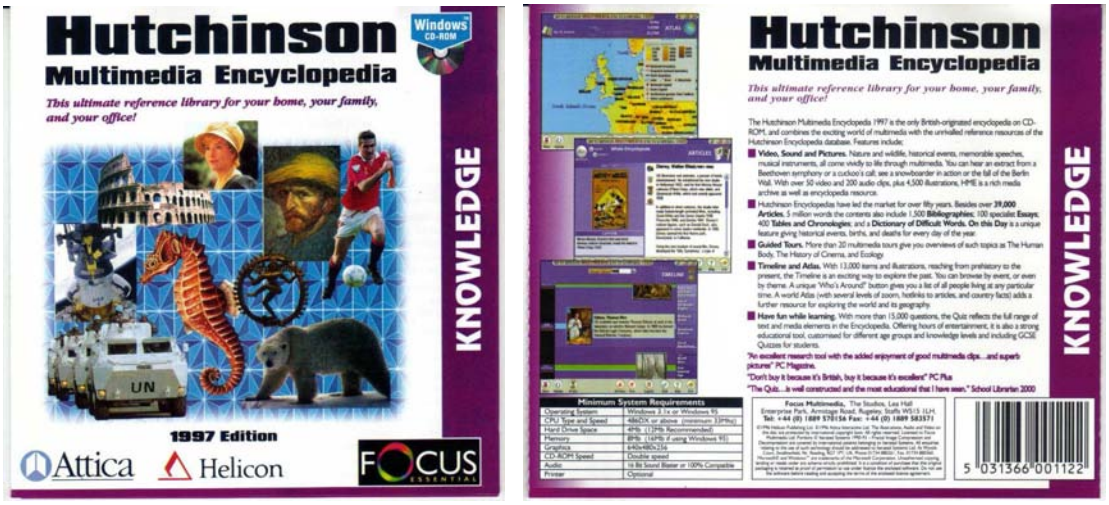
I examine texts that may be encountered in the process of searching and visiting review websites in order to reveal the discursive constructions of the website visitor, software products, and their consumers (their identities, needs, and expectations). I also reveal the discursive constructions of software evaluation and a review website as an information source (its credibility, reliability, and objectivity). The overarching purpose is to map the discourses that are employed in the Internet information sources about educational and children's software products.

4.3.2 The CD-ROM encyclopaedia

A CD-ROM encyclopaedia is composed of a large number of different texts presented in various modes (linguistic, visual, and hypertext). My selection of texts for analysis has been governed by the purpose of this thesis which is an exploration of CD-ROM encyclopaedias as educational sites and pedagogical practices of the discursive construction of the user as a social and a literate subject. In order to do this, I analyse those texts that offer discursive constructions of the product, its intended consumer/user, and literacy. Such texts are encountered in the process of making decisions about purchasing a CD-ROM encyclopaedia, in the process of using the product and interacting with the software, and in the process of being instructed in how to operate the software. Following are the types of texts:

a. texts on CD-ROM packaging;
b. texts representing software options and tools, including tools for search and browsing (interface texts);
c. help texts;
d. the texts of reference works stored in a CD-ROM database (database texts) (see Figure 4.2 on next page for a range of examples).

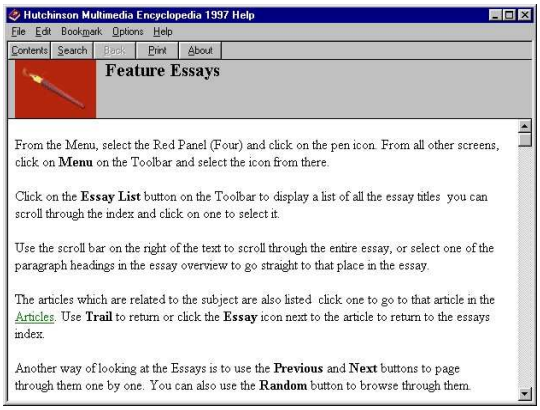
The texts displayed on CD-ROM encyclopaedias' packaging inform the intended CD-ROM buyer and user about the encyclopaedia's content, the software capabilities, and the system requirements. These texts identify the intended consumer in terms of age and interest group, outline the software features, and explain where, how, and for what purposes a given CD-ROM encyclopaedia can be used.



(a) Texts on CD-ROM packaging



(b) Interface texts



(c) Help text



(d) Database text: article

Figure 4.2 **CD-ROM encyclopaedia: types of texts**

The importance of the package in which reference and other educational software products are available to the consumer is reflected in the practice of software evaluation. According to the evaluation criteria accepted by many software reviewers, products have to be evaluated in terms of packaging integrity (*Children's Software Revue*, "Software Evaluation Instrument", 1995). The packaging integrity criteria requires that the packaging represents the software content accurately, correctly identifies the age of the intended users, and clearly states the educational objectives of the product.

In this thesis, packaging texts are objects of critical discourse analysis. I do not aim at an assessment of how accurately they represent the products' content and software capabilities. My purpose is to examine the CD-ROM encyclopaedias' packages as constructing both a product (a CD-ROM encyclopaedia) and its intended buyer and user. The texts on the CD-ROM packaging are an important part of the discursive context in which the use of the CD-ROMs is embedded. However, these texts are not part of the actual process of using the product. Once a CD-ROM encyclopaedia had been bought and installed, its use is mediated by the software interfaces. The software interfaces enable the user to interact with the software. The user interacts with the software in order to navigate a CD-ROM, operate tools, and perform actions. 'Reading' the interface texts (this reading also includes viewing interface icons) is an integral part of the user's interaction with the software. The interfaces are represented by such 'texts' as toolbar options, menus, search tools' dialog boxes, and so on. For example, the navigation of a CD-ROM encyclopaedia is mediated by the text of the main menu. The text of the main menu is composed of icons and words representing sections of the CD-ROM encyclopaedia, such as Atlas, Dictionary, and Timeline. This text represents a navigation tool enabling the user to access a particular section of the CD-ROM encyclopaedia. Such texts as toolbar options, roll-down (drop-out) menus, and search boxes represent the tools that enable the user to search, edit, print, and so on.

The interface design is widely discussed in software development literature (Mayhew, 1992; Nielsen, 2000). The issue of the development of a user-friendly interface is one of the main issues. In the field of children's software evaluation it is considered to be important that an interface enables the user to operate the software 'intuitively' (Preece, Rogers, & Sharp, 2002). In educational literature, interfaces are mainly discussed in relation to the issue of computer literacy. However, some educational researchers argue that it is necessary to teach students about the meanings of interface icons as well as to

explore how interface icons and navigation links may effect "the reading pathways of students as they search for information" (Zammit, 1999, p. 85).

In this thesis, interfaces are approached from yet another perspective. They are approached as instances of the discursive practice in which both the tools and their user are constructed. I examine the interface texts as constructing the user and the represented objects, tools, and literacy-related actions. I also examine the interface texts as instances of communication between the user and the tool and interpret them as instances of social interaction in which the user is positioned in terms of power relations. My overarching purpose is to explore CD-ROM encyclopaedias' interfaces as discursive practices constitutive of the user as a social and a literate subject.

CD-ROM encyclopaedias contain Help texts. The user reads these texts when he/she encounters a problem and needs more information about the software. The Help texts instruct the user in how to operate the software and how to use software tools in order to perform such actions as searching, editing, creating a project, and so on. In this thesis, Help texts are examined as instances of pedagogical discursive practices brought to contemporary students in the electronic format, as practices of teaching literacy and as practices of the formation of user's subjectivity. I examine Help texts as offering discursive constructions of literacy-related notions, activities, and products (text, information, writing, search, editing, project, and others). I also reveal and critically analyse the intended user's identities offered in these texts and the subject positions set up for the user as a participant in social interaction.

Finally, I examine texts that are stored in the CD-ROM databases. The database texts are the texts of encyclopaedia or dictionary articles, timelines, quotations, and so on. Although the consumption of the articles' texts and other reference sources is supposed to be the main discursive practice in which the user of a CD-ROM encyclopaedia is involved, database texts are not the main object of study in this thesis (see Chapter Two for a more detailed argument regarding ICT-mediated products as objects of educational research). In this thesis, only a few encyclopaedia articles are examined. They are analysed as instances of the discursive practice in which the user is taught how to read an encyclopaedia article.

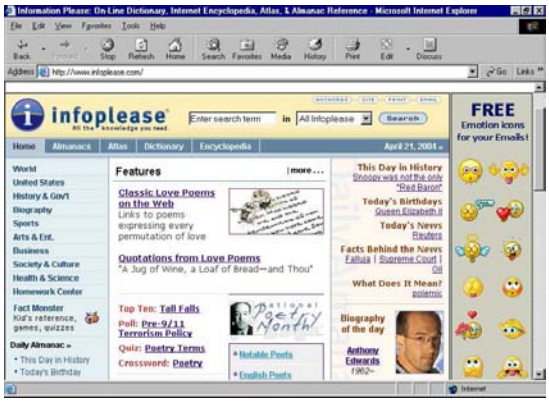
4.3.3 The online encyclopaedia

Online encyclopaedias may consist of several pages displaying different texts. These are:

a. texts on online encyclopaedias' homepages and the 'About Us' pages;
b. texts representing online encyclopaedias' navigation and search tools, including subject categories (interface texts);
c. texts on the Help pages;
d. texts of search results and information sources (database texts) (see Figure 4.3 on next page for a range of examples).

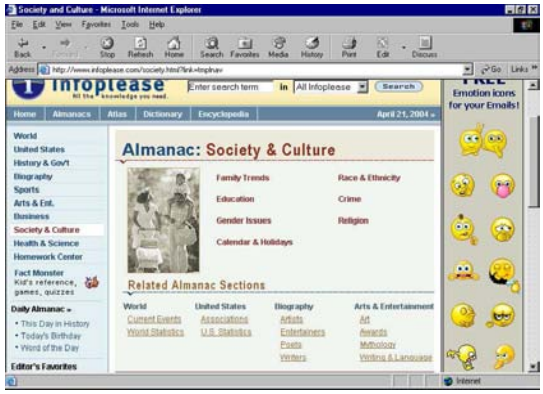
My purpose in this thesis is to explore online encyclopaedias as discursive practices of the construction of the user as a social and a literate subject. Online encyclopaedias are examined in order to: reveal how the users are constructed as consumers of online information services; and understand how the user is constructed as a member of a literacy culture. These tasks do not require an analysis of encyclopaedia articles available online. They require focusing on such 'marginal' texts as those displayed on the homepages, the texts mediating the online encyclopaedias' navigation and information searching, and texts that inform the visitor/user about the encyclopaedias and instruct how to use the available search tools.

The texts displayed on the homepages and the 'About Us' pages inform the visitor about the online encyclopaedias and serve the purposes of a company's market communication and the promotion of other services and products. I approach these texts as constructing the online encyclopaedia, its visitor/user, and the visitor/user's needs and expectations. The texts displayed on the pages providing search tools are interface texts. They mediate the visitor/user navigation of an online encyclopaedia and the use of tools for performing such actions as information search and encyclopaedia browsing. In this thesis I examine these texts as offering discursive constructions of an online encyclopaedia and the 'world of knowledge', as implying the intended visitor/user's identity and as assigning particular information needs to the user. Some online encyclopaedias may contain Help texts. Usually, the Help texts available to the user of an online encyclopaedia teach how to navigate the encyclopaedia by explaining the meanings of Boolean operators or by instructing how to use natural language search tools. I analyse the Help texts as offering discursive constructions of information searching and of the visitor/user as a social subject and an information searcher.

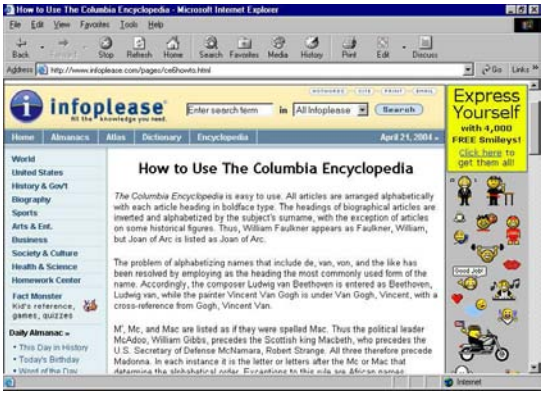


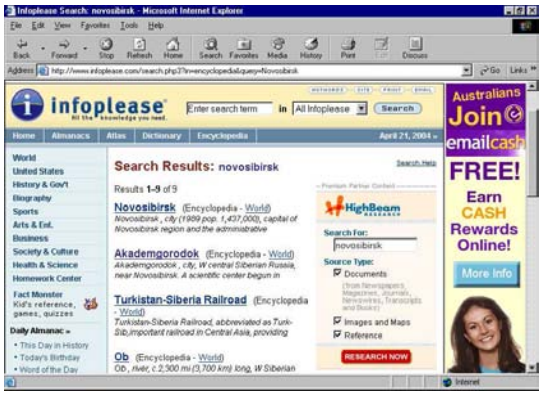
(a) Homepage





(b) Interface texts





(c) Help text (d) Database texts

Figure 4.3 **Online encyclopaedia: types of texts**

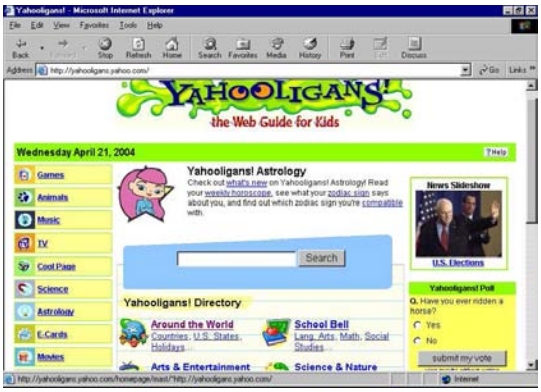
4.3.4 The Internet search tools

The websites of children's Internet search tools usually consist of several pages displaying multiple texts. The visitor may encounter the following types of texts:

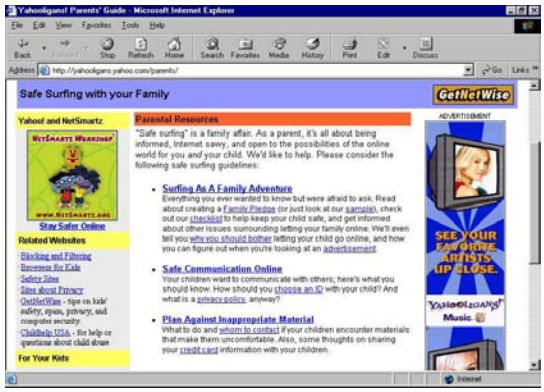
a. texts on homepages and 'About Us' pages;
b. texts on 'Privacy Policy', 'Disclaimer' and similar pages;
c. texts of subject categories;
d. the search tools' interface texts (see Figure 4.4 on next page for a range of examples).

Texts displayed on the homepages and 'About Us' pages and on the pages that serve a marketing strategy ('Feedback', 'eMail Us', 'Contact', and so on) inform the visitor about the capabilities and the characteristic features of a given search tool. They typically explain how children and students (and their parents and teachers) can benefit from using that tool specifically and the Internet in general. Such an explanation can also be encountered in the texts displayed on such pages as 'Privacy Policy', 'Disclaimer', and on the pages designed for parents and teachers. These texts explain to the visitor how information is filtered, who selects the information, and whether or not the creators of a given Internet search tool are responsible for the information that can be reached by the user. I analyse these texts as offering discursive constructions of the Internet; Internet searching; and the child as an information searcher, an Internet user and a social subject.

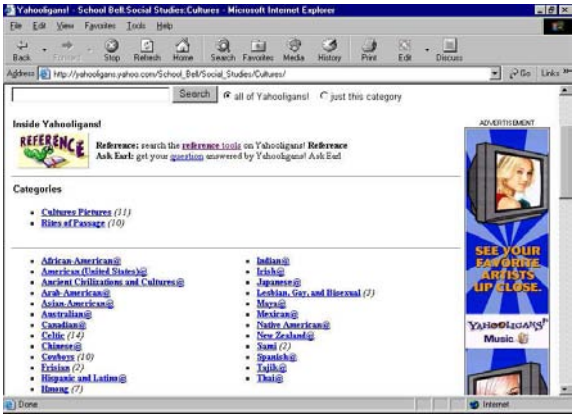
I also examine the texts representing subject categories and search tools. These texts may differ according to the types of search engines that are used in particular search tools. There are several types of Internet search tools, such as hierarchical indexes, standard search engines, alternative search engines, vertical portals and graphical search tools (Berkman, 2000). Some use automated devices for information searches; others use information sources selected by people. Standard search engines, such as *AltaVista*, use software for searching the Web and indexing pages, and mathematically calculate how relevant a page is to a search query. Hierarchical indexes, such as *Yahoo!*, offer the user a range of categories and subcategories. These categories are created by librarians and indexers who examine the Web, select the pages and categorise them.



(a) Homepage

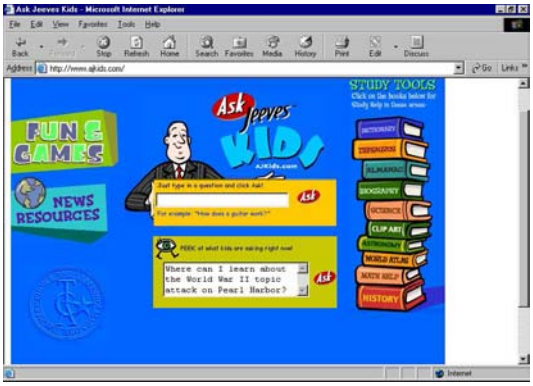


(b) 'Privacy Policy' and 'Disclaimer' texts



(c) Subject categories





(d) Search tools

Figure 4.4 **Internet search tools: types of texts**

In comparison to automated search engines, the hierarchical indexes created by people include only a small portion of the information sources on the Internet but these sources are well catalogued and relevant. *Ask Jeeves* is an example of an alternative search engine. It collects questions that users ask and finds websites that answer these questions. When the user enters a question in the natural language, *Ask Jeeves* offers a list of questions that may relate to the user's question. The user selects one of the questions. The tool shows a list of websites that may contain the required information. Vertical portals and graphical search engines are innovative search tools. Vertical portals enable the user to search only a designated slice of the Web. Graphical search tools display search results graphically, such as thematic maps (Berkman, 2000).

Among Internet search tools for children, the most popular are natural language search tools and hierarchical indexes created by people. A characteristic feature of the texts representing the interfaces of children's Internet search tools is that they represent a dialogue between the user and an animated host character, such as Jeeves the Butler (*Ask Jeeves for Kids*), Earl (*Yahooligans!*), Bruce the Spider (*WebWise*), and others. I examine how these texts construct the child user of Internet search tools as an information searcher.

There are no texts of information sources on the websites of Internet search tools. Web directories, search engines, and encyclopaedic portals are simply gates to the constantly growing and changing network of information sources on the Internet. They cannot present a stable picture of the world of knowledge since the 'information universe' is constantly changing. They may, nevertheless, offer certain versions of how this universe can be explored by offering sets of categories that represent a certain subject/topic hierarchy. I analyse the texts of subject categories as offering particular and culturally specific constructions of the world of information and as implying who the intended visitor/user is.

In this section, I have suggested that an exploration of software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as educational sites and pedagogical practices of subjectivity formation and literacy teaching requires an analysis of multiple and diverse texts. The texts for analysis include texts that are encountered in the process of searching for information about products and making the decision to purchase a CD-ROM or to subscribe to an online encyclopaedia. The texts for analysis include texts encountered by the user in the process of operating software and in the process of being instructed in how to operate it. These texts also include texts that enable the user to browse encyclopaedias. I have also stated that analysis of the texts of

encyclopaedia articles stored on CD-ROMs or available online is largely beyond the scope of this research. Table 4.1 shows the types of texts that I examine in this thesis.

Table 4.1 **The objects of analysis: products, types of texts, and analytic foci**

Products	Types of texts	Analytic foci
REVIEW WEBSITES	Search queries and search results Homepage and 'About Us' texts Site maps and product indexes Product reviews	Construction of the website visitor, software products, and their consumer (identities, needs, expectations) Construction of software evaluation and a review website
CD-ROM ENCYCLOPAEDIAS	CD-ROM packaging texts Interface texts Help texts Encyclopaedia articles	Construction of CD-ROM encyclopaedia and its intended user as a social and a literate subject Subject positions set up for the user Construction of literacy-related notions, objects and actions
ONLINE ENCYCLOPAEDIAS	Homepage and 'About Us' texts Interface texts Help texts	Construction of online encyclopaedia and its visitor/user as a social and a literate subject Construction of information searching and the information searcher
INTERNET SEARCH TOOLS	Homepage, 'About Us', 'Disclaimer' and similar texts Interface texts Subject categories	Construction of the Internet and Internet searching Construction of the child visitor/suer as an information searcher and a social subject

The texts selected for examination may seem marginal or unimportant in comparison to the content of encyclopaedias and other information sources (for example, texts on CD-ROM packaging and texts on websites' homepages and 'About Us' pages). Some of these texts, such as interface icons, site maps and product indexes, can be called 'texts' in a very broad sense. I suggest, nevertheless, that these are the types of texts to analyse in order to study and critically assess ICT-mediated products as educational discursive practices. These are the texts that offer constructions of contemporary children, students, parents, and teachers; these are the texts that may affect their thinking about CD-ROM encyclopaedias, online encyclopaedias and Internet search tools; and these are the texts that may contribute to the users' understanding of certain literacy-related notions such as 'creating a project'. I also suggest that these are the texts that reflect the broader

processes of sociocultural change and the process of the interaction and contestation of different groups involved in education, the ICTs production and marketing, and parenting. Table 4.1 shows the analytic foci for each group of explored products.

The texts presented on children's software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools employ various semiotic means: linguistic, visual, multimodal, and hypertext. In the next section, I outline the analytic tools and the methods of analysing such texts as practices of the discursive production of social and literate subjects and as practices of social interaction and ideological contestation manifested as an interaction, legitimisation and naturalisation of discourses.

4.4 Analytic tools and methods

In order to explore review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of the production of social and a literate subject, I analyse the constructions of the intended user's identities that are offered in linguistic texts or are implied by images. I also discuss the constructions of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools, since the intended user is often constructed indirectly, in relation to ICTs in general and to a particular product specifically. This method is informed by the studies of the discursive construction of pedagogical subjects (Comber, 1996, 1997; Cormack & Comber, 1996) in which the constructions of pedagogical subjects are approached as relational.

In order to investigate how CD-ROM encyclopaedias, online encyclopaedias and Internet search tools may contribute to the users' acquisition of certain literacies, I analyse the constructions of literacy-related notions, activities, tools and artefacts that are offered to the user. In order to investigate how the user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools is constructed as a social subject, I examine subject positions set up for the user in the process of using these products.

My development of analytic tools for this study is informed by the categories developed in systemic functional linguistics, social semiotics and critical discourse analysis (Halliday, 1985a; Hodge & Kress, 1988; Janks, 1997; Kress & van Leeuwen, 1990; Lemke, 1995). These are such categories as ideational, interpersonal, and textual meaning; interdiscursivity; and the information unit. These categories have been used in

order to analyse linguistic texts and images as: (1) constructing social subjects, reality, and knowledge; and (2) arenas of power and ideological contestation. Texts and images construct social subjects and reality by creating ideational meaning and interpersonal meaning. First, I establish a set of tools for an analysis of the ideational meanings.

4.4.1 Ideational meaning

In critical linguistics, critical discourse analysis, and social semiotics, ideational meaning is analysed in order to understand how texts work as a means of the production of social identities and versions of reality. In linguistic texts, ideational meaning is created by such means as lexis (word meaning, lexicalisation, and metaphorisation); grammar (transitivity, voice, and modality); and argumentation (Fairclough, 1992). Lexical choice is an important means of the construction of reality and the intended reader of the text. An analysis of lexis enables the analyst to explore a text as a realisation of a particular discourse. For example, the analysis of metaphors enables a discourse analyst to show that reality is constructed in a text from a particular and a partial perspective (Lakoff & Johnson, 1980). The analysis of the 'patterns of wording' (naming) associated with various participants in a text proved to be useful in identifying the discourses employed in the text (see Janks, 1997; Kamler, 1994).

Grammar (the choice of the patterns of transitivity, voice, and modality) is also an important means of the discursive construction of reality and social subjects. In the English language, transitivity and voice are used in order to construct the world of experience as a process that consists of three components: the process itself; the participants in the process; and the circumstances associated with the process (Halliday, 1985a). There are several types of processes in the English transitivity system. Halliday identifies six types: material, mental, relational, behavioural, verbal, and existential. The participants play different roles in different types of processes. For example, the participants play the roles of an 'actor' or a 'goal' in the material processes. In the mental processes, they play the roles of the 'senser' or the 'phenomenon'. Transitivity is one of the most important linguistic means used for the construction of the participants: it constructs the participants by presenting them as active agents or passive objects of a process (Halliday & Martin, 1993; Janks, 1997; Lemke, 1990).

The categories of voice and modality are also important means of discursive construction. They are used in order to construct events and processes in terms of causality

and agency. As Halliday (1985a) states, the category of voice addresses the issue of the process structure as determined by the source of the processes: "The question at issue is: is the process brought about from within, or from outside?" (Halliday, 1985a, p. 162). The choice of voice and modality enables the speaker to present the participants of events and processes as active agents or passive objects, and to present an event or a process as having an agent/cause or as just happening. The latter effect is also created due to the use of such means as nominalisation (Halliday & Martin, 1993; Lemke, 1990, 1995). Social semioticians and critical discourse analysts have highlighted the use of voice and modality in the scientific discourse and in media discourse in order to present the particular and partial versions of reality as general and objective (Fairclough, 1992; Janks, 1997; Lemke, 1990).

This study is informed by transitivity, voice and modality analysis in two ways. This analysis enables me to reveal how literacy-related notions are constructed for the user. It also enables me to reveal how the user and the tool are constructed in relation to each other as participants of a literacy activity. Transitivity, voice and modality analysis is particularly fruitful in the exploration of the Help texts instructing the CD-ROM encyclopaedia user in how to use a tool in order to create a project:

> You can use the Projects roll-up to create a personalized project using information from anywhere in the Encyclopaedia. You will notice that the Projects roll-up has two buttons in its title bar. The right-hand button lets you alternatively roll and unroll the Projects roll-up and the Hide or close button hides the Projects roll-up.Type a title for your project in the ***Project Title*** text box. You may call it anything you want. (***Webster's Encyclopedia of Australia 2000***)

An analysis of the patterns of transitivity in such texts enables me to reveal whether literacy-related activities are constructed as material processes composed of concrete, physical actions (***click, type, highlight, move, place***) or as mental processes composed of perception (***see***), feeling (***need, want, like***) and thinking (***decide, remember***). An analysis of the patterns of voice and modality enables me to reveal how the user is constructed as a participant of processes, a participant who can be positioned differently in terms of agency in relation to the non-human participants (the CD-ROM, software, a specific tool). It enables me to reveal whether the user is constructed as an active participant of a process (the one who is finding, creating, searching, and so on) or as a passive participant who is

ordered what to do or is allowed to do something (you *can* see, you *can* search, the toolbar *lets* you display, a series of buttons *let* you select).

I use the analyses of transitivity, voice and modality in order to interpret the analysed products as discursive practices contributing to the user's understanding of literacy-related notions. I also use these analyses in order to interpret the examined products as discursive practices contributing to the construction of the user as a participant in social interaction who is positioned in terms of agency in relation to technology.

4.4.2 Images of literacy

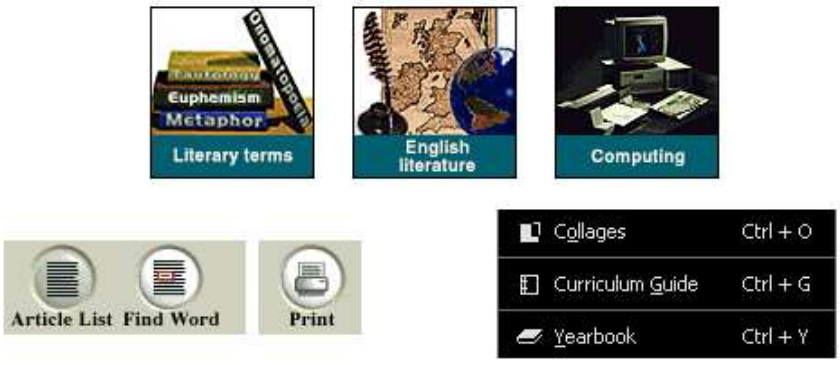
In this thesis, I focus on images in order to understand how the user is constructed as a literate subject and what notions of literacy might be acquired in the process of using CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I focus on what I call 'images of literacy' following Hamilton (1999),.

Hamilton (1999) studies newspaper photographs as a socially contextualised way of channelling literacy-related notions. As Hamilton argues, studying media images of literacy is a way of studying public discourses of literacy and a way of understanding how these can be criticised. Media images are socially salient, public representations of literacy practices created by photojournalists and editors as a practice of creating newsworthy messages and meanings. Therefore, the researcher can infer "folk models of those events and the ideological preconceptions that underpin them" (Street, 1995, p. 2) from photographs of literacy events. For example, images of the participants of various literacy practices can be interpreted in terms of the social relationships of producing, interpreting, circulating and regulating texts. Images of settings in which a literacy event takes place can be interpreted in terms of the sense and the social purpose of the event. Images of literacy artefacts and tools can be interpreted in terms of the non-material values, understandings, ways of thinking, feeling, skills and knowledge. Images of literacy-related actions can be interpreted in terms of structured routines that regulate literacy practices.

The majority of images in the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are not documentary images of literacy events (see examples in Figure 4.5). The functions of interface images are different from that of paintings or media photographs: they substitute, or simulate, things and actions – they do not create visualised narratives. The majority of interface icons show isolated items that have no relationships between them other than that of co-existence.



(a) Participants, literacy activities, and settings



(b) Artefacts, symbols, and tools

Figure 4.5 **Images of literacy**

I suggest that interface icons can be approached as public representations of literacy because they are produced within certain institutional settings and are part of the message that the creators of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools address to the user. This message is based on certain assumptions about literacy practices, their value and their meaning. Therefore, the images of literacy used in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools can be considered as a way of constructing literacy-related notions and values.

The images of literacy can also be interpreted as a social practice of constructing the user as a member of a particular literacy culture. The images of literacy can be inclusive or exclusive of some users by implying who the intended user is (the user who may find particular images of literacy unproblematic). They can also contribute to the user's socialisation into a particular literacy culture and contribute to his/her formation of literacy-related concepts by offering particular, culturally specific and ideologically loaded constructions of literacy-related practices, notions and values.

My analysis of images of literacy in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools is based on the methods of ethnographic research into literacy as suggested in Heath (1982a) and modified in Hamilton (1999). I use the definitions of literacy event suggested in these works for the development of criteria to identify images in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as images of literacy. Heath defines a literacy event as an event in which a piece of writing is integral to the participants' interaction or interpretation. Accordingly, images of literacy events are ones that show participants interpreting or interacting around a piece of writing. This definition points out two key elements of an image of literacy event: there are human participants involved in a certain activity; and a piece of writing is the key integral element of this activity.

In her study of newspaper photographs, Hamilton extends Heath's definition in order to include:

- images that show pieces of writing, without showing human participants involved in a certain activity with that piece of writing; and
- images in which a piece of writing is present but does not play a key role in the participants' activity or seems entirely incidental to the narrative's main focus.

My investigation of images of literacy in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools has required a further extension and modification of these criteria. I suggest the following three modifications.

1. I do not consider the human (or human-like) participants to be a necessary element of the images of literacy in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. It is possible to find images that show human participants among the pictures and the photographs that represent particular sections of database in the subject/topic menus. However, such images are not characteristic of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. The majority of images in subject/topic menus, and all images that are used as the menu and toolbar icons are symbolic representations of literacy-related artefacts, tools, settings and activities. They do not show human or human-like participants involved in those activities, using those tools, and producing or consuming those artefacts.

2. I have reconsidered the notion of literacy that is employed in both Heath (1982a) and Hamilton (1999). The notion of literacy employed by Heath and Hamilton refers to the traditional, language-centred, pen-and-paper or print literacy. According to the models of new literacies (see Chapter Two), the notion of literacy has been extended beyond reading and writing linguistic texts presented via the hand-written or the print mode and includes: information searching; the creation and perception of images, multimodal layouts, and hypertexts; and the usage of computer-mediated tools. Therefore, the presence of a piece of writing cannot be considered as the only, or even the key, element of an image of literacy event. Based on the extended models of literacy, I identify, for example, images of printers, diskettes, graphs, and charts as images of literacy.

3. I identify any images that symbolically represent literacy-related activities or settings as images of literacy. For example, I identify images showing a magnifying glass or scissors as images of literacy-related activities, such as searching and editing.

The selected images are analysed and interpreted in order to understand who and in what way can benefit from using CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of literacy teaching. I analyse images as representations of particular literacy cultures (for example, middle class literate culture or popular culture) and a particular literacy tradition defined in relation to the technologies of literacy (‘old’ literacies: hand-writing, print book, pen and paper; and ‘new’ literacies: computer-mediated, digital). I use this analysis in order to explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as sites of the reproduction of particular literacy

cultures and as sites of the production (construction and inclusion/exclusion) of the user as a member of a literacy culture and as a social subject.

The images representing particular literacy cultures exclude or disadvantage those users who find them problematic. This could be due to their highly symbolic nature which makes it difficult for the user to grasp their meanings intuitively and, therefore, those users who do not know their meanings may be disadvantaged or excluded. Due to these images' cultural specificity, they may be problematic for those users who have been socialised into other literacy cultures and have not become familiar with represented artefacts and settings.

I also analyse the images of literacy as constructing represented literacy activities. According to Kress (2000a) and Kress and van Leeuwen (1990), images construct represented things and actions and, therefore, can be used as a means of affecting the user's perception of the represented objects. Also, images can be used as a means of constructing the viewer since they imply the viewer's identity, offer a particular perspective of viewing objects, and position the viewer as a participant in social interaction. The majority of images that are used in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools represent processes that Kress and van Leeuwen call conceptual processes. Images representing conceptual processes are "about the more or less timeless, stable and constant (visible) essence of a particular participant or set of participants" (Kress & van Leeuwen, 1990, p. 73). These images explain what things are like, teach us what the order of things is, and are to be understood intellectually and consciously. These images are more likely to be found in textbooks, scientific papers, instruction manuals, and so on (Kress & van Leeuwen, 1990). These are also the kinds of images that can be found in CD-ROM manuals and interfaces. My analysis aims at an explication of the creators' notions of literacy and at the interpretation of the images of literacy as affecting the user's understanding of the represented literacy activities. In this way, I explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as pedagogical practices that are brought to contemporary children and students by ICTs.

Visual representation of literacy-related activities may result in some aspects of these activities being emphasised and others being silenced. Therefore, I find it particularly important to highlight the potential consequences of the fact that literacy 'instruction' is delivered in the visual mode. The visual mode brings with it "a shift from the temporal-sequential logic of spoken (and to somewhat lesser extent written) language to the spatial-simultaneous logic of the visual" (Kress, 1999, p. 68). In the visual mode, an activity is

presented as a static structure rather than as a dynamic process, a change, a development. Such presentation is characteristic of the menu interfaces that mediate the user's activities (editing, searching, and so on). Although the particular commands and options comprising those activities are represented with words or sentences, the entire activity is presented on the interface as a static structure rather than as a dynamic process. Also, in visual mode, literacy-related activities are more likely to be constructed as material, physical processes rather than as mental, abstract processes. For instance, in the *Maximedia School Project No 2* "Instruction Guide" (1999), the activity identified as 'find more information' is represented both linguistically and visually. In the linguistic text, it is constructed as involving both abstract (*search*) and concrete physical actions (*click, type*). In the visual mode, it is constructed as a process composed of concrete physical actions – actions represented by images of the tools and artefacts involved in computer-mediated information searching. For example, the image of a toolbar button stands for such actions as clicking on the button and starting to search for information. The image of a search box with a keyword typed in stands for such actions as typing and formulating a search query. The image of a text with a highlighted keyword represents such events as having found a piece of text containing the keyword and having found the required information.

4.4.3 Subject positioning

Discourse produces social subjects not only by offering them identity constructions but also by positioning them in relation to other subjects. My analysis of the positioning of subjects in terms of social relations focuses on the interpersonal meanings created in texts and images. Interpersonal meaning is a category that is used in systemic functional linguistics in order to analyse clause as a communicative exchange and as a negotiation of the social relationships between the participants of communication. The former aspect of interpersonal meaning is realised by the choice of speech roles; the latter aspect of interpersonal meaning is realised by the means covered by the category of tenor.

According to Halliday (1985a), there are two fundamental types of speech roles: those of giving and those of demanding. These basic categories are further distinguished according to the nature of the 'commodity' being exchanged, which may be either information or 'goods and services':

> If you say something to me with the aim of getting me to do something for you, such as 'kiss me!' or 'get out of my daylight!', or to give you some object, as in 'pass the salt!', the exchange commodity is strictly non-verbal: what is being demanded is an object or an action, and language is brought in to help the process along. This is an exchange of goods-&-services. But if you say something to me with the aim of getting me to tell you something, as in 'is it Tuesday?' or 'when did you last see your father?', what is being demanded is information: language is the end as well as the means, and the only answer expected is a verbal one. This is an exchange of information …. (Halliday, 1985a, pp. 68-69).

As a result, four primary speech functions are identified: offer (giving goods and services); command (demanding goods and services); statement (giving information); and question (demanding information). The speech functions are realised with the grammatical category of mood. The category of mood is closely connected to the category of modality which is "the area of meaning that lies between yes and no – the intermediate ground between positive and negative polarity" (Halliday, 1985a, p. 356). In statements and questions, modality means some degree of probability (*certain*, *probable, possible*) or usuality (*always*, *usually*, *sometimes*). In offers and commands, modality means some degree of obligation (*required*, *supposed*, *allowed*) or inclination (*determined*, *keen*, *willing*). The categories of mood and modality are used by the participants of a communicative exchange as a means of positioning themselves and the interlocutors in terms of social relationships (Lemke, 1995; Martin, 1992). Tenor is a general category that refers to the negotiation of social relationships among participants (Martin, 1992). Tenor refers to the negotiation of the interlocutors' positions in terms of social hierarchy (power, status); social distance (the degree of contact between the interlocutors); and affect (the character of their relationships, which can be neutral or emotionally loaded) (Hasan, 1978; Martin, 1992; Poynton, 1985, 1990).

In terms of social hierarchy, the participants of communication are positioned as equal or as unequal. This positioning is realised by the choice of mood and modality; by the reciprocity of speech roles; and by the choice of the phonological, grammatical, lexical, and semantic means. For example, asserted polarity, modality of obligation, and familiar vocation are associated with speakers of a higher status. Matched polarity, the modality of inclination, and respectful vocation are associated with speakers of a lower status. (For a

more detailed repertoire of the linguistic means of positioning the participants of communication in terms of social hierarchy, power, and status, see Martin (1992, p. 529).)

In terms of social distance (intimacy), participants are positioned as involved or distant. This positioning is indicated by various grammatical and lexical means. Grammatically, an involved contact (more intimate relationships) is indicated by the use of such means as minor clauses, mood ellipsis, a nickname, and other means. An uninvolved contact (more distant relationships) is indicated by the use of such means as major clauses, no ellipsis, and a full name. Lexically, an involved contact is realised by the choice of specialised lexis, technical lexis, and slang; an uninvolved contact is realised by the choice of core, non-technical, standard lexis. (For a more detailed repertoire of the linguistic means of the positioning of the participants of communication in terms of social distance, see Martin (1992, p. 532).)

The category of affect concerns the participants' attitudes towards each other. It is likely to be realised in involved contact situations and among equal participants (Martin, 1992). Affect is expressed by such grammatical means as exclamative, attitude, comment, minor expressive, intensification, repetition, diminutives, and by the use of attitudinal lexis, taboo words and swearing (Martin, 1992).

In this research, I use the categories of speech functions and tenor in order to reveal how the user is positioned as a participant in social interaction. As suggested above, the analysis of interpersonal meaning as a realisation of the negotiation of social relations between participants of communication enables the analyst to explore how social subjects are constructed in discourse by positioning them in terms of power, status, and social distance. Similarly, the viewer of an image can be positioned as a participant in a communicative exchange and social interaction (Kress & van Leeuwen, 1990). The image can position the viewer in terms of status and power and in terms of inclusion/exclusion and social distance. These social relations between the image and the viewer are realised by the means of the angle (high or low; frontal or oblique) and the shot distance (close, medium, or long).

In terms of social hierarchy, status and power, the viewer is positioned as superior by being shown images of objects and people from a high angle. The viewer is positioned as inferior when images are shown from a low angle. In terms of inclusion/exclusion, the viewer is positioned as being included in the range of represented participants by the frontal angle and excluded from it by an oblique angle. In terms of social distance, the viewer is positioned by such means as the shot distance. The viewer is positioned as

involved in personal, or intimate, relations with the represented object via a close shot. The viewer is positioned as being in less close (more distant) relations with the represented object via a medium shot. The viewer is positioned as being in very distant relations with the object via a long shot.

Not all images can position the viewer in terms of social hierarchy and distance. According to Kress and van Leeuwen (1990), only images with perspective (perspectival images) position the viewer and the participants represented in the image in terms of social relations. The perspective is a built-in point of view selected for the viewer by the artist. Therefore, the viewer is directed to see the represented objects as the maker of the image wants him/her to see it:

> The perspectival image compels the viewer to become, together with the institution that has produced the image, an 'us' with respect to a 'them' or an 'it' – that is, with respect to the participants represented in the image. (Kress & van Leeuwen, 1990, p. 32).

Interface images are not perspectival images. Also, they do not typically display human or human-like participants. Therefore, they do not position the viewer in relation to the represented participants in terms of social relations. Nevertheless, they still position the user as a participant in a social interaction, although this positioning is not in relation to the shown participants but in relation to the program/software. The interface images position the user and the program as participants in a social interaction by assigning to them particular speech roles.

Kress and van Leeuwen (1990) suggest that images showing people or people-like characters (portraits, photographs) position the viewer as a participant of a communicative exchange (an exchange of demands and offers). The demand-offer relations between an image and its viewer are realised by such means as the presence/absence of a gaze at the viewer. The demand is realised by a gaze at the viewer. The absence of a gaze at the viewer is interpreted as an offer. I suggest that interface images can also be interpreted as establishing demand-offer relations, although they do not typically show people or people-like participants. They can be interpreted as offers due to the fact that they show 'objects' from which the viewer/user is invited to choose. I also suggest that the interface images position the user and the program as unequal participants in interaction. The user is positioned as a more powerful participant due to the absence of the reciprocity of speech

roles: the program is always offering goods and services while the user is always positioned as demanding goods and services.

The analysis of ideational meanings created in linguistic texts and images enables critical discourse analysts to examine a text as a social practice of the production of versions of reality and the subjects' identities. The analysis of interpersonal meanings enables analysts to examine a text as a communicative practice that contributes to the production of social subjects by positioning them in terms of power, status, and social distance. However, the analyses of the ideational and interpersonal meanings do not enable the analyst to explore a text as a site/practice of ideological contestation manifested through the interaction and legitimisation of discourses and particular discursive constructions. In the following subsections, I develop tools for the analysis of the interaction, legitimisation and naturalisation of discourses in computer-mediated texts.

4.4.4 Interdiscursivity

The analysis of texts in terms of interdiscursivity is one of the most problematic areas within the fields of critical discourse analysis and social semiotics (Fairclough, 1992; Lemke, 1995). In his overview of the studies of discourse informed by the critical social theory, Fairclough argues that systemic functional linguistics, critical linguistics, and social semiotics have offered highly elaborated systems of categories and tools for the analysis of texts as social practices of the construction of subjects and reality. He also argues that they have not provided equally elaborate systems of categories and tools for the analysis of texts as sites of ideological contestation manifested via an interaction of discourses (Fairclough, 1992).

I believe that there is at least one example of an elaborate system of categories for an analysis of texts as realisations of the interaction of discourses. The theoretical foundations of this system – the concepts of utterance, language as a social practice, and monological and dialogical discourses as two different ways of social (ideological) interaction – have been developed in Voloshinov (1986) and Bakhtin (1981, 1984, 1986). Voloshinov has also offered a system of categories for an analysis of reported speech as the manifestation of the speaker's relationship towards the words of the other. He also interpreted reported speech as the manifestation of an interaction of discourses. Voloshinov interprets different types of reported speech (direct, indirect, and others) as the linguistic manifestations of a reporter's attitudes towards the words of the other and as the means of

positioning the reported and the reporting discourses in relation to each other. Voloshinov's categories may be particularly helpful in a study of linguistic texts containing reported speech. Due to the fact that such texts are not particularly characteristic of children's software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools, these categories can be used only occasionally in this research. Rather, my analysis of computer-mediated texts is informed by the general concept of text as an arena of the interaction of discourses developed in the works of Voloshinov and Bakhtin. Within this approach, texts are manifestations of the relational positioning of discourses in terms of their hierarchy, legitimacy, authority and power.

Such an approach enables me to use a rather elaborate system of linguistic categories and tools for an analysis of the ways that meanings, discursive constructions and discourses can be presented (or present themselves) as natural (having to be taken for granted), legitimate, and authoritative. Some of these categories can also be applied to an analysis of visual images, layouts, and multimodal texts (Janks, 1997; Kress, 2003; Kress & van Leeuwen, 1990). However, an analysis of the texts of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as instances of interaction and legitimisation of discourses requires the development of additional analytic tools. These are tools for an analysis of computer-mediated texts employing linguistic, visual, multimodal, and hypertext means. I suggest that the development of such tools can be informed by the concepts of the information unit and modality.

In the following subsections, I outline these categories as they have been developed in systemic functional linguistics; demonstrate how they have informed visual semiotics, focusing on the concept of layout as an information unit, the modality of image, and sociocultural codes; and discuss how these categories can be used in order to study CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as instances of the interaction of discourses and of their legitimisation and naturalisation. My development of the tools for the analysis of the interaction, naturalisation, and legitimisation of discourses in the electronic mode is also informed by the idea of hierarchy of the linguistic and visual modes of representation, and by the concept of hypertext as a hierarchy of texts.

4.4.5 The information unit and the spatial semiotics of layout

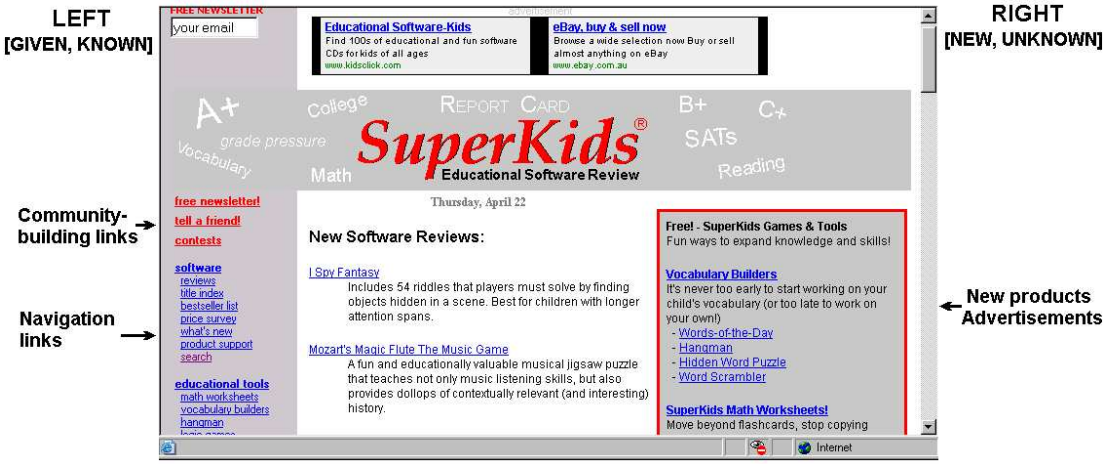
In functional grammar, the concept of an information unit is used for the analysis of a clause and a text as an interplay of the given and the new:

> The information unit is what its name implies: a unit of information. Information, in this technical grammatical sense, is the tension between what is already known or predictable and what is new or unpredictable. This is different from the mathematical concept of information, which is the measure of unpredictability. It is the interplay of new and not new that generates information in the linguistic sense. Hence the information unit is a structure made up of two functions, the New and the Given. (Halliday, 1985a, p. 296)

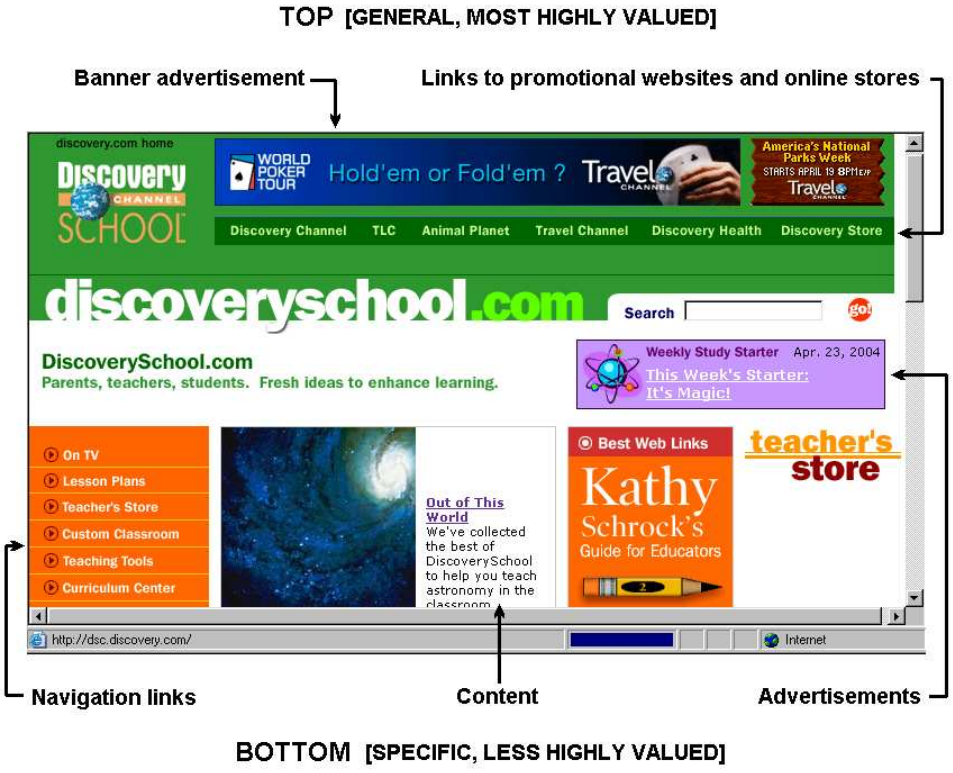
An analysis of a clause or text as an information unit shows how a text presents something as given (and, therefore, as expected to be taken for granted) and new; and how a text establishes the relationships between ideas (those of causality and subordination).

Kress and van Leeuwen (1990) have applied the concept of an information unit to the analysis of a layout. They introduce the concept of a layout as an integration code that establishes the relations between parts of the whole. The layout is the code of spatial composition; it operates in those texts in which all elements are spatially co-present, such as paintings or magazine pages. The layout produces a text by providing coherence and ordering between the meaningful elements on the basis of such structural principles as salience, balance, vectors, reading paths, framing and perspective. The vertical and horizontal structuring of the layout is a particularly important means of establishing the relationships between its elements. I use the categories developed by Kress and van Leeuwen for the analysis of the interface layout as a means of establishing a hierarchy of discursive constructions and as a means of encouraging the user to take some of them for granted (see Figure 4.6 for examples of Web page layouts).

Figure 4.6 shows examples of vertical and horizontal designs of webpage layouts. According to Kress and van Leeuwen (1990), the page layout may be approached as being divided along a horizontal axis, into left and right parts. The left part equals the 'Given' – the well established, known, understood, implicitly held. The given remains unquestioned, unchallenged, intact. The right part equals the 'New' (the to -be-established, not yet known). Therefore, the horizontal division of the layout can contribute to the legitimisation of certain discursive constructions and discourses by placing them into the right part of layout and, therefore, by presenting them as a theme or a given.



(a) Horizontal layout



(b) Vertical layout

Figure 4.6 **Webpage layout**

The webpage layout may also be divided according to the vertical axis, into the top and the bottom elements. According to Kress and van Leeuwen (1990), the top has the general meaning of the ideal, most highly valued, and salient or the abstract and general. The bottom has the general meaning of the real, less highly valued, and less salient or the empirical and specific. Therefore, the meanings created in the texts and images placed at the top of a page can be interpreted as being more highly valued, more salient, or more general than the meanings created in the texts and images placed at the bottom of the page. Another means of establishing a hierarchy of discourses in computer-mediated texts are hyperlinks and the sequential hierarchy of hypertext nodes. See, for example, analyses of CD-ROM screen layouts in Zammit (1999) and Kress (2003). Zammit focuses on positioning an image and a written text on screen and how different layouts affect the user's reading path (what sections of the screen will be read most often). Kress also discusses how screen layouts may affect reading/viewing/visiting pathways. He argues that these pathways are not predetermined by the layout only but are also affected by the visitor's interests, dispositions, and desires. Kress explores the interplay between the visually salient elements of a screen layout and the functionally important elements. For example, a block of website navigation links may be visually less salient than a larger block displaying information (content). However, this is balanced due to the functional importance of the navigation links which are most likely to be chosen (by younger visitors, in particular), as 'entry-points'.

4.4.6 The hierarchy of hypertext

In a study of such hyperlinked texts as a CD-ROM encyclopaedia or a website, it is necessary to take into account that hypertext is not a conglomerate of texts. Due to the hierarchy of hypertext links, and due to their asymmetry in terms of the forward-back movement, such hypertexts as a website or a CD-ROM encyclopaedia are hierarchical structures in which hypertext links are the means of establishing a hierarchy between different texts. Therefore, it would be incorrect to make a conclusion about such a discursive practice on the basis of a 'summary' and/or the generalisation of the analyses of separate texts without taking these texts' hierarchy into account. In order to explore hypertext as a discursive practice, it is necessary to not only reveal the discourses that are employed in the texts representing its elements but to also reveal how these discourses are positioned in relation to each other by the hypertext links.

My interpretation of hypertext links as a means of establishing relationships between discourses is informed by the concept of the hypertext link as a meaningful relation suggested by Burbules (1997). Burbules suggests that links should be seen not as mere connectives between hypertext nodes, as they usually are seen, but "as associative relations that change, redefine, and enhance or restrict access to the information they comprise" (Burbules, 1997, p.103). Links are the manifestations of the tacit assumptions and values of the webpage designer/author. They establish connections between hypertext elements (nodes) and imply meaningful relations (associations) of different types. Burbules suggests that these relations can be described in terms of some standard categories from rhetoric (metaphor, metonymy, synecdoche, hyperbole, antistasis, identity, sequence and cause-and-effect, catechresis).

Metaphoric links associate apparently unrelated textual points, thus changing the usual way of perceiving things. Metonymic links represent things as associated not by similarity, but by contiguity, as related in practice. Some links (Burbules classifies them as synecdoche) identify, or suggest, relations of categorical inclusion; they relate categorical wholes to particular instances, or parts to wholes. This relating is, as Burbules argues, vitally important because the "power to register superordinate categories to which particulars are subsumed is a special way of influencing people's conceptual and normative thinking" (Burbules, 1997, p. 112). Different categorical wholes cluster and organise things in different ways, and identifying particulars as instances is a way of regulating them. Links can also work as a means of erasing differences by putting "all phenomena within the same semic space, eliding time, space, and discursive context, making all these information points simply grist for the contemporary reader" (Burbules, 1997, p. 114).

I suggest that the hierarchy of hypertext nodes can be interpreted as a manifestation of the interaction (or, rather, the hierarchical positioning) of the discursive constructions offered in particular texts and of the discourses that shape those constructions. For example, in a CD-ROM encyclopaedia, searching, editing, and so on are constructed in: toolbar icons; roll-up menus; tool interfaces; and Help texts. In each of these texts, searching, editing and so on may be constructed differently. A toolbar icon typically represents an activity by showing a tool that is used in order to perform this activity (for instance, editing can be represented by an image of scissors; searching – by an image of binoculars). Due to this, the represented activity is constructed as a material, concrete, physical action. In the roll-up menus and the tool interfaces, the range of menu options, commands, and dialog boxes constructs an activity by structuring and ordering it. They

typically focus on the operational aspects of the activity. In the Help texts, the given activity is constructed by the choice of lexical and grammatical means. These texts may offer a rather extended and multifaceted construction of the activity.

These different constructions are not given to the user simultaneously. Some of them, such as the constructions created by toolbar images, can be viewed on the screen from the beginning. The constructions created in the roll-up menus and tool interfaces, are made available to the user when he/she chooses to perform a particular activity. The constructions created in the Help texts are available only by request, when the user encounters a problem. Users may perceive the constructions available in the first place as more important than those available 'by request' only. Taking into account that these constructions may be shaped by different discourses, an analysis of their sequential hierarchy can be used for an interpretation of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as contributing to the dominance of certain discourses and to the marginalisation of others. A website – a hierarchical structure of particular pages[1] connected to each other by the means of navigation and hypertext links – can also be approached as establishing a hierarchy of discursive constructions and of the discourses that shape those constructions.

I examine the hierarchy of discourses in software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools in order to reveal what/whose discourses and discursive constructions are positioned as the 'main' ones in these discursive practices and which discourses and discursive constructions are positioned as 'subordinate'. I use this analysis in order to explore software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as sites of ideological contestation and sociocultural change. For example, the fact that the discourse of marketing is positioned as the main (dominant) discourse on a software review website affiliated with an educational department or a university (rather than with a commercial organisation) can be interpreted as one instance of the manifestation of the colonisation of education by the market culture.

[1] See examples in Figures 5.1; 5.2; 6.6; 7.17.

4.4.7 The modality of image and the sociocultural code

Visual semiotics (Kress & van Leeuwen, 1990) provides categories for the analysis of images as constructing represented reality in terms of modality. There are several categories of modality (real, unreal, hyper-real). These categories have been developed within particular cultures and institutions and, therefore, represent the ideologies of these cultures. They can contribute to the legitimacy of representation by bringing into action the authority of those cultures and institutions. There are different visual resources that are used in order to represent images as having the modality of real or unreal: colour, texture, light and shade, form idealisation, decontextualisation, and perspective. The interpretation of pictorial realisations of modality depends on coding systems. For example, images of decontextualised objects, represented without light, shade and perspective, may be interpreted as real in one code system and unreal in another code system. This is because, as Kress and van Leeuwen (1990) point out, visual modality "rests on culturally and historically determined standards of what is real and what is not, and not on the objective correspondence of the visual image to a reality defined independently of it" (p. 52). In other words, within different code systems and cultures, the categories of realism and naturalism do not always merge.

According to Kress and van Leeuwen (1990), they merge in the case of photographic naturalism. Photographs use maximum (to a certain degree) colour saturation, differentiation and modulation. The perception of such images as real is based on the belief in the objectivity of photographic vision, and on the primacy of visual perception and the general equalisation of seeing with understanding in the Western culture. In science and technology, naturalism and realism do not merge. Here visual modality is shaped by the concept of reality called Galilean reality. According to this concept, only size, shape, quantity and motion exist; tastes, smells, sounds, and the other sensory qualities do not exist. The real is what can be known by the methods of science (counting, weighing, and measuring). Therefore, a technical line drawing, for instance, is more real than a photograph. In a scientific coding system, such schematic images have a value of real although these images represent an ideal process or phenomenon rather than a fragment of concrete, empirical reality.

In hyper-real photos that appeal to sensory qualities, the principle of reality is "just about the opposite of Galilean reality: the more the picture can create an illusion of touch and taste and smell, the higher its modality" (Kress & van Leeuwen, 1990, p. 53). In

abstract art, on the contrary, the modality of reality is shaped by the attitude that looks for a deeper truth 'behind appearances'. Within this code system, abstract expository writing is perceived as having a higher reality or truth-value than the stories about concrete, individual events and people. Accordingly, visual representations that reduce the typical, or extract from it only the essential qualities have a higher value. These are the kinds of images that are found in toolbars, menus, and navigation links of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I suggest that, due to these being schematic and abstract, the interface icons can be perceived by the users as an objective representation of the essence of represented objects. The interface images are images without perspective. Kress and van Leeuwen identify such images as objective: the images without perspective do not insert a certain, particular and subjective, point of view. Rather, these images reveal everything there is to know about represented objects, even if the laws of naturalistic depiction or the laws of nature are violated. This is so, for example, in technical drawings which represent what we *know* about things rather than what we would *see* if we were looking at them in reality. Because the attention (and the intention) of the artist is focused on the objects represented, the viewer is disregarded: "The image says, as it were: 'I am this way regardless of who or where or when you are'" (Kress & van Leeuwen, 1990, p. 32).

The fact that these images show objects 'as they are' (rather than as they are seen from a particular perspective) does not mean that they represent reality in a socioculturally and ideologically neutral, disinterested, objective way. As Kress and van Leeuwen (1990) remind us, non-perspectival images reveal everything there is to know about represented objects – or what the artist judges to be so. In other words, these images still offer a particular perspective, although this perspective is cultural and ideological rather than physical. Therefore, the interface images can and should be critically analysed as offering particular, socioculturally specific, visions of represented objects. In such an analysis, their very objectivity should be interpreted as a means of the naturalisation and legitimisation of the offered constructions.

In this section, I have developed tools for a critical discourse analysis of review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as social practices. Such an analysis requires two sets of tools. It requires tools for the exploration of these products as practices of the discursive construction of social and literate subjects. I have grounded my development of these analytic tools within such categories as ideational meaning and interpersonal meaning, and have suggested how these

meanings can be revealed when they are manifested in the linguistic and visual modes. Table 4.2 summarises these tools.

Table 4.2 **Analytic tools (1): Construction of social and literate subjects**

Analytic foci	Categories	Types of texts	Means
Construction of the product and its user: identities, needs, and expectations	Ideational meaning	Linguistic texts	Lexis Grammar: *Transitivity* *Voice* *Modality* Argumentation
Construction of the user: subject positions	Interpersonal meaning	Linguistic texts	Speech roles Modality Tenor: *Social hierarchy* *Social distance* *Affect*
Construction of literacy and the user as a literate subject	Ideational meaning	Linguistic texts Images	Lexis Grammar: *Transitivity* *Voice* *Modality* Argumentation Entities Processes Relations: *Spatial* *Temporal*

Also, this analysis requires tools for the exploration of computer-mediated texts as sites of ideological contestation and sociocultural change manifested by the interaction, naturalisation and legitimisation of discourses. My development of analytic tools for this task has been informed by such categories as interdiscursivity, textual meaning and information unit, sociocultural code, and rhetoric (logical) relations. I have discussed how these categories can be applied to an analysis of multimodal texts, layouts, and hyperlinked texts. These tools are summarised in Table 4.3.

Table 4.3 **Analytic tools (2): Interaction, legitimisation and naturalisation of discourses**

Analytic foci	Categories	Types of texts	Means
Interaction (hierarchy) of discourses	Sociocultural code	Multimodal texts	Modality The hierarchy of linguistic texts and images
	Rhetoric relations	Hyperlinked texts	Hyperlinks' meaning Sequential order of texts
Naturalisation and legitimisation of discourses	Textual meaning	Linguistic texts	Thematisation
	Information unit	Layouts	Spatial semiotics

In this section I have outlined my methods of an analysis of the discursive construction of literacy and of the user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as a social and a literate subject. My methods are based upon detailed analysis of texts. Due to the multiplicity of texts comprising review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools, it is impossible to conduct a detailed analysis of all these texts. Therefore, I use a method of 'tracking' particular discourses and subjectivity constructions in various discursive practices (see Comber, 1997; Cormack, 2004; Kamler, 1994; C. Luke & A. Luke, 1995b).

4.5 The analytic scope of the research

All researchers need to be aware of the limits of the scope of their work and their perspectives in relation to the field of investigation. In this section I clarify the particular analytic scope of this thesis in order to remind the reader of the potential scale and reach of its findings. This research needs to be read with three caveats in mind. The first relates to the interpretative character of critical discourse analysis as a methodology of social research and to the fact that discourse analytic research is a social and discursive practice itself. It is contextualised, particular and partial. The second caveat follows from my choice of the methodology (textually-oriented critical discourse analysis) and the complexity of texts selected for analysis. The third relates to the status of the knowledge obtained in this study.

Critical discourse analysis as an interpretative methodology

In order to identify the scope of critical discourse analytic research, the analyst should give an explicit account of the broader social and cultural context in which the analysis of a particular object is embedded. In this way the interpretations and conclusions can be identified as contextualised in relation to certain social practices and group interaction (Comber, 1996; Fairclough, 1992; Janks, 1995; Nixon, 1999). A context is needed because the discourse analysis is a mode of social practice. As Fairclough (1992) notes, it relates to social structures and hegemonic struggles and it is ideologically and politically invested. Therefore, the discourse analyst must be conscious of the structures that condition his/her analysis, its orientation to positions in the struggle, its outcomes, and its effects. This requires an account of the research in terms of self-reflexivity and self-critique, via an explication of the analysts' commitment to a study of a particular discourse or discourse practice and via an explication of their engagement with a certain group (Comber, 1996; Janks, 1997; Nixon, 1999).

I contextualise my research in relation to the issues generated by the growing use of ICT-mediated products in educational purposes. Taking into account that ICTs are becoming an education provider, it is important that educators and parents are aware that ICTs are not neutral. It is necessary to understand that some groups can be disadvantaged due to the uncritical acceptance of the ICTs producers and the marketers' claims regarding the educational benefits of ICT-mediated products. These issues provide a general context for the interpretation of my analysis of the discursive constructions of the user as a social and a literate subject that are offered in review websites, CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools.

Critical discourse analysis as a social practice

I see the major purpose of my study as being to help educators (and parents and children) to exercise more agency in relation to ICTs. Following Fairclough (1992), Comber (1996), Janks (1997) and others, I believe that critical discourse analysis contributes to the increase of subjects' agency by making explicit the means of presenting particular and partial visions of subjects and reality natural and legitimate and the ways in which social subjects are encouraged to accept the position of an 'ideal' reader who finds these constructions unproblematic. In this research I aim to provide an account of those discursive means that are used in computer-mediated texts in order to legitimise and naturalise particular discursive constructions and in order to encourage the user to take the offered

constructions for granted. This can inform a critical assessment and a transformation of computer-mediated discursive practices by those who might be interested in such transformations. In this way, this research offers resources for increasing educators' agency in relation to ICTs. Such an analysis requires focusing on particular texts and involves their detailed analysis on several levels (lexis, grammar, and so on). Taking into account the complexity of computer-mediated texts, I could examine only a rather small number of products (see section 4.2 for the criteria of their selection) and, for reasons of space, provide selected indicative examples of my analysis in this thesis.

Status of obtained knowledge

The third caveat of this research is related to the fact that the methodology of discourse analysis enables the researcher to explore the meaning potential of the analysed discursive practices rather than to study their actual effects on concrete subjects (Fairclough, 1992; Janks, 1997; Lemke, 1995; Nixon, 1999). The methodology of critical discourse analysis aims to investigate the social production of subjects via an analysis of how identities, subjectivities, power relations, and reality are constructed in discourse. The analyst can identify and explore the constructions that are produced in a given institutional context in a particular historical moment. The critical discourse analyst prefers to speak only about their potential impact on real people. It is beyond the scope of this research to investigate how the examined products are actually used by students and/or how the constructions of the user's identity and literacy are actually perceived. These are questions that can be asked in the studies of children's actual uses of these products in particular institutional settings.

In this project I have not aimed to assess the extent to which the examined products actually help (or, rather, as my study shows, do not help) their users to acquire literacies that are required in an information society. Such questions cannot be addressed by the kinds of methods adopted in this study. It is hoped that the results of this discourse analytic research can be used as a platform for studies of the actual uses and effects of electronic information products on children's acquisition of literacies, as well as on their subjectivities. This study examines the potential of electronic information products to constitute learners and young people in new ways, but does not empirically address the question of how much influence these products actually have on subjectivity. The contribution of this study is to provide the conceptual and analytic tools that may be

employed in studies which do examine how learner subjectivity is formed through electronic information products in both formal and informal educational settings.

4.6 Conclusion

In Chapter Four, I have described my corpus of software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I have also described the texts selected for analysis and assembled my analytic tools. In this conclusion, I summarise my discussion and outline my analytic chapters.

My corpus includes four groups of products: children's software review websites; CD-ROM encyclopaedias; online encyclopaedias; and children's Internet search tools. Their selection was governed by different purposes and selection criteria. The selection of software review websites for analysis has been informed by the idea that these websites should be approached as instances of discursive practices emerging within particular institutional settings and, therefore, reflecting views, values, and ideologies that are specific for those settings. I have distinguished between three types of software review websites: websites that represent discursive practices of software promotion and marketing (commercial websites); websites that represent discursive practices emerging within official educational institutions (websites affiliated with universities and educational departments); and websites that represent 'public opinion' (so-called independent websites created by teams or individuals). I have suggested that the examination of the different types of websites will help reveal the multiple discourses on technology that are brought to teachers and parents on the Internet.

My selection of CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools for analysis was informed by the following considerations. I needed to select products whose analysis would help me understand who their intended user is and how inclusive the offered constructions of the user may be. Therefore, I selected CD-ROM encyclopaedias, online encyclopaedias and Internet search tools promising help and success to everybody. My other purpose is to explore these products as practices of literacy teaching. Therefore, I selected those products that provide tools for conducting such literacy-related activities as report writing and project creation.

I have described software review websites, CD-ROM encyclopaedias, the websites of online encyclopaedias and Internet search tools as discursive practices shaped by

specific purposes and functions. I have categorised texts encountered on CD-ROMs and websites as representations of the practice of product promotion and of the process of using tools and interacting with the software. I have suggested how these texts can be analysed as offering and naturalising constructions of the products, their user, and literacy.

I have assembled tools for the analysis of software review websites, CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices represented by computer-mediated texts. I have put together two sets of analytic tools: (1) tools for the analysis of these texts as discursive practices of the construction of the user as a social and literate subject; and (2) tools for analysis of these texts as manifestations of ideological contestation and sociocultural change realised through an interaction, legitimisation and naturalisation of discourses.

I have developed methods of studying the discursive construction of the user as a social and a literate subject in computer-mediated texts. These methods enable me to conduct a multifaceted study of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as socioculturally specific, ideologically loaded, and selective practices for producing social and literate subjects. The suggested methodology allows me to reveal how the user is constructed as a social subject in three different ways: by offering constructions of the intended user's identity; by constructing the user and the user's needs and goals in relation to the examined products; and by positioning the user as a participant in social interaction. The suggested methodology also enables me to explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as practices of literacy pedagogy. I use it in order to examine the constructions of literacy and literacy-related activities offered in these products and interpret them as contributing to the user's acquisition of literacies required in the information age. I also use this methodology in order to examine images of literacy cultures and technologies and interpret them as being inclusive/exclusive of certain groups of users.

In the following analytic chapters, I use the developed analytic tools and methods for the analysis of selected products. The colonisation of education and of the public thinking by the discourses shaped by the logic of technological determinism is the overarching theme in Chapters Five and Six. In Chapter Five, I explore this issue by studying different types of websites as practices of the discursive construction of CD-ROM encyclopaedias and their intended consumer. In Chapter Six, I analyse how the products and their user are constructed in the process of using electronic encyclopaedias and Internet search tools. My analysis stems from two sides of one theme: the theme of

technology as powerful and as empowering. My purpose in Chapter Six is to assess who is envisioned as the user, who may be empowered by the technology and how the discourse of the power of technology is used in order to reproduce the selected discourses of education and learning. In Chapter Seven, I analyse the discursive construction of literacy and the user as a literate subject in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. My intention is to assess rhetorical claims regarding the effects of ICTs on the literacy required in the information age. I aim to reveal what literacy technologies and cultures are presented in these products, what these constructs imply about the user and who may find the offered constructions problematic. I also analyse how these products teach certain literacy-activities, and discuss whether this teaching may contribute to the user's acquisitio n of literacy required in the information age.

Chapter Five Being informed in the age of information: The discursive construction of the CD-ROM encyclopaedia and its consumers on software review websites

> With kids' edutainment software sales at a record high, you owe it to yourself to becoming an informed consumer – whether you're contemplating buying software for your child's birthday or considering purchasing a second family computer! (*The Review Zone*)

5.1 Introduction

The consumption of ICT-mediated educational products is embedded in broader discursive contexts which may contribute to the intended consumer's understanding of what these products are; what needs may be satisfied by these products; what the benefits of using them are; and who can use them and for what purposes (Nixon, 1998). Informational and promotional materials addressed to teachers and parents appear "in newspaper advertisements, catalogues and direct mail shots; in television commercials and specialist magazines; and, of course, on the World Wide Web…. and it is not always easy to tell the difference between the advertorials and the editorials (Buckingham, Scanlon, & Sefton-Green, 2001, p. 33). Therefore, an educational study of ICT-mediated products can benefit from an analysis of this broader discursive contexts. In this chapter, I study one particular discursive context. I focus on the constructions that are offered on children's software review websites that publish reviews of CD-ROM encyclopaedias. The purposes of this analysis are:

- to reveal the discursive constructions of the visitors of children's software review websites, CD-ROM encyclopaedias, and their intended users;
- to critically analyse the offered constructions of the software review websites' visitors and the CD-ROM encyclopaedias' intended users as inclusive/exclusive of some groups of visitors and users; and

- to show how the offered constructions are legitimised and naturalised.

My overall purpose in this chapter is to study how the texts encountered by a consumer in the process of becoming informed about CD-ROM encyclopaedias may affect the consumer's perception of these products. I begin my examination of the discursive construction of the CD-ROM encyclopaedia by analysing search queries that can be created and website descriptions that can be obtained in the process of Internet searches for websites publishing CD-ROM encyclopaedia reviews (section 5.2). In section 5.3, I examine software review websites as discursive practices that construct the intended visitor, the reviewed products, the reviewer, and the review website. I focus on the texts displayed on the review websites' homepages and site maps; the texts representing tools for software review searching; and the texts displayed on the 'About Us' and similar pages. In section 5.4, I focus on CD-ROM encyclopaedia reviews and analyse the discursive constructions of the review reader, the CD-ROM encyclopaedia, and its intended child user. In the final section, I summarise the analytic results.

5.2 Searching the Internet for review websites

In this section, I analyse texts that can be encountered in the process of searching the Internet for review websites, such as search queries, lists of search results, and websites' descriptions. The analysed texts were obtained in the process of my experimental searches for information about CD-ROM encyclopaedias.

5.2.1 Search queries and search results

In order to find information on the Internet, people may use Internet search engines and Web directories.[1] The process of searching begins with formulating a search query. A search query is a "word, a phrase or a group of words, possibly combined with other syntax used to pass instructions to a search engine or a directory in order to locate web pages"

[1] A search engine is a "server or a collection of servers dedicated to indexing internet web pages, storing the results and returning lists of pages which match particular queries. … Some of the major search engines are Altavista, Excite, Hotbot, Infoseek, Lycos, Northern Light and Webcrawler. … The term Search Engine is also often used to describe both directories and search engines." ("Search Engine Terms", 1999). A Web directory is a "server or a collection of servers dedicated to indexing internet web pages and returning lists of pages which match particular queries. Directories (also known as Indexes) are normally compiled manually, by user submission (such as at whatsnew.com), and often involve an editorial selection and/or categorization process (such as at LookSmart and Yahoo)." ("Search Engine Terms", 1999).

("Search Engine Terms", 1999). Due to the quantity of information on the Internet and because of the way in which search engines work, it is very important to formulate search queries that are both inclusive and discriminating in order to include all relevant and exclude irrelevant sources. In the instructions addressed to the user of Internet search tools, the user is informed that successful searching depends on the searcher's ability to formulate a search query correctly, which means that the information searcher has to be able to identify his/her information needs and goals and to use his/her knowledge of the broader information context. Without this knowledge, the information searcher may fail to formulate those search queries that would result in finding the required information.[2] These rules and conditions of successful information searching are formulated within the domain of information science and, in particular, within the field of the studies of information searching in the electronic environment (T. Wilson, 2000). Models of human information behaviour and concepts of information literacy that have been developed within cognitive science and information science inform these rules. Within these fields, information searching is approached as a cognitive rather than a social activity.

Another approach in the studies of information searching is informed by the postmodern view of knowledge as a social construction (Foucault, 1972) and by the idea of the role of social networks within knowledge and information access (Davenport & Hall, 2002; Lievrouw & Farb, 2003; Olsson, 1999). Within this approach, information searching is understood as a social process of becoming affiliated with particular communities and sharing concepts and discourses developed within particular domains of knowledge and practice. From this perspective, the formulation of a search query is an act of the searcher's affiliation with a particular knowledge and/or discourse community. I adopt this approach to information searching in this study. I examine the texts of search queries and search results that can be formulated and obtained in the process of searching the Internet for CD-ROM encyclopaedias' reviews. I analyse these texts as constructing the object of the search and the searcher as a member of a particular knowledge/practice community.

The texts for analysis were obtained in the process of using *Google* for finding CD-ROM encyclopaedias' reviews. *Google* is promoted by its creators as being an objective way to find high-quality websites. According to its creators, this objectivity results from

[2] For example, in order to find a website that publishes CD-ROM encyclopaedias' reviews it may be more useful to enter such a query as `<reference software>` rather than `<CD-ROM encyclopaedia>` (see my analysis below of the search results for both queries). The fact that `<reference software>` is a more successful query may indicate that the majority of review websites are produced within communities that consider encyclopaedias published in CD-ROM format as pieces of software rather than as encyclopaedias.

the usage of automated search methods that "make human tampering with our results extremely difficult" (*Google*, "All About Google", 2000).[3] My analysis suggests, however, that the automated methods of a search do not eliminate the significance of the social in information searching.

In order to find information about CD-ROM encyclopaedias, I experimented with five search queries. All five queries contained the words *children* and *education*, and each query contained different words for referring to the encyclopaedias published in electronic format. My search queries were:

```
<children education electronic encyclopaedia>
<children education CD-ROM encyclopaedia>
<children education electronic reference work>
<children education electronic reference product>
<children education reference software>
```
[4].

First, I used `<electronic encyclopaedia>` in my search query. I believed that this query was both inclusive and discriminating and that I would get information about encyclopaedias published in different electronic formats (CD-ROM, online, and DVD-ROM) and designed as educational aids for children and school students. This query resulted in a list of links to more than 7000 information sources. The majority of those links[5] were to the websites of online encyclopaedias (mainly to *Columbia Electronic Encyclopedia*) rather than to websites that provide information *about* encyclopaedias.

In order to make my search more specific, I tried `<CD-ROM encyclopaedia>` as a search query. This search query resulted in a list that contained about 1260 matches. On the one hand, this query appeared to be quite successful: the list of search results contained links to websites providing information *about* CD-ROM encyclopaedias, including educational resources websites and software review websites. On the other hand, this search query appeared to be not particularly discriminating: the majority of the search results were links to websites providing information about both CD-ROM and online encyclopaedias (mainly *Microsoft Encarta Online* and *Britannica Online*). Also, the search results included links to websites of online stores and publishing companies.

---

[3] Such claims have been called into question by reports that users have found a way to modify HTML pages to improve their ranking and to increase the chance of them being placed near the top of search results - for example, reported cases of "Google bombing" (see http://en.wikipedia.org/wiki/Google_bomb). Google bombing is practised by website creators to improve the chances that Internet users searching for a particular word or phrase will encounter their websites.

[4] Further in the text, I omit words *children* and *education* in the examples of my search queries.

[5] I examined only first twenty matches in each list of search results.

Using such search queries as <electronic reference work> and <electronic reference product> resulted in relatively short lists of 56 and 92 search results respectively. Each list provided links to specific kinds of information sources and to a specific domain of knowledge and practice. The <electronic reference work> search query resulted mainly in links to electronic journals for librarians. The <electronic reference product> search query resulted mainly in links to websites of such publishing companies as The World Almanac and Grolier.

Using the <reference software> search query resulted in a list of more than 8000 links. In spite of its length, the obtained list of search results was quite useless in terms of getting access to review websites. Many of these search results were links to online stores, such as *Amazon.com*, rather than to review websites. Table 5.1 summarises the search results.

Table 5.1 Search queries and search results[6]

Search query	Number of Matches	Types of information sources[7]	Knowledge domain
Electronic encyclopaedia	7700	The websites of online stores and publishing companies	Marketing, *e*-commerce Publishing industry
CD-ROM encyclopaedia	1260	The websites of online stores and publishing companies Educational resources websites	Marketing, *e*-commerce Publishing industry Education
Electronic reference work	56	Electronic journals	Information science and librarianship
Electronic reference product	92	The websites of publishing companies	Publishing industry
Reference software	8030	The websites of online stores	Marketing, *e*-commerce

Table 5.1 shows that using differently formulated search queries results not only in access to a different number of information sources (from tens to thousands) but also in access to different types of information sources. It results in access either to sources providing information, such as professional electronic journals and websites of educational institutions, or to sources used for market communication, such as the websites of online stores and publishing companies. Using different search queries also results in accessing

[6] The table is based on the analysis of the first twenty search matches obtained in the process of searching the Internet with *Google* in November 2003.
[7] This column shows the most common types of information sources about encyclopaedias published in the electronic format.

different domains of knowledge and practice, such as information science and librarianship, publishing industry, e-commerce and marketing, and education. Within each of these domains, both the object of search (the CD-ROM encyclopaedia) and the information searcher are constructed differently. The CD-ROM encyclopaedia can be constructed as: a CD-ROM edition of a reference work; a piece of software; a product for sale; or an educational resource. Accordingly, the searcher is constructed as: a user of reference works published in the electronic format; a software user; a buyer and a consumer of technological products; and a learner or a teacher.

5.2.2 Review website description

The review websites' descriptions are provided together with the names and addresses of review websites. A description is a "[d]escriptive text associated with a web page and displayed, usually with the page title and URL, when the page appears in a list of pages generated by a search engine or directory as a result of a query" ("Search Engine Terms", 1999). The following is an example of a link and its description obtained in the process of searching the Internet with *Google*:

> GameZone's KidZone! – The Software Site for KIDS!!!
> ... about children's software! Our goal is to educate kids and parents about the
> wide array of software on the market today. ... Kids Club. JUST REVIEWED Barbie ...
> www.gzkidzone.com/ - 20k - Cached - Similar pages
> (*Google*, "GameZone's KidZone!", 2004)

The first line of the quoted text shows the website's title. The second and the third lines show the website description. The last line shows the website address.

Using an Internet search engine, such as *Google*, is not the only way of obtaining information about CD-ROM encyclopedias on the Internet. There are other ways of finding, or being provided with, such information. For example, one can be provided with links to review websites when visiting an online store. The visitor of an online store is directed to some review websites in order to help him/her make an informed decision about purchasing a product. The provided links are usually accompanied by descriptions of the websites to which the visitor is being directed.

For instance, *Amazon.com* provides a link to the *Children's Software Revue* website. In the description, *Children's Software Revue* is recommended as an independent, objective, and reliable source of information about children's software. The *Amazon.com* visitor (and a potential buyer) is informed that *Children's Software Revue* does not aim to promote products and that it was established by three teachers who "witnessed the explosion in children's software over seven years ago" and "saw the need for comprehensive, objective reviews of this quickly changing medium" so that "more of us can tap the amazing potential of new media for children" (*Amazon.com*, "Children's Software Revue", 2002). However, the *Children's Software Revue*'s independence and objectivity can be questioned, since the *Amazon.com*'s link to this periodical's website is also an advertisement of this particular periodical. The *Amazon.com* visitor is informed that *Children's Software Revue* is available at an "affordable price: just $42 for 6 issues (overseas dispatch is included in this price)" (*Amazon.com*, "Children's Software Revue", 2002).

Using small Web directories is another way of finding information on the Internet. Small Web directories provide links to selected websites that focus on particular issues and target a particular audience. Some educational resources websites affiliated with educational institutions and government organisations may function as small Web directories. For example, an educational resources website, *NWREL's Northwest Educational Technology Consortium*, provides links to websites that publish reviews of educational electronic products, such as *Children's Software Revue*, *Way Cool Software Reviews*, *School House Software Review*, and others.

The links provided on educational resource websites can be interpreted as connections that tell something about both the host site and the recommended site. For example, they can be interpreted as an indication of recommended websites' credibility. The very fact of finding a review website's address on an official website providing information about educational resources may encourage the visitor to perceive the review website as a reliable source of information.

Some websites are recommended both on educational resources websites and on the websites of online stores and publishing companies. It is important to consider *how* the same review website is described and recommended on the different types of websites. It is particularly important that commercial websites are marked as such, so that the searcher is able to assess their credibility. Compare, for example, the descriptions of software

evaluation websites that are recommended to teachers, school librarians, parents and students on *ISLMC, the Internet School Library Media Center*[8] website:

> EvaluTech
> Provides professional reviews of over 5000 instructional materials.
> From North Carolina Department of Public Instruction and the Southern Regional Education Board.
> Children's Software Revue
> Reviews, directory of stores; has Children's Software Finder
> SuperKids Educational Software
> Commercial site
> (*ISLMC, the Internet School Library Media Center*, "ISLMC Acquisitions & Selection Resources for School Libraries, K-12", 2002)

In the example above, *Children's Software Revue* and *SuperKids Educational Software*[9] are clearly identified as commercial websites ('commercial site'; 'reviews, directory of stores'). They are distinguished from a non-commercial website *EvaluTech*, which is affiliated with a governmental educational department.

Such a clear identification of review website types is not always provided. For example, the *SuperKids Educational Software Review* website is recommended as a source of impartial information on some other websites:

> SuperKids Software Review – provides impartial reviews of children's educational software (*Education hot-links*, 2001)

> Superkids Educational Software Review – The introduction on the homepage says it all: Welcome to SuperKids, an impartial source of information for parents and teachers – children's software reviews based on objective analyses by parents, teachers and kids, advice that will improve your child's education and save you money, the place to come before you buy! The most comprehensive site on the topic we have seen thus far! (*Tech Corps*, "Children's Software", 2002)

Both descriptions are close to the way that *SuperKids Educational Software Review* introduces itself. It introduces itself as an independent publication, on the grounds that it

[8] *ISLMC, the Internet School Library Media Center* recommends itself as "a preview site for teachers, school librarians, parents and students" (*ISLMC, the Internet School Library Media Center*, "ISLMC Acquisitions & Selection Resources for School Libraries, K-12", 2002). It provides links to review websites.
[9] The full name of this website is *SuperKids Educational Software Review*. In this chapter, I also refer to it as *SuperKids*.

does not place advertisements of the products it reviews (*SuperKids Educational Software Review*, "About SuperKids", 2002).

It is not absolutely clear what type of website *SuperKids* is, as it is described so vaguely. However, even those websites that are definitely commercial are not always identified as such. For example, *DiscoverySchool.com* is a commercial website and a wholly owned subsidiary of Discovery Communications. This website promotes and sells video, print and CD-ROM educational products, and markets TV channels. It is overloaded with advertisements, 'free' product and services offers, and links to online stores (see my analysis in section 5.3). Nevertheless, the 'About Us' page describes this website as a source of information and educational resources rather than as a market place. In this self-description, the commercial nature of *DiscoverySchool.com* is hidden from the visitor:

> [*DiscoverySchool.com* provides] innovative teaching materials for teachers, useful and enjoyable resources for students, and smart advice for parents about how to help their kids enjoy learning and excel in school. (*DiscoverySchool.com*, "About Us", 2002)

DiscoverySchool.com seems to be a rather popular (frequently visited and recommended) website. *Google* listed it among the first ten search results for `<children's software review>`. Links to *DiscoverySchool.com* can also be encountered on educational websites. For instance, a link to *DiscoverySchool.com* was provided on *EdNA Online*. The descriptions of *DiscoverySchool.com* provided in both *Google* and *EdNA* do not differ significantly from the *DiscoverySchool.com* self-description provided on the above quoted 'About Us' page. Both *Google* and *EdNA Online* present this website as a source of information and educational resources rather than as a commercial enterprise aiming at the promotion and sales of a company's products and services. Compare:

> Welcome to DiscoverySchool.com! ...
> DiscoverySchool.com offers clipart and free teaching resources. You can also find personalized classroom materials at DiscoverySchool.com. (*Google*, "Welcome to DiscoverySchool.com", 2004)

> DiscoverySchool.com offers homework help tools, information, encyclopaedias, and stories for math, science, English and social studies. (*EdNA Online*, "DiscoverySchool.com", 2002)

Google is an automated Internet search engine that uses websites' descriptions provided by websites themselves during registration. It is not surprising, therefore, that the description provided on *Google* does not differ significantly from what *DiscoverySchool.com* says about itself. *EdNA Online* is a network of education services funded by Australian governments. It is organised around Australian curricula, provides free tools for Australian educators, and functions as a small Web directory that helps Australian educators find educational resources on the Internet. It may be expected that the latter task involves informing educators about the commercial or non-commercial nature of websites which provide such resources. Nevertheless, as the above quotes show, the description provided by *EdNA Online* is masking rather than highlighting the commercial nature of *DiscoverySchool.com*, as the descriptions provided by *Google* and *DiscoverySchool.com* itself do also.

The educator visiting *EdNA Online* could get some information from the top-level domain[10] – *.com* – shown in the recommended website's title (*DiscoverySchool.com*) and address (*http://school.discovery.com*). However, in order to do this the visitor needs to be Internet literate. The visitor needs to be aware of the fact that there are different types of information sources on the Internet; to know how these differ in terms of the credibility of information provided; and to be able to decode Internet addresses as containing information about website types (see Alexander & Tate, 1999). Even in this case, the visitor of an official educational resources website, such as *EdNA Online,* can expect that the recommended websites have been selected from a particular perspective, which is to provide information about educational resources rather than to promote them.

Indeed, the creators of educational resources websites often state clearly that their selection of information sources is conducted from a particular perspective and is governed by certain purposes. They advise their visitors that they provide links to 'safe' or 'family-friendly' websites (websites that do not contain any materials which could be harmful to children). Having selected websites that are safe, the creators of educational resources websites do not always find it necessary to pay attention to the types of websites they recommend and provide links to. Rather, they simply reproduce the self-descriptions provided by the selected review websites. Often, the texts of these descriptions construct

[10] Domain is a "sub-set of internet addresses. Domains are hierarchical, and lower-level domains often refer to particular web sites within a top-level domain. The most significant part of the address comes at the end – typical top-level domains are .com, .edu, .gov, .org (which sub-divide addresses into areas of use). There are also various geographic top-level domains (e.g. .ar, .ca, .fr, .ro etc.) referring to particular countries." ("Search Engine Terms", 1999).

the intended visitor as a consumer of technological products and a concerned buyer who is overwhelmed with the quantity and diversity of technological products in the market and, therefore, needs expert advice on what is the best.

The reproduction of these descriptions on official educational websites may mean more than just a failure to provide full information regarding the recommended websites' credibility and objectivity. It means that educational resources websites are becoming part of companies' public relations and market communication strategies, contributing to the promotion of products and services in the same way as, for example, the analytic papers in serious journals do (Lyon & Silverstein, 2001). This practice may also be interpreted as the manifestation of a broader process of the marketisation of education. This process is characterised by the penetration of the discourses of marketing, the ICTs industry, and consumerism in the educational field and the changing roles of educational institutions and subjects.[11]

The texts of search queries and search results are not neutral. They offer particular discursive constructions of the search object and the searcher. They construct the object of the search differently by connecting it to information that is generated within different domains of knowledge and practice. The CD-ROM encyclopaedia can be constructed as a market product, as a reference work, or as a piece of software depending on the kinds of websites that are made accessible in the process of searching. The texts of search results may also construct review websites as objective and reliable sources of information.

One of the ways in which review websites are constructed as objective and reliable sources of information is by providing links from official educational resources websites to commercial and independent review websites without an identification of these websites' types. By providing links to review websites without clear identification of their types, educational websites may contribute to the perception of the commercial websites as legitimate and neutral in the educational context. What are these constructions? In the next section, I examine the constructions of the intended visitor, the reviewed product, the reviewer, and the software evaluation that are offered on the commercial and 'independent' review websites.

[11] In relation to similar processes characterising the colonisation of the discourse of education by the discourses of marketing, quality, managerialism and the ICTs industry, see Bigum and Green (1993), Comber (1997), Fairclough (1993), Gee (2001), and Kenway (1995).

5.3 The review website

In this section, I focus on three websites: a commercial website *DiscoverySchool.com*; an independent periodical *SuperKids Educational Software Review*; and *The Review Zone*, a children's software review website created by an individual (parent). I examine the texts displayed on the pages that precede the visitor's reading of the CD-ROM encyclopaedias' reviews. My aims are: to reveal the discourses employed in these texts; to understand whether there is a difference between the discourses employed on commercial and independent websites; and to show how the offered constructions are presented as legitimate, neutral, and natural.

In order to obtain a review of a CD-ROM encyclopaedia, the review website's visitor may have to move through a number of pages. These are such pages as the homepage; pages that offer tools for navigating the site and for searching information (site maps and index pages); and pages that tell the visitor about the website, the software evaluation, and the reviewers.

For example, the visitor to *DiscoverySchool.com* has to move through at least three pages (Figure 5.1): homepage (Step A); site map (Step B); and a page providing an index of the reviewed products (Step C). After having chosen a particular product review title, the visitor uses it as a link to the page displaying the review text (Step D). The visitor may also wish to go to the 'How We Rate Products' page in order to get detailed information about the website and about children's software reviewing and rating criteria.

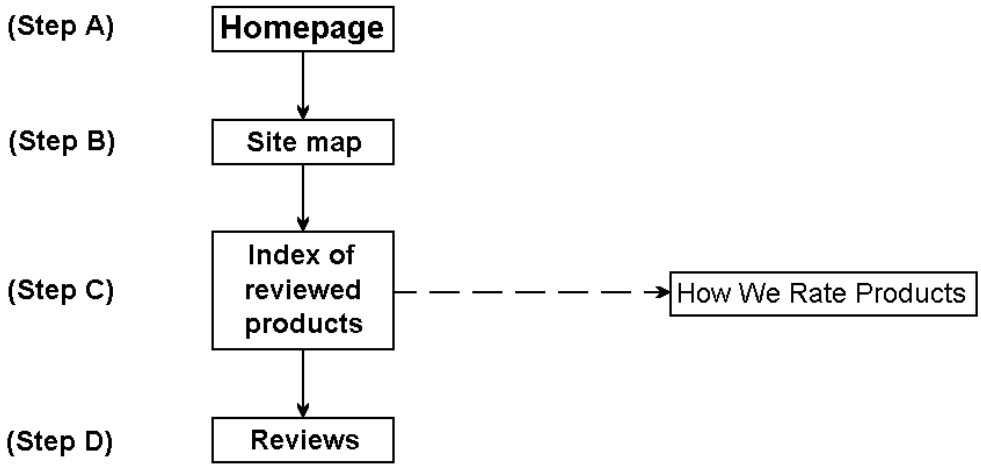


Figure 5.1 DiscoverySchool.com: the website structure

The visitor to the *SuperKids Educational Software Review* website has to move through at least four pages (Figure 5.2) in order to reach a review of a CD-ROM encyclopaedia. These pages are: homepage (Step A); site map page (Step B); and pages that provide search tools, such as subject and title indexes of the reviewed products (Step C and Step D). After having chosen a particular product review title, the visitor uses it as a link to the page displaying the review text (Step E). Also, the visitor may wish to go to the 'About SuperKids' and 'About SuperKids Reviews' pages in order to get more detailed information about the website and about software reviewing.

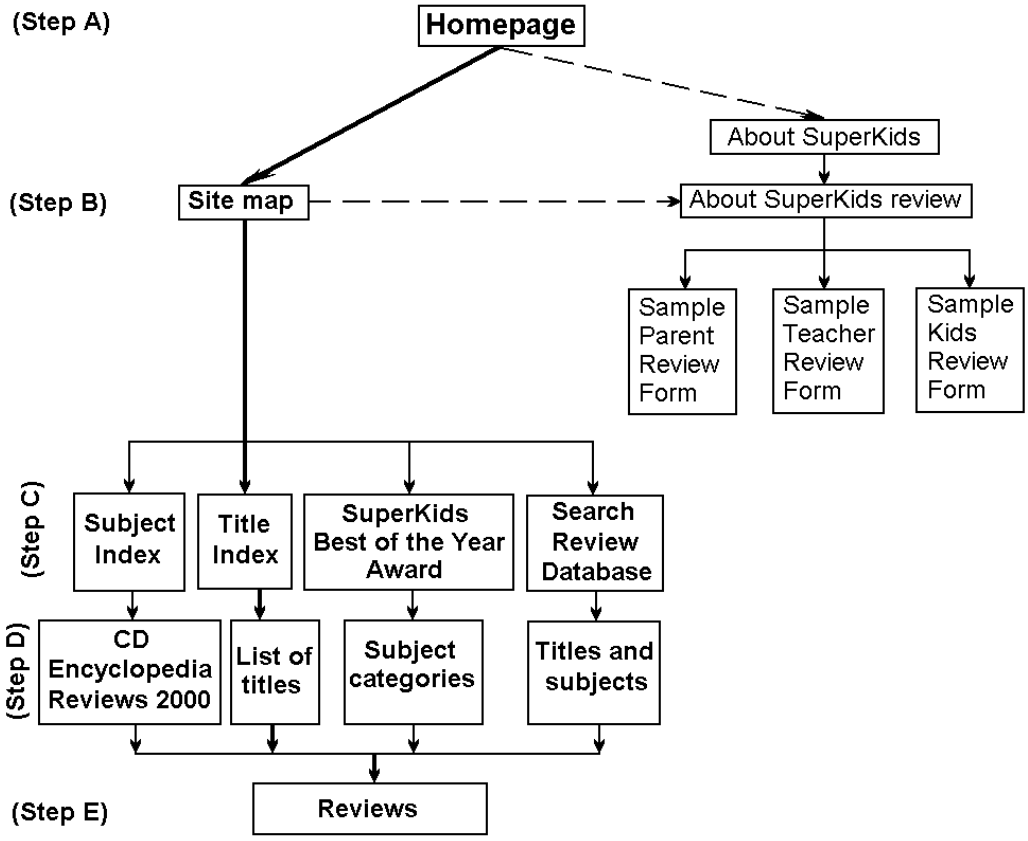


Figure 5.2 SuperKids: the website structure

In this section, I first investigate how the intended visitor of a review website is constructed in the texts displayed on the homepages and the site map pages. I then examine how the reviewed products are constructed in the websites' indexes and discuss how indexes may ascribe certain needs to the website's visitor. Finally, I consider constructions of the reviewer and constructions of software evaluation in the texts on 'About Us' and similar pages, such as software evaluation forms.

5.3.1 Homepage and site map: constructing the visitor

The homepage and the site map page of a review website give the visitor an idea about the site's content, show the visitor which products are reviewed. They also provide tools facilitating the websites' navigation. They usually display multiple and heterogeneous texts, each of these contributing to the construction of the intended visitor.

DiscoverySchool.com

The homepage of a commercial website *DiscoverySchool.com* (*DiscoverySchool.com*, "Homepage", 2003) consists of the following elements: the top, the content, and the margins (see Figure 5.3). The texts on the top and inside the right-hand margin of the homepage usually display advertisements and navigation links. The links direct the visitor to websites promoting The Discovery Networks[12] TV channels and to the Discovery Store. These services are also advertised in the texts placed in the content section of the homepage. The content section of the *DiscoverySchool.com* homepage displays the website heading; identifies the intended visitors as parents, teachers and students; and formulates an offer (ideas which relate to learning):

> **DiscoverySchool.com**
> Parents, teachers, students. Fresh ideas to enhance learning.

This offer is further specified in the descriptions of links displayed in the content section of the DiscoverySchool.com homepage. For example:

> Out of This World
> We've collected the best of DiscoverySchool to help you teach astronomy in the classroom.

The left-hand margin displays navigation links to other pages and sections of the *DiscoverySchool.com* website. The left-hand margin navigation links are not accompanied by any descriptions. This can be interpreted as an implication of the fact that this website has regular visitors who may not need to be advised about or, rather, be attracted to its content.

[12] "The Discovery Networks – Discovery Channel, TLC, Animal Planet, Travel Channel, Discovery Health - provide continuing support to Cable in the Classroom by offering educational programs for grades K-12" (*DiscoverySchool.com*, "On TV", 2004).



Figure 5.3 DiscoverySchool.com: homepage

The *DiscoverySchool.com* homepage consists of the following elements: the left-hand margin, the top section, the content section, and the right-hand margin. The left-hand margin identifies the intended visitor, formulates an offer, and displays navigation links to the website's pages and sections within the *DiscoverySchool.com* website. The top section and the right-hand margin display advertisements and navigation links directing the visitor to websites promoting The Discovery Networks TV channels and to the Discovery Store. These services are also advertised in the texts placed in the content section of the homepage. The content section displays offers of children's software and other products.

On the contrary, the links provided or, rather, advertised, in the content section can be interpreted as addressed to a newcomer. By presenting links in these two ways – with and without advertising the materials that can be found if the visitor follows those links – the site creators position the visitor as their usual client or as a newcomer and potential client. This positioning may also serve as one of the ways of the website's self-promotion. The fact that the same information can be reached using shortcuts implies that there are people who visit this website on a regular basis. It implies that there is, indeed, a community of visitors or, rather, a clientele for the services provided on *DiscoverySchool.com*.

The site map of *DiscoverySchool.com* (*DiscoverySchool.com*, "Site Map", 2003) indicates the visitors' anticipated identities by the titles of the website's major sections: 'For Teachers', 'For Parents', and 'For Children' (Figure 5.4). Each section displays a particular set of links that can be interpreted as constructing the intended visitors' interests and needs. Each section contains different links. The only links that can be considered common for all three target groups are the TV-advertising links:

- 'TV To See' – placed under 'For Students' heading;
- 'On TV' – placed under 'For Teachers' heading; and
- 'Smart TV' – placed under 'For Parents' heading.

These links construct teachers, students and parents as being TV viewers or, rather, as clients of The Discovery Networks, since the offered links direct the visitor to the websites that promote this particular company's channels. However, even these common links construct each group of anticipated visitors – students, teachers and parents – differently. Students are (strongly) advised about TV to see, which implies that students are TV watchers who are not able to correctly choose what to watch and need expert guidance. Parents are provided with the offer of 'smart' TV, which constructs parents as being in search for TV channels that are 'smart' and, therefore, educational rather than just entertaining. Teachers are neither advised nor provided with an offer. They are simply informed about what is on TV, which implies that the teachers are also regular clients of The Discovery Networks TV channels. This also implies that the teacher visitor can make a professional decision regarding what to watch (unlike parents and students).

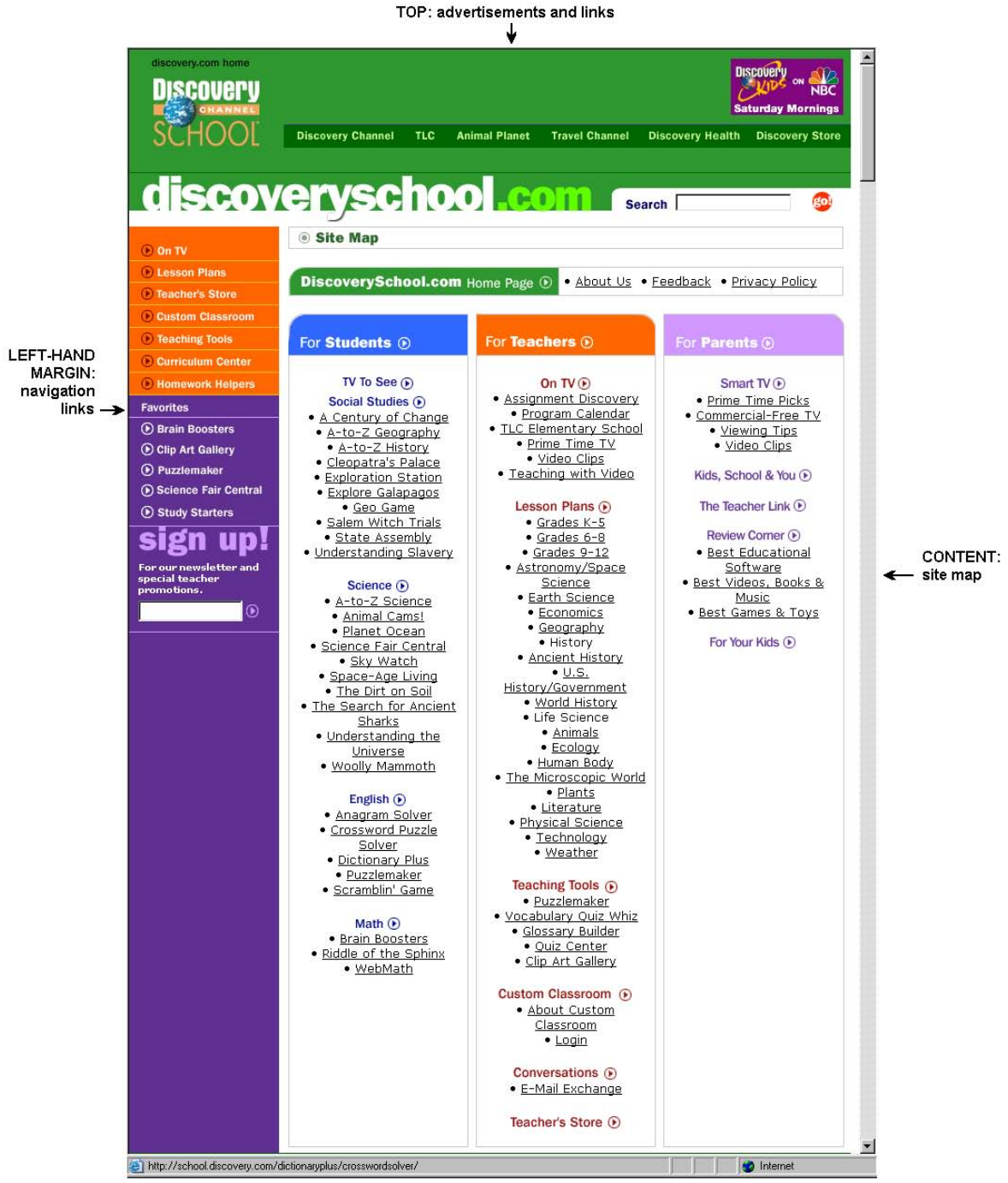


Figure 5.4 DiscoverySchool.com: site map

The *DiscoverySchool.com* site map page consists of the left-hand margin, the top section, and the content section. The left-hand margin displays navigation links to the website's sections. The top section displays advertisements and links to The Discovery Networks and to the Discovery Store. The content section displays the *DiscoverySchool.com* site map.

Apart from the TV-focused links, there are no common links in the sections for students, teachers, and parents. This suggests that students, teachers and parents are constructed as having completely different needs and interests. The links placed under the 'For Students' heading imply that the student visitor needs access to resources on particular subjects and topics, such as social studies, science, English, math, Cleopatra's palace, slavery, and ancient sharks. The links 'For Teachers' imply that the intended teacher visitor is interested in lesson plans for particular grades, subjects and topics, and in teaching tools, such as 'Puzzlemaker', 'Glossary Builder' and 'Clip Art Gallery'. Also, the links construct the teacher visitor as a member of a community who may wish to exchange e-mails with other members of the community; and as a buyer who may wish to visit 'Teacher's Store'. The links 'For Parents' imply that the parent visitor needs information about 'the best' computer and media products: the best videos, books, music, games, toys, and educational software. Due to this need being assigned to the parent visitors, parents are constructed as the intended buyers of these products. The link to a page containing reviews – 'Review Corner' – is provided only under the 'For Parents' heading.

These specific constructions of the student, the teacher, and the parent are constituted within the all-embracing construction of the intended visitor as a consumer and a buyer. This construction is offered in the texts placed at the top of the site map page. These are the same texts that are displayed at the top of the homepage. The construction of the visitor as a client (consumer) and a buyer can be perceived as overarching, given that this construction is offered in the texts displayed at the top of the page. According to Kress and van Leeuwen (1990), the top element of the page layout may be interpreted as more important, general and of most value. This perception can be reinforced in the process of navigating *DiscoverySchool.com* due to the reproduction of the homepage's top texts on all other pages. The dominance of this construction is not surprising: *DiscoverySchool.com* is a commercial website created in order to promote the company's services and products.[13] I now turn to *SuperKids Educational Software Review* – a website that claims to be an independent information source.

[13] I visited *DiscoverySchool.com* between 2002 and 2004. In 2002, the site map was displayed on the actual homepage. In 2004 it was preceded by a homepage. The 2004 homepage displayed more advertisements than the 2002 homepage.

SuperKids Educational Software Review

According to its creators, *SuperKids Educational Software Review* aims to provide objective information about educational and children's products:

> Our reviews are designed to give you unbiased information to aid in your selection process. (*SuperKids Educational Software Review*, "Reviews", 2004)

> In addition to presenting unbiased, noncommercial software reviews, SuperKids also features stories and interviews on subjects related to education, technology, and parenting. (*SuperKids Educational Software Review*, "Features", 2004)

The *SuperKids* homepage[14] displays multiple and heterogeneous texts (see Figure 5.5). The texts displayed in the content section inform the visitor about new educational products:

> Math Missions: The Race to Spectacle City Arcade Grade K-2
> Key math concepts for early learners. Best for children who already have familiarity with basic math concepts, and with using a computer mouse and keyboard. (*SuperKids Educational Software Review*, "Homepage", 2004a)

These texts offer a persuasive construction of the intended readers' interests. They assume that the visitor is interested in being informed about the educational effects of new software products and about the skills and abilities that are required in order to use them. Although the intended visitor is not identified directly, the texts are addressed to parents and teachers:

> Vocabulary Builders
> It's never too early to start working on your child's vocabulary (or too late to work on your own!)

> SuperKids Math Worksheets!
> Move beyond flashcards, stop copying copyrighted workbooks, and make your own printable math facts worksheets. Have your child do one a day, and see their skills improve.

[14] I visited *SuperKids* between 2002 and 2004. Although the content of the homepage is regularly updated, the design of the homepage has not been changed since 2002.

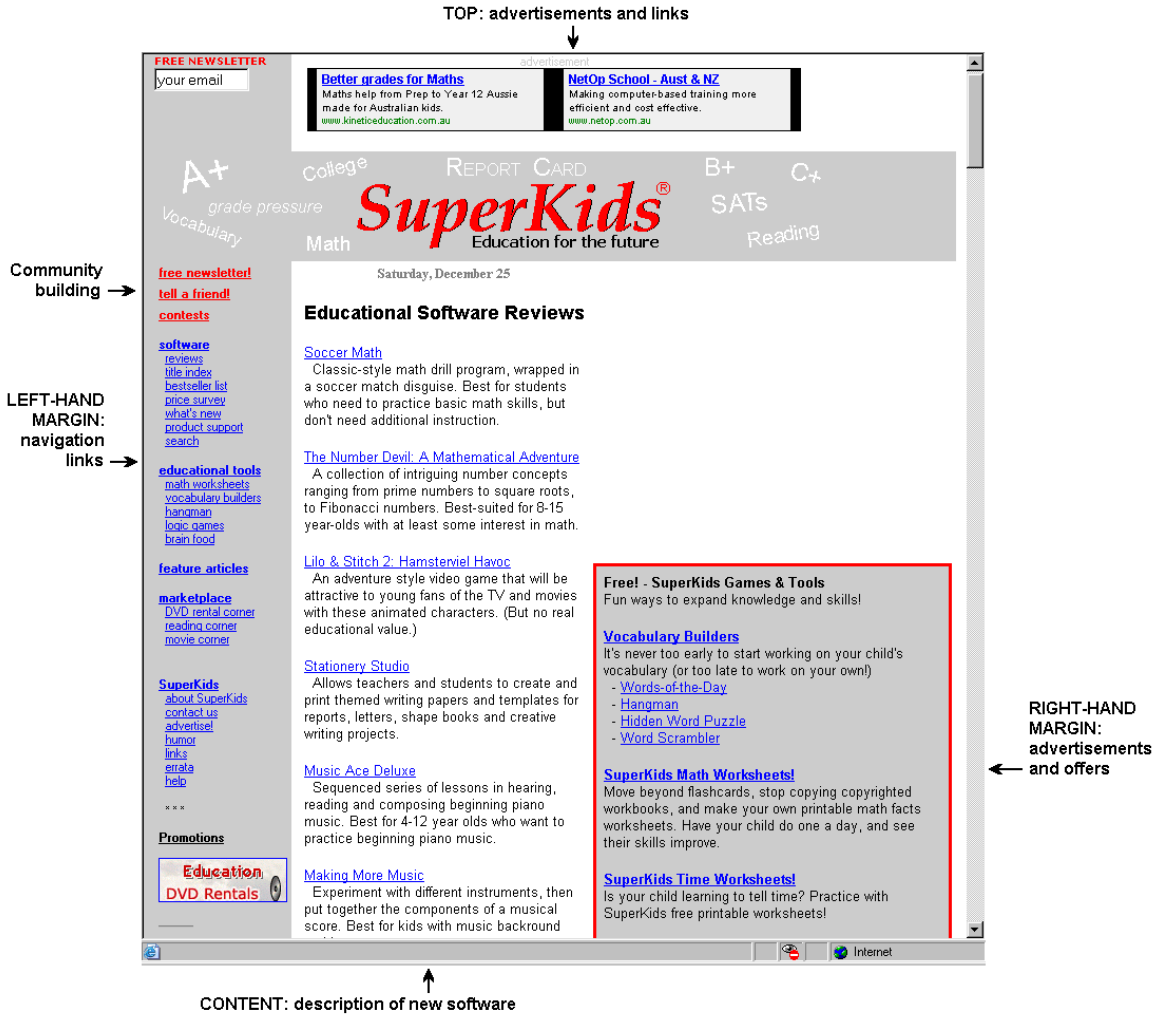


Figure 5.5 SuperKids: homepage

The *SuperKids* homepage consists of the following elements: the left-hand margin, the top section, the content section, and the right-hand margin. The left-hand margin displays navigation links to the pages and sections within the *SuperKids* website. Some of these pages and sections serve the 'community building' purpose. The top section displays advertisements of children's software and links directing the visitor to the eBay website. The right-hand margin displays advertisements and product offers. The margins and the top section compose a 'frame' in which the content section is embedded. The content section displays texts informing the visitor about new educational products.

Mission Possible World Geography

A geography quiz, cloaked in the guise of an adventure game. Best suited as a practice review tool for junior high students.

(*SuperKids Educational Software Review*, "Homepage", 2004b)

The content texts are embedded in a frame composed of multiple texts inside the margins. These texts are distributed among such sections as 'Marketplace', 'Contests', 'Price Guide', and 'Promotions'. These are the texts of: banner advertisements; promotional posters; news releases from software developers, publishers, and resellers; invitations to visit a marketplace online or win free software; offers of free educational tools and technological support; and offers of educational software, games, books and videos. These texts employ the linguistic and stylistic means typical of advertising, such as exclamatives, ellipses and attitudinal lexis. Also, they exploit the themes that are the key themes characteristic of educational software marketing: learning as having fun and ICTs as a means of improving learning and creativity (Buckingham, Scanlon, & Sefton-Green, 2001):

Free! – Educational Tools

Easy ways to build knowledge
and skills... and have some fun!

(*SuperKids Educational Software Review*, "Homepage", 2002)

Free! – SuperKids Games & Tools

Fun ways to expand knowledge and skills!

(*SuperKids Educational Software Review*, "Homepage", 2004a)

As the above examples demonstrate, the majority of texts displayed on the homepage of an independent periodical (which claims to provide unbiased information) employ the discourses of marketing and advertising. They construct this website's visitor in the same way as the texts on the *DiscoverySchool.com* homepage: as a consumer and a buyer. Similar constructions are offered on the homepage of *The Review Zone* (see Figure 5.6), a website created by an individual (a technology writer and a parent).

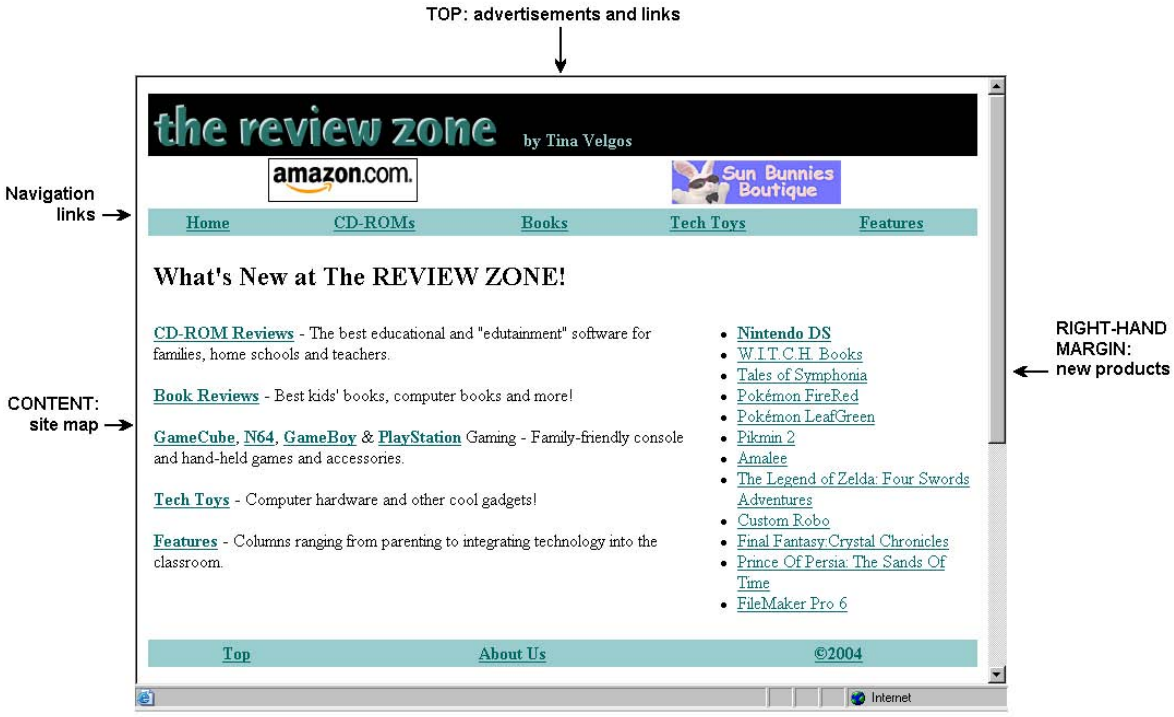


Figure 5.6 The Review Zone: homepage and site map

The Review Zone homepage consists of the following elements: the top section, the content section, and the right-hand margin. The top section displays navigation links to the website's sections and banner advertisements that direct the visitor to an online store *Amazon.com* and to the eBay store *Sun Bunnies Boutique*. The content section displays navigation links to specific sections. The links are accompanied by descriptions of these sections' content. The right-hand margin displays new products' titles. The titles may serve as links that lead to these products' reviews.

The Review Zone

The Review Zone introduces itself as a website that provides in-depth and independent reviews reflecting the needs, interests and opinions of children, their parents, and teachers:

> The Review Zone's mission is to provide in-depth reviews on "the best" kids' and family edutainment software, hardware, computer books and cutting edge technology for parents and teachers. Written by Tina Velgos, an experienced freelance technology writer and mom to two school-age children, these independent product reviews are kid-tested and parent approved! (*The Review Zone*, "About The Review Zone", 2000)

In order to reach a software review, the visitor of *The Review Zone* has to move through its homepage (Figure 5.6). The homepage consists of a top section, a content section, and the right-hand margin. The right-hand margin displays new products' titles, such as 'Final Fantasy Crystal Cronicles', 'Final Fantasy Tactics Advance', 'Sword of Mana', 'Fire Emblem' and others. The titles can be used as links leading to these products' reviews. The list of titles can also serve the purpose of product advertising.

The content section is placed under the heading 'What's New at The Review Zone!' This section is composed of links to specific sections of this website: 'CD-ROM Reviews', 'Book Reviews', 'GameCube, N64, GameBoy & PlayStation', 'Tech Toys', and 'Features'. The links are accompanied by descriptions:

> CD-ROM Reviews – The best educational and "edutainment" software for families, home schools and teachers.
>
> Book Reviews – Best kid's books, computer books and more!
>
> GameCube, N64, GameBoy & PlayStation Gaming – Family-friendly console and hand-held games and accessories.
>
> Tech Toys – Computer hardware and other cool gadgets!
>
> Features – Columns ranging from parenting to integrating technology into the classroom. (*The Review Zone*, "Homepage", 2004)

The navigation links and their descriptions imply that the intended visitor of this website is a parent or a teacher. The links and their descriptions offer a particular construction of the family home and the classroom, as well as their inhabitants. The family home and the

classroom are constructed as sites for using ICT-mediated products for education and entertainment. The family home, in particular, is presented as a place stuffed with computers, educational and edutainment software, computer books, consoles, computer games and accessories, and other 'cool gadgets'.

The top of *The Review Zone* homepage displays navigation links to the website's sections ('CD-ROMs', 'Books', 'Tech Toys', and 'Features') and banner advertisements of an online store *Amazon.com* and to an *eBay Store Sun Bunnies Boutique* (see Figure 5.7 and Figure 5.8). The banner advertisements construct the intended visitor as an online shopper and can easily transfer the visitor from this 'information-only' website to the websites of online stores. For example, within one-two clicks of the mouse (see Figure 5.7), the parent or teacher visitor to *The Review Zone* may find oneself in an online store or in a virtual boutique:

> Filled with loads of NEW TOMMY HILFIGER clothing for women and juniors and NEW PLAYBOY BUNNY t-shirts for women! You'll also find NEW Victoria's Secret lingerie and clothing; NEW Boyds Bears bunnies and more!
> (*Sun Bunnies Boutique*, 2004)

The descriptions of the items in *Sun Bunnies Boutique* construct its visitor as, most probably, a female buyer of particular companies' products (see the display of items in Figure 5.8):

> Victoria's secret nude floral cami (L) Sexy!!
> NWT authentic playboy athletic dept. pink/blk T-shirt.
> NWT Hedys Hawaiian sexy string bikini set.
> (*Sun Bunnies Boutique*, 2004)

So, the banner advertisements displayed in the top section of the website created by a parent and mainly for parents imply that the intended visitor of this website is interested not only in the products that are 'kid-tested' and 'parent-approved' but also in the products that are 'authentic playboy' and 'sexy'.

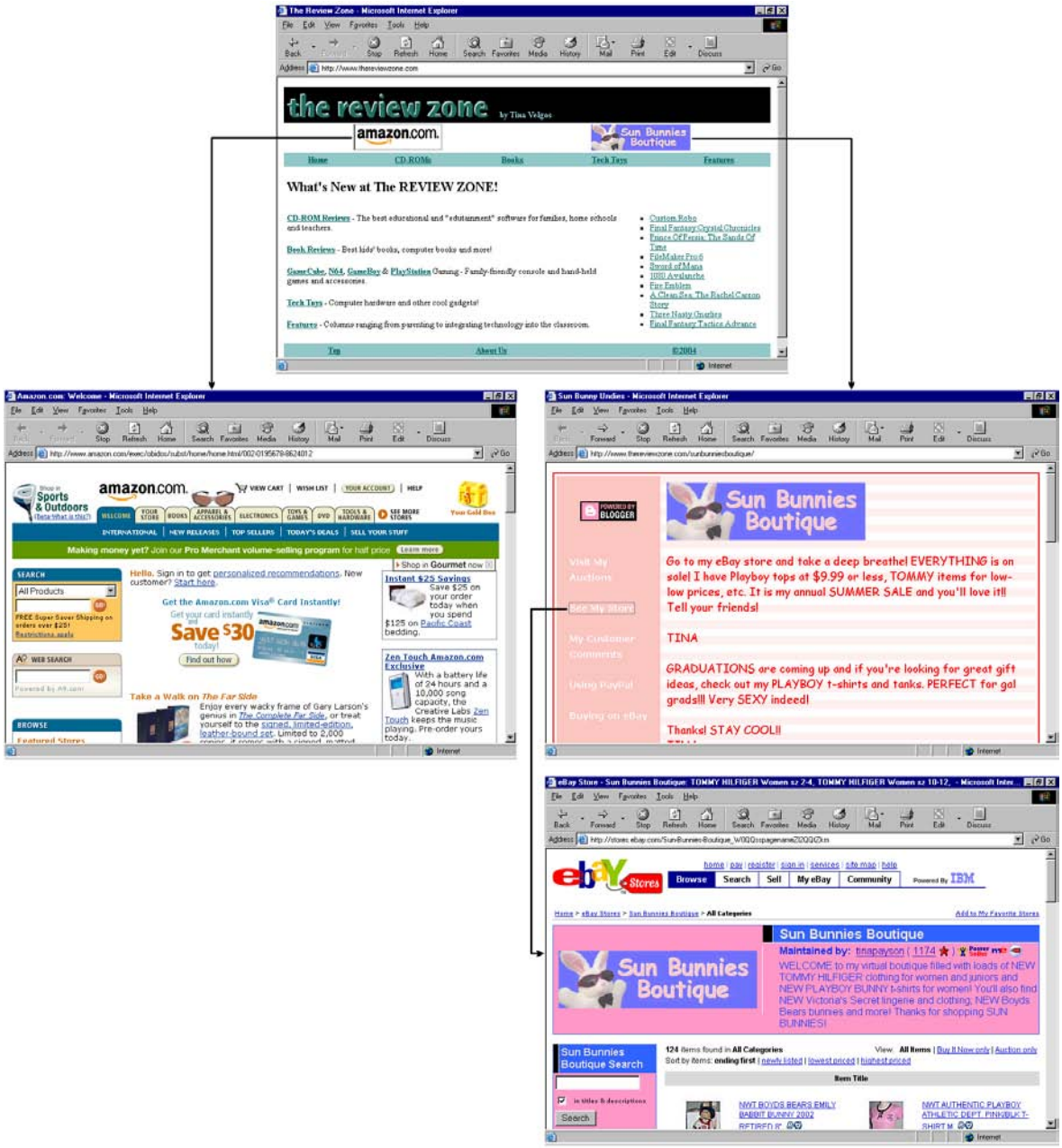


Figure 5.7 The Review Zone: advertising links

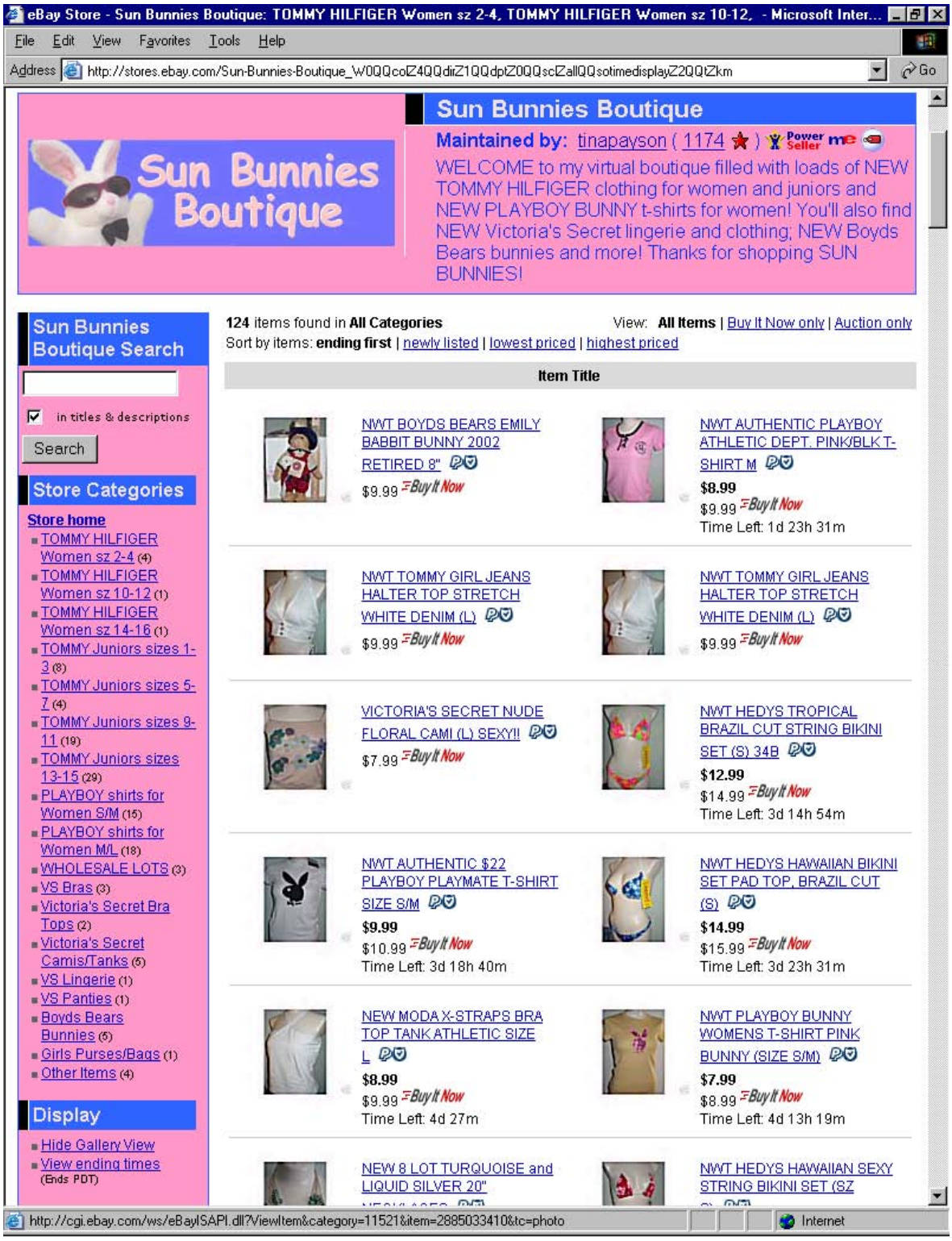


Figure 5.8 Sun Bunnies Boutique

As my analysis of the *DiscoverySchool.com*, *SuperKids*, and *The Review Zone* websites shows, the texts displayed on the review websites' homepages and the site map pages construct the intended visitor in several ways. They may do so by identifying the visitors' identities and by assuming their needs and interests. They also may do so by positioning the visitors as members of a particular community, such as the community of the consumers of a company's products and services, and by positioning them as the website's regular visitors or newcomers. The intended visitors of children's software review websites are mainly parents. The intended visitors' group can also include students, teachers and school librarians. On the one hand, different groups of visitors are constructed as having specific needs and interests. On the other hand, these specific constructions are presented as subordinate to the general construction of the review website visitor, a construction shaped by the discourses of advertising and marketing. As a result, the intended visitor is constructed primarily as a consumer and a buyer rather than as a parent, a teacher, a librarian, or a student. The market-oriented construction of the intended visitor of children's software review websites is offered not only on commercial websites affiliated with companies and promoting and selling these companies' products and services. The market-oriented construction is also offered on review websites that claim to be independent sources providing either objective information or individuals' opinions.

The salience of the market-oriented construction of the intended visitor on both the commercial and independent websites can be partially explained by the fact that, regardless of the website type, the homepages have similar purposes. The homepage may be the only page on a website that will be visited. Therefore, advertisers and website creators mainly place advertisements on this page. The homepage has to encourage the visitor to explore the website. Therefore, it has to promote the website itself. The necessity to accomplish these purposes and to perform these tasks results in the majority of homepage texts employing discourses of advertising and marketing. This, in turn, results in homepage texts typically constructing their visitors as consumers and buyers. In the next subsection, I examine those pages that provide tools for website navigation and review searching.

5.3.2 Indexes: constructing the reviewed products

Indexes are tools that facilitate review website searching by displaying the reviewed titles and product categories. In this subsection, I show that they are not just neutral tools but texts constitutive of the reviewed products and the website visitor. I analyse the 'All Educational Software' index page offered to the visitors to *DiscoverySchool.com*; the *SuperKids Educational Software Review* subject index page; and *The Review Zone* subject index and alphabetical index.

DiscoverySchool.com: indexes

The visitors to *DiscoverySchool.com*, parent visitors in particular, are invited to use the "All Educational Software" indexes (see Figure 5.9). The indexes contain such categories as: 'Alphabetically'; 'by Brand'; 'Ages'; and 'Interests'. The index, therefore, is a search tool that enables the visitor to search for information about educational software in several ways. The user may search for a particular software title ('Alphabetically'); software produced by a particular company ('by Brand'); and software for certain ages and/or interests. Here, 'Interests' refers to school subjects and thinking and literacy skills and abilities.

The index (*DiscoverySchool.com*, "All Educational Software", 2003) can also be interpreted as offering particular constructions of educational software. On the one hand, the index offers a construction that is shaped by the discourse of the school curriculum and the discourse of educational developmental psychology. The index categories encourage the visitor to think about educational software as suitable for learning particular school subjects ('Foreign Language', 'Geography/History'), as developing certain skills ('Reading/Prereading/Spelling', 'Social Skills', 'Thinking Skills') and as suitable for a particular age group ('Early Learning'). On the other hand, the index categorises educational software by its brand, which entails the construction of educational software as a market product, and implies that the visitor may identify oneself as the consumer of a particular brand.



Figure 5.9 DiscoverySchool.com: indexes

SuperKids Educational Software Review: subject index

Figure 5.10 shows the *SuperKids Educational Software Review* subject index page. The subject index page invites the visitor to search the website database for reviews about educational software on a particular subject and/or for a particular age:

> **Subject Index**
>
> Each month, SuperKids' parent, teacher, and kid review teams focus on software dealing with a specific subject and age range. Products are evaluated and compared, producing the high-level summaries listed below. Click on the subject you're interested in to see the most recent comparisons. (*SuperKids Educational Software Review*, "Subject Index", 2004)

The index encourages the visitor to think about software products in terms typical of the discourses of school curriculum and developmental psychology. For example, it encourages the visitor to search for software teaching particular subjects ('Algebra', 'Anatomy', 'Art', 'Astronomy', 'Fractions', 'Geography'). Also, it encourages the visitor to search for software suitable for a particular group of children identified in terms of age and gender ('1st Grade', '2nd Grade', 'Software for Infants', 'Software for Girls'). The offered categories imply that the visitor is either a teacher or parent interested in ICT-mediated educational products and tools. The index suggests that the teacher/parent visitor is looking for products that enable him/her to benefit from new computer technologies ('Interactive Books') while avoiding undesired or dangerous 'side-effects' ('Internet Filtering').

The *SuperKids* subject index also enables the visitor to compare current and previous product reviews. Simultaneously, the index implies that the visitor is a consumer looking for the best products on the market. The index page also presents *SuperKids* as a source of the most recent and 'in-depth' information about children's software and the *SuperKids* teams as authoritative judges who regularly evaluate and compare software products and produce 'high-level summaries'.

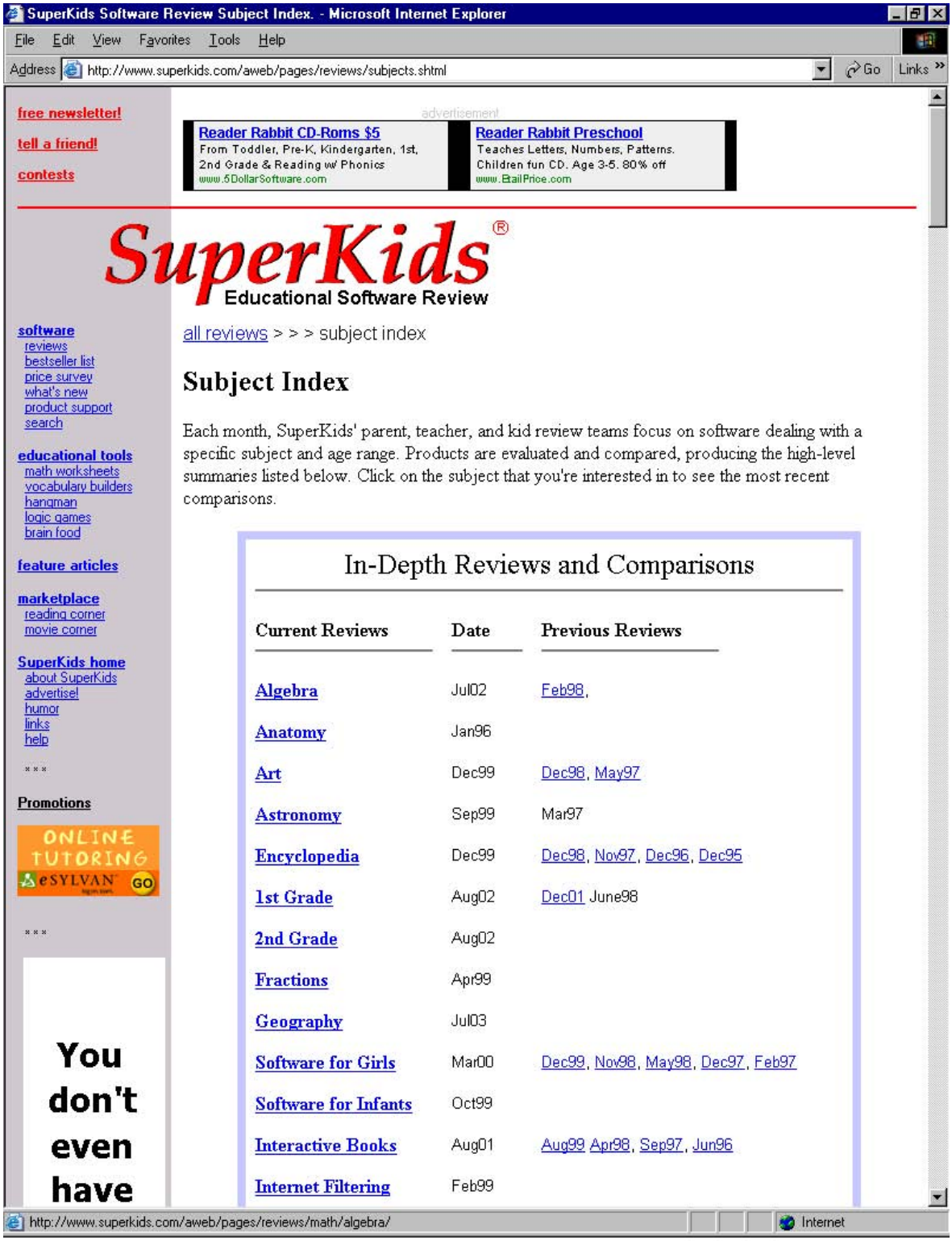


Figure 5.10 SuperKids: subject index

The Review Zone: 'The Review Zone CD-ROM Reviews' subject index

Figure 5.11 shows *The Review Zone* subject index (*The Review Zone*, "The Review Zone CD-ROM Reviews", 2003).



Figure 5.11 The Review Zone: subject index

The *Review Zone* index (*The Review Zone*, "The Review Zone CD-ROM Reviews", 2003) categories are accompanied by short texts displaying features typical of advertising. These texts are written in the offer modality; they are characterised by the usage of evaluative lexis and display grammar that is characteristic of informal communication:

> Reading – Writing
>
> Yes, your child can learn to read, write, and master phonics with these CD-ROMS!

The idea of edutainment and learning as fun is actively exploited and promoted in these texts:

> Teaching Tools – Reference – Family Productivity
> Multimedia encyclopaedias, reference software, tax software and teaching aids to make you smile.
>
> Medical
> Biology, virtual dissection, and more! Who says you need to dissect a real frog, anyway?

The index enables the visitor to search for reviews of the CD-ROMs that can be used for studying different school subjects ('Geography – History – Social Studies', 'Math – Science'); those that are suitable for a particular age ('Early Learning'); and those that aim at the development of specific skills and abilities ('Reading – Writing', 'Games – Problem Solving'). This categorisation is intertwined with a categorisation of ICT-mediated products as being either educational or non-educational (entertaining). The educational CD-ROMs are represented by categories relating to school subjects:

> Math – Science
> From basic math to anatomy programs, these titles are content-rich and fun to play!

The non-educational products are represented by two categories: 'Just for Fun' and 'CD-ROMs for Girls'.

> Just for Fun
> Nothing educational here!
>
> CD – ROMs for Girls
> Most girls enjoy software which involves creativity and mystery. Here are some great ones!

The description of the 'CD-ROMs for Girls' category offers a rather remarkable construction of girls (and also implies an equally remarkable relational construction of boys) as a particular group of software users and as engendered subjects. Girls are identified as a group of software users interested in non-educational software. The index encourages a stereotype construction of girls as preferring creativity and mystery, which can also be interpreted as preferring play and entertainment to serious work.

As the examples demonstrate, such seemingly neutral texts as indexes are able to affect the visitors' thinking about software products, to assign certain needs and expectations to the visitor and the intended consumer of the reviewed products, and even to reproduce gender stereotypes. In the subject indexes examined above, CD-ROMs are constructed as market products. This construction encourages the visitor to think of oneself as a buyer and a consumer.

The descriptions of index categories employ a particular discourse on parenthood in which parenthood is envisioned as the provision of conditions and resources for children's education or, rather, as constantly encountering problems relating to the provision of such conditions and resources. This construction of the parent visitor merges perfectly with the construction of ICTs as a solution to educational problems in the popular discourse on education and technology. The product indexes bring all these constructions together in order to encourage the parent visitor that buying CD-ROMs and other ICT-mediated products is the best way of being a caring parent. It may be suggested that product indexes are discursive practices in which parents are re-constructed as buyers of technological products.

The fact that subject indexes offer particular constructions of the reviewed products and the review website visitor is not particularly surprising. Subject categorisation is always grounded in a particular ontology, and entails a particular vision of things and their relations (Bowker & Star, 1999). Whenever a subject index is offered as a search tool, it is encouraging the searchers to adopt a certain vision of the object of their search. Those search tools that do not offer any categorisations, such as alphabetical indexes, are not neutral either (see my analysis below).

The Review Zone: alphabetical index

The alphabetical index implies that the visitor is looking for information about a particular product title, since alphabetisation can facilitate searching only if the visitor knows the exact title of the product. For example, *The Review Zone* "CD-ROM Titles for Teaching, Reference and Family Productivity" (2002) displays titles of CD-ROM encyclopaedias and other reference works in alphabetical order (see Figure 5.12).

In this index, some titles begin with the edition year: "1999 Multimedia Encyclopedia Roundup"; "1998 Grolier Multimedia Encyclopedia – Deluxe Edition". Other titles begin with the product or company name: "Britannica 97 CD"; "Britannica 98 CD"; "Encarta 98 Encyclopedia Deluxe". Yet other titles begin with words relating to

software features, such as *multimedia*. As a result, software focusing on dogs is placed under the letter 'M' because its title is "Multimedia Dogs 2.0". Even if the visitor knows which software title to look for, he/she may still need to look through the entire index. While looking through the entire list, the visitors will become informed about the titles that are available in the market. In this way, an alphabetical index can also promote products.

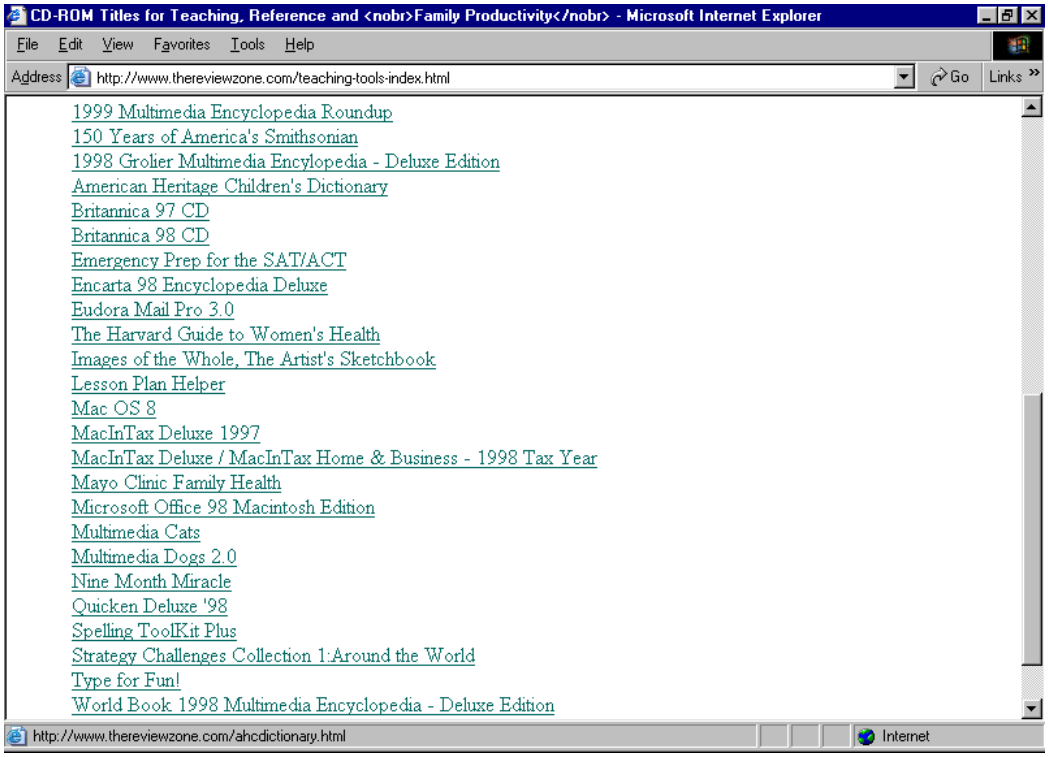


Figure 5.12 The Review Zone: alphabetical index

Also, the alphabetical index offers a particular construction of the reviewed products. It may encourage the visitor to think about CD-ROM encyclopaedias as either a piece of technology (by putting *multimedia* at the beginning of a product's title) or as a particular company's product (by putting the company's name at the beginning of the product's title). This index implies that the visitor who finds such an index unproblematic is a member of a community of informed educational software consumers. Knowledge of software titles is a characteristic feature of membership in the community. Therefore, an alphabetical index may construct the review visitors by positioning them as members of the community or as novices.

The analysis shows that even such seemingly neutral texts as indexes offer constructions of the reviewed products, their users, and the review website visitors. The

indexes construct the visitors' needs and interests by categorising educational and children's software. Therefore, the texts of the indexes can be critically analysed, questioned and problematised similarly to the texts presented on the homepages. Unlike homepage texts, however, the texts of indexes are less likely to be questioned. Index categories do not have the linguistic and stylistic features that are characteristic of easily recognisable genres of influencing consumer behaviour such as advertisements and promotional offers. As a result, indexes are more likely to be perceived as neutral tools rather than as practices of the production of social subjects. Because of this, the constructions offered in the indexes may even be more persuasive than those offered in the advertisements. Therefore, indexes can be considered a means of presenting the offered constructions as neutral and natural. In the next subsection, I turn to yet another way of legitimising and naturalising discursive constructions on review websites.

5.3.3 About Us: the reviewer, software evaluation and evaluation forms

Review websites often provide information about the software reviewers and software evaluation. This information is usually provided on the 'About Us' pages and on the pages dedicated to the procedures and methods of software evaluation and rating. In these texts, the intended visitors are constructed as having particular information needs.[15] The visitors are constructed as needing expert help because they "find it difficult to identify good educational software – software that they find educationally valuable and that their children enjoy using" (*SuperKids Educational Software Review*, "About SuperKids", 2002). The visitors are also constructed as needing objective, independent, disinterested information: "It's the best place on the Net for students, teachers and parents that want no-nonsense independent assessments of what software's worth getting and what's not" (*The Edutainment Page!* 1997). In order to reassure the visitors that the websites they are exploring are reliable sources of objective information, the reviewers are presented as authoritative speakers and experts and software evaluation is presented as an objective procedure.

[15] The construction of the Internet user as an information user and construction of his/her information needs is one of the common market communication strategies on the Internet (Julien, 1999; Lyon & Silverstein, 2001; Talja, 1997).

The reviewer

Information about reviewers is an important part of what is considered to be worth knowing about software review websites. For example, the fact that software reviews published in *Children's Software Revue* are written by experienced educators is considered to be worth mentioning in the description of this website provided in such different sources as *NWREL's Northwest Educational Technology Consortium*, an educational resources website, and the website of the online store *Amazon.com*. Information about reviewers is given in the descriptions of *The Edutainment Page!* and *SuperKids Educational Software Review* on *Tech Corps*, a commercial website:

> The Edutainment Page -- Now a part of School PC Australia *(yes, it was created there, by a mother!*), this page is dedicated to reviews and discussions of education and home software. While it hasn't been updated since 1996, it includes an excellent list of the classic favorites.
>
> SuperKids Educational Software Review -- The introduction on the homepage says it all: Welcome to SuperKids, an impartial source of information for parents and teachers – children's software reviews based on *objective analyses by parents, teachers and kids*, advice that will improve your child's education and save you money, the place to come before you buy! The most comprehensive site on the topic we have seen thus far!
> (*Tech Corps*, "Children's Software", 2002) (Italics added)

More comprehensive information about reviewers is usually provided on 'About Us' pages. For example:

> What are the Qualifications of the Reviewers?
> Warren Buckleitner, Editor, is a parent of two young children and a former teacher (preschool, 2nd, 4th and 6th grades) who has been studying the design of interactive learning products since 1982. His reviews can be seen in Instructor, Parent & Child, Parade and Curriculum Administrator. In 1995, he won the Software Publisher Association's Codie Award for "Best Software Reviewer." He holds a BS in Elementary Education and an MS in Human Development. He is a doctoral candidate in educational psychology at Michigan State University.
> (*Children's Software Revue*, "About Children's Software Revue", 1999)

The example above shows that the visitor of a review website is informed and, therefore, expected to be interested in knowing:

- whether the reviews are written by an individual or a team;

- the reviewer's age, sex, and family status (married, being a parent, having young children); and
- the reviewer's education, current occupation, work experience and field of expertise.

I have examined seventeen review websites in order to understand who the reviewers of children's and educational software are. On the basis of the gathered data I have reconstructed the following typical features of the children's and educational software reviewer. The reviewer may be either an individual (11) or a team/group (13). The reviewers can be either adults or adults and children: 4 out of 13 review teams included children or students participating in software testing and evaluation together with educators, parents and experts:

> Our reviews are written by teams that include educators, parents, and children from across the United States. Our review teams include experts from Stanford, Harvard and Northwestern universities. (*SuperKids Educational Software Review*, "About SuperKids", 2002)

The majority of individual reviewers are females: there are seven females and four males amongst individual reviewers. Often information is provided about the reviewers' marital and parental status. Among the seven reviewers who provide information about their parental status, five persons also provide information about the number of their children (four of them have two children, and one is a mother of three) and their children's age (school age, young). By providing this information, the reviewer is presented as capable of sharing the parent visitors' concerns and as having experience with children's use of software:

> Written by Tina Velgos, an experienced freelance technology writer and mom to two school-age children, these independent product reviews are kid-tested and parent approved!
> (*The Review Zone*, "About The Review Zone", 2000)

In terms of their occupation, the software reviewers were:

- educators/teachers (7)
- journalists (5)
- editors (4)

- freelance writers (2)
- authors of websites and ezines (2)
- ICT and software experts (4)
- librarians (2)
- student (1)
- education professional (1).

Some reviewers had two or three professions. The majority of the reviewers were ex-teachers and are currently 'writing people': journalists, freelance writers, editors, and technology writers. The most frequently mentioned fields of professional expertise were: education, child development, and educational psychology; journalism and writing; and software publishing.

As the above data shows, the group of people evaluating and reviewing children's and educational software is rather diverse. This group includes: adults and children; parents and students; males and females; editors and authors of websites and ezines; former educators and teachers; freelance writers and software developers; university experts and officers working for educational departments. This inclusive and diverse group does not, nevertheless, include anybody from the field of software marketing. Also, there are few ICT and software experts among the reviewers. The absence of the former group, in particular, may encourage the review website visitor to believe that review websites are sources of objective, disinterested and reliable information and/or that they reflect the views and concerns of teachers and parents.

It might be expected, therefore, that the review website offers constructions shaped by the educational and parental discourses. However, as my analysis of CD-ROM encyclopaedias' reviews will demonstrate, the reviews offer constructions of reviewed products and their user that are shaped mainly by the discourses of ICTs and marketing. The fact that these constructions are offered in the reviews created mainly by teachers and parents rather than by marketing and software specialists can be interpreted as evidence of these discourses having been naturalised in the domain of educators' and parents' thinking about ICT-mediated educational products. Due to the reviewers being introduced as educators and/or parents, the constructions that are offered in the reviews can be perceived as authoritative by the parent and teacher visitors. This makes critical questioning of their legitimacy less likely.

Software evaluation

The presentation of software evaluation as an objective procedure is another way of constructing review websites as reliable sources of knowledge about ICT-mediated products. For example, the visitors to the *Children's Software Revue* website are informed that the reviewed products were formally evaluated by experts using a software evaluation 'instrument' (see *Children's Software Revue*, "Software Evaluation Instrument", 1995). The *DiscoverySchool.com* website provides a description of evaluation processes for specific groups of products (see *DiscoverySchool.com*, "How We Rate Products", 2002). The visitor of the *SuperKids Educational Software Review* website is informed that the reviewed software has been tested following a prescribed protocol; that there are certain criteria of software evaluation which the visitor can assess; and that the conditions of software testing and evaluation are simulated in order to make them as close as possible to the actual environment in which the software is being used:

> SuperKids' reviews are written by teams consisting of parents, teachers and kids, following a prescribed testing protocol. You can see samples of our review criteria here:
>
> - Sample Parent Review Form
> - Sample Teacher Review Form
> - Sample Kids Review Form
>
> Their evaluations are conducted not in the unrealistic conditions of a laboratory, but in homes and schools just like yours. Our goal is to simulate as closely as possible the actual environment in which these software products are used, to avoid creating test-induced biases.
> (*SuperKids Educational Software Review*, "About SuperKids' Reviews", 2002)

In the above example, the software evaluation is presented as a 'scientific experiment'. The text describes the experimental conditions (which are as close as possible to the actual environment in which the software can be used), informs the reader that there are certain evaluation criteria, and claims that the reviewers aimed to avoid bias. By stating that there are certain evaluation procedures, tools, and criteria, the quoted text presents software testing as a process of obtaining true and objective knowledge.

The visitor is informed neither about the origins of those procedures nor about the creators of the evaluation tools and criteria. Due to their anonymity, impersonality and formality[16], the evaluation tools (questionnaires, scales, comparative lists) and the

[16] These features are typical of scientific discourse (Halliday & Martin, 1993; Lemke, 1990) and contribute to the perception of scientific discourse as authoritative and true. Such a perception is in tune with a broader

evaluation policy guides are most likely to be perceived as capable of providing true, objective, 'scientific' knowledge.

Apart from presenting the review website as an authoritative source of objective and true information, the evaluation guides and tools may also affect the visitors' thinking about ICT-mediated educational and entertaining products by prescribing which questions can be asked about them. Some review websites are recommended specifically because they provide samples of evaluation forms and descriptions of evaluation procedures. For example, *ccclearn* website recommends *Children's Software Revue* and *SuperKids* because these websites can help develop software evaluation tools:

> Children's Software Revue
> An online reference for evaluating children's software. It will aid you in developing questions you want to ask as you evaluate software.
>
> SuperKids Educational Software Review – Teacher Review
> This page showcases the worksheet that SuperKids reviewers use to evaluate educational software. You can use it to help develop your own questions and rating system.
> (*ccclearn*, "How to Evaluate Learning Software", 2001)

Such guidance calls for an investigation into what questions are asked and how these questions may affect educators', parents' and children's thinking about educational software. In this subsection, I analyse samples of software evaluation forms and guides provided in *Way Cool Software Reviews* and *SuperKids Educational Software Review*. These are non-commercial websites. However, as my analysis will demonstrate, they may encourage a reviewer to think about educational software as a market product.

Way Cool Evaluation Form

Way Cool Software Reviews is a non-commercial website affiliated with a university. It offers a software evaluation form to anybody who wants to evaluate a piece of software. The evaluation form consists of two parts: general and additional. The general part includes factual questions. These are questions about the software producer, the publishing format (CD-ROM, disk), software package, publishing date, operational system (including

---

cultural process as reconstructed in the following passage from Foucault's essay *What Is an Author?*: "[in the seventeenth or eighteenth century, s]cientific discourses began to be received for themselves, in the anonymity of an established or always redemonstrable truth; their membership in a systematic ensemble, and not the reference to the individual who produced them, stood as their guarantee" (Foucault, 1984, p. 109).

the system that was used by the reviewer), and prices. These questions encourage the reviewer to think about the software as a market product and a piece of technology:

> Software name:
> Who makes it?
> Does it come on a disk? CD-ROM? both?
> Does package include anything in addition to the software and the documentation? (e.g., map, stickers, fact book, etc.)
> Is it available for PC's? Macintosh? both?
> What computer did you evaluate it on?
> Date published:
> Date reviewed:
> List price:
> or
> Price in discount stores:
> (*Way Cool Software Reviews*, "Evaluation Form", 1997)

Other questions encourage the reviewer to think about software in such vague terms as *like* and *dislike*:

> Briefly describe what the software does:
> (PLEASE USE MORE SPACE ANSWERING THE QUESTIONS)
> What do you like about the software?
> What makes this software Way Cool?
> Is there anything you don't like about the software?
> What age students would like to use this software?
> Additional comments:
> Give software a rating from 1 to 10: (10 being best)
> (*Way Cool Software Reviews*, "Evaluation Form", 1997)

These questions may serve as an instrument of market research aiming at an exploration of preferences and tastes of different consumer groups. Nevertheless, these questions are offered as the basic framework for thinking about software on an independent website affiliated with an educational institution. More educationally specific questions (addressed directly to parents, teachers, and students and encouraging the reviewer to conduct a deeper exploration of the educational value of the software product) are categorised as additional information and, therefore, not necessary to be asked. These

questions are offered in the evaluation form under the heading ‘Additional Information from Parents, Teachers, or Students’. They require the reviewer’s opinions about the product’s relevance to a particular school subject and a particular group of students:

> **Additional information from parents, teachers, or students:**
> This software is relevant to what subject matter?
> Would this software be particularly relevant to particular groups of students (please specify)
> (*Way Cool Software Reviews*, “Evaluation Form”, 1997)

The fact that the evaluation form allows for different opinions does not mean that the form provides much freedom of choice to the reviewers in terms of adopting a particular stance towards the evaluated software. The form allows the reviewer to categorise him/herself in such broad terms as teacher, parent and student, implying that there are particular standpoints in relation to software that are characteristic of these subject positions and are shared by those who accept these positions. The form offers two perspectives within which software should be evaluated as an educational product. These perspectives are: software suitability for the school curriculum defined in terms of subject disciplines and grades; and software suitability for children defined in terms of age and cognitive development.

SuperKids Evaluation Forms

The same perspectives are implied by the questions offered in the *SuperKids Educational Software Review* sample forms for parents, for ‘kids’ and for teachers. There are questions used in all three forms. These questions encourage the reviewer to approach educational software as a technological product:

> **Configuration Information – Circle answers**
>
Software was tested on a:	PC	Mac	PowerMac		
Software was on a:	floppy disc	CD			
Computer monitor was:	color	black&white			
Computer memory:	2MB	4MB	8MB	16MB	>16MB
Printer used (if any):	dot-matrix	ink-jet		laser	
		color	black&white		

General Software Quality Evaluation

(5 = excellent, 4 = good, 3 = OK, 2 = weak, 1 = unacceptable)

Comments

Ease of installation

Ease of initial use

Manual usefulness

Sound quality

Graphics quality

Please detail any operational problems you encountered (e.g. difficulty in set-up or installation, machine crashes or lock-ups, printer problems, etc.)

(*SuperKids Educational Software Review*, "Parent Evaluation Form", 1996)[17]

There are questions that are specific to each form. Such questions encourage the intended reviewer to adopt a particular perspective for looking at the product. For example, the questions offered in the parent evaluation form (*SuperKids Educational Software Review*, "Parent Evaluation Form", 1996) encourage the parent reviewers to think about the software products in relation to their parental duty (and desire) to participate in their children's education and to keep them busy. The evaluation form suggests evaluating software in terms of its capability to hold the child's interest, to be used by the child independently or to not require much time from parents to help the child use it (see questions for assessment of software in terms of interest, longevity, parent-friendliness, and value as an independent activity):

SuperKids Parent's Product Evaluation

(5 = excellent, 4 = good, 3 = OK, 2 = weak, 1 = unacceptable)

Interest – Did it hold your child's interest? …

Longevity – Will it hold their interest in 3 mos? 6 mos? next year? …

Parent-friendliness – How easy was it for you to help your child? …

Truth in packaging – Was it what you thought it would be? …

If not, why not?

Value as an independent activity for your child? …

Will your child use it while alone? For how long?

Value to child's education …

What will your child learn?

[17] This text is also provided in *SuperKids Educational Software Review*, "Teacher Evaluation Form" (1996) and in *SuperKids Educational Software Review*, "Kids Evaluation Form" (1996).

Purchase Value – Would you buy it or recommend it? …

Why or why not?

My child especially liked ...

What type of child would benefit most from this product?

Who would be least happy with this product?

Parent's Review:

(*SuperKids Educational Software Review*, "Parent Evaluation Form", 1996)

The construction of children's software as an educational product (that both keeps the child's interest and teaches) is merging with the market-oriented construction of educational software. Being asked to evaluate children's software in terms of its value as an independent activity for a child and in terms of its value to child's education, the parent is then encouraged to think about children's software in terms of its purchase value. Also, the form positions the parent reviewer as a participant in market communication aiming at software promotion and advertising (or counter-advertising) via asking the parent reviewer to answer whether he/she would buy and/or recommend the evaluated software.

The evaluation form suggests that the parent reviewer can speak for the child user. The parent reviewer is expected to provide an account of what his/her own child liked about software: "My child especially liked…". This question implies that the parent reviewer was observing his/her child using the software and/or was talking to the child. The parent reviewer is also expected to be able to comment on the software's effects on other children: "What type of child would benefit most from this product?" "Who would be least happy with this product?" These questions imply that the parent reviewer is able to make general comments regarding the effects of the evaluated products on 'other' children and on children of different types. The types of children are not further specified. Apparently, there is a universal typology of children that parents are expected to be familiar with.

The teacher evaluation form (*SuperKids Educational Software Review*, "Teacher Evaluation Form", 1996) reproduces the same perspectives of thinking about children's educational software: the software's ability to keep children busy; software as a market product; and software effects on different types of children. However, the teacher reviewer is also encouraged to think about software products more in terms of the teaching profession and the practice of schoolwork:

SuperKids Teacher's Product Evaluation

(5 = excellent, 4 = good, 3 = OK, 2 = weak, 1 = unacceptable)

What is the educational value proposition of this software – what is it trying to teach?

Content value – Is the design educationally sound? …

Methodology appropriateness …

Is the methodology employed appropriate for teaching the featured material?

Is it age-appropriate SW? …

Is this software appropriate for the labeled ages, based on

content, skills/knowledge level required, and typical interests?

Is it sufficiently supportive? …

Is it gender-neutral? …

Is it sufficiently interactive? …

Is it easy to keep individual student records? …

Is it easy to set the difficulty level? …

Truth in packaging – Was it what you thought it would be? …

Value as an independent activity? …

Value to child's education? …

Purchase Value – Would you recommend it? …

Is it appropriate for remedial education, accelerated studies,

or for gifted children? (Circle all that apply, and comment)

What type of child would benefit most / least from this product?

Pluses...

Minuses...

Things you would like to see changed...

Overall Rating …

Teacher's Review – Does it achieve its educational goals?

(*SuperKids Educational Software Review*, "Teacher Evaluation Form", 1996)

The form requires the teacher reviewer to think about software in terms of its educational design and content, suitability for learning subjects and curriculum, teaching methods, suitability for a particular age, and interactivity. The teacher reviewer is also supposed to be able to assess the evaluated software in terms of gender or cultural bias.[18] Apart from this general professional expertise, the teacher reviewer is also expected to have expertise in the specific field of computer-mediated teaching and learning. The form

[18] Here, I do not discuss the questionnaire technique, although the quoted questionnaires can be questioned as tools for obtaining information about people's opinions. I found it very difficult to use the same scale that was suggested for the evaluation of software as a piece of technology (5 = excellent, 4 = good, 3 = OK, 2 = weak, 1 = unacceptable) when trying to answer such a question as: "Is it gender-neutral?" Can software be 'excellently' gender-neutral or 'unacceptably' gender-neutral?

implies that the teacher is able to assess and clearly articulate the advantages and disadvantages (pluses and minuses) of the software and to formulate possible recommendations that can be used by the producer in order to change the product.

The teacher evaluation form seems to be more specific and appears more professional than the parent evaluation form, which is manifested by the more detailed and specialised questions about software features, educational content and methodology, and students. On the one hand, the teacher evaluation form can be interpreted as a manifestation of the existence of a specifically educational vision of ICTs. On the one hand, the form encourages the teacher reviewer to approach ICT-mediated products from the educational perspective and to assess software in terms of pedagogy and schooling. On the other hand, the form sets up strict boundaries for such an approach in terms of the range of software products that can be evaluated from the outlined perspective. According to the questions, this perspective can be applied to a particular group of software products designed for computer-based learning or computer-assisted learning.

In the children's evaluation form (*SuperKids Educational Software Review*, "Kids Evaluation Form", 1996), questions are formulated in simpler words than in the evaluation forms for parents and teachers:

> **SuperKids Kids Product Evaluation**
> (5 = excellent, 4 = good, 3 = OK, 2 = weak, 1 = unacceptable)
>
> Is this software easy to use? …
> Is it fun?… Why or why not?
> Will it keep your interest over time?…
> What have you learned from this software? …
> What did you like best? least?
> What age group would like this software the most? Why?
> What type of person would like this most? Why?
> Who would not like this? Why not?
> What would you like to see changed?
> Would you recommend it to your friends?
> Kids review (1 - 2 paragraphs):
> (*SuperKids Educational Software Review*, "Kids Evaluation Form", 1996)

The form invites the child reviewer to formulate his/her opinion about the product in such terms as *easy*, *fun*, *like* or *dislike*. Yet the form still encourages the child reviewer to think

about educational software in terms similar to those offered to the parents and teachers. It requires the child reviewer to formulate his/her opinion about educational software in terms of the product's learning outcomes, and in terms of its suitability for a particular age group and for a particular type of person. Also, the form constructs the child reviewer as a competent software user who can provide an account of his/her experience of using a piece of software and can suggest how the software can be improved.

As my analysis of texts provided on the 'About Us' and similar pages has demonstrated, these texts aim to present software evaluation as a scientific procedure that results in the production of objective knowledge and impartial reviews, the reviewer as an authoritative speaker, and the software review website as a reliable source of information. Such presentations may contribute to the naturalisation of the constructions offered on the entire website, including the constructions of ICT-mediated educational products and their user offered in the texts of software reviews. In order to reveal the constructions made legitimate through the software review websites, I now turn to an analysis of the constructions offered in the reviews.

5.4 The CD-ROM encyclopaedia review

In this section, I examine CD-ROM encyclopaedia reviews provided on commercial, independent, and educational websites. I outline the generic features of a CD-ROM encyclopaedia review and examine the discursive constructions of the review reader, the CD-ROM encyclopaedia, and the user of the CD-ROM encyclopaedia.

5.4.1 The genre of the CD-ROM encyclopaedia review

I have examined more than twenty reviews of CD-ROM encyclopaedias published on educational, commercial and independent websites (Appendix C). These reviews demonstrate a great variety in terms of style, register and language: from formal to conversational, from scientific to advertising, from distant to intimate. They employ different semiotic resources such as tables, hypertext links, images, and so on. Nevertheless, the reviews of CD-ROM encyclopaedias demonstrate a certain consistency in terms of their generic structure (see examples in Figure 5.13).

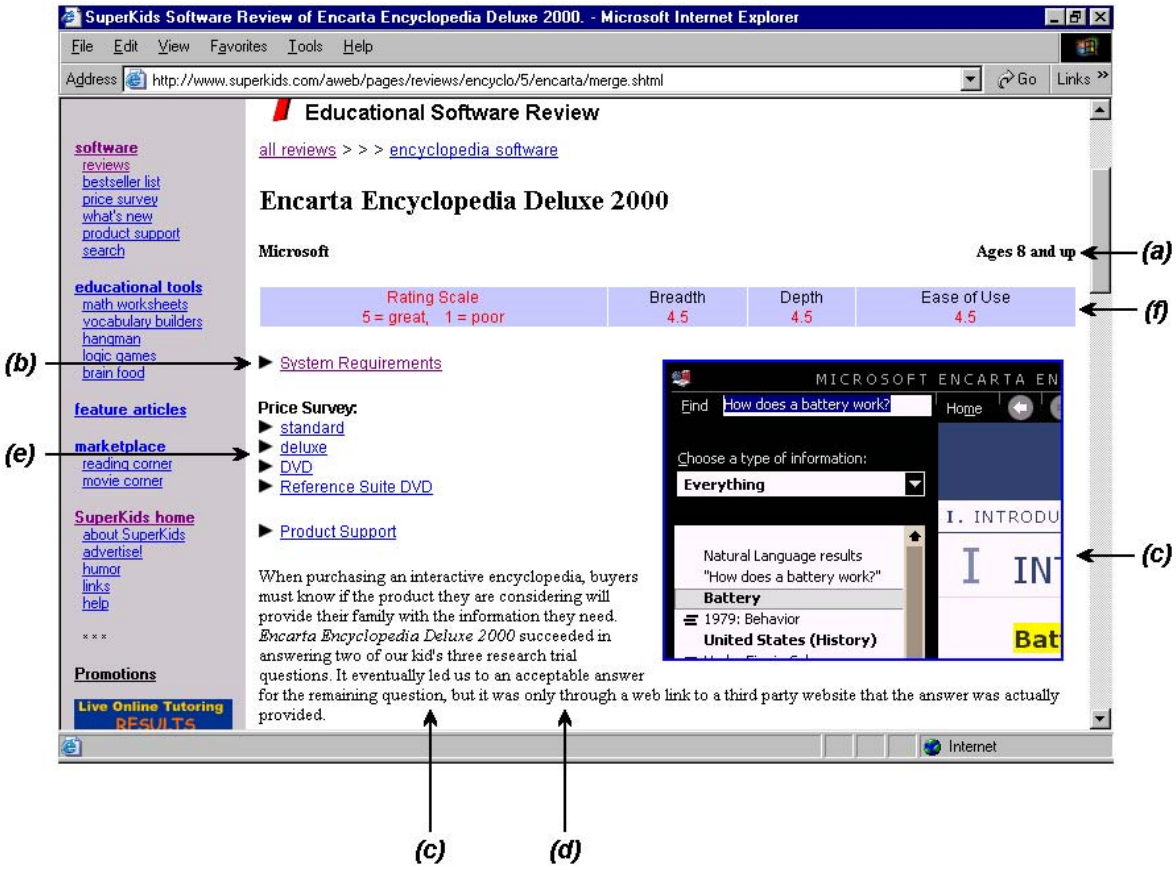


Figure 5.13 SuperKids: review page

The review page displays: *(a)* a section that identifies the product's intended user; *(b)* a section that informs the reader about the product's system requirements; *(c)* a description and illustration of the software features; *(d)* an account of software installation and testing; *(e)* information about the product's prices and supporting services; and *(f)* summary (rating) of the product's quality.

The genre of the CD-ROM encyclopaedia review is characterised by the presence of the following sections in review texts:

a. identification of the intended user of the product;
b. information about system requirements;
c. description of software features;
d. an account of the processes of software installation and testing;
e. information about the product's price, sellers, and supporting services; and
f. a summary of an evaluation of the product's quality (see Figure 5.13).

These sections may be located differently in the texts of the reviews. For example, Figure 5.13 shows a review published on the *SuperKids* website (*SuperKids Educational Software Review*, "Microsoft Encarta Encyclopedia Deluxe 2000", 2002). At the beginning of the review, its reader is informed about the producer of the reviewed CD-ROM encyclopaedia ("Microsoft") and about the intended user of the product. The intended user is identified in terms of age ("Ages 8 and up"). The reader is then informed about the reviewed product's rating and the product's overall quality. The product's quality is summarised in such terms as breadth, depth, and ease of use. These relate both to the encyclopaedia's content (evaluated in terms of breadth and depth) and to the quality of the software (evaluated in terms of the ease of use). The rating information is presented in the form of a table that shows the product's rating within a scale from '5 = great' to '1 = poor'. The table shows that the reviewed product has been rated highly in terms of its breadth ("4.5"), depth ("4.5") and ease of use ("4.5"). Due to the use of decimal fractions, the rating information may be perceived as being precise and objective. The scale also implies that the reviewer possesses a universal instrument of software evaluation. Overall, the table format may contribute to the construction of the review as an authoritative and unbiased source of information.

The review shown in Figure 5.13 contains hypertext links. These lead to the review sections that inform the reader – and the intended buyer of the reviewed software product – about its system requirements, the prices of its different editions ('standard', 'deluxe', 'DVD', and 'Reference Suite DVD'), and the contacts for product support. Simultaneously, these links inform the reader about all the editions of this product available in the market and position him/her as a buyer who can choose among various products (although this is the same encyclopaedia only published in different editions and formats). This information may also encourage the reader/buyer to think about updating

his/her hardware and software in order to use the new products. In the content section of the review, an account of software installation and testing is provided and the software features are described. These are features relating to multimedia, interactivity, and the product's search tools. A picture of the product's interface illustrates some of these features and gives the reader a general idea of how the product looks.

As the above example shows, each section of the CD-ROM encyclopaedia review may contribute to the construction of the reviewer and the review reader, the CD-ROM encyclopaedia and its buyer/user. I now turn to a more detailed analysis of these constructions.

5.4.2 The reviewer and the review reader

The reviewers may adopt a subjective or an objective style of writing. An example of the subjective style is presented in the reviews published on the *School House Software Review* website, a website affiliated with a company called InforMedia. The reviews published on this website display features of spoken rather than written discourse, such as omitted words, familiarisation, and paratactic complex sentences, as in the following example:

> Imagine, all 25 or 26 or 30 volumes of an encyclopedia on one small disk. … The newest encyclopedia to hit the market, and the subject of this review, is from our good friends at The Learning Company, and is called the Ultimate Children's Encyclopedia. (*School House Software Review*, Cunningham, 1997b).

Also, the review texts may contain incorrectly built sentences and even spelling mistakes, for example:

> There is an animated guide named Zak to help point things out and from time to time offers useful tips. … These include Illustrated Dictionary, Illustrated Thesaurus and Book Of Words. Combined, the [omission] make a simply wonderful program for children between the age of 7 and 12, and the emphasis is on the word simple. (*School House Software Review*, Cunningham, 1997b).[19]

[19] It is interesting that an instance of such writing culture is placed on the website presenting itself as education-related or, rather, school-related: the website is called the *School House Software Review*. However, it is beyond the scope of the present thesis to investigate the writing norms and standards that are promoted on the Internet.

The author of the *School House* reviews refers to his personal memories, emotions, and concerns. This makes the image of the reviewer salient, vivid, and 'recognisable'. The reader is invited to share the reviewer's identity, memories and feelings. For example, one of the reviews begins with the reviewer's recollection of his school years and with his warm and continuing memories of using print encyclopaedias for preparing his homework:

> One of the joys I had growing up was discovering the amount of information that was contained in the encyclopedia in our school library, and how helpful it was in completing school work at the last minute. Unfortunately, my teachers must have had access to the same encyclopedia, because they were always encouraging me to be more original in my work. And over the years I did. But the joy of working with encyclopedias never diminished. (*School House Software Review*, Cunningham, 1997b)

This paragraph can be read as a construction of the intended encyclopaedia consumer's needs, as an explanation why someone might need to purchase the reviewed CD-ROM encyclopaedia. The consumer might need to purchase an encyclopaedia because, as the reviewer recollects from his schooling, encyclopaedias contain an enormous amount of information, are helpful in completing school work at the last minute, and are a joy to work with. In order to explain why the reader needs an encyclopaedia published in CD-ROM format, the author provides a brief outline of the history of progressive movement from print encyclopaedias to multimedia interactive CD-ROM encyclopaedias. This movement is shown though the lenses of the author's attitudes and preferences:

> When CD-ROMs first hit the computer world, one of the first uses for them was storing massive amounts of information. Imagine, all 25 or 26 or 30 volumes of encyclopedia on one small disk. The first ones were text only and were somewhat boring to use. But as technology improved, so did the encyclopedias that were being sold. Today, the ones that are being published are multimedia works of art that are fun to explore, as well as use doing one's school work. (*School House Software Review*, Cunningham, 1997b)

The argument constructed in the reviews that employ a subjective style is based on the assumption that the reader is someone who shares the reviewer's memories and tastes and the reviewer's intention to think about technological products in terms of epochal, global, and dramatic changes. On the one hand, these reviews construct the intended reader as a socioculturally specific and contextualised subject, which is a rather exclusive construction. For example, the childhood memories of the above quoted text's author may

not be shared by the younger generations. Someone whose school years were not associated with using an encyclopaedia in his/her homework hours (either because someone was educated within a system that did not encourage students' usage of other sources than textbooks or because someone grew up in a community which did not have access to encyclopaedias and similar sources due to their relatively high cost) could also feel excluded. On the other hand, the reviews construct the reader (and the intended consumer of ICT-mediated products) as a member of a technological society characterised by rapid and progressive technological development and encourage the reader to uncritically accept the modern discourse on technological progress.

Another way of constructing the reviewer as an authoritative speaker is based on the power of the 'objective' – formal and impersonal – style of writing. For example, the reviews published on *The Edutainment Page!* employ a neutral and distant language. This helps the reviewer present his/her opinions as based on a systematic and unbiased assessment of the reviewed products:

> On the down-side, the 1995 modifications to Encarta, have not all been improvements. With the price reduction, Encarta loses its quality packaging and guide book on research and writing, both positive features of earlier editions. … The extra level of filters added in Encarta 1995, at first glance, seemed to make finding information more difficult than it was in the 1994 version. You can however sidestep the filters and search, as in the 1994 version, by clicking "Find", typing a word into Pin-pointer and looking for the icons alongside the text, that indicate the media included on this subject. (*The Edutainment Page!*, "Microsoft Encarta 1995", 1997)

The 'objective' reviews focus on technological requirements, software features and the content of the products rather than on the reviewer's and the reader's memories, and feelings. Nevertheless, the objective reviews also offer a particular construction of the intended reader and consumer of ICT-mediated educational products. This construction may be even more persuasive due to the seemingly impartial and objective style of writing. The review reader is addressed in second person (*you*) and constructed mainly as a generic software user. The reviews imply that the reader/user's main concern is that the software is user-friendly. The user-friendliness means that the user can navigate software easily, retrieve information easily, and does not have to wait for long:

> Webster's is easy to move around, explore and extract information. Another plus for users who hate being held to ransom, is you can return to the opening menu from anywhere within Webster's, by

> clicking on the picture of the reading lamp labelled “Menu”. (*The Edutainment Page!*, “Webster’s Interactive Encyclopaedia”, 1997)

Apart from being a software user, the reader of the reviews published on *The Edutainment Page!* website is identified as being Australian. This is done in two ways. The review summary contains information about Australian retail prices, Australian distributor, or suitability for Australia. The author provides Australia-related examples of content assessment and search results:

> As with the other encyclopaedias we reviewed, the atlas is Encarta’s weak point. You get an online of Australia with the capital cities marked and little more. Encarta offers more information on Australian cattle dogs than Australian explorers, and is of limited use for students doing projects on Australian history. Like the 1994 version, Encarta 1995 replaces the photograph of the old Australian Parliament house with a sketchy map of Canberra.
> (*The Edutainment Page!*, “Microsoft Encarta 1995”, 1997)

> To find information you can look up articles alphabetically or you can perform idea search by entering your own words or questions. It allows a variation of Boolean searches. It assumes “or” if you type several words. If you want to see what it has to say about Prime Minister Paul Keating, you have to put brackets around the query: (Paul Keating).
> (*The Edutainment Page!*, “The Britannica CD, ON-line, and Electronic Index”, 1997)

The above example demonstrates that even reviews that employ an objective, impersonal, and neutral style of writing may construct the intended review reader in terms of nationality. For example, the intended reader of the quoted reviews is an Australian teacher or parent. This follows from the implied importance of Australian content and the examples of search queries that were used in the process of testing the CD-ROM encyclopaedias. However, as I show in the next analyses, both the national-specific content and the reader/user’s nationality are less salient in these reviews because they construct the reader/user as a generic CD-ROM user.

5.4.3 The CD-ROM encyclopaedia

In reviews, the CD-ROM encyclopaedia is constructed mainly as a technology of information storage, presentation and retrieval. It is constructed as an advanced technology

of information storage which is capable of storing large volumes of information measured in millions of words, thousands of images, and hundreds of audio records and video clips:

> With more than 10 million words, over 50,000 articles including 20,000 biographies, nearly 12,000 photographs, over 100 video clips and over 1,200 sounds, this CD-ROM is sure to satisfy the most voracious hunger for knowledge! (*Overmode*, "World Encyclopedia 2000 CD-ROM", 2002)

The capability of storing large volumes of information is an advantage only if the user can access the information quickly and easily. Therefore, the construction of the CD-ROM encyclopaedia as a powerful technology of information storage is intertwined with its construction as a powerful tool of information retrieval:

> A slick search engine helps you wade through tons of articles and index entries and even detects slight spelling mistakes while entering a search word. (*The Review Zone*, Velgos, 1998a)

In the reviews, CD-ROM encyclopaedias are constructed against the background of developing technologies of information presentation and communication, from print encyclopaedias to CD-ROMs containing textual data only and then to multimedia interactive CD-ROMs. This construction entails the popular and the technoenthusiastic educational discourse on technology. These discourses are employed in order to present the reviewed product as an instance of the latest technological development, and, therefore, as the most advanced technological product:

> It [the Hutchinson Encyclopedia 2001] sings, it dances, it juggles flaming sticks and it even makes you tea if you ask it nicely. Okay, maybe not; we'll have to wait a few more years for the encyclopaedia-teasmaid hybrid that everyone dreams of. That we dream of. Grasping back for reality, what this new incarnation of Hutchinson's actually does boast in numerical terms is well over 1,000 new images, over 600 new web links, 7,000 quiz questions and a whole set of new videos. (*IT Reviews*. "The Hutchinson Encyclopedia 2001", 2002)

The reviews emphasise that a CD-ROM encyclopaedia provides more 'services' to its consumer than the print encyclopaedia ever did due to the capabilities and features of the CD-ROM technology. The CD-ROM encyclopaedia is represented as providing better, quicker, and easier access to the information due to the availability of powerful database search tools. It is presented as a richer reference source because the CD-ROM technology

of information storage allows a lot of extra content, such as virtual tours, statistical tools, dictionaries, and atlases. The multimedia and interactive CD-ROM technology allows the presentation of encyclopaedia content in multiple modes and enables the user to interact with it. All these features are presented as features that are new and characteristic of encyclopaedias published in the CD-ROM format, which makes the CD-ROM encyclopaedia so much better than its print counterpart although many of those features were present in print encyclopaedias. In addition, the CD-ROM encyclopaedia is more affordable than its print edition and a lot of physical space in bookshelves is saved due to using a tiny CD-ROM rather than several thick (and dusty) volumes:

> Perfect for elementary school students, World Book 1998 Multimedia Encyclopedia-Deluxe Edition is a quality reference tool you and your family can't afford to be without!
> The two-CD set includes all of the articles from the best-selling 22-volume print World Book Encyclopedia plus multimedia features including 360-degree views, videos, animations, colourful photos, illustrations and cutting-edge audio. (*The Review Zone*, Velgos, 1998a)

The construction of the CD-ROM encyclopaedia as a technology of information storage, presentation and retrieval is intertwined with the construction of the CD-ROM encyclopaedia as an educational resource that can be used in certain learning areas and that can develop information skills, scientific understandings, and cultural understandings in students. On the one hand, this embraces the construction of the CD-ROM encyclopaedia as an educational resource. On the other hand, the capabilities of the CD-ROM technology of information searching and CD-ROM encyclopaedia software features are presented as the most important aspects to consider when choosing educational resources published in the CD-ROM format.

> An almost seamless interface and a well-organized set of research tools makes World Book 1998 Multimedia Encyclopedia – Deluxe Edition a smart choice for an outstanding educational resource for your family or the classroom. (*The Review Zone*, Velgos, 1998a)

CD-ROM encyclopaedias are claimed to be valuable educational resources and powerful learning tools due to them being pieces of advanced information technology. For example, the CD-ROM encyclopaedia is claimed to increase children's and students' motivation to learn and encourage active learning due to its being a piece of multimedia and interactive technology (*School House Software Review*, Cunningham, 1997a, 1997b).

A CD-ROM encyclopaedia that has some content problems can still be recommended as excellent because of its search capability and its interface design. For example, the reader is informed that the *Microsoft Encarta* CD-ROM encyclopaedia can hardly be considered a good resource for studying Australia-related topics:

> Being an American based product, Encarta is biased towards the US. ...
> As with all the Encyclopedias we looked at though offering excellent cross-section of material, there was a noticeable lack of Australian content.
> (*The Edutainment Page!*, "1994 Microsoft Encarta", 1997)

Nevertheless, the reviewed product is evaluated as excellent in terms of its suitability to Australia and as very good in terms of its educational value:

> Skills Developed: research
> Age: 7-107 years
> Suitability to Australia: Excellent
> Educational value: very good
> Rating: 9/10
> (*The Edutainment Page!*, "1994 Microsoft Encarta", 1997)

The technological construction is particularly salient in the summarising sections of the reviews. These are such sections as 'Featuring', 'Scorecard', 'Verdict', and 'The Bottom Line'. These sections summarise the most relevant and essential information about the reviewed products. In these sections, a description of product features is provided and presented as objective and factual information rather than as somebody's subjective opinion about the reviewed product. However, the 'Featuring', 'Verdict', and similar sections of CD-ROM encyclopaedias' reviews are not just neutral descriptions of the software features and/or impartial summaries of their evaluation. These sections also offer particular constructions of the review readers and reviewed products. They construct the review reader as a buyer.

For example, in the 'Verdict' sections of the reviews published on the *IT Reviews* website, the intended user of the CD-ROM encyclopaedias is constructed as an online buyer by being offered to upgrade your PC online, to buy reference software online, and by being provided with links to online bookstores and auctions:

Verdict

Hutchinson 2001 carries the same level of quality over from the previous version with enough added extras to keep anyone happy, and now it's a particularly strong family product with the added support for the National Curriculum. Finally, the price point is very reasonable. Nice one, Focus.

Buy reference software securely online at a bargain price
Auctions Buy or Sell *anything* at the best price
Compare prices of Reference software
Upgrade your PC: buy RAM online

Details

£29.99 inc. VAT
Focus Multimedia: 01889570156
www.focusmm.co.uk (other Focus Multimedia-related sites)
(*IT Reviews*, "The Hutchinson Encyclopedia 2001", 2002)

The 'Featuring'-like sections are positioned in the left-hand margin of the review page or at the beginning/end of the review. Due to this distinct positioning and a rather impersonal writing style, such sections work as a means of presenting the ICTs and market-oriented constructions of the CD-ROM encyclopaedia as the most essential and important, and contribute to these constructions' legitimisation.

The construction of the CD-ROM encyclopaedia shaped by the discourse of ICTs works as a means of constructing the consumer's needs. When an encyclopaedia is described in terms of the capabilities of CD-ROM technology (the features of the interface design and the speed of the search engine), each new edition of the same encyclopaedia can be offered to the public as a new product:

> Containing over 600 Megabytes of CD-storage, the 1994 Encarta starts with the 29-volume Funk and Wagnalls encyclopedia and adds more than 1000 articles. The 1994 version has increased hours of sound from seven to eight, samples of languages from 36 to 60, and now includes 7800 photos and illustrations, 100 animations and video clips, 800 maps, 1000 interactive charts, the illustrated timeline, and an atlas-all updated for 1994. (*The Edutainment Page!*, "1994 Microsoft Encarta", 1997)

New editions have new system requirements, such as more RAM, a better sound card, and more space on the hard disk. Therefore, new editions often make it necessary to upgrade the hardware. In this way, the seemingly neutral – factual, purely technological –

construct of a CD-ROM encyclopaedia works as a basis for constructing the parent and/or the teacher reader of the review as a consumer of innovative technological products. I explore this issue in more detail in the following subsection.

5.4.4 The CD-ROM encyclopaedia buyer and user

The reviews offer particular constructions of the intended buyer and user of the CD-ROM encyclopaedia. In the reviews, the CD-ROM encyclopaedia buyer is identified as a parent or a teacher. Seemingly, the reviews are addressed to any parent who shares common parental concerns about children's education and to any teacher who intends to use the CD-ROM encyclopaedias as an educational resource and a learning aid. In terms of their needs and concerns, the group of the potential buyers and users of CD-ROM encyclopaedias is claimed to be very inclusive. This presentation conceals the fact that the group of potential consumers is not so inclusive in terms of their social, economic, and national identity. For example, the intended consumer needs to be quite well-off economically, as implied by the information about the system requirements and the price of the product. Also, the consumer of CD-ROM encyclopaedias is supposed to belong to a social group that considers investment in children's development and education a top priority and is willing (and able) to pay for it. It might also be a case that the reviews refer to a particular idea of 'good parenting' which is nowadays seen to require investment in computer hardware and software (Buckingham, Scanlon, & Sefton-Green, 2001).

The selection of CD-ROM encyclopaedias' titles for review indicates that the reviews are not addressed to everybody: as the lists of reviewed titles show, the more expensive CD-ROM encyclopaedias are mainly reviewed on the Web (see Appendix D). Also, different editions of these products are reviewed. For example, my data contains reviews of different editions of *Microsoft Encarta*, such as:

- *Microsoft Encarta 1994* CD-ROM edition offered in Australia for AUS $249 plus $155 upgrades;
- *Microsoft Encarta 2000 Reference Suite* edition available in Australia for AUS $199;
- *Microsoft Encarta Reference Suite Deluxe 2001* (US $74.95); and
- *Microsoft Encarta Reference Library 2002* (US $60).

These products' reviews are addressed to those who can afford to spend hundreds of dollars on another CD-ROM encyclopaedia title in his/her CD-ROM library, or on another edition of the same title. In the reviews, the intended buyer and user is identified as someone who is ready to upgrade one's hardware, or to buy a second computer, which may exclude many groups of parents and families.

The seemingly neutral information about hardware requirements – a necessary section of the CD-ROM encyclopaedia reviews – also works as a means of constructing the intended user. This information is presented as neutral due to such headings as 'System Requirements' or 'Technically Speaking'. For example, in the reviews published on the *DiscoverySchool.com* website, the section 'Technically Speaking' provides a list of the minimal technical requirements needed in order to use the product. These requirements may also be interpreted as a way of specifying the intended user's identity as belonging to a group that can afford a particular kind of hardware, for example, the DVD edition of the product.

The impression that the reviewed products can be used by anybody may be encouraged by not making explicit the national identity of the intended user. For example, reviewers may advise the review reader that a reviewed product is particularly useful for students because "its content is geared to grade-appropriate topics students typically covered in school curriculums" (*The Review Zone,*Velgos, 1998b). However, the authors of reviews published in the global network do not always find it necessary to mention which country's school curriculum they are referring to. This implies either that there is a global school curriculum (or, at least, a school curriculum that is common to all English-speaking countries) or that the reader knows that, for example, National Curriculum is the proper name for the school curriculum in the UK:

> The content has also been tuned to match the National Curriculum, with a whole host of links which highlight the articles that correspond to key stages 2.3 and 4 – in other words this is the most school pupil-friendly encyclopaedia yet. (*IT Reviews*, "The Hutchinson Encyclopedia 2001", 2002)

One of the characteristic features of the CD-ROM encyclopaedia reviews is that the construction of the intended user of the CD-ROM encyclopaedia is quite inclusive in terms of age. The intended user can be both a child and an adult, or an entire family, all of them having the same needs and preferences. This results in a somewhat ambivalent construction of both adult and child users. Both adult and child users of the CD-ROM

encyclopaedia are constructed as needing instant access to the unrestricted amount of information and preferring this information to be presented in a multimodal and interactive format. The CD-ROM encyclopaedia – an advanced technology of information storage, access and presentation – is presented as a means of satisfying these universal needs and preferences.

The only difference between the adult and child users that is considered to be worth mentioning (and which, in fact, is made particularly salient) in the reviews is the difference formulated in terms of cognitive and literacy skills and abilities, a difference which is to be taken into account when the encyclopaedias' content and language are evaluated. Therefore, reviewers inform the readers that, for example, an encyclopaedia works well for students who want "basic explanations delivered in a tried and true format" (*SuperKids Educational Software Review*, "Year 2000 Grolier Multimedia Encyclopedia Deluxe", 2002) or that it is recommended for "families with elementary to junior high school students and report writers. Older students and adults, however, may find the depth of information inadequate" (*SuperKids Educational Software Review*, "World Book Millennium 2000 Deluxe edition", 2002). Both children and adults are constructed as software users, the only difference between them being that children are less competent and less experienced users and that they have underdeveloped cognitive and literacy skills and abilities:

> It is a very easy program to use in every aspect. It is primarily an encyclopedia which features topics and subjects that are age appropriate. But it also has some nice extras that each child can use as their skills mature and develop.... The level of the material presented is just right for the targeted age group, and is presented in a clear and understandable way. (*School House Software Review*, Cunningham, 1997a)

On the one hand, the construction of the adult and child users of the CD-ROM encyclopaedia as having the same needs and preferences may result in the infantilisation of adult users. This is, for example, a case when a review reader (presumably, a parent or a teacher) is invited to share the review author's evaluation of the text-only format as dull, and the availability of interactive and multimedia features (pictures and, in particular, audio and video clips) as having unquestionable value for all – because they make a reference work less boring. On the other hand, such a construction can be interpreted as a way of shaping the needs of the child consumer of ICT-mediated products. More precisely,

it can be interpreted as a way of transferring rather specific needs of a particular group of adults, such as scholars, to a different and broader group, such as children and students.

The idea that ICTs provide the best possibilities for satisfying one's information needs has been developed within the conception of the scholar's working station. This reflects a scholar's need to have a quick and relatively inexpensive access to sources of information and data. The scholar may require a large amount of information from sources located at a significant distance from the scholar's office. Reaching these sources may be a costly enterprise, require much time, and not always be possible. In the context of such information needs, the advantage of the digital technologies of information access seems to be unquestionable. Given that some groups' information needs may differ from those of scholars, this advantage cannot be taken for granted. Particularly, it cannot be taken for granted that the digital technologies of information access are so necessarily beneficial for children and young students. Children and students need to be *educated* rather than *informed*.

The construction of children and students as a particular group with specific needs may entail issues relating to the quality of information that can be accessed with the help of ICTs rather than issues relating to the features of ICTs and questions regarding who may benefit from their use (Comber & Green, 1999a, 1999b; Downes, 1997; Kenway, 1995; Lankshear & Knobel, 2003). On the contrary, the construction of the child user of CD-ROM encyclopaedia as a generic software user makes sociocultural differences between the users invisible. This construction, therefore, is important in software marketing. It helps convince the review reader that any child can benefit from using the CD-ROM encyclopaedia if only it were chosen according to the child's age, literacy level and technological competence. Implicitly, however, the intended review reader and the consumer/user of CD-ROM encyclopaedias is identified as a member of a well-situated group. The intended readers of the reviews are mainly parents who are encouraged to uncritically accept the market-oriented construction of ICT-mediated children's and educational products.

In this section, I examined reviews of CD-ROM encyclopaedias published on educational and independent websites. The analysis has shown that the dominant construction of the CD-ROM encyclopaedia in these websites is that of a technological product. The review reader is constructed as a buyer of innovative technological products. The child user of CD-ROM encyclopaedias is constructed as a generic software user. Also, the reviews assign to the child and student user the needs of a generic information

consumer. The offered constructions are shaped by the popular and technoenthusiastic educational discourses on technology. The revealed constructions and discourses are presented as legitimate, natural and neutral. The following means are typically used in order to do so: the choice of key topics (software features and usability); 'objective' accounts about software testing; and 'factual' summaries of the CD-ROM encyclopaedias' features, system requirements, and information about prices.

5.5 Conclusion

In this chapter, I have examined children's software review websites as part of the discursive context in which the consumption of CD-ROM encyclopaedias and other children's and educational ICT-mediated products is embedded. I have shown that a review website is a multileveled and hierarchically organised practice of the discursive construction of the intended visitor and his/her information needs, the children's and educational software, the intended consumer/user of the reviewed software, and the software review website as an information source. These are constructed not only by the texts comprising the content of website pages but also by what may be perceived by the visitor as neutral tools for navigating and searching review websites.

Software review websites represent three types of discursive practices. First of all, it is the practice of information marketing, in which the website visitor is constructed as being in need of objective and comprehensive information about educational and children's software, while the review website is constructed as a reliable and authoritative source of such information. The discursive practice of information marketing is intertwined with the discursive practice of software marketing. The construction of the intended visitor as having particular information needs is intertwined with the construction of the intended visitor as a concerned and informed buyer. These constructions imply that the visitor needs objective expert information about educational and children's software because there is an enormous number of titles offered in the market, and because the visitor wants to make an informed decision when purchasing software.

Both these discursive practices are brought together within the discursive practice of the construction of the domain of knowledge about educational ICT-mediated products. In this practice (represented, for example, by search queries and search results, and by the texts of reviews), the CD-ROM encyclopaedia is constructed as: a market product; a

programming product (software); a piece of advanced (multimedia, interactive) technology of information presentation; and a solution to educational and parenting problems.

The review website visitor is constructed as a parent or teacher who has an interest in the cutting edge technology and the best edutainment software. The parent visitor is constructed as a parent who cares about his/her child's education but who may prefer to invest money rather than time. He/she also believes that purchasing ICT-mediated educational products is a good investment, since they motivate children to learn, keep them busy, and are fun to use. The reason for reading reviews is that the amount of software targeted at children can be 'intimidating' and, therefore, parents need independent and objective information about it in order to save time and money. It is implied that the only alternative for contemporary parents is to buy educational software with or without savings (rather than to buy software or not to buy it).

In the texts of reviews, the construction of the CD-ROM encyclopaedia and its intended user is shaped by the discourses of ICTs, marketing and educational developmental psychology. The reviews tend to construct the CD-ROM encyclopaedia in terms of the development of information and communications technology from print to digital format as a history of encyclopaedia publishing, from print encyclopaedias that were impossible to update, to CD-ROMs containing textual data only, to multimedia interactive CD-ROMs that contain a lot of extra content, and finally to online encyclopaedias presented as gates to an unrestricted amount of information available on the Internet (see, for example, Kister, 1998). The reviewers' intention to evaluate CD-ROM encyclopaedias on the basis of this image of progressive technological development is not surprising. To construct the potential consumer as somebody at the edge of technological development is the usual strategy of market promotion and advertising (Bolinger, 1980). At the beginning of the third millennium and almost twenty years since the release of the first reference work on a CD-ROM it would be difficult to exploit the innovative technology image, without such a large-scale retrospective.

The constructions offered on the review websites are shaped mainly by such discourses as the discourse of marketing; the discourse of ICTs; and, to a lesser degree, the discourse of educational developmental psychology. These constructions are offered not only in the texts of the reviews but also in the texts that mediate review website navigation and information search. Many of these texts are located in the left-hand margin and in the top sections of pages, which positions them as points of departure and, therefore, contributes to the legitimisation of the offered constructions. These texts are consumed in

the process of the usage of tools for website navigation and information search, which may encourage uncritical acceptance of the constructions offered in these texts.

The legitimisation of market-oriented and ICTs-oriented constructions of CD-ROM encyclopaedias in Web-located discursive practices may prevent a more multi-dimensional assessment of the reviewed products. For example, it may prevent their assessment as discursive practices that contribute to the construction of users' subjectivities, or as practices of literacy education. It is well accepted in educational contexts (for example, in school subjects such as English and Media Studies) that students need to be aware of media bias and that they can be taught how media and advertising shape their desires and their subjectivities. The analysis presented here suggests that such work should be extended to ICTs. The CDA methods and techniques utilised in this study could form a starting point for critical educational approaches to examining ICT-mediated educational products. In the following chapters, I study CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools as constitutive of their users.

Chapter Six Powerful technology – empowered user? The discursive construction of the user in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools

> "As yet we cannot say anything about this model's spiritual capabilities…. But we shall expose these spiritual capabilities now." The dour technicians deployed a tape recorder, a radio, a movie projector, and a small portable library on the table. The zombi scanned the instruments of culture with an indifferent gaze and sampled the tape for taste. It became evident that the spiritual capabilities of the model would not develop spontaneously. And so Vibegallo ordered a forceful infusion of cultural habits, as he put it. The tape recorder sang in sugary tones.… The radio whistled and gargled. The projector displayed the animated film, *Wolf and the Seven Sheep*. Two technicians stood one on each side of the zombi and started to read aloud simultaneously… As should have been expected, the alimentary model responded to all this noise with complete indifference. (A. & B. Strugatski, *Monday Begins on Saturday*)

6.1 Introduction

In Chapter Five, I explored one broader discursive context in which the process of selecting and purchasing children's and educational software and CD-ROM encyclopaedias may be embedded. In the present chapter, I explore CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools as discursive practices that may contribute to the formation of their users' subjectivities, be selective of certain groups of users, and legitimise and naturalise particular discourses on technology and education. I examine texts that are encountered by the user in the process of using CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. These are the texts on CD-ROM boxes and on the homepages of online encyclopaedias and Internet search tools; texts that mediate software operating, such as toolbars and menus; and Help texts that instruct the user in how to use the available products and services. My analysis is governed by three goals.

My first goal is to explore CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools as educational discursive sites, and to problematise them in relation to a broader context of educational and pedagogical theory and practice. In order to do this, I critically analyse how these products are constructed as educational, how the intended consumer of ICT-mediated educational products is constructed, what this construction implies about the intended consumer's needs and identity, and who may be excluded by this construction.

My second goal is to explore each group of products – CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools – as sites of discursive construction of their user. These products employ different technologies of information storage and access (CD-ROM technology and Internet technology). They emerged at different times. They have their own advantages and disadvantages. They provide access to different types of information sources and offer different tools of information access and presentation. Some of them are available for free and others need to be purchased. I suggest that the texts encountered by the user in different groups of products may offer different constructions of the user and the products.

My third goal is to explore these products as computer-mediated discursive practices of subjectivity formation. As I have suggested in Chapter Three, adopting a social theory of discourse allows me to investigate the practices of subjectivity formation in three ways: it allows me to examine constructions of reality that may affect the subjects' thinking about reality and about themselves; constructions of the subjects' identities, needs, interests, and desires; and subject positions set up for the participants in a social interaction. In this chapter, I study how the user is constructed in all these ways. I aim to reveal whether there is any difference or contradiction between, for example, the construction of the user in the CD-ROM packaging texts and subject positions set up for the user in the texts that mediate his/her use of the CD-ROMs.

Taking into account the number of texts and the complexity of textual formations in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools, it is impossible to examine all the texts that may be encountered in these products in detail and/or to critically analyse all the discursive constructions of the user that may be offered in these products. I interrogate one dominant theme – the theme of technology as powerful and as empowering its user. As I have demonstrated in Chapter Five, this is one of the most important themes in the texts that comprise a broader discursive context of the choice and

the consumption of CD-ROM encyclopaedias. The theme of power is central to my exploration of diverse products, texts, and discursive constructions in this chapter.

The chapter consists of five main sections. In sections 6.2 and 6.3, I focus on the discursive constructions of the CD-ROM encyclopaedia and its intended consumer. These are constructions of the CD-ROM encyclopaedia as a powerful information technology, as an educational environment that encourages inquiry and makes learning easy and fun, and as an educational product that is equally beneficial to all its users – whoever they are. I identify the discursive means that are used in order to make these constructions salient and natural, and critically assess the claims regarding the educational benefits of CD-ROM encyclopaedia usage for everybody. In section 6.3, I also explore the relational construction of the user and the tool. I focus on the subject positions set up for the user in the texts that mediate the use of the tools and in the texts instructing the user in how to operate the software. I show the multiplicity of subject positions set up for the user and discuss how they correspond with the construction of the user as being empowered by and being in control of the technology.

In section 6.4, I focus on online encyclopaedias and children's Internet search tools. I explore how the theme of powerful/empowering technology is developed and used in texts that a visitor encounters on these online information services' websites. I explore how the power-oriented construction of ICTs is intertwined with constructions of the Internet as a chaotic information universe and dangerous environment and reveal how this construction helps construct the online encyclopaedia visitor as a client of a pay information service, and children as a particular group of Internet users. In the concluding section, I summarise my analyses.

6.2 The CD-ROM encyclopaedia

In this section, I analyse the discursive construction of a CD-ROM encyclopaedia in the texts addressed to the intended consumer, such as the texts on the CD-ROM packaging. I discuss what this construction implies about the consumer's needs, desires, and expectations, and show how the offered construction of the CD-ROM encyclopaedia is evidence of technological determinism in popular discourse on technology and education.

6.2.1 Information on the CD-ROM packaging

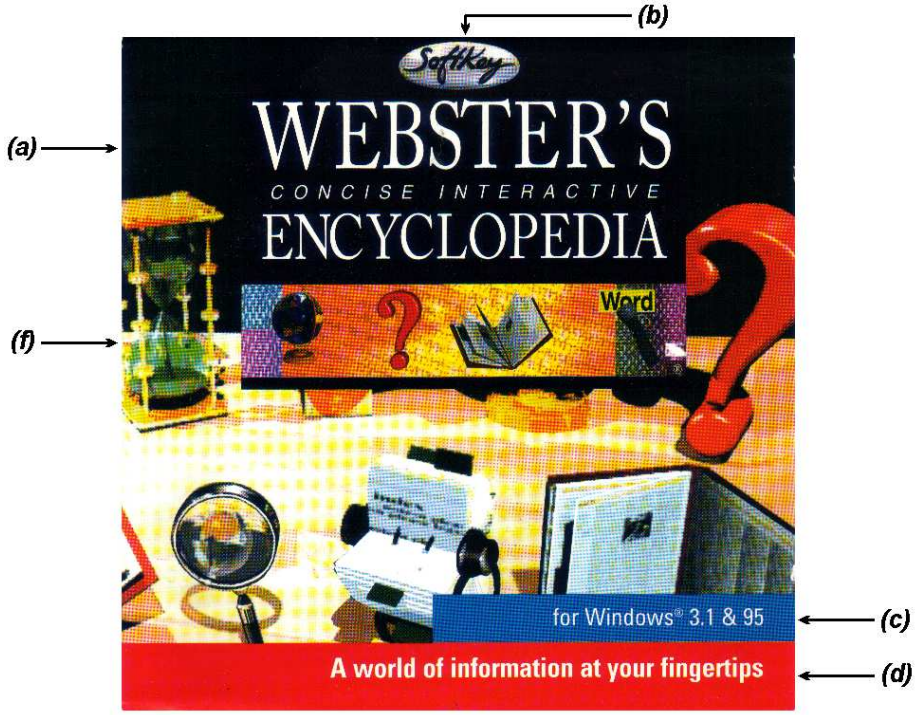
The constructions of the CD-ROM encyclopaedia and its intended consumer's needs are offered mainly in the texts on the CD-ROM packaging (see Figure 6.1). Some of these texts are consistently present on the products' packaging, while others are optional.

The following information about a CD-ROM encyclopaedia is always presented on the packaging: product title; producer's name and trademark; product price; and system requirements.[1] Other texts displayed on the packaging are optional. These are texts that tell the intended consumer about where, how, and by whom the product can be used; outline the product's content; and describe software features, such as storage capacity, interactivity, multimodality, and the power of the search engine. The following text from the back cover of the *Birds of Australia* CD-ROM is an example of an optional text:

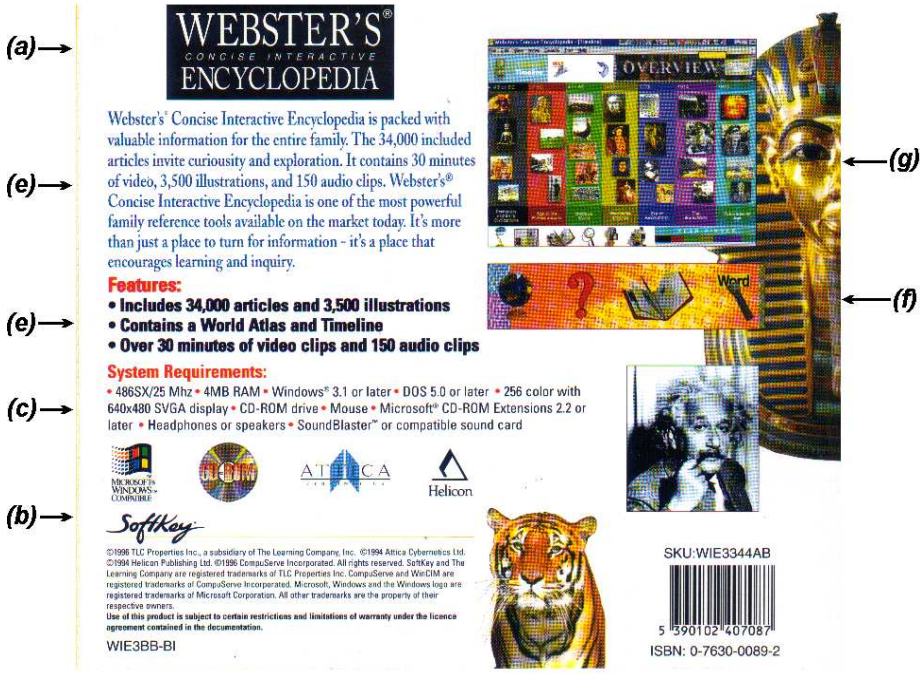
> Birds of Australia Version 5.0 from Natural Learning contains 790 bird pictures and an almost complete collection of birdsong recordings. The CD includes a bird finder to help identify species observed in the field. Based on the best selling 5th edition of "Simpson and Day's Field Guide to the Birds of Australia" the CD is a must for all schools, libraries and naturalists who want to know more about Australia's wonderful bird life. The CD Birds includes a complete list of Australian habitats, over 655 birdsongs and a birdsong identifier. (*Birds of Australia 5.0* [Packaging], 1999)

This text informs the intended consumer about the product, its content (information on Australian birds), the amount of information (790 bird pictures; over 655 birdsongs), and the tools that facilitate the information search ('Bird Finder'; 'Birdsong Identifier'). Such expressions as "over 655" are typical of the texts on CD-ROM packaging, although such expressions do not seem to make much sense. What does over 655 mean? Is it 656 or 657?

[1] System requirements inform the intended consumer of a CD-ROM encyclopaedia what hardware and software are needed in order to use the product. For example, the consumer needs to know about the required operating system (e.g., Windows 95) or the amount of RAM (e.g. 16 Mb RAM). RAM is Random Access Memory. In order to know if one can operate a certain software product on his/her computer, one needs to know what amount of RAM is required in order to operate the software. RAM is measured in megabytes (Mb). Some software products require more RAM than others. The more RAM required in order to operate the software, the more updated and, therefore, more expensive system is needed to run the CD-ROM.



(a) Front cover



(b) Back cover

***Figure 6.1 Webster's Concise Interactive Encyclopaedia*: packaging**

Standard elements: ***(a)*** title; ***(b)*** producer; ***(c)*** system requirements.

Optional elements: ***(d)*** slogan; ***(e)*** product features (description); ***(f)*** product features (illustration); ***(g)*** content (illustration).

Why was the exact figure not used? It seems the text producer, apart from using figures, aimed to use as many words that mean comprehensiveness and quantity (*almost complete*; *complete*; *over*) as possible. Also, this text points out who the intended consumers are or, rather, who must have this CD-ROM. These are "all schools, libraries, and naturalists who want to know more about Australia's bird life." The text provides reasons why this product is a must: the CD-ROM provides complete or almost complete information about Australia's bird life and it is based on "the best selling 5th edition of 'Simpson and Day's Field Guide to the Birds of Australia'."

Such optional texts are important elements of CD-ROM packaging. They inform the intended consumers about the products and persuade them to make a purchase. In these texts, a factual description of software features is intertwined with features typical of advertising, such as catchy slogans, exclamatives, hyperboles, attitudinal lexis, clichés, and metaphors:

> Explore 21 map styles and 1.8 million place names!
> (*Microsoft Encarta Reference Suite 2001 – Australian Edition* [Packaging])

> A world of information at your fingertips.
> (*Webster's Concise Interactive Encyclopaedia* [Packaging], 1996)

Whether they are standard or optional, and whether they offer factual information about system requirements or catchy slogans, all texts located on the packaging of CD-ROM encyclopaedias offer particular constructions of the products. They assign certain needs, desires, and expectations to the intended consumer, and imply who this intended consumer is. The central message in these texts is that the CD-ROM encyclopaedia is a piece of powerful technology of information storage and access, and an advanced (multimedia) technology of information presentation. This construction is integral to the message that a CD-ROM encyclopaedia is an educational product that empowers its consumers as students and learners.

6.2.2 The power of CD-ROM technology

The CD-ROM encyclopaedia is constructed as a powerful technology of information storage when it is described in terms of the quantity of words and images, and the quantity

and/or temporal length of the audio and video clips that are stored on it. Different means are used in the packaging texts in order to present a CD-ROM encyclopaedia's ability to store information as amazingly high. Describing a CD-ROM encyclopaedia in terms of big numbers is a typical feature of the packaging texts. The effect of big numbers may be strengthened due to extra graphics and colour. In the packaging texts, figures and quantitative lexis are often printed in a larger font or in a different colour than the rest of the text (see Figure 6.2). Apart from reinforcing the impact of the numbers, the visual salience of the messages relating to the quantity of information stored on a CD-ROM may encourage the uncritical acceptance of the idea that its storage capacity is the main feature of the CD-ROM encyclopaedia and the main thing the consumer should care about.

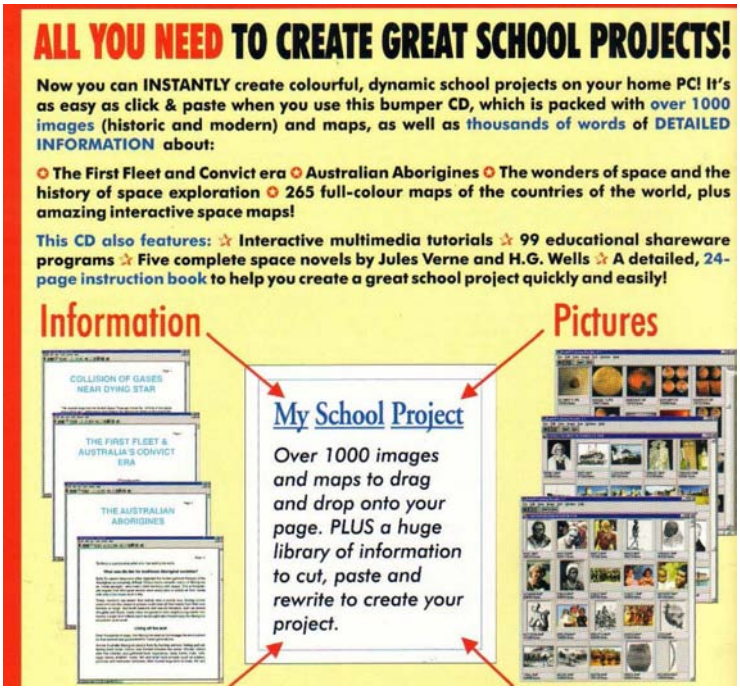
For example, the text placed on the back cover of the *Webster's Concise Interactive Encyclopedia* (1996) CD-ROM's packaging describes the product as follows:

> Features:
> - Includes 34,000 articles and 3,500 illustrations
> - Contains a World Atlas and Timeline
> - Over 30 minutes of video clips and 150 audio clips

Similarly, the back cover of *The Encyclopedia of Great Artists* (1995) CD-ROM's packaging presents the product with the aid of numbers:

- 20 minutes of video highlighting painting techniques.
- Over 1,000 full colour images.
- More than 500,000 words.
- 100 music and voice-over clips.

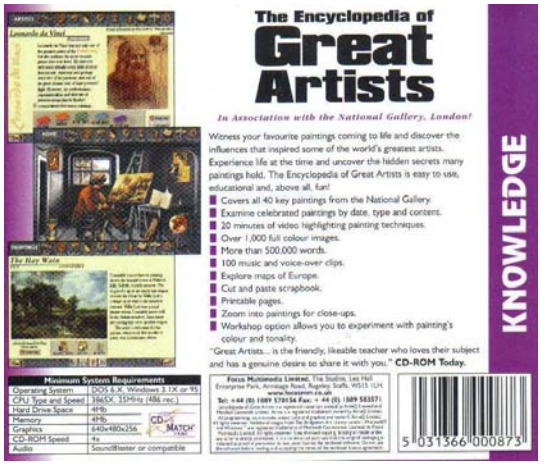
Within the field of software development, describing a CD-ROM encyclopaedia in terms of the quantity of words, images, and the temporal length of audio and video clips may be accepted as natural and neutral. It is not so in the field of marketing technological products. Talking about a CD-ROM encyclopaedia in such terms serves the purposes of promotion and advertising. Whatever the actual amount of information stored on a CD-ROM is, this amount is presented as being impressive, amazing, and unbelievably huge.



(a) The ***Maximedia School Project No 3*** booklet (back cover)



(b) ***The World's Best 10000 Clipart Images***
CD-ROM packaging (front cover)



(c) ***The Encyclopedia of Great Artists***
CD-ROM packaging (back cover)

Figure 6.2 **Usage of numbers, extra graphics and colour in description of software features**

The consumer's desire to purchase is expected to be sparked both by the fact that there are "27 million" words and "27,700+" photos and illustrations (*Microsoft Encarta Deluxe Suite 2001 – Australian Edition* [Packaging]) and "thousands of words" and "over 1000 images" (*Maximedia School Project No 1* [Packaging], 1999).

In the following text, for instance, numbers and a rhetorical question are used in order to present *Webster's Encyclopedia of Australia 2000* CD-ROM as containing an unbelievably large amount of information:

> Would you believe over 9,800 pages, more than 4,000 photos, charts and tables, over 80 movies and animations, 2,360 biographies of famous Australians, and 500 graphs and tables? (*Webster's Encyclopedia of Australia 2000* [Packaging])

Focusing on the numbers, the reader of this text might, indeed, get the impression that this CD-ROM contains an unbelievable amount of information. Having read the text more carefully, the reader may doubt its claim. The reader may ask, for example, why tables have been mentioned twice: "more than 4,000 photos, charts and tables, …and 5 00 graphs and tables." Why should the consumer of an encyclopaedia (a reference work) be impressed with the number of pages (9,800) stored on the CD-ROM and not, for instance, with the number and/or depth of its encyclopaedia articles? The reader could ask whether those thousands of photos, charts, tables, graphs, and biographies are displayed on those 9,800 pages or these pages contain different information, as the text encourages the reader to think. Also, the reader might find it unbelievable that there are 80 movies and animations on one CD-ROM. CD-ROM technology is not yet capable of storing so much unless those are 80 very short fragments of movies and animations. Who, then, is the intended consumer assumed to be? Is he/she a 'complete CD-ROM dummy' with such a vague idea of the capabilities of CD-ROM technology that he/she would not question this information? Or is the text expected to affect the decisions of consumers with such means of persuasion as the magic of big numbers?

The construction of the CD-ROM encyclopaedia as a powerful technology of information storage is merging with its construction as an advanced and multimedia technology of information presentation. One of the strongest selling points made in the packaging texts is that CD-ROM technology allows the use of multiple modes of information presentation, such as pictures, audio clips, video clips, and animations:

> Nature and Wildlife, historical events, memorable speeches, musical instruments, all come vividly to life through multimedia. …With over 50 video and 200 audio clips, plus 4,500 illustrations, HME is a rich media archive as well as encyclopaedia resource. (*Hutchinson Multimedia Encyclopedia* [Packaging], 1997)

In the packaging texts, the CD-ROM encyclopaedia is constructed as a powerful tool of information access. It is a tool that enables the user to find all the information he/she requires and to access it instantly:

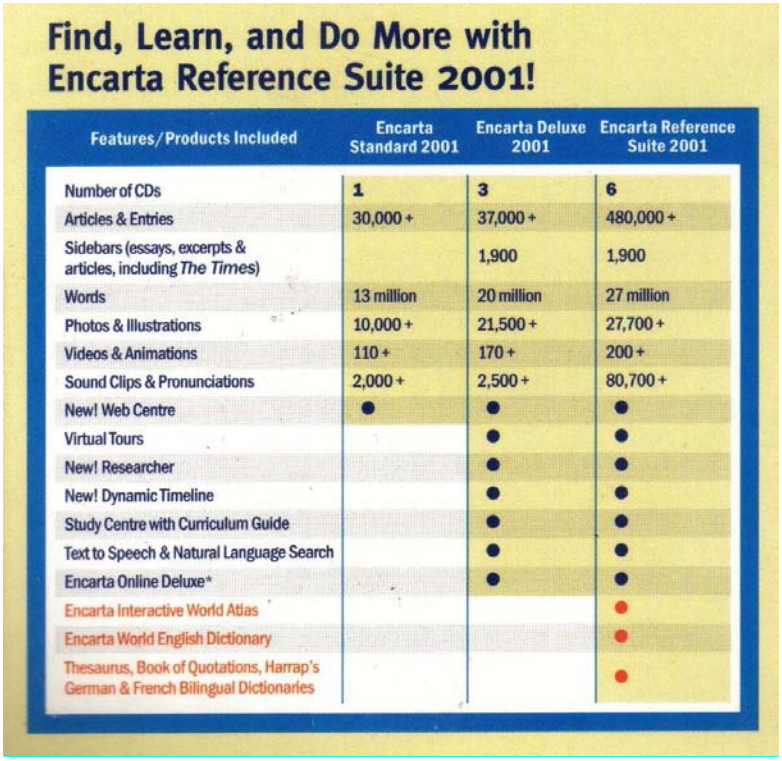
> Showcasing the Super Fonts browser this CD-ROM allows you to: ... Easily navigate over 60 categories. (*The World's Best 10000 Clipart Images* [Packaging], 1998)

> So, at the click of a mouse button, the powerful built-in Search Engine will instantly pinpoint the person you are looking for. (*Who did What in Australia* [Packaging], 1999)

The latter quote suggests that the extremely powerful tools for information searching and access can be managed easily, with a mouse click. Here, the construction of the CD-ROM encyclopaedia as a powerful technology is intertwined with the implied construction of its user as being in control of the technology and, with this technology's help, in control of reality (it 'will instantly pinpoint the person you are looking for'). The construction of the CD-ROM encyclopaedia as a powerful tool of information access entails a theme that is central in technology advertising: the theme of technology as an easily controlled power that augments a person's power. As Noble (1999) points out, merging technology, power and control is a common feature of the technology advertising discourse. In the advertising of technological products, the fantasy of mastery is created, and mastery over technology is presented as mastery over our lifestyle and the world. Computers, in particular, are presented as offering power to their users. One of the most popular symbols of power is the hand on the button. This symbol represents the technological products as offering their users power and control at their fingertips (Noble, 1999). This presentation of technology as offering its user power and control can be interpreted as an implication that the potential consumers of technology desire such power/control. In the following subsection I explore how the theme of technology as powerful and empowering is used in the texts advertising CD-ROM encyclopaedias as educational products.

6.2.3 Empowering learners and students

In the packaging texts, CD-ROM encyclopaedias are constructed as an advanced and powerful technology of information storage, access, and presentation. This construction is used in order to present a CD-ROM encyclopaedia as a technological product that empowers learners/students. The descriptions of such features as the number of reference materials stored on a CD-ROM, the quantity of information measured in words or minutes, and the diversity of the modes in which this information is presented – all these are placed in the same context as the claims regarding the usefulness of a CD-ROM encyclopaedia for learning and schooling. For instance, the back cover of the *Microsoft Encarta Reference Suite 2001 – Australian Edition* packaging displays a table (Figure 6.3) comparing this edition of *Encarta* with the previous editions.



Find, Learn, and Do More with Encarta Reference Suite 2001!

Features/Products Included	Encarta Standard 2001	Encarta Deluxe 2001	Encarta Reference Suite 2001
Number of CDs	1	3	6
Articles & Entries	30,000 +	37,000 +	480,000 +
Sidebars (essays, excerpts & articles, including *The Times*)		1,900	1,900
Words	13 million	20 million	27 million
Photos & Illustrations	10,000 +	21,500 +	27,700 +
Videos & Animations	110 +	170 +	200 +
Sound Clips & Pronunciations	2,000 +	2,500 +	80,700 +
New! Web Centre	●	●	●
Virtual Tours		●	●
New! Researcher		●	●
New! Dynamic Timeline		●	●
Study Centre with Curriculum Guide		●	●
Text to Speech & Natural Language Search		●	●
Encarta Online Deluxe*		●	●
Encarta Interactive World Atlas			●
Encarta World English Dictionary			●
Thesaurus, Book of Quotations, Harrap's German & French Bilingual Dictionaries			●

***Figure 6.3 Microsoft Encarta Reference Suite 2001 – Australian Edition*: learning and technology**

In the table (Figure 6.3), different editions of *Encarta* are compared, firstly, in terms of the number of: CDs; articles and entries; words; photos and illustrations; video and animations; and sound clips and pronunciations. Secondly, different editions of

Encarta are compared as facilities that provide access to Internet information services: "Web Centre"; "Encarta Online Deluxe". Thirdly, they are compared as programming products in terms of software features (virtuality, interactivity, and sophisticated research tools): "Virtual Tours"; "Researcher"; "Dynamic Timeline"; "Text to Speech and Natural Language Search"; "Encarta Interactive World Atlas". Finally, the editions are compared as information sources in terms of the availability of extra content: "Study Centre with Curriculum Guide"; "Encarta World English Dictionary"; "Thesaurus"; "Book of Quotations"; "Harrap's German and French Bilingual Dictionaries".

Overall, the table constructs the compared products mainly as technologies of information storage, access, and presentation. However, the table heading locates this ICT-oriented construction within a broad field of activity that includes learning: "Find, Learn and Do More with Encarta Reference Suite 2001!" In this way, the ICT-oriented construction is made natural and legitimate within an educational context.

Similarly, information about the number of articles, the minutes of video records, the number of illustrations and audio clips is used in order to present *Webster's Concise Interactive Encyclopedia* CD-ROM as a place that encourages learning and inquiry:

> Webster's Concise Interactive Encyclopedia is packed with valuable information for the entire family. The 34,000 included articles invite curiosity and exploration. It contains 30 minutes of video, 3,500 illustrations, and 150 audio clips. Webster's® Concise Interactive Encyclopedia is one of the most powerful family reference tools available on the market today. It's more than just a place to turn for information – it's a place that encourages learning and inquiry.
> (*Webster's Concise Interactive Encyclopedia* [Packaging], 1996)

In this text, statements about the amount of informational sources are placed within a framework of claims relating to the product's educational value. These claims invoke particular kinds of educational discourses – the discourses of progressive pedagogy and inquiry learning. It may be that the creators of the texts on the packaging of CD-ROM encyclopaedias draw upon pedagogical ideas that have been developed, for example, in the works of Bruner (1960, 1986): knowledge is constructed by learners; it is constructed by learners in the process of interacting with the environment; and knowledge construction depends on learners' interests and backgrounds. Students need to be engaged in investigating an issue, processing available knowledge and organising and refining that knowledge. The main function and task of educators is to provide conditions that would

encourage students to discover, develop and organise knowledge instead of passively consuming knowledge that is presented to them in its final form.

The availability of resources is not the only or even the main thing that is needed in order to empower the learner. The main thing is to foster the learner's desire to use these resources for discovering knowledge, and to instruct in how to conduct an inquiry. This is a goal that cannot be reached by simply providing access to resources: "engaged learning occurs when the lives, knowledges, interests, bodies and energies of young people are at the center of the classroom and school" (Thomson & Comber, 2003, p. 305). In order to make it a real inquiry and go beyond the traditional 'transmission of knowledge' approach, the teacher has to carefully structure and plan the process of inquiry considering the student's background, learning styles, values, and interests (Murdoch, 1992; Murdoch & Wilson, 2004). This task, however, is not highlighted in the CD-ROMs packaging texts that appeal to inquiry and curiosity. Rather, these texts equate the quantity of the resources stored on a CD-ROM with its ability to empower learning and inquiry.

The possibility of avoiding effort and hard work is yet another point emphasized in the texts on CD-ROM packaging:

> The Encyclopedia of Great Artists is easy to use, educational and, above all, fun!
> (*The Encyclopedia of Great Artists* [Packaging], 1995)

Using a CD-ROM encyclopaedia is presented as an experience of learning that is easy, pleasant, and fun. It is suggested that, being a piece of interactive multimedia technology, the CD-ROM encyclopaedia offers knowledge in a colourful and entertaining way, all ready for consumption. The quality of the learning environment created in the CD-ROM encyclopaedias is made contingent upon such features of the CD-ROM technology of information presentation as multimedia:

> The Hutchinson Multimedia Encyclopedia 1997 … combines the exciting world of multimedia with the unrivalled reference resources of the Hutchinson Encyclopedia database. …
> Have fun while learning. With more than 15,000 questions, the Quiz reflects the full range of text and media elements in the Encyclopedia. Offering hours of entertainment, it is also a strong educational tool. (*Hutchinson Multimedia Encyclopedia* [Packaging], 1997)

> Bring learning to life – experience the wonders of the world through dynamic multimedia maps, videos, images, animations, and more. (*Microsoft Encarta Interactive World Atlas* [Packaging], 2001)

It might also be the case that the connection of multimedia with learning refers to the pedagogical theories of multiple intelligences and learning styles, such as those developed in H. Gardner (1993). Gardner argues that students learn in distinctive ways and distinguishes between such learning styles as visual-spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, linguistic, and logical-mathematical. The theory of multiple intelligences and learning styles has been used in the critique of the traditional school education system for its being based on the assumption that everyone can learn in the same way, and also for instruction being largely based on linguistic modes. It has been suggested that using multiple media is more appealing to learners and, therefore, more effective. The use of multiple media, however, does not necessarily provide effective learning unless its choice is justified by the learning tasks. For example, visual media helps students better acquire concepts relating to spatial relationships. Meanwhile, in the packaging texts, multimedia is presented as a value in itself and as a feature that automatically improves learning. In marketing such products, publishers carefully invoke contemporary educational trends.

The construction of the CD-ROM encyclopaedia as a comprehensive source of information (counted in words, images, clips, and so on) and as a powerful technology of information access (measured in temporal units) and presentation (multimedia and dynamic) implies that this is what the consumer is in need of. The construction of the CD-ROM encyclopaedia or the reference CD-ROM as a powerful technology of information storage, access and presentation is intertwined with, and used as a foundation for, its construction as an educational aid that facilitates learning and school work and makes them easy and fun:

> Now you can INSTANTLY create colourful, dynamic school projects on your home PC! It's as easy as click & paste when you use this bumper CD, which is packed with over 1000 images (historic and modern) and maps, as well as thousands of words of DETAILED INFORMATION about: *The First Fleet and Convict era *Australian Aborigines *The wonders of space and the history of space exploration * 265 full-colour maps of the countries of the world, plus amazing interactive space maps!

> This CD also features: *Interactive multimedia tutorials *99 educational shareware programs *Five complete space novels by Jules Verne and H. G. Wells *A detailed, 24-page instruction book to help you create a great school project quickly and easily!
> (*Maximedia School Project No 2* [Packaging], 1999)

In the quoted text, the persuasive effects of the emotive lexis, exclamations, and advertising clichés ("as easy as click & paste"; "this bumper CD"; "the wonders of space"; "plus amazing interactive space maps!"; "to help you create a great school project quickly and easily!") may be enhanced and strengthened due to the use of different colours and capitalisation: "INSTANTLY"; "over 1000 images"; "thousands of words"; "DETAILED INFORMATION"; "265 full -colour maps"; "99 educational shareware programs"; "five complete space novels"; "24 -page instruction book". The product is presented in the quoted text as a comprehensive source of information, although such a feature as "thousands of words" can hardly be considered impressive in relation to a CD -ROM. Also, the availability of a 24-page instruction book may be considered odd as it appears that, in order to create a great school project 'quickly and easily', it might be necessary to study those 24 pages.

The construction of a CD-ROM encyclopaedia or another reference product as a piece of powerful technology helps sell these products as great homework helpers that provide instant educational effects and benefits. For example, a text on the *Maximedia School Project No 1* (1999) CD-ROM booklet promises instant and easy success when creating a project. The text reads:

> YOUR COMPLETE PROJECT CREATION KIT!
> My School Project
> Over 1000 images – simply
> drag-and-drop onto your
> page! PLUS a huge library of
> information to cut, paste and
> rewrite to create your project
>
> **Five easy steps to a great school project**
> Step 1: Create headings and borders in your wordprocessor.
> Step 2: Use powerful search engines to quickly scan through
> thousands of images and articles on this CD-ROM.
> Step 3: Drag, drop and resize the pictures you want.
> Step 4: Cut, paste and rewrite information.

Step 5: Print your project in black-and-white or colour!

This text refers to a long-standing pedagogical practice – using projects as part of the classroom pedagogy. This tradition dates back to the beginning of the twentieth century (work on projects in education done by John Dewey and others) and has been used across the curriculum by educators since (Ruopp, Gal, Drayton, & Pfister, 1993). Projects were the focus of those teachers who aimed to motivate students and vary their learning experiences because they were concerned with students being involved in activities that were chosen for them and, therefore, being bored, disengaged, and resisting learning (Lave & Wenger, 1991; Ruopp et al., 1993). Because project making is considered to be an activity that students can own, projects are believed to be a way of helping students engage more with their learning (Ruopp et al., 1993). The value of project-based learning is seen to be that it provides an opportunity for students to be engaged in a task and requires commitment, time, effort, and dedication.

In the text quoted above, the activity of project creation is presented in opposite terms. The text claims that, with the help of this CD-ROM product, project creation will be an instant production that can be achieved in five easy steps, rather than being an activity which involves long-term commitment and in-depth exploration of the chosen issue. In other words, the text denies the very idea of a school project as a way of learning – learning that is inspired by the teacher's commitment to make the process of knowledge acquisition meaningful to students. By offering a tool that enables students to produce school projects instantly, without effort and, subsequently, without commitment, the quoted text denies that the learning experience obtained in the process of inquiry is as valuable as the produced artefact (namely, the project).

This view contradicts studies which show that the media and ICTs can be used in schools for making learning more meaningful and engaged. As Thomson and Comber (2003) argue, the media and ICTs have enormous potential for a pedagogy that empowers students as knowledge producers. This empowering is possible if students are apprenticed as co-producers of knowledge:

> The move from apprentice to artisan knowledge producer is one in which students will acquire a repertoire of knowledge production practice – an assemblage of habits, dispositions, accumulated understandings, tools and strategies that work in particular situations, with specific languages, categories and theories. As they move

> through their apprenticeship learning from and with their artisan teachers, student knowledge producers will become adept at asking questions, looking for surprises, systematically generating evidence, theorizing, analyzing, writing, designing and arguing.…They will be deeply immersed in the play and pleasures of knowledge production for the long period of compulsory schooling. Knowledge production will become a taken-for-granted way of doing things. It will be a way of being, doing and living in an information-saturated world. Students might be apprenticed as filmmakers, journalists, global communicators, researchers and theorists to teachers whose refashioned professionalism has a renewed pedagogical focus. This is a metaphor of meaningful engagement. (Thomson & Comber, 2003, p. 318)

According to the educational researchers quoted above, ICTs may be an integral part of meaningful and engaged learning. In order to use the ICTs' potential, school teachers (and parents) need to realise clearly that this potential cannot be used fully without people's effort, commitment, and, most importantly, without reconsidering the pedagogical metaphors that are shaping the school pedagogy in general and the use of ICTs in education specifically (Comber, 1997). Without this critical reconsidering, the rich educational potential of multimedia interactive ICT-mediated products may become a noise to which students will respond with complete indifference, like Strugatskis' alimentary model did. Teachers and parents cannot and should not rely on the ICTs' potential and expect that the spiritual capabilities (learning abilities, literacy skills, and deep understanding of school subjects) would spontaneously develop if children were surrounded by ICTs.

Meanwhile, teachers' and parents' thinking about ICTs is shaped by a discourse of technological determinism, which entails the uncritical reliance on ICTs as a tool that will either change the nature of learning completely or will just enhance and augment existing pedagogies (Bigum, 1997; Bingham, Valentine, & Holloway, 1999; Burbules & Callister, 2000; Thomson & Comber, 2003). This point of view is quite popular, and the above quoted texts on the *Maximedia School Project* CD-ROMs' booklets is an indication of this phenomenon. The fact that the market offers a tool for disengaged project creation implies that there is a need for such a product, that there are such students and such schools in Australia where the practice of project-based learning may significantly differ from what is recommended in theory. If this is the case, the way in which project creation is constructed in the discourse of ICT-mediated products' marketing may contribute to furth er

proliferation of such practices by naturalising the concept of a project as an artefact rather than as a learning experience.

6.2.4 The power of popular discourse on technology

CD-ROM packaging texts – texts addressed to the intended buyer of CD-ROM encyclopaedias – construct the CD-ROM encyclopaedia mainly as a powerful technology of information storage, presentation and access. I have shown that, in these texts, this construction is presented as the most salient, that it is naturalised, and intertwined with the construction of the CD-ROM encyclopaedia as an educational product. I have already mentioned that the description of the CD-ROM encyclopaedia in terms of the quantity of information stored on a CD-ROM, the power of a search engine, and the usability of the software is neutral and natural in the discursive practice of software development. These descriptions are not neutral when used in the discursive practices of software marketing represented by the texts on the products' packaging. In such texts, talking about CD-ROM encyclopaedias in quantitative terms is part of a marketing strategy aimed at making the CD-ROM encyclopaedia a desirable purchase.

This construction is naturalised and widely accepted due to the logic of technological determinism in the popular and media discourses on technology. According to this logic, technology is assumed to be self-determining, which means that it is developed according to a technical logic and that it is a force which, being autonomous from society, has a powerful influence on society. In the history and the philosophy of technology, the logic of technological determinism has been debated and largely rejected (Ellul, 1964; Postman, 1993). Nevertheless, this logic is consistently reproduced in the public, political, and media discourses on technology (Goguen, 2001; M. Wilson, 2004; Young, 2003) and in the mainstream educational discourse on ICTs (Bigum, 1997; Burbules & Callister, 2000; Haas, 1996; Pedersen, 2001).

The logic of technological determinism has several consequences, some of which were intended by the producers of these products and others, most likely, unintended. It is reasonable to suggest that the producer might use the logic of technological determinism in the hope that it will help sell CD-ROM encyclopaedias as educational products. This logic makes it possible, when describing the educational relevance and significance of a CD-ROM encyclopaedia, to refer to such authoritative (for certain groups of educators and parents) educational discourses, theories, and practices as progressive pedagogy, inquiry

learning, and project-based learning. Within these approaches, access to resources is one of the conditions of learning that draws upon the learners' natural curiosity and stimulates an exploratory mind. When one accepts the logic of technological determinism, one finds it logical and natural to think that, because the CD-ROM technology allows the storage of a large amount of resources, the CD-ROM encyclopaedia is, indeed, the best place for such learning.

Apart from the impact on the products' sale, the logic of technological determinism employed in the texts promoting CD-ROM encyclopaedias may indirectly affect the development of educational and pedagogical views and, most importantly, their practical application. One of the possible consequences is that, although inquiry learning and progressive pedagogy have been problematised and critically explored in educational research (Boran & Comber, 2001), they are often referred to as unproblematic and as having universal educational and pedagogical value. They are naturalised within the popular discourse on educational technology due to the link established between inquiry, access to resources, and CD-ROM encyclopaedias as the technology of information storage and access.

The logic of technological determinism makes it natural to think that, if the technological characteristics of the CD-ROM encyclopaedia (its storage capacity, the amount of reference materials, and the speed of the search engine) are universal and objective, the educational effects and benefits that may result from its use are also universal and objective. This is the same phenomenon that Bigum and Green (1993) warn about when they discuss the impact of ICTs on literacy education. There are several discourses and models of literacy, of which only one seems to be reproduced in literacy teaching software products without any critical consideration. It is necessary to critically analyse such cases and problematise the ICTs as yet another provider of education.

Another consequence of employing the logic of technological determinism is that it may contribute to the consumers' understanding of inquiry learning or project-based learning as provision of a large amount of resources and as facilitating access to them. Meanwhile, progressive pedagogy is about encouraging students to inquire and about teaching how to inquire, to explore resources, and how to draw upon existing knowledge in order to solve a specific problem (Lave & Wenger, 1991; Ruopp et al., 1993). The logic of technological determinism may encourage educators to pay less attention to teaching how to inquire and, instead, to focus on the provision of resources. Teaching students how to inquire is a complex and time-consuming enterprise. It requires from the teacher (and often

parents) high pedagogical competence, creativity, thorough preparation, and the ability to involve students in the learning process. In other words, it requires more effort from parents and teachers than buying a CD-ROM encyclopaedia or advising students that they need to use sources available in print and in electronic format. Taking into account that not every parent is aware of what inquiry learning is or should be, and that nourishing the inquiry learning is hard work for a teacher, it is highly possible that the CD-ROM encyclopaedias' promises to encourage curiosity and inquiry (simply because they provide access to a large number of resources) will be uncritically accepted.[2]

The most important consequence of constructing the CD-ROM encyclopaedia as a piece of technology (software) is that it may facilitate the re-construction of children and students as generic software users rather than as sociocultural subjects. In the following section, I explore how the consumer/user of the CD-ROM encyclopaedia is constructed in further detail.

6.3 The CD-ROM user

The promotional texts claim that a CD-ROM encyclopaedia provides educational benefits to everybody and that it can empower every learner and student. In this section, I analyse how the intended user is constructed in terms of his/her identity and show that the offered construction is socioculturally specific and selective.

In CD-ROM encyclopaedias the user's identity can be constructed both explicitly and implicitly. It is constructed explicitly in those cases when the intended user of a given CD-ROM encyclopaedia is, for example, identified in terms of his/her age (child, adult), occupation (school student, teacher), or nationality (Australian students). Implicitly, the user's identity is constructed by texts providing information about the product's price, system requirements, and about the encyclopaedia content.

The implicit and explicit identities of the intended user may differ and even contradict each other. The explicitly constructed identity tends to be very inclusive. Producers of many CD-ROM encyclopaedias and reference CD-ROMs address their products to the widest possible audience. These products describe themselves as designed for use everywhere and by everybody and are often addressed simply to "you":

[2] I take a closer look at the pedagogies of project creation in Chapter Seven.

> The ultimate reference library for your home, your family, and your office!
> (*Hutchinson Multimedia Encyclopedia* [Packaging], 1997)

> Webster's Concise Interactive Encyclopaedia is packed with valuable information for the entire family. (*Webster's Concise Interactive Encyclopedia* [Packaging], 1996)

> Instant access to our greatest events!
> Every important event in our history since 1788 is chronicled in this major reference work, making it an essential resource for every Australian home.
> (*What Happened When in Australia* [Packaging], 1999)

The quoted texts use *all*, *every*, *entire*, and the generic *our* and *you* to include all possible audiences. What kinds of homes and what kinds of families are included here? In order to answer this question, I take a closer look at the texts informing the consumer about the product's system requirements. This information can be questioned as offering an implicit construction of the potential consumer in terms of his/her 'economic status'.

6.3.1 Economic status

Who is the intended consumer of *Microsoft Encarta Reference Suite 2001 – Australian Edition*? From the product title, the market slogans, and the product description, it may be understood that the product is addressed to Australians and, amongst this group, to everybody who needs access to reference materials, the primary target audience being school students, adult learners, and teachers. This seemingly very inclusive audience is invited to enjoy the rich multimedia learning environment provided by the six CD-ROMs:

> Research at your convenience from your desktop – at work, school, or home. Encarta Online Deluxe at www.encarta.com.au gives you instant access to encyclopedia articles from any PC connected to the Internet. …
> See the whole world at a glance! Get a global perspective on climates, eco-regions, and world trends. Print out easily for presentations or classroom displays.…
> Hear difficult words pronounced correctly in this "talking" dictionary.
> (*Microsoft Encarta Reference Suite 2001 – Australian Edition* [Packaging])

The description of the system requirements (provided in a text located on a lateral side of the box) constructs the group of likely consumers as less inclusive. It identifies the

consumers as people who can at least afford the following: a Pentium 133 MHz or higher processor; an operating system not earlier than Microsoft Windows 95; up to 160 Mb of hard-disk space and 45-125 Mb of additional hard-disk space for using "Encarta Researcher" or *Encarta World English Dictionary*; a sound card; a CD-ROM drive; and so on. In order to get the best out of the product, the consumer has to be connected to the Internet, which "may require payment of a separate fee to an Internet service provider. Local and long distance telephone charges may also apply."

According to the requirements, the intended consumer of this product is someone who has or can afford to spend about $1000 on computer hardware and software plus a monthly Internet fee and associated telephone charges. In other words, the intended consumer of *Microsoft Encarta Reference Suite 2001 – Australian Edition* may not be found in every Australian household. In comparison, the text informing the user about system requirements for the *Who Did What in Australia* CD-ROM seems to identify the intended consumers as a more inclusive group. The text informs that the consumer can use the earlier (and cheaper) version of Windows (e.g. Windows 3.1) and that he/she needs 8 Mb RAM and 5 Mb of hard-disk space. This means that this product can be used by those who can afford to invest about $400 in computer hardware and software, or by those who have not upgraded their systems for quite a while (for example, Windows 3.1 is almost an antique item at present). Table 6.1 shows the examined products' prices, the costs of minimal system requirements for these products, and the ratio of the products' prices to the costs of the minimal system requirements.

Table 6.1 compares product prices and the costs of minimal system requirements for both the cheapest and the most expensive products. The table shows that the consumers of the cheapest products need to spend 26-46 times more than the product's price in order to be able to use them; the consumers of the more expensive products need to spend only 4-10 times more in order to be able to use the products (see column 4 in Table 6.1). The table also shows that the total cost (see column 5 in Table 6.1) of using the expensive products is only slightly more then twice the total cost of using the cheapest products.

Table 6.1 **Product prices and system requirements costs**[3]

Product title	Product price, $AUS	Minimal system requirements cost, $AUS	Ratio[4] of price to system requirements cost	Total cost[5], $AUS
1	2	3	4	5
Who did What in Australia	9.99	390	1 : 39	400
What Happened When in Australia	9.99	390	1 : 39	400
Maximedia School Project No 1	9.99	400	1 : 40	410
Maximedia School Project No 2	9.99	400	1 : 40	410
Maximedia School Project No 3	9.99	400	1 : 40	410
Animals, A Multimedia Encyclopedia	9.99	460	1 : 46	470
Webster's Concise Interactive Encyclopedia	14.95	390	1 : 26	405
Webster's Encyclopedia of Australia (2 CD-ROMs and a book)	69.95	680	1 : 10	750
Microsoft Encarta Reference Suite 2001 – Australian Edition (6 CD-ROMs)	199.00	820	1 : 4	1020

For example, the *Webster's Encyclopedia of Australia* CD-ROM ($69.95) is seven times more expensive than its cheaper counterpart – the Australia-focused *Maximedia School Project* CD-ROMs ($9.99 each). However, the total cost for *Webster's Encyclopedia of Australia* ($750) is only 1.8 times more than the total cost for each of the *Maximedia School Project* CD-ROMs ($410). In addition, *Webster's Encyclopedia of Australia* is sold in a package with another CD-ROM and a printed book titled *Australia 2000 – Commemorative Edition*. Similarly, a general reference product *Microsoft Encarta Reference Suite 2001 – Australian Edition* ($199.00) is thirteen times more expensive than *Webster's Concise Interactive Encyclopaedia* ($14.95). In total, the consumer of *Microsoft Encarta Reference Suite 2001* has to spend about $1020 in order to use this product while the consumer of *Webster's Concise Interactive Encyclopaedia* only has to spend $405, which is 2.5 times less. However, the *Microsoft Encarta Reference Suite 2001* package includes six CD-ROMs, offers a large amount of extra content, and enables the consumer to use *Microsoft Encarta Online*.

[3] The table shows approximate prices in Australian dollars. The product prices are as at the moment of their purchase (1999-2001). The costs of minimal system requirements were calculated in March 2004 on the basis of hardware and software prices that existed at that time.
[4] Ratios have been rounded off to the nearest whole number.
[5] Total cost is the sum of product price and system requirements cost. Total costs have been rounded off to the nearest whole number.

The bottom line is that those consumers who can afford to spend $750-1000 on system requirements can use products that are up to 10 times more expensive than those products that can be used by consumers who can afford spending only twice less on system requirements ($390-400). In other words, the former group of consumers gets non-proportionally more for their money. In addition, this group have such an advantage as the freedom of choice: they can choose between more expensive and cheaper products.

A more detailed analysis of prices and hidden costs is beyond the scope of this research. My purpose was to show that even such 'marginal' texts as the lists of system requirements (often printed in a smaller font on the side of the CD-ROM box) play a role in the construction of the intended consumer of the CD-ROM encyclopaedia. By identifying the intended consumer in terms of his/her access to economic resources (which are tied up with class and income), these texts, unobtrusively, perhaps, reduce the group of 'everyone' to 'everyone within a certain income group'. The lists of system requirements identify the intended consumers in terms of their access to economic resources. They also entail the issue of social justice by sending the message that those who can only afford the cheaper products have to spend proportionally much more in order to be able to use them. However, they still are disadvantaged in comparison to the consumers of the more expensive software products.

6.3.2 Nationality

The nationality of the intended consumer is not always indicated in the texts on the CD-ROM encyclopaedia's packaging. For example, the text displayed on the box of *Webster's Enyclopedia of Australia 2000* CD-ROM emphasises that the product is a comprehensive source of information about Australia. However, it does not refer to the intended consumer of this product as an Australian. On the other hand, there are products that clearly identify the intended consumer in terms of his/her nationality. For example, *Microsoft Encarta Reference Suite 2001 – Australian Edition* clearly indicates that it is a product made for Australians and, specifically, for Australian teachers and students (see Figure 6.4).



(a) Front cover



(b) Back cover

***Figure 6.4 Microsoft Encarta Reference Suite 2001 – Australian Edition*: the front cover and the back cover**

The front cover (Figure 6.4) displays the words "Australian Edition" in the product title; information that the product includes Australian lesson plans; and pictures of a koala and of (most likely) an Australian Indigenous person. These elements may encourage the intended consumer to think that this product focuses on Australia more than on other places and topics. The back cover (Figure 6.4) displays three quotes from the product reviews published in the Australian media, which also indicate that the intended consumer of the product is an Australian. In addition, one of the quotes informs readers that there is "lots of Australian content" in the offered product:

> "..[Encarta 2000 h as] the most comprehensive and integrated set of reference material available on CD-ROM." – Mark Butler, *The Australian*, September 1999.
> "[Encarta Reference Suite 2000] is a really beautiful suite with lots of Australian content…" – Keith Williams, *2Day FM*, October 1999.
> "For depth of information on a range of topics and mix of media, Encarta Deluxe is the best all-round encyclopedia." – Tony Kleu, *The Sydney Morning Herald, ICON*, January 2000.

Apart from the Australian media quotes, there are no other texts or pictures on the back cover that would support the idea that the intended consumer of this product is an Australian teacher or student and/or that there is a lot of Australian content. Rather, those texts and pictures support the slogan displayed on the back cover: "The Complete Multimedia Information Resource." This slogan is displayed at the top of the back cover. The texts and pictures displayed beneath it inform the intended consumer about the quantity of information that is available on the six CD-ROMs in different modes. They show the number of: articles and entries; words; photos and illustrations; videos and animations; sound clips and pronunciations; virtual tours; and dynamic timeline (see example in Figure 6.3). Also, the texts displayed on the back cover construct the intended user as needing access to the global content:

> Created for the new age of global communications, this unique dictionary captures modern English as it is written and spoken around the world. …See the whole world at a g lance! Get a global perspective on climates, eco-regions, and world trends. …What are Egypt, Japan, and Moscow called by the people who live there? Click to switch between map languages and see thousands of local settings.

The content is also outlined in the texts displayed on the inside cover (Figure 6.5) beneath the third slogan under which the product is marketed: "4 Essential Reference Products in One."

The texts and pictures displayed on the inside cover (Figure 6.5) can be interpreted as an indication that there is a lot of Brazilian content. The inside cover shows: maps of Brazil; images of Brazilian flora, fauna, towns, and cultural artefacts; screenshots of encyclopaedia articles focusing on the history and geography of Brazil; and texts inviting the intended consumer to zoom into the Amazon rainforest, see the sights of Rio de Janeiro, and discover how far away Brazil is.

This focus on Brazil can be interpreted in several ways. On the one hand, taking into account that topics relating to Brazil or any other overseas country occupy a relatively humble place in the Australian school curriculum, the placement of Brazil-related materials could be an ill-informed decision about how to illustrate the content of a product marketed as the essential learning tool to Australian teachers and students. On the other hand, the display of Brazil-related materials may be intended to serve as an illustration of how comprehensive *Encarta* is – it enables the user to find information on distant and exotic countries.

I do not think that the publisher of the Australian edition aimed to contradict the school-focused slogan under which this product is marketed, or that this is simply a case of the inside cover being reproduced from another (non-Australian) edition of *Microsoft Encarta Reference Suite*. Or, if this was the case, it was reproduced without considering the message it may send to the intended consumer. Rather, I would interpret this reproduction as a manifestation of one of the most profound changes introduced by the ICTs in the field of education. This change is a shift of focus from content to information access. From this perspective, the message sent to the intended consumer by the inside cover does not in any way contradict the slogan under which the product is marketed. On the contrary, the inside cover text supports this slogan. The product is the essential learning tool for schools, not because it provides access to particular content, but because it provides access to a large amount of information ("4 Essential Reference Products in One") and because the information is presented in a multimedia format.



***Figure 6.5 Microsoft Encarta Reference Suite 2001 – Australian Edition*: the inside cover**

The seemingly out-of-place Brazil-related texts and pictures displayed on the inside cover serve as a link connecting the two slogans under which the product is marketed. It is a link between the slogan displayed on the front cover and the slogan displayed on the back cover: between "The Essential Learning Tool for School" and "The Complete Multimedia Information Resource." In this way, the student and teacher consumers of this product are constructed as the consumers of powerful ICT-mediated tools of information access and presentation.

6.3.3 Age

Among the products that I explore in this chapter, there are general encyclopaedias, subject-specific encyclopaedias and reference works. Some of these products, such as the *Animals, A Multimedia Encyclopedia* and the *Maximedia School Project* CD-ROMs are offered to children and students. Others, such as the *Hutchinson Multimedia Encyclopedia*, and *Webster's Encyclopaedia of Australia 2000*, are offered to a broader audience that includes adults and children, school students and adult learners, teachers and parents, and are designed for being used at homes, classrooms, and offices.

The construction of the intended consumer as a transgenerational subject implies that both the adult and child users have similar information needs, similar purposes, and a similar technological competence. The construction of the intended consumers as a very inclusive group in terms of their age suggests that all the intended consumers have several things in common regardless of their age. They all value a rich multimedia environment. Also, they all have concerns about homework and school projects. For example, in the text displayed on the packaging of *Webster's Encyclopaedias of Australia 2000* CD-ROM, the addressee (*you*) is, most likely, a school student:

> This CD-ROM contains an exciting collection of intriguing Australian information. It will keep you busy for a long time and is a great "homework helper" for those school projects.

The message that the product will keep its user busy for a long time is, most likely, being addressed to a parent. The message that the product is a homework helper may be addressed to both the child/student user and to his/her parent (see also the analysis of reviews in Chapter Five) implying that both are interested in buying a product that will help with homework.

There are other cases when the intended user is identified quite clearly as a child user and is addressed accordingly in the texts on the boxes. However, in the process of using the product, one may encounter texts addressed to more adult users. In order to illustrate the case, I have conducted a detailed analysis of two texts addressed to the intended consumer/user of the *Animals, A Multimedia Encyclopedia* CD-ROM and informing him/her about the product: a text on the packaging and the "Introduction" text on the CD-ROM.

Animals, A Multimedia Encyclopedia: text on the packaging and the "Introduction" text

The packaging of the *Animals, A Multimedia Encyclopedia* CD-ROM displays screenshots of the product's interfaces and a text addressed to the intended consumer:

> **Find out how big the animal kingdom really is!**
> Animals, a multimedia encyclopedia, is a fun filled interactive path to over 2,000 creatures with animal illustrations and interesting facts…
> Discover more about birds, reptiles, fish, mammals and amphibians. Gather information via stunning colour illustrations and descriptions including sizes, diets, range, habits and behaviors. You can search for an animal by its scientific classification, class, order or family…
> Your animal kingdom is just a click away with your fun and easy to use interface. Print detailed fact sheets on each animal or with the zoo feature, create your own very personal zoo.[6]
> (*Animals, A Multimedia Encyclopedia* [Packaging], 1998)

The text on the packaging is written in plain English: it contains simple clauses, a lot of emotive lexis and a very few general terms (mammals, amphibians). The intended reader of the text on the packaging may be a child as well as an adult.

The text offers the intended child user the opportunity to listen to over 220 fantastic animal sounds, discover more about different kinds of animals, gather information via colour illustrations, search for any animal, hear clear and correct name pronunciations, find animals in a particular geographic location from around the world, print detailed fact sheets and create "your very own personal" zoo. The text is particularly rich with attitudinal lexis and expressions ("just a click away"; "fun and easy to use interface"; "[encyclopedia is] a fun filled interactive path"; "fantastic animal sounds"; "stunning colour illustrations") and exclamatives ("Find out how big the animal kingdom really is!"). These features are

[6] Inconsistent spelling ("colour", "behaviors") and incorrect comma use ("Print detailed fact sheets on each animal or with the zoo feature, create your own very personal zoo") as in original.

related to the packaging's communicative purposes, which are product advertising and influencing the potential buyer's decision to make the purchase. Also, they can be explained by the fact that the text is addressed to a child consumer or to a parent/grandparent buying it for a child.

As soon as the purchase has been made, the child user of the *Animals, A Multimedia Encyclopedia* CD-ROM gets yet another opportunity to be introduced to this product. There is the "Introduction" text available through a link located in the 'Topic' section. The "Introduction" text informs the user that the pro duct helps him/her learn more about that area of zoology which studies vertebrate animals. It also explains why the user might need to deepen his/her knowledge in this particular area and why he/she might find this particular product interesting and useful. The purpose of this text is largely the same as the packaging text. However, the "Introduction" text offers a different construction of the user and different reasons for using the product. The text on the packaging is addressed to the child; it makes offers and promises fun and games, such as creating one's zoo or enjoying stunning colour illustrations. It positions the reader as a participant in an unofficial, almost intimate, communication. On the contrary, the "Introduction" text is not directly addressed to anybody. It provides information about the product in an official, distant, impersonal manner:

> This Multimedia Encyclopedia sets out to provide a comprehensive catalog of the staggering range of animal types within the vertebrate group. ...
> A discussion of the major characteristics of each family is accompanied by a number of representative examples of the family; thus, if a given species is not shown, a close relative of it will be.
> (*Animals, A Multimedia Encyclopedia*, "Introduction", 1998)

The "Introduction" text displays features of written scientific language: complex clauses, passive voice, nominalisation, and specialised lexis. Some terms, such as *vertebrate* and *species* are defined in the text. Others, even more specific (*genus, phylum*), remain unexplained. Apart from the terms, the text is full of lexis that can be difficult for a child to understand (*taxonomic hierarchy, esoteric, intrinsic attributes, rudiments*). Even in the concluding part of the text, where an attempt is made to represent the use of the product as 'fun', the text refers to such arguably adult variants of fun as *marvel* and *savor*:

> Instead of emphasising the shared characteristics, one can marvel at the almost infinite range of life-styles and physical structures of vertebrate animals that is a joy in itself. There is opportunity enough in this program to savor the amazing diversity of mammals, reptiles, amphibians, even between members of the same family.

The text seems addressed to an adult rather than to a child. It begins with identifying its reader as a human being. Human beings are defined as living beings belonging to the group of animals who have the vertebra:

> Human beings are vertebrate animals, as are all our essential domesticated creatures and most of the dominant large animals…

The entire group of vertebrate animals is described as having the highest place in the hierarchy of living beings as creatures that rule the sea and the land because they are the higher, most recently developed types of living beings and the most exquisite and complicated machines:

> When compared with invertebrate groups, such as corals, flatworms, …spiders and insects, there is little doubt that the vertebrate type of body organisation provides the potential for the most intricate and sophisticated animals. …Animals have been called the most exquisite and complicated machines in the known universe, and the higher vertebrates represent the very pinnacle of complexity and subtlety.

Further, the text asserts that such a particular group of these dominant, ruling, and higher animals (machines) as human beings is superior in relation to other vertebrate animals, on the foundation that they have developed a special science – zoology, which enables them to understand and learn about these machines:

> In this perspective, zoology, which might otherwise appear to be esoteric speciality, becomes one of the most demanding and vital disciplines – the attempt to understand and learn more about those extraordinary machines.

When read critically, the quoted text can be questioned in several ways. This text can be problematised, for example, as uncritically reproducing the mechanistic discourse of science. It can also be problematised as uncritically presenting the relationships of hierarchy, dominance, and submission as natural for both animals and human beings. From this perspective, it is particularly significant that this text (located in a CD-ROM for

children) implies that its user has a natural desire for power and constructs the user as having a natural right to rule as the most powerful creature on Earth. This is partly due to it being the most complicated machine and partly due to having knowledge about those extraordinary machines; knowledge that is comprehensive, objective, and universal:

> This Multimedia Encyclopedia sets out to provide a comprehensive catalog of the staggering range of animal types within the vertebrate group. …The classification of animals into groups often seems a mystifying or intimidating exercise, as does the scientific naming of animals that goes with it. But both are merely an attempt to organise the creatures into recognisable groups which show their relationships. …The Latin and Greek -based names are enormously useful because of their stability: the scientific name of an animal remains the same all over the world, but there may be dozens of common names.

Judging by the difficulty of the "Introduction" text, it is supposed to be read by a parent rather than a child. The presence of such a text as "Introduction" in a product offered to a child consumer can be considered as an indication of the producer's view of how and by whom this product will be used. It may be interpreted as an indication that the intended child user of this product will most likely use it in the company of an adult who may be attracted by the opportunity to enjoy the physical structures of vertebrate animals and who would value such a mode of knowledge about animals as zoological taxonomy. Also, the "Introduction" may be inte rpreted as a suggestion that this product will cover the changing and different information needs of a family over time – from primary school to high school and, perhaps, into university.

It may also mean that the software producers took materials from whatever sources were available to them (i.e. whatever copyrights they could buy) without giving much thought to what views, philosophies, and values they are reproducing. Or, perhaps, they do not worry about such texts as the "Introduction", considering tha t children learn about software products in the process of using them. This means that the child user of the product will be affected mainly by the texts that mediate his/her use of the software, for example, by the menus that enable the child user to search a database or to read an encyclopaedia article.

The Maximedia School Project CD-ROMs

Similarly to the *Animals, A Multimedia Encyclopedia* CD-ROM, the *Maximedia School Project* CD-ROMs display a diversity of texts – a diversity that implies that these CD-

ROMs may have a variety of users. For example, the texts on the booklets attached to these CD-ROMs display all the features of advertising and are addressed to an Australian school student engaged in the creation of a school project. Apart from the materials that can be used for school projects by students, these CD-ROMs also offer shareware, which is supposed to be used by adults rather than children. For example, there is software on baby care, accounting, and so on.

Also, the Help texts are written in a rather complex language and are addressed to adults rather than children. For example:

> **Working around stopwords and other exclusions**
> If you are unsuccessful searching for a phrase that includes a common word such as *to* or *that*, it may be a *stopword*.
> If the unsuccessful search phrase includes a number, numbers may also have been excluded from the index.
> If you are unsuccessful searching for an alphanumeric term that includes a separator character such as a symbol or mark of punctuation, it is probably because numbers also have been excluded. Acrobat Catalog regularly excludes separator characters from indexes, and in the process sometimes reduces alphanumeric terms such as phone numbers to numbers. (*Maximedia School Project No 1*, "Working Around Stopwords and Other Exclusions" [Help text], 1999)

As this example shows, the Help texts in the *Maximedia School Project* CD-ROM series use a rather special terminology. Some of these terms are explained and illustrated with examples, such as *common words*, which implies that the reader does not know what common words are. Other terms, such as *marks of punctuation* are not explained. *Alphanumeric* is another such term – although the reader is given an idea of what this term means (phone numbers, for instance), this is done when the term is mentioned in the text for the second time. The pattern of using terms in this text implies that its reader is most likely an adult and an experienced computer user and, also, a quite literate person.

The diversity of texts and the diversity of identities of the product's intended users may be interpreted as an indication that the producer of these CD-ROMs, when offering them to school children, envisioned these children users as members of a particular kind of families. These are families where adults are expected to be involved in the process of using these software products. These are families where older members (parents or siblings) are willing to participate in their children's educational activities. These are families where parents are using software products on a daily basis for mundane purposes

such as keeping bills, tax records, and making greeting cards (as suggested by the shareware offered on those CD-ROMs). This implies that they are both computer literate and highly literate in the traditional sense.

This construction of the parent is very different from the dominant media image of parents as members of the 'old' print culture. The implied construction of the parent in *Maximedia* CD-ROMs excludes those parents who are not digital or those who had no opportunity to learn and master computers to a degree where they became part of their lifestyle and business activity. This construction excludes those whose literacy is different from that of the mainstream middle-class literacy (see, for example, Gee, 1996; Kale & A. Luke, 1991). The implied image of the user of the cheapest product on the market – a product which, according to the claims on the booklet and the price ($9.99), is designed for every Australian family and is quite affordable – turns out to be very selective. Implicitly, it constructs its intended child user as being a member of a family that can provide access to cultural capital and the literate culture required for the information age, including computer literacy.

There is continuity between the reviews of CD encyclopaedias published on the Internet (see Chapter Five) and in the texts placed on CD-ROM packagings. Both the reviews and the packaging texts employ the discourses of marketing, advertising, and the popular discourse on technology with the logic of technological determinism inscribed in it. In the reviews, these discourses are employed mainly for the construction of the parent visitor to the review website. In the texts placed on the CD-ROM packaging, these discourses shape the construction of the intended consumer. The intended consumer is constructed as a transgenerational subject, a student, a consumer of technological products, and an empowered user of a powerful technology. The consumer is constructed as having universal needs like quick access to information; as desiring power and control; and as wanting to be entertained and to have fun rather than to be taught and to work. This construction of the intended consumer (together with the construction of the product as a piece of a highly advanced and powerful technology) helps sell these products to the widest possible audience.

The intended consumer is constructed as a member of a very inclusive group, which facilitates the product's promotion and sales. This construction is possible due to the intended consumers being placed under the tag of the generic software user identity. Uncritical acceptance of this construction may overlook subjects' unequal access to educational resources of different qualities. The construction of the child, student, and

learner as a generic software user can be interpreted as a manifestation of the broader process of the colonisation of education by such fields as ICTs industry and ICTs marketing.

The identity of the intended consumer of CD-ROMs is shifting in terms of age. This helps assign certain needs to both children and consumers; needs that are associated with scholarly research work rather than with learning. This shifting can be interpreted as a producer's hidden admission that the ICT-mediated educational products for children and students are to be used in the company of older, more technologically competent and well-educated users so that the child users are able to gain full benefit from those products. In other words, it can be interpreted as an admittance that the child user needs access not only to technological products but also to cultural capital and expertise. This means that the group of users who can really benefit from the availability of ICT-mediated educational products is not so inclusive as is claimed and as may be implied by the fact that many such products are available at reasonable prices.

So, apart from the explicit information regarding the identity of the intended user of a CD-ROM encyclopaedia, the following texts need to be critically analysed in order to understand who is really envisioned by the producer as the product's user: the information about system requirements; the software content; the texts which inform the user about the product; and the Help texts. Each of these types of texts offers an element to a mosaic portrait of the intended user. The resulting image may be quite different from the image outlined in the promotional texts. In order to see the entire picture, it is necessary to adopt a critical position in relation to ICTs. This is not an easy task, considering that the promotion of ICT-mediated educational products is grounded in and supported by popular and media discourses on technology with the logic of technological determinism.

This results in the deep proliferation and naturalisation of the CD-ROM encyclopaedia's construction as powerful technology and its user as a generic human being, a learner, and a student empowered by this technology. This construction is made more salient and naturalised further in the process of using the product, when the user encounters such texts as the tool's interfaces. These texts are less visible for critical reading or, rather, they seem to not offer any construction of the user that would be worth deconstructing. Nevertheless, as I show in the following subsection, the texts that mediate the user-software interaction are also constructing the user, mainly by positioning him/her as a participant in a communicative exchange and social interaction.

6.3.4 Subject positions

I move now to an analysis of the subject positions set up for the user in the texts that mediate the user-tool interaction (menus, dialogue boxes, and command buttons) and in the texts which instruct the user in how to operate the tools. I focus on "Encarta Researcher". "Encarta Researcher" is offered to the users of *Microsoft Encarta Encyclopedia Deluxe 2001* as a tool that facilitates their research and report writing, a tool that "helps students of all ages to collate and structure their notes from a variety of sources" (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Learning", 2001).

"Encarta Researcher" comprises multiple texts (see the "Encarta Researcher" hypertext structure in Figure 6.6).

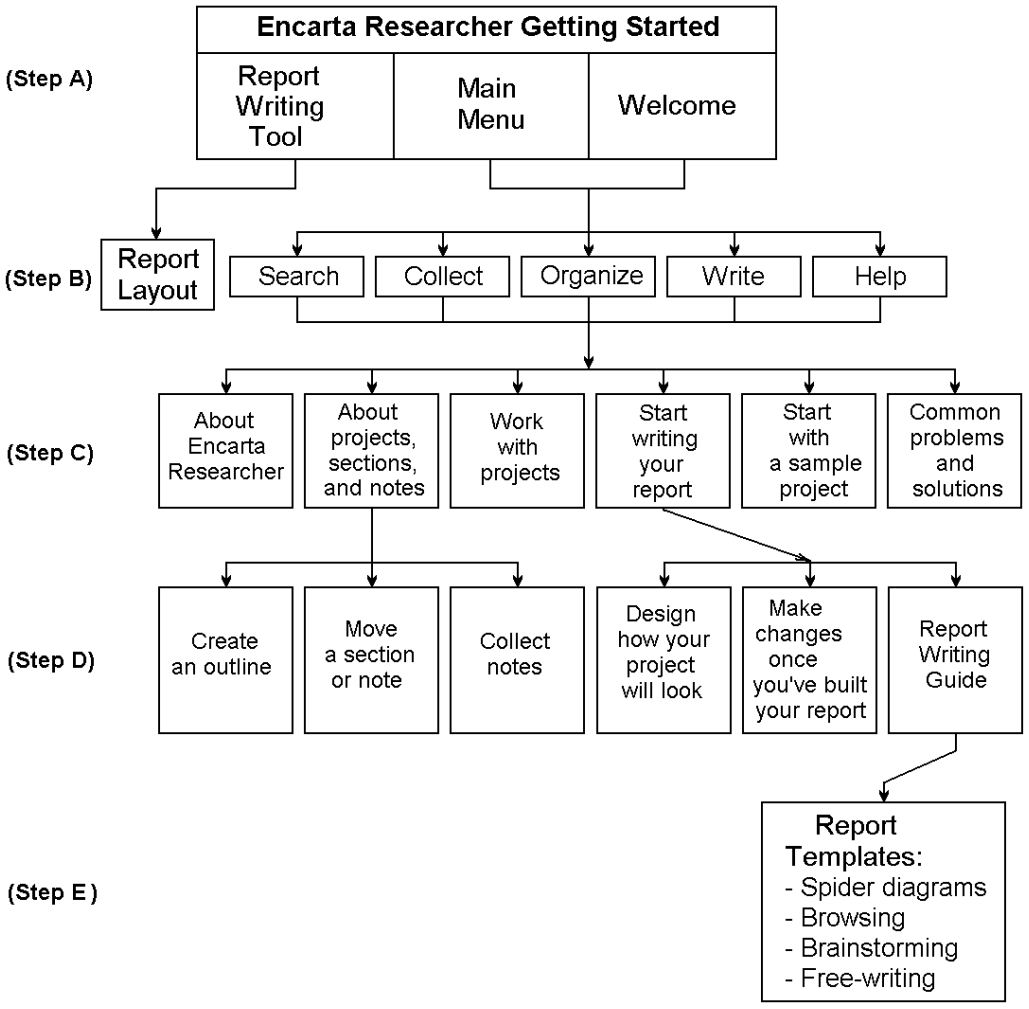


Figure 6.6 **"Encarta Researcher": the hypertext structure**

When the user starts running "Encarta Researcher" he/she encounters a screen divided into three parts:

a. main menu;
b. the "Welcome to Encarta Researcher!" text; and
c. the report writing tool interface (see Figure 6.7 on next page).

The main menu interface

I start my analysis of the user's subject positioning in "Encarta Researcher" with an analysis of the main menu (the menu displayed in the middle of the screen in Figure 6.7). Menus are sets of options that enable the user in order to operate the software. The menu options represent communicative actions of both the user and the software. When the menu options represent the program's communicative action, the menu can be interpreted as an offer. It constitutes a range of options offered by the program for the user to choose from. For example, the "Encarta Researcher" menu offers the user such services as collecting information, organizing it, and writing a report. When the menu options represent the user's com municative action, the menu can be interpreted as the manifestation of the user's demands for particular services: once having been chosen, a menu option becomes the user's command addressed to the software, ordering it to perform a specific action.

The user's and the tool's speech functions are always non -reciprocal. The menu always positions the user as demanding services and giving commands; the program is always positioned as offering the services and executing the commands. This means that the user and the tool are positioned as unequal participants in the interaction, both in terms of their status and in terms of the power relationship. By assigning only one speech role to the user – that of demanding services (making commands) – the menu positions the user as having higher status and more power.

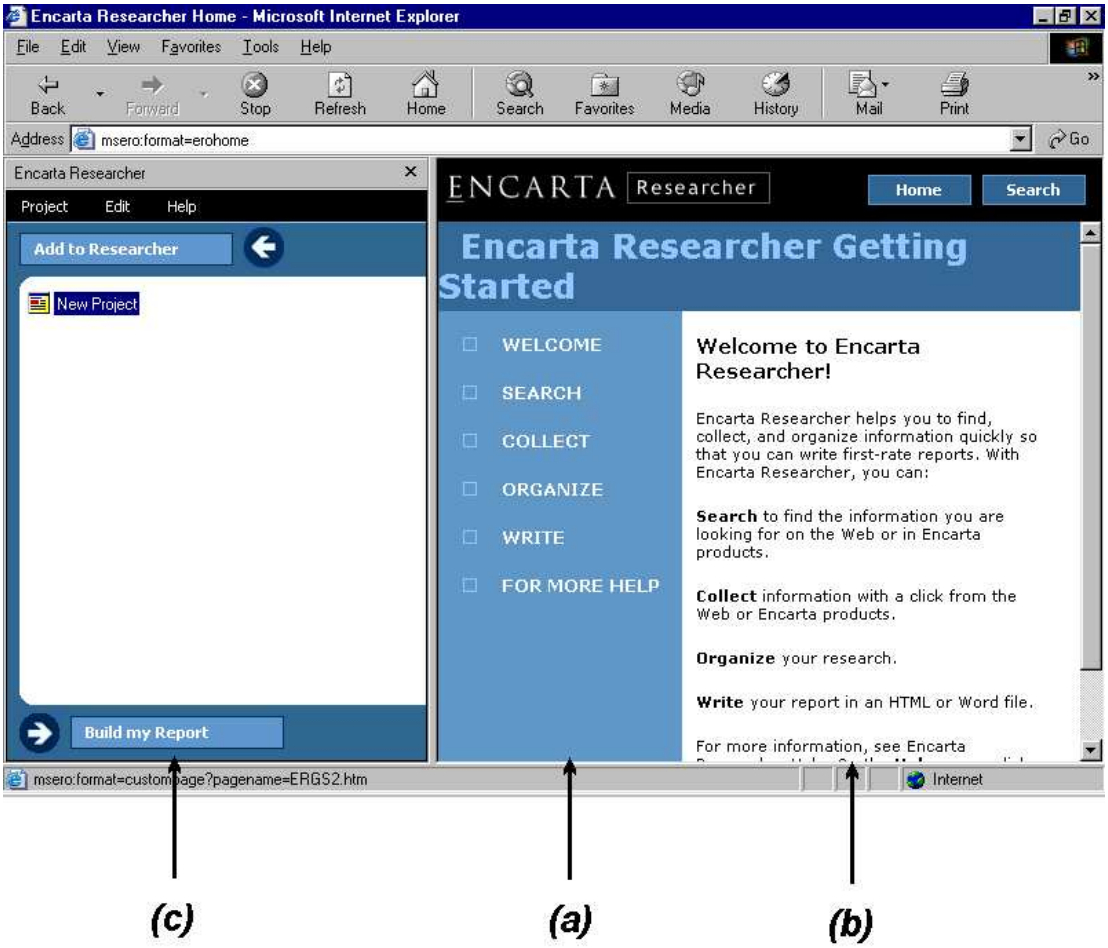


Figure 6.7 **The "Encarta Researcher Getting Started" interface**

This figure shows the "Encarta Researcher Getting Started" interface. It is the first interface the user encounters when he/she starts using "Encarta Researcher". The interface displays: ***(a)*** the "Encarta Researcher" main menu; ***(b)*** the "Welcome to Encarta Researcher!" text; and ***(c)*** the report writing tool.

The main menu options represent the main sections of "Encarta Researcher". The menu enables the user to reach a specific section ('Search', 'Collect', 'Organize', 'Write', 'For More Help'). The main menu options are also presented in the "Welcome to Encarta Researcher" text as hyperlinks. The "Welcome to Encarta Researcher" text informs the user about 'Encarta Researcher' and can be used in order to reach other sections of 'Encarta researcher' as 'Search', 'Collect', 'Organize', and 'Write'. The report writing tool is displayed in the left-hand part of the screen. This tool mediates the process of report writing.

However, the fact that the user can choose from a restricted set of options makes possible other interpretations of the status and power relations set up by the menu. On the one hand, the user is positioned as a participant who has choice and who is free to accept or reject the offers, while the software has to respond to the user's demands and obey the user's commands. On the other hand, the menu text serves as the user's ready -made speech function and, therefore, positions the user as being restricted both in terms of the speech role to adopt (the user is always a demander of the services) and in terms of what to demand (the user is only allowed to demand from a restricted range of options). Due to these restrictions, the texts mediating the user-program interaction, such as the multi-choice menus, can be considered as creating an illusion of the user's higher status and more power.

The "Welcome to Encarta Researcher" interface

The new user of "Encarta Researcher" may choos e to click on the 'Welcome' option of the main menu. The "Welcome to Encarta Researcher!" interface will then be displayed in the right part of the window (see Figure 6.7).

The "Welcome to Encarta Researcher!" interface text positions the user as a receiver of information and offers. It informs the user about the program's capability, promises that the "Encarta Researcher" will satisfy the user's needs, and makes offers. The construction is shaped by topics that characterise the software promotion discourse, such as quick and easy access to information; access to a large amount of information sources; and the availability of sophisticated tools:

> Encarta Researcher helps you to find, collect, and organize information quickly so that you can write first-rate reports.
>
> **Collect information** with a click from the Web or Encarta products.
> (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Welcome to Encarta Researcher", 2001)

Some offers are realised by imperatives ('Collect information'). They are, simultaneously, menu options (this is why they are indicated with a bold font). Because of the embedded menu options, the "Welcome to Encarta Researcher!" text positions the user not only as a receiver of offers but also as a demander of services. This means that the "We lcome to Encarta Researcher!" text constructs the user as being empowered by the tool. It positions the user as a more powerful participant in the communicative exchange

and the social interaction by assigning to him/her the roles of the receiver of offers and the demander of services.

In the process of reading/using the "Welcome to Encarta Researcher!" text/interface, the user may decide to know more about each specific option/service offered in "Encarta Researcher". For example, the user may wish to know more about the 'Write' option. He/she can do this by clicking on the 'Write' button.

The "Write" interface

The text displayed on the "Write" interface (see Figure 6.8) explains to the user what the "Encarta Researcher" report -writing tool does and instructs the user in how to operate this tool. This text sets up three subject positions for the user.

Firstly, the "Write" text positions the user as an equal or higher participant of the communicative exchange, a participant who can accept or reject an offer:

> You can build a formatted HTML or word file and begin writing your report

Secondly, the 'Write' text positions the user as a receiver of instructions and commands:

> To build a report click **Build my Report**

Thirdly, by clicking the 'Build my Report' button, the user stops being the object of instruction and is in the position of demanding a service:

> **Build my Report**

This role is supported by the program's response to the demand: the user is informed that the demanded service has been provided at his/her request:

> All of your research is organized and includes bibliography information for your sources.

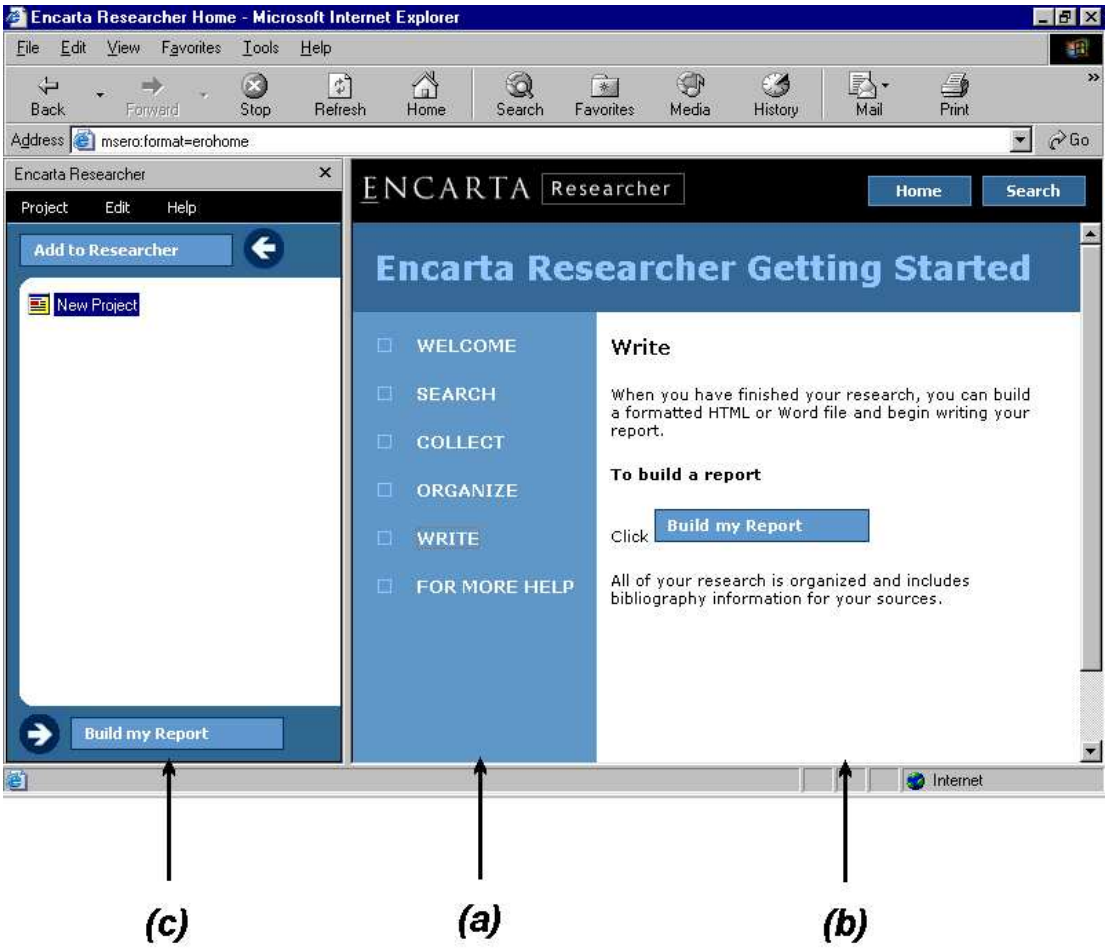


Figure 6.8 **"Encarta Researcher": the 'Write' interface**

This figure shows the "Write" interface in "Encarta Researcher". The user encounters this interface when he/she choses the 'Write' option in the main menu. The interface displays: ***(a)*** the "Encarta Researcher" main menu; ***(b)*** the "Write" text with the 'Build my Report' command button embedded in it; and ***(c)*** the report writing tool.

The main menu options represent the main sections of "Encarta Researcher". The menu enables the user to reach those sections. The "Write" text instructs the user what to do in order to begin writing a report. The 'Build my Report' command button enables the user to perform this action (to begin writing). The report-writing tool displayed in the left-hand part of the screen mediates the process of report writing.

Now I turn to an analysis of subject positions set up by the texts representing the user's interaction with tools. I focus on the subject positions offered to the user in the text that represents an interface of a tool for report writing.

The report writing tool interface

The report writing tool interface is composed of two parts (see Figure 6.9). In the left part of the screen, toolbar options are displayed: 'Project', 'Edit', 'Help', 'Add to Researcher', and 'Build my Report'. When the user clicks on a button, a roll-down menu appears. Both the toolbar options and the roll-down menus position the user as demanding services, making commands, having a higher status, and being a more powerful participant in the interaction.

The actual report writing is mediated by the report layout interface (see the right-hand window in Figure 6.9). In order to start writing, the user commands the program to create a new note[7] in the project file. Once the new note template has been created, the user becomes a writer rather than a software user.

The report layout interface reverses the speech roles of the user (report writer) and the tool. The report writer is positioned as having to provide services due to the fact that his/her writing is mediated by an interface displaying a structured layout. The report layout is composed of two rectangular boxes entitled 'Source' and 'Note' in which the writer is supposed to type. The boxes and their titles can be interpreted as demands addressed to the writer. They demand that the writer structures and inputs information according to the offered framework. Thus, the tool, which was offered as empowering the report writer, provides a kind of a communicative experience that contradicts this offer. This contradiction is made less noticeable by the co-presence of an interactive menu that positions the user as a more powerful participant in the interaction. Nevertheless, the contradiction is there: the *user of the report writing tool* is positioned as a powerful subject who demands services and makes commands while the *report writer* is positioned as having to provide services to the tool and to execute the tool's commands.

[7] In "Enacarta Researcher", to create a new note means to open a new template in which notes can be written.

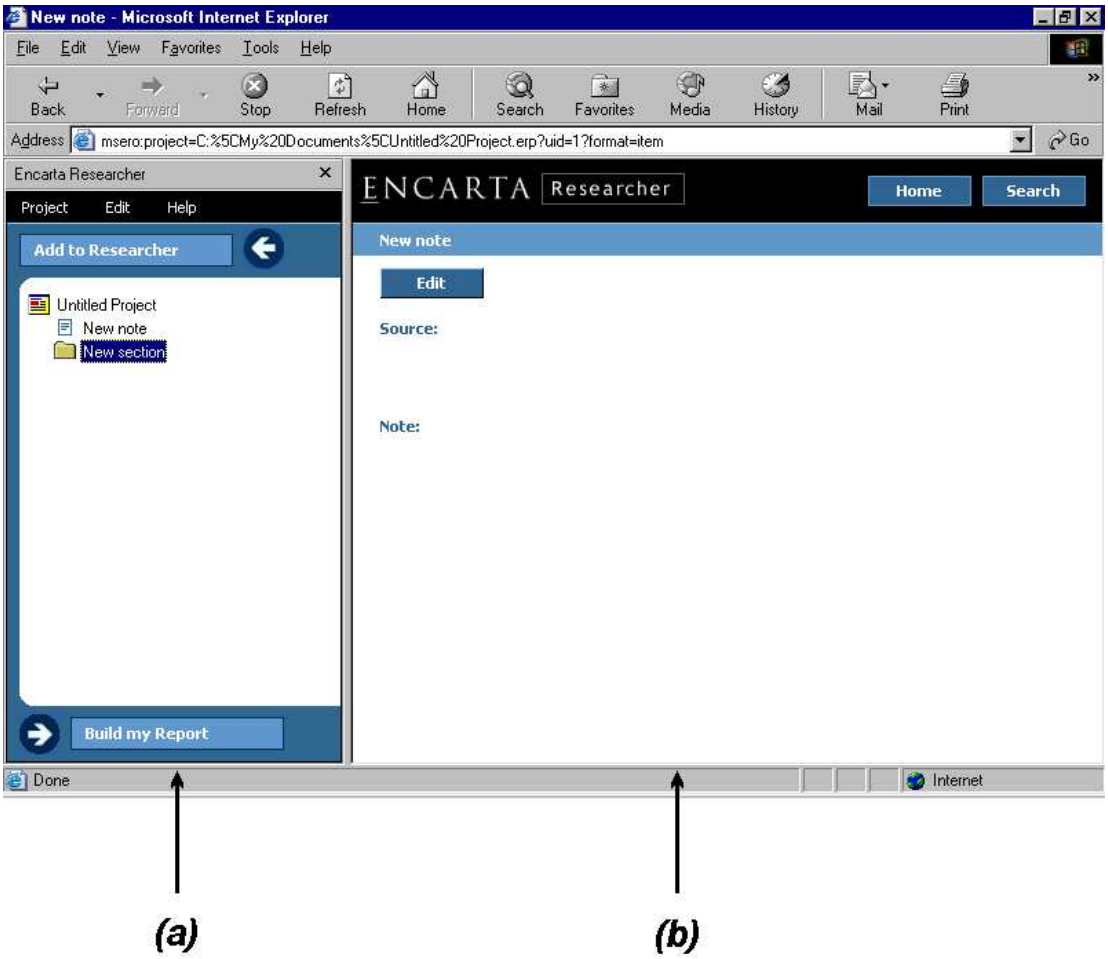


Figure 6.9 **"Encarta Researcher": the report writing tool interface**

This figure shows the report writing tool ("New Note") interface in "Encarta Researcher". The user encounters this interface when he/she wants to create a new note in the process of using the report writing tool. The interface displays: ***(a)*** the report writing tool's main options; and ***(b)*** the report layout.

When the user clicks on the report writing tool's main options ('Project', 'Edit', 'Help', 'Add to Researcher', and 'Build my Report'), roll-down menus appear. The report layout is used for the actual report writing. The layout is composed of two rectangular boxes entitled 'Source' and 'Note', where the user can type a text.

The "Report Writing Guide" texts and templates

If a user encounters problems with report writing, "Encarta Researcher" offers the "Report Writing Guide" to the user:

> **Welcome**
> The Report Writing Guide offers ideas to help you write first-rate reports. Each section contains information to help you through one part of the report writing process:
> **Search for information** offers tips on finding the information you need.
> **Collect information** helps you evaluate if you have enough sources for information and helps you take clear, complete notes.
> **Organize your report** shows you different ways you can organize your information to create a clearly written report.
> **Write your report** contains ideas for getting started and a checklist for revising your work.
> **Produce your report** suggests ways to add supporting materials and format your report so it looks great.
> (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Report Writing Guide", 2001)

Guides are offered for each stage of report writing, which are: 'Search', 'Collect', 'Organize', 'Write' , and 'Produce'. For example, the *Microsoft Encarta Encyclopedia Deluxe* "Report Writing Guide – Produce" (2001) text shown in Figure 6.10 instructs the user how to produce a report.

In the "Report Writing Guide" texts, the double positioning set up for th e user in the process of using the report writing tool disappears completely. These texts position the user as an unequal participant in the interaction; as having less power and a lower status, as passively receiving information, as having to answer questions, and as receiving orders. For example, the "Report Writing Guide – Search" text instructs the user how to search for information:

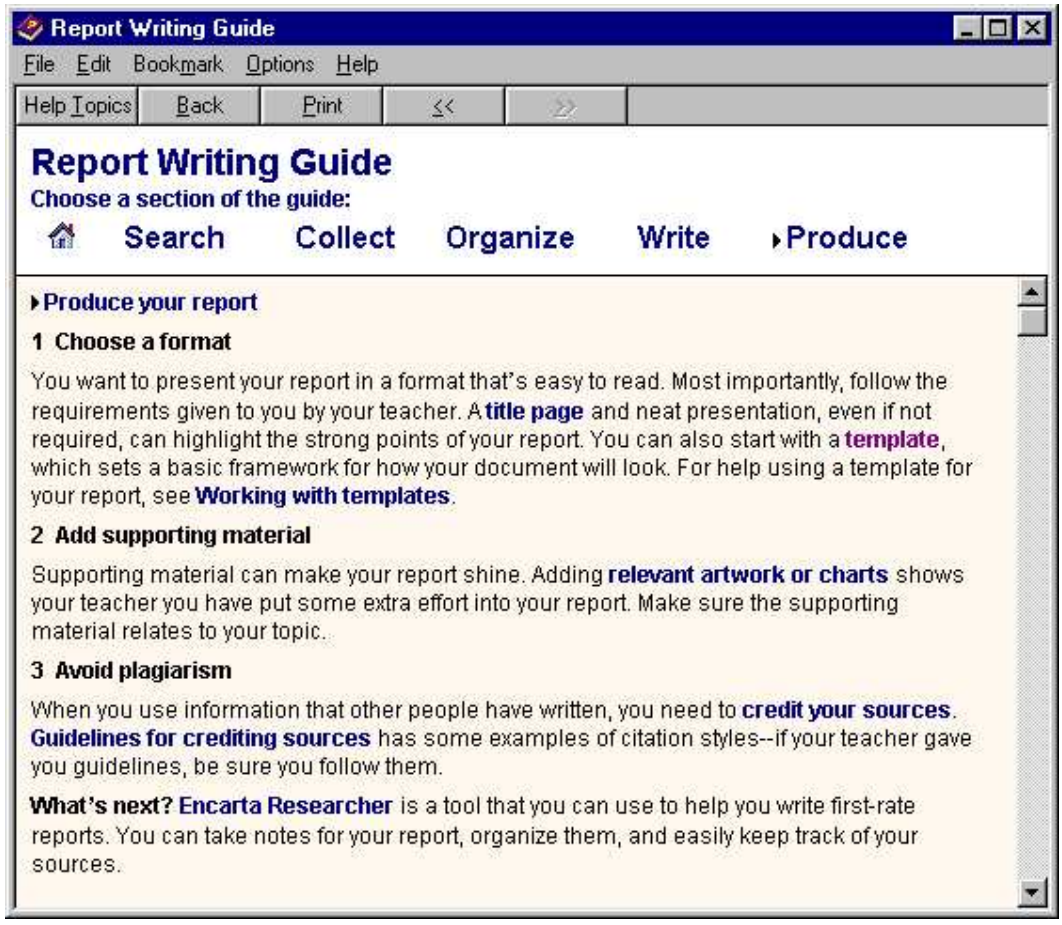


Figure 6.10 **"Encarta Researcher": the "Report Writing Guide – Produce" text**

The "Report Writing Guide – Produce" text instructs the student user how to produce a report. The text contains hyperlinks: 'title page'; 'Working with templates'; 'relevant artwork or charts'; 'credit your sources'; 'Guidelines for crediting sources'; 'What's next? Encarta Researcher'. These hyperlinks lead the user to texts focusing on these particular issues.

1 Choose a topic

Look at your assignment, and think about which topics interest you the most of those that you have a strong opinion about. Refine your ideas until you can write a clear, specific statement of what your report will be about. …Try the following methods to narrow your idea:

▪ Spider diagrams ▪ Browsing ▪ Brainstorming ▪ Free-writing

2 Look for sources

Think about what you need to know and what sources would be most likely to give you accurate and complete information. Check the instructions for your assignments to see if it tells you what types of sources you can use. Has your teacher given you sources that you must or cannot use? You will need to locate good **sources for information**.

(*Microsoft Encarta Encyclopedia Deluxe 2001*, "Report Writing Guide – Search", 2001)

The quoted text positions the user in a way that is very different from the subject positions that have been set up for the user before. It positions the user as a less powerful or, indeed, a powerless participant in the interaction. The user is actually being positioned as someone who has to 'shut up and listen'. The text is full of imperatives addressed to the user: *look, think, refine, check, evaluate*. The user is positioned as having to provide an account regarding the resources he/she has: "Has your teacher given you sources that you must or cannot use?" The text implies that the user is actually a school student and that his/her report writing activity, although being conducted most likely outside a classroom, is under a teacher's control: the student writer *must* use some resources; and there are resources that the student *cannot* use. This construction is very different from the intended consumer's identity that is outlined in the promotional texts which claim that *Encarta* "can be used in different ways by people of different ages and needs" (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Learning", 2001), and from the subject positions set up for the user in the menus and such texts as "Welcome to Encarta Researcher!"

Lastly, the quoted text demands that the school student do things that are rather difficult. It requests that the students – inexperienced report writers (otherwise they would not find themselves in this rather distant hypertext node) – reflect upon and assess their own writing and decide whether their statements are clear and specific. In case they are not, the 'artificial teacher' (or homework helper) provides a recommend ation that, no doubt, will help anybody achieve an excellent result ("Refine your ideas!") and provides links to "methods to narrow your idea", which are: spider diagrams, browsing, brainstorming, and free-writing.

The "Report Writing Guide" also offers t exts that teach how to present the ideas and information logically:

> The way you organize your report depends on what information you are trying to present or what points you are trying to make. For some ideas on how to organize your report, see **Types of organization**. Make sure your organization supports your report's purpose. (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Report Writing Guide – Organize", 2001)

If the user (report writer) decides to click on the 'Types of organization' link, he/she will be presented with templates that represent several report structures (e.g., the five-paragraph report, the outline, spider diagram, chronology, and Venn diagram). In these templates, the user (report writer) is once again positioned like in the report-writing tool: as having to provide services according to the prescribed framework. For example:

> **The five-paragraph report**
>
> This outline describes the structure of a five-paragraph report.
>
> I. Introduction
>
> A. Background
>
> B. Thesis sentence
>
> II. First main point
>
> A. Supporting evidence for first main point
>
> B. How evidence relates to this sentence
>
> III. Second main point
>
> A. Supporting evidence for first main point
>
> B. How evidence relates to this sentence
>
> IV. Third main point
>
> A. Supporting evidence for first main point
>
> B. How evidence relates to this sentence
>
> V. Conclusion
>
> (*Microsoft Encarta Encyclopedia Deluxe 2001*, "Report Writing Guide – The Five-Paragraph Report", 2001)

The main message that the student report writer gets from the "Report Writing Guide" texts is that the best way to achieve a good result is to obediently follow the procedure set up by the authorities, such as "your teacher" or a technological tool that provides document templates.

The multiplicity of identities and subject positions

"Encarta Researcher" assigns multiple i dentities to the user and sets up multiple subject positions (see Table 6.2).

Table 6.2 **"Encarta Researcher": the multiplicity of texts, practices, user identities and subject positions**

Text	Practice	User identity	Subject position
The main menu interface	User – software interaction	Software user	Equal and/or more powerful participant in interaction Receiver of offers Demander of services
The "Welcome to Encarta Researcher!" interface	Product advertising User – software interaction	Product consumer Software user	Equal and/or more powerful participant in interaction Receiver of offers Demander of services
The "Write" interface	Product advertising User – software interaction Instruction to the user	Product consumer Software user Novice user	Equal and/or more powerful participant in interaction Receiver of offers Demander of services Less powerful participant in interaction Receiver of information and commands
The report writing tool interface	User – software interaction Report writing	Software user (user of the report writing tool) Report writer	Equal and/or more powerful participant in interaction Demander of services Less powerful participant in interaction Receiver of commands
The "Report Writing Guide" texts and templates	Teaching on report writing	School student Report writer	Less powerful participant in interaction Receiver of information Provider of information Receiver of commands

The following identities are assigned to the user: product consumer; software user; novice software user; user of the report writing tool; report writer; and school student. These identities are manifested by positioning the user as being an equal, more powerful or less powerful participant in the interaction; and as receiving offers, demanding services or giving orders. Different, sometimes contradicting, identities and subject positions are offered in the texts which comprise "Encarta Researcher" (see Table 6.2).

For example, the main menu addresses the user of the software. The "Welcome to Encarta Researcher!" text addresses the product consumer. The texts that focus on specific options, such as the "Write" text, assign even more identities to the user, such as being the product consumer, a software user, and a novice software user. The last identity explains why the "Write" text may position the user as having lower status and/or being a less powerful participant in interaction (one who receives commands and is told what to do). This positioning is compensated for the positions of the software user and the consumer that are also offered in this text.

It is the report writer and the student who are always positioned as unequal participants in the interaction, as having a lower status and less power, and as having to obey commands and to passively receive information, to be instructed. However, the texts addressed to the student are located at the furthest end of the hypertext hierarchy constructed in "Encarta Researcher" (see Figure 6.6). Due to this hierarchy, the construction of the user as a subject empowered by technology, and the positioning of the user as a more powerful participant in interaction are the most salient.

6.3.5. Constructions of the user: from packaging to interface

There is a difference between the explicit and implicit constructions of the intended and the actual user of the CD-ROM encyclopaedias. In the texts on the front/back covers of the CD-ROM packaging, the consumer is claimed to be everybody – in large colourful texts. In the texts on the lateral sides or at the bottom, in an almost unreadable font, information about system requirements is given, which implies that 'everybody' should be read as everybody within a particular income group. In this case 'everybody' is implicitly re-described as 'everybody with an access to certain resources'.

In the texts on the packaging, the intended user may be clearly identified simply as a child or as a school student from every family while the texts addressed to the user on the CD-ROMs themselves and the materials available on them are, at least partly, addressed to an adult user. I interpret this as the intended child user of these products belonging to a family in which adult members share the pleasure of using CD-ROMs with their children, a family in which computers are a part of its daily life. The 'every' child/student user is implicitly re-described as a 'child from a family that is able to provide access to the high-order literacy and cultural capital'.

The outlined examples of the difference between the explicit and the implicit constructions of the intended consumer/user show that the implicit constructions are less inclusive than the explicit constructions. A critical analysis indicates that the benefits and success promised to everybody are actually promised only to those groups that have access to a certain amount of economic and cultural capital. This applies to those children who have access to expert support, and to those who have already been apprenticed into the culture of the information age.

The implicit constructions also re-define the intended user/consumer's identity by eliminating the importance of such traditional sociological and cultural attributes as nationality and age. These traditional identities are replaced with identities relating to the ICTs and computing. For example, while the texts on the front cover clearly may hail the intended consumer in terms of his/her nationality (e.g., Australian teachers and students), the inside and back covers imply that this attribute is not important and that being an Australian teacher/student means, first of all, being a user of a powerful technology of information storage, access, and presentation.

Similarly, the texts on the front cover may identify the intended consumer as a very inclusive group in terms of age (including children and adult learners). At the same time, the description of the product and the argument regarding its educational effects imply that both these groups (children and adults) have same needs and interests. These needs and interests are closer to the needs and interests of such a specific group of adults as scholars who require access to the most comprehensive and up-to-date information sources. The child and the school student are reconstructed as generic users of ICTs by assigning to them the needs and interests claimed to be universal for any user of reference materials published in the electronic format.

Finally, the texts on the CD-ROM packaging promise to empower its users. They present the CD-ROM encyclopaedia as a powerful tool under the user's control. In the process of the actual use of the CD-ROM encyclopaedia, the user is not always constructed as being more powerful than the tool. The subject positions set up for the user, even when the user is positioned as a demander of services (a sender of orders/commands), remain ambivalent. The construction of the software user as being powerful and as being in control is re-described in the process of actual interaction with the tools, and turns out to be rather restricted and illusory.

To sum up, in the process of using CD-ROM encyclopaedias, the user is constructed mainly as a software user – or, rather, this is the dominant construction. Such a

construction, together with the logic of technological determinism inscribed in the popular discourse on technology and education, makes the CD-ROM encyclopaedia a site where students and learners are constructed as generic software users. The generic software user identity is constructed via the assignment of certain needs and interests to the intended consumer in the texts that promote the products. This construction is supported by the broader construction of ICTs as powerful and as empowering its user, no matter who this user is. In the next section, I examine the construction of the user of online information services, such as online encyclopaedias and Internet search tools for children.

6.4 Empowered on the Internet

In this section, I focus on two issues. Firstly, I study how the visitor to a free online encyclopaedia is reconstructed as a client of a pay information service. Secondly, I study how children are constructed as a specific group of users of the Internet technology of information access.

6.4.1 Online encyclopaedias and their visitors

The online encyclopaedias offer constructions of the user and the encyclopaedia that seem to be similar to those offered in the CD-ROM encyclopaedias packaging texts. They construct the online encyclopaedia as a powerful tool that gives access to thousands of articles, which implies that the visitor is empowered by this tool. The descriptions of online encyclopaedias introduce them as reference works, as powerful technologies of information access, and as information services – either free or pay-based:

> Infoplease is the world's largest free reference site. Encyclopedia,
> Dictionary, Almanacs, and Homework Help on English, math, history ...
> (*Google*, "Infoplease", 2004)

> The Encyclopedia Britannica is recognized world-wide as the most authoritative resource of its kind. They offer a trial membership for seven days, after which the subscription cost (at one time: $14.95 a month or $150 per year) is now $8.50 a month or $85.00 per year; schools are provided with steep cost discounts.
> (*The San Diego Science Alliance Guide and Links to On-Line and CD-ROM Encyclopedias*, 2003)

Free online encyclopaedias can be accessed from online stores and from websites that provide educational resources. They are linked to each other and to pay-based information services and databases. Figure 6.11 shows a fragment of a network in which the use of online encyclopaedias is embedded. Figure 6.11 shows that online stores and educational resources websites provide links to online encyclopaedias that are available for free. In their turn, the free online encyclopaedias provide links to pay information services.

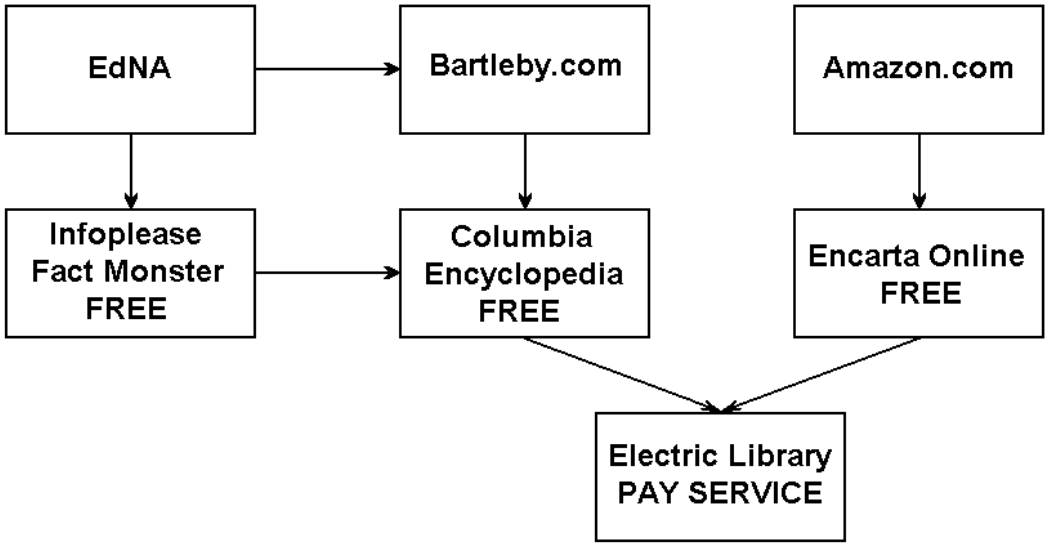


Figure 6.11 **Online information services' network: fragment**

For example, a visitor to *EdNA Online* (an Australian website of educational resources for teachers and parents) searching for `<online encyclopaedia>` is provided with a link to *Infoplease*[8]. *Infoplease* is a part of *Learning Network*, "the Internet's premier educational source" (*Learning Network*, "Welcome to the Learning Network", 2001). *Infoplease* provides a link to a children's Web directory *Fact Monster*. *Fact Monster* contains a page entitled 'Encyclopedia'. On this page, the visitor finds a search tool that enables him/her to search *Columbia Electronic Encyclopedia*. In its turn, *Columbia Electronic Encyclopedia* provides a link to *Electric Library*, a pay information service. The visitor then can choose to either search *Columbia Encyclopedia* for free or go further and become a client of the pay service.

[8] The full title is *Information Please: On-line Dictionary, Internet Encyclopedia, & Almanac Reference*.

This is not the only way in which the visitor to *EdNA Online* could find him/herself at the gates of this pay database. The visitor could choose to go to *Bartleby.com*, which was listed among *EdNA*'s evaluated pages for `<encyclopedia>` and was described as containing many free resources, among them a number of encyclopaedias. *Bartleby.com* recommends itself as "providing students, researchers and the intellectually curious with unlimited access to books and information on the Web, free of charge" (*Bartleby.com*, 2003). It directs the visitor to *Columbia Electronic Encyclopedia*, which, in turn, offers the visitor to go to *Electric Library*.

A visitor to *Amazon.com* can reach the same destination (*Electric Library*). The *Amazon.com's* visitor is provided with a link to *Microsoft Encarta Online*. There he/she can choose to use *Microsoft Encarta Encyclopedia* for free[9] or to go to *Electric Library*, a link to which is provided on the *Microsoft Encarta Online* site.

The example illustrated by Figure 6.11 suggests that free online encyclopaedias are used by the providers of pay information services as relays that transfer an information searcher to pay services. It can also be suggested that free online encyclopaedias are not so much sources of information but part of the practice of marketing pay information services. The transfer of the visitor from a free online encyclopaedia to a pay information service is accompanied or, rather, encouraged by changing the needs of the client of online information services. Let us consider how the online encyclopaedia and its visitor are constructed in the texts located on the homepages of online encyclopaedias available for free. In the texts located on the homepages, the construction of an online encyclopaedia is shaped mainly by the technological discourse with emphasis on the capability of the digital technology of information access and communication. For example, *Columbia Encyclopedia* is presented as an information source and an information service that provides access to a large amount of up-to-date information:

> Containing nearly 51,000 entries (marshalling six and one-half million words on a vast range of topics), and with more than 80,000 hypertext cross-references, the current Sixth Edition is among the most complete and up-to-date encyclopedias ever produced. (*Columbia Electronic Encyclopedia*, 2001)

Also, the free online encyclopaedia is constructed as providing access to concise, factual knowledge. In comparison to this, fee-based services are constructed as providing

[9] Only a part of the content of *Encarta Encyclopedia* is available to the visitor of *Microsoft Encarta Online* for free

access to more in-depth knowledge: "[*eLibrary*[10] is] a subscription-based research tool that allows you to search an archive of over 17 million documents from the finest newspapers, magazines, books, transcripts, and more!" (*Electric Library*, "Ask eLibrary", 2003).

So, a visitor to *Encyclopedia.com* has a choice: either to browse *Columbia Electronic Encyclopedia* for free and get short factual ('concise') information or to subscribe to *eLibrary* and get access to information published in primary and, apparently, more authoritative sources, such as books, journals, and so on:

> Now you can conduct research without going to the library or visiting hundreds of websites. With eLibrary you'll have unlimited access to many of the world's top publications.
> Read magazine articles before they hit the newsstands, retrieve years of full-text newspaper articles, find transcripts from popular news programs, view celebrity photos, and much, much more. (*Encyclopedia.com*, "Free Services", 2004)

The user of the online encyclopaedia is constructed as having particular information needs that are directly linked to the user's desire and ability to pay for information. By constructing different information services as providers of the information of a different nature and quality, the texts located on the homepages of online encyclopaedias reconstruct the information searcher into an information consumer. Below, I investigate the constructions of the online encyclopaedia and its visitor on the website of *Britannica Online*, a subscribed encyclopaedia.

The homepage of *Britannica Online* contains such elements as: banner and pop-up advertisements; content (texts situated in the middle of the page); texts and links in the left and right margins of the page; and links and information about the publisher at the bottom of the page (Figure 6.12). The *Britannica Online* homepage texts construct the visitor as a client and a consumer (an online shopper). These are texts that offer the visitor to subscribe to *Britannica Online* and advertisements situated under such headings as 'Shopping'.

[10] *eLibrary* is a common reference to *Electric Library*.



***Figure 6.12 Britannica Online*: homepage**

The hypertext links displayed on the homepage lead the visitor to other texts, such as the "Britannica Online Subscription Form" text. In this text, the visitor and the intended subscriber is identified as a researcher, a learner or a parent of a school student and is constructed as a consumer who needs access to the highest quality content and wants to find information on the Web as quickly as possible. The subscription form claims that one needs an expert mediator's help in order to find the highest quality information and quickly. The implication is that when one uses an expert's help and is served without delay, one should pay for these high quality and urgent services:

> Sign up for a one-year subscription to Encyclopedia Britannica Online for only $50, and a world of knowledge will be at your fingertips in no time! (*Britannica Online*, "Britannica Online Subscription Form", 2001)

The presence of advertisements on the *Britannica Online* homepage may reinforce the visitor's desire to become a client of an advertising-free service. The user of a subscribed online encyclopaedia is constructed as a privileged client who has guaranteed access to the information of the highest quality. Being a privileged client means being able to access information in comfort, without pop-up and flashing advertisements. The online encyclopaedia is presented as "an advertising-free research and learning environment that enables you to cut through the clutter of the Web" (*Britannica Online*, "Britannica Online Subscription Form", 2001). This implies that one should take it for granted that one should pay not for having access to information but for the possibility to access information in an advertising-free environment. In other words, one has to pay somehow.

The user of online encyclopaedias is constructed indirectly by emphasis on particular features of online encyclopaedia. The online encyclopaedia is described in terms of the amount of information that can be accessed, in terms of the kind of knowledge that can be accessed and in terms of the speed of information search. This construction implies that the users are primarily concerned with those issues. I now turn to another type of Internet information services – children's Internet search tools.

6.4.2 Internet search tools for children and their users

In CD-ROM encyclopaedias and online encyclopaedias, the user is constructed as a subject empowered by technology. In contrast, the constructions of the Internet search tools for

children and their child user are mainly shaped by the discourse of children's safety and focus on the credibility and accuracy of the Internet information sources. For example, a homepage of a Web directory for children called *Free Internet Encyclopedia* contains "General Disclaimer".

The "General Disclaimer" text constructs the visitor as an information searcher whose primary concern is the credibility and accuracy of information that can be found on the Internet. The text starts with the explanation that not all information on the Internet is accurate. The user has to be cautious when it comes to the accuracy of information:

> This means that you have to decide on the accuracy and appropriateness of any information you may access here for your own uses and purposes and the responsibility for such decisions is completely your own.
> (*Free Internet Encyclopedia*, "General Disclaimer", 1999)

The texts on the homepages imply that the main concerns of the user of children's Internet search tools is the tools' ability to provide access to information sources that are safe and credible rather than their ability to provide instant access to an unlimited amount of information located all over the globe. In the texts located on the homepages, children's Internet search tools are generally presented as safety guides. For example, parents visiting *Yahooligans!* may encounter a text warning that it is parents' responsibility to surf the Internet safely, and an offer of safe surfing guidelines:

> "Safe surfing" is a family affair. As a parent, it's all about being informed, Internet savvy, and open to the possibilities of the online world for you and your child. We'd like to help. Please consider the following safe surfing guidelines.
> (*Yahooligans!* "Parents' Guide: Safe Surfing with Your Family", 2000)

On the Internet search tools' websites, children are constructed as a particular group of information searchers whose information needs differ from those of adults. Children users of Internet search tools are constructed as needing help, guidance, and access to monitored information. This construction is used in order to further construct the child user of Internet search tools as a client of particular services. Because automated search engines provide surplus information and cannot select reliable and safe information sources, the child explorer of the Internet needs the assistance of information professionals, Internet experts, or any other reliable and caring person. This construction is implied, for

example, by such host characters as Jeeves, "your very own information valet" (*Ask Jeeves for Kids*). This character represents a team of "real human researchers" and is recommended as "the world's most knowledgeable internet librarian." In relation to such Internet characters, the child user of Internet search tools is constructed as an inexperienced information searcher who is unable to find relevant information and cannot assess information sources in terms of their credibility. Therefore, the child user of Internet search tools is constructed as being in need of mediators, experts, and guides.

The Internet search tools for children usually assure their visitors that children will have access only to safe websites. This does not necessarily mean that these sites are actually safe for children to visit. The search engines that are offered to the user may have powerful filters that will sort out any websites containing risky words. There may be an advertisement pop-up window on the homepage, the content of which is not under the website creators' control.

6.5 Conclusion

In Chapter Five, I have argued that the educational and children's software review websites construct reference software products as powerful technological tools. The reviews offer a picture of the sustainable progressive development of these tools from text-only CD-ROMs to interactive multimedia CD-ROM encyclopaedias, from encyclopaedias published in the CD-ROM format to their online versions, and from technologies that enable the user to quickly find and access information to technologies that serve as gateways to unlimited information sources on the Internet. In this chapter I have studied three groups of products: CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools. My analysis has shown that the technoenthusiastic and determinist discourse on technology is largely reproduced in these products. It has also shown that the overarching construction of the ICTs as powerful and empowering does not always correspond to the more specific constructions of the users' identities and subject positions.

My analysis shows that the CD-ROM encyclopaedia is constructed in terms of the CD-ROM technology's advantages in regard to information storage and presentation. Within CD-ROM encyclopaedias there are texts that promote these products, mediate the user-software interaction, and instruct the user in how to operate the software. These different types of texts offer different constructions of the intended user. The multiple

subject positions set up for the user are connected with the different (implied) identities of the user. In the promotional texts on CD-ROM packaging, the consumer is constructed as a software user and as a learner empowered by the ICTs. These texts inform the user about the products' outstanding capabilities and features, and promise quick and impressive educational effects as well as fun. They position the user as a powerful subject who, after purchasing a product, will enjoy total control over the world of information, the sophisticated information technology, and his/her learning and schooling. This construction is supported by subject positions set up for the user in the interface texts. The interface texts mediating the use of CD-ROM encyclopaedias position the user as a more powerful subject than the tool. This positioning, however, may be illusory due to the fact that the interface texts determine the user's choices by offering a restricted set of options. In addition, the Help texts that instruct the user how to operate those empowering tools tend to present the tools as having more agency than the user. This means that the subject positions set up for the user in the process of using the software products do not correspond completely to the construction of these products' consumer as a subject empowered by the technology.

The online encyclopaedia is constructed as the next, and higher, stage in reference products' publishing (see, for example, Kister, 1998). However, it is not compared to CD-ROM technology as a technology of information presentation, since the CD-ROM technology provides better quality of multimedia and, very importantly, is less time-consuming than the databases available online. Rather, the online and the CD-ROM encyclopaedias are compared in terms of these products' prices, and in terms of such features of the CD-ROM and the Internet technology as their materiality/virtuality. There are free encyclopaedias available online while CD-ROMs need to be purchased. The virtuality of the online encyclopaedia means that the information can be easily updated and the user can access the latest information, while CD-ROMs need to be upgraded for an additional price, or a new edition has to be purchased. Being online also means that the user can access not only encyclopaedia articles but he/she can go to other sources on the Internet, while the CD-ROM technology is capable of storing a large but limited amount of information.

Internet search tools are constructed as yet another, a more progressive, stage since they enable the user to access an unrestricted amount of information available on the Internet (see Kister, 1998). However, children's Internet search tools present themselves not only as powerful technological tools of information access but also as tools for

navigating the Internet safely, as a special 'kidspace' made up of websites that have been selected by experts. Although the creators of children's Web directories and search engines claim these issues to be their priorities, it is rather difficult for them to present their products as capable of challenging the authority of the encyclopaedia as an information source that is child-safe, relevant and reliable. This is why children's Internet search tools are compared not to the CD-ROM encyclopaedia or to the online encyclopaedias but to Internet search tools that have not been designed specifically for children.

The intended user of the CD-ROM encyclopaedia is constructed as a transgenerational subject who wants interactive learning, has desires for success, power and control, and is an information searcher empowered by technology. He/she does not need anybody, since he/she has a powerful tool. The user of the online encyclopaedia is constructed as having different information needs, the difference being linked to the ability to pay for information rather than to being a child or an adult information searcher. Unlike the user of the CD-ROM encyclopaedia, the user of the children's Internet search tool is constructed as a child rather than as a transgenerational subject. On the websites of Internet search tools, the construction of the child user is shaped by the discourses of personal safety and financial security. The child user is constructed as a potential victim whose major need is to be protected by adults. The construction of the Internet as a dangerous place is closely intertwined with its construction as a source of abundant, poorly structured, and unreliable information. Accordingly, the construction of the user as an information searcher is different. As in CD-ROMs, this construction is shaped by the discourse of the power of technology. However, the child user of Internet search tools is constructed not as being empowered by this technology but as being endangered by it.

In this chapter, I have shown that the user is constructed as a subject empowered (or even endangered) by ICTs, and that this construction is shaped by the discourses of technological power and technological determinism. I have also argued that not everybody can be empowered by these technological educational products. In the following chapter, I turn to a more detailed investigation of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools as pedagogical practices. I will focus on how they construct their user as a literate subject.

Chapter Seven The virtual literacy classroom: The discursive construction of literacy and the user as a literate subject

7.1 Introduction

In Chapters Five and Six, I demonstrated that the discursive constructions of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools are shaped by a technoenthusiastic educational discourse aligned with the discourses of technological determinism and the discourse of technology marketing. Within these discourses, the assumption is made that the educational effects and outcomes of ICTs are available and beneficial to all and that these effects and outcomes are determined by the nature of ICTs. These discourses are employed in the texts promoting CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools. These texts claim that every student can benefit from using these technological products and that using these products will result in better learning and more successful schooling. They also claim that educational advantages and beneficial effects are possible for everybody due to the capacities of computer technologies of information access and the quality of the software.

Texts promoting CD-ROM encyclopaedias, online encyclopaedias and Internet search tools for children send a message that the user of these products and services will acquire information searching skills and develop research abilities simply because these particular products and services provide advanced and powerful technologies of information searching and access. Also, the promotional texts claim that these products and services facilitate learning and schooling because multimedia and interactive technologies create a rich and stimulating learning environment, and because they make it easy to produce high-quality reports, assignments, essays, and projects. In this chapter, I investigate claims relating to the educational benefits and the outcomes of using CD-ROM encyclopaedias, online encyclopaedias and Internet search tools. I aim to understand how these products affect their users' access to the literacy required in the information age and to understand whether all groups of users can benefit equally from the literacy education

provided by these products. In order to do this, I explore CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as discursive practices of literacy teaching rather than as instances of digital technologies of information access and presentation.

My assessment of these products as providers of literacy education is informed by concepts and models of literacy for the information age and the knowledge society, suggested by those literacy researchers who adopt a sociocultural approach to literacy and the poststructuralist theories of literacy education and pedagogy (Gee, 2000, 2003; Green, 1988; Kamler, 2001; Knobel, 1999; Kress, 2003; Lankshear & Bigum, 1999; Lankshear & Knobel, 2003; New London Group, 1996; Snyder, 1997). These scholars have suggested multiple and more complex ways of thinking about literacy and proposed multidimensional models of literacy which include, for example, operational, visual (multimodal), hypertext, network, and critical literacies.[1] Operational literacy refers to the ability and skills to use literacy instruments and tools, from pen and paper to computers and Internet search engines. Multimodal literacy includes the ability to use semiotic resources in order to create (design and redesign) meanings (Kress, 2000a). In the information society characterised by multiple and diverse modes and the media of information presentation and communication, it is also important that people are able to use various semiotic resources; that they are not only linguistically literate but also possess visual literacy, multimodal literacy, and hypertext literacy (Kress, 2003; New London Group, 1996; Snyder, 1997). Critical literacy involves the ability to approach and critically question texts as well as the ability to develop an alternative vision of reality, self, and others (Lankshear, 1998; Lankshear & Knobel, 1998). Literacy for the knowledge and/or the network society includes the ability to perform symbolic operations of a higher order and to make knowledge a means of production (Gee, 2000; Lankshear & Knobel, 2000).

Being a literate member of contemporary society characterised by the proliferation of ICTs and diverse textual environment means not only being a competent user of new literacy tools but also a postmodernist reader/writer (Snyder, 1997); a designer capable of creatively using multiple semiotic resources (Kress, 2000a, 2000b); a technoculture insider who understands the codes of the new literacy (New London Group, 1996; Lankshear & Knobel, 2003); a critical and reflecting subject and a subject capable of high-order symbolic activities (Gee, 2000; Lankshear & Knobel, 1998). Literacy researchers argue that different social subjects have unequal access to these multiple literacies (see Cope &

[1] These concepts and models were outlined in more detail in Chapter Two.

Kalantzis, 1993, 2000; Graff, 1987; Lankshear, 1997) and that acquisition of particular literacies may vary depending on the subjects' access to social, economic, and cultural capital (Gee, 2000; Gee, Hull, & Lankshear, 1996). In particular, the use of ICTs in schools and homes and their diverse effects on students' literacy skills and abilities have been made objects of theorisation and exploration (Bigum, 2002, 2004; Burbules & Callister, 2000; Comber & Green, 1999a, 1999b; Green, 1993; Lankshear, Bigum, Durrant, Green, et al., 1997).

In this chapter I study CD-ROM encyclopaedias, online encyclopaedias and Internet search tools as 'sites' of literacy education. I aim to reveal the concepts of literacy which are brought to the user in these products and how they may affect the acquisition of literacy required in the information age. CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools do not provide any explicit teaching instructions. Rather, they teach by offering constructions of literacy-related activities, tools, artefacts, and settings in the texts that mediate literacy-related activities undertaken by the users. These texts include toolbar icons, menus, tools' interfaces, and help texts. They offer constructions of literacy that can be interpreted as being inclusive/exclusive and advantaging/disadvantaging certain groups of users due to the fact that the offered constructions of literacy imply who the intended user is. I explore CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools in order to answer the following questions:

- Which constructions of literacy are offered to the user of CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools?
- What do these constructions imply about the intended user's identity as a member of a literate and a social culture?
- To what extent do these constructions contribute to the acquisition of a multimodal literacy, critical literacy, or literacy for a knowledge society?

I start with an exploration of how the user of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools is constructed as a member of a literate and a social culture. In section 7.2, I focus on the images of literacy in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. In sections 7.3-7.5, I consider the constructs of literacy-related activities in these products. I interrogate the constructs of project creation, information searching, and information 'consumption' (reading the multimodal encyclopaedia article). In the concluding section, I discuss my analytic

findings in order to understand how CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools may affect different users' access to the literacy required in the information age, and who may find problematic the offered constructions of literacy and the user.

7.2 Images of literacy – images of the literate subject

Images of literacy are images that show literacy-related artefacts, people or animated characters involved in literacy events, or images that stand for literacy-related activities. Images of literacy are a characteristic feature of multimedia software products and, in particular, products designed for children. For example, the users of CD-ROM encyclopaedias and children's Internet search tools encounter images of literacy amongst toolbar icons and subject menus as well as in the texts that provide instructions and in the texts that promote the CD-ROMs or online services. Images of literacy are used in order to help the user operate software as well as in order to represent and advertise products and services. In this section, I approach images of literacy as messages based on certain assumptions about literacy practices and as constructing the user as a social and a literate subject. I aim to answer the following questions:

- What literacy technologies are represented by images in CD-ROM encyclopaedias, online encyclopaedias and children's Internet search tools?
- What literacy cultures are represented by images in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools?
- What do the selected images of literacy imply about the sociocultural identity of the intended user of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools?

7.2.1 Images of literacy technologies and literacy cultures

In order to describe the images of literacy in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools, I use the typology of images of literacy as the images of the constituents of literacy events suggested in Hamilton (1999). According to this typology, I distinguish between: images of human (or human-like) participants; images

of literacy activities; images of settings in which literacy events take place; and images of literacy tools, symbols, and artefacts (see Figure 7.1).

Figure 7.1 shows the start page of the children's Web directory *Learning Links*. The page displays twenty icons: four icons for the website's navigation links ('Home', 'Fun & Games', 'Learn', 'Search') and sixteen icons for subject categories ('The Arts', 'Biography', and so on). Images of literacy are encountered within twelve of the icons. These are: a pile of books, an open book and pens ('Learn'); musical notation ('The Arts'); a world map ('Countries'); a large book ('History'); sheets of paper and a pen ('Homework Helper'); newspapers ('In the News'); an open book and letters ('Language Arts'); mathematical symbols ('Math'); maps ('Michigan', 'U.S.A.'); a child sitting in an armchair and holding an open book ('Reading'); and a book page ('Religion'). These images show different constituents of literacy events. The majority of these images show literacy tools and artefacts, such as books, newspapers, sheets of paper, maps, and a pen. Some images show literacy-related symbols: letters, mathematical symbols, and musical notation. There is also an image of a human participant of a literacy event (a child reading a book). This image may also be interpreted as an image of a setting in which this event is taking place (home) and as an image of a literacy activity (reading).

In order to understand how the images of literacy construct the user as a sociocultural subject, I categorise these images according to the following typologies of literacy: (1) literacy as a technology of information presentation and communication[2] (Bolter, 1991; Goody, 1968; McLuhan, 1962; Ong, 1982; Poster, 1990; Tuman, 1992); and (2) literacy as a sociocultural tradition (Gee, 1996; Heath, 1983; Street, 1993, 1995).

Within the communication tradition, various periods of human history are identified according to epochal communication technology breakthroughs such as movement from orality and face-to-face communication to writing, print and further to computer-mediated communication (Peters & Lankshear 1996). Within this tradition, the focus is on information and communication technology as influencing literacy, knowledge, thinking, subjectivity, and social interaction. Literacy is conceptualised in terms of the medium of communication, (oral speech, print, electronic, and digital) and in terms of the mode of representation (spoken language, written language, image, or their mixture). According to this tradition, I distinguish between the following types of literacy technologies: pre-print, print, and post-print (digital).

[2] After Peters and Lankshear (1996), I label it the communication tradition.



Figure 7.1 **The *Learning Links* categories: images of the constituents of literacy events**

Within the sociocultural approach, literacy is a social practice. Literacy education means enculturation into particular literacy traditions, which includes not only the knowledge of grammar, rules, and spelling but also the internalisation of certain cultural and aesthetic dispositions and values (Gee, 1992, 1996; Hasan, 1996a; Heath, 1982b, 1983; Kress, 1994). Literacy involves activities fulfilling social purposes within particular practices (Gee et al., 1996; Street, 1995). From this perspective, the focus is on a meaning making activity of a social subject embedded in a particular sociocultural and situational context, and positioned in a system of social relations and power (Freebody & A. Luke, 1990; Gee, 1996; Green, 1988). When literacy is approached as cultural, it can be categorised in terms of national and cultural specificity and in such sociological terms as popular, middle-class, and exclusive or privileged (see, for example, Besnier & Street, 1994; Street, 1993, 1995).

Images of literacy in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools can be categorised as images of literacy *technologies* and images of literacy *cultures*. Images of literacy technologies are images of tools, artefacts, and settings typical for the pre-print, the print, and the electronic and digital technologies of information presentation and communication (see examples in Figure 7.2).

In Figure 7.2, images of scrolls and medieval manuscripts represent pre-print literacy; images of books and pieces of paper with printed words represent print literacy; and images of a computer, a printer and a keyboard represent post-print (digital) literacy. Images of literacy technologies can also be interpreted as images of literacy cultures. For example, an image of gold-bound volumes or an image of a fountain pen and a sheet of paper displaying calligraphic writing can be interpreted as images of an exclusive or privileged literacy culture. Based on my professional knowledge in the field of literacy studies and on my own experience of being educated into particular literacy cultures, I mark some images as nationally, culturally, or professionally specific. For example, an image of a castle-like library interior (see Figure 7.5) or images of medieval manuscripts represent Western literacy culture; and images of mathematical symbols, musical notation, and different alphabets represent literacies characteristic of particular professional fields.

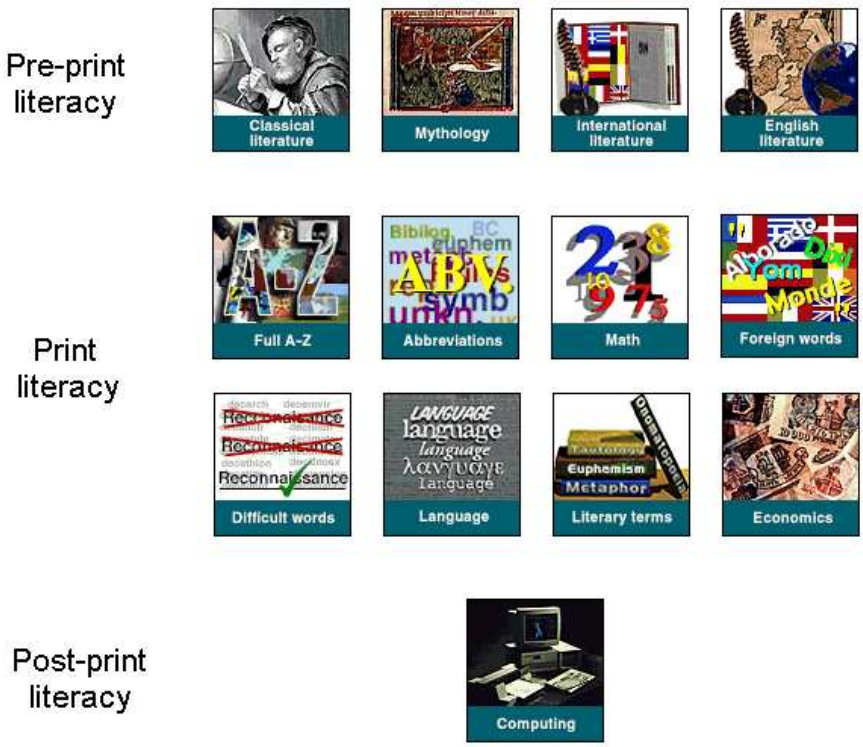


Figure 7.2 **The *Webster's Concise Interactive Encyclopedia* subject menu: images of literacy technologies**

Images of literacy are encountered in different types of texts: texts that promote CD-ROMs, online encyclopaedias, and Internet search tools (promotional texts); texts that mediate the user's interaction with software (interfa ce texts); and texts that instruct the user how to operate software (instructional texts). Different types of texts have different functions. Promotional texts highlight the producer's assumption of what the best features and qualities of the offered products are. The interface texts highlight what the producer considers to be the meaning and the essence of the represented objects and what the producer hopes to be inferred by the user from the interface icons. Instructional texts describe literacy-related actions that can be performed by the user in the process of being taught how to use particular tools, such as a project creation tool or a search tool.

In order to perform their functions, different types of texts employ different means, including images of literacy. Therefore, the images of literacy in different types of texts are to be examined in relation to the texts' purposes and functions. In this section, I examine:

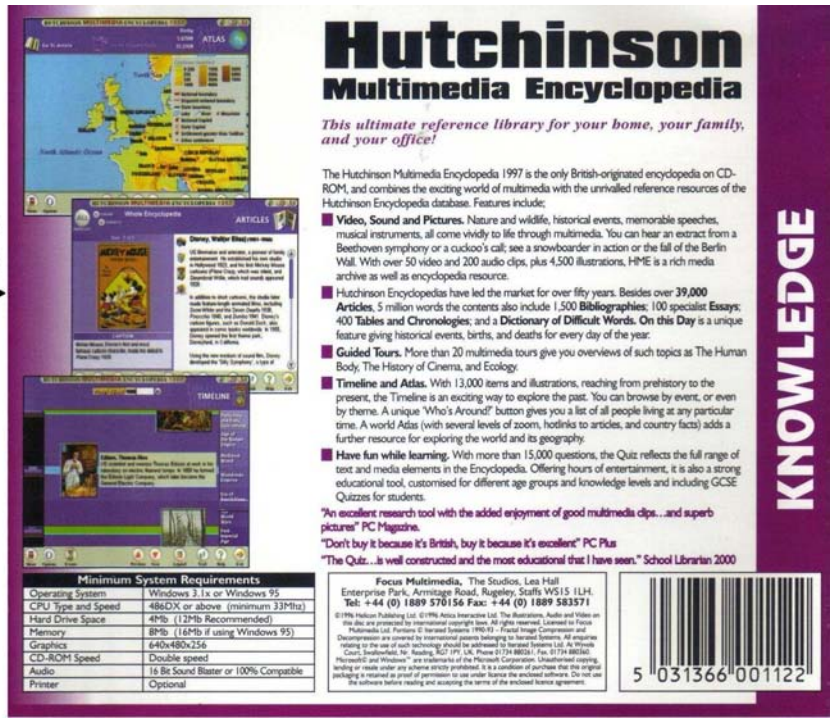
- images of encyclopaedias on CD-ROM packaging, main menus, and on the homepages of online encyclopaedias and Internet search tools; and
- images of literacy in toolbar icons, command menus, and subject/topic menus (further in the text I refer to them as interface images of literacy).

7.2.2 Images of encyclopaedias on packages, main menus and homepages

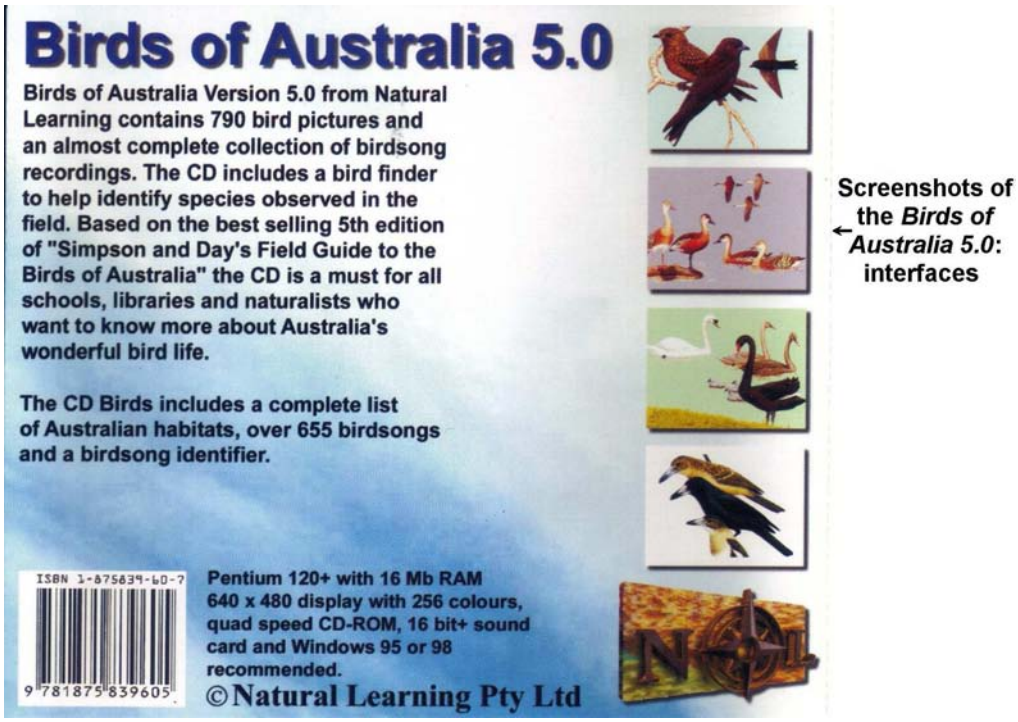
The texts on the CD-ROM packaging and on the homepages of online encyclopaedias texts inform the intended consumer/user about the products. The majority of images encountered on the packaging of the CD-ROM encyclopaedias are screenshots of a CD-ROM encyclopaedia's interface. For example, Figure 7.3 shows the *Hutchinson Multimedia Encyclopedia* CD-ROM packaging (back cover) and the *Birds of Australia 5.0* CD-ROM packaging (back cover). In both cases, the packaging displays descriptions of software features and a few screenshots of the encyclopaedias' interfaces. I interpret these screenshots as 'images of the CD-ROM encyclopaedia'.

Such images (images that show encyclopaedias' interfaces displaying colourful and attractive pictures) highlight the capability of the CD-ROM technology to present information in multiple modes. Also, a display of several screenshots of the encyclopaedia's interfaces may encourage the consumer to think about the CD-ROM encyclopaedia as a piece of technology which enables the user to access a large amount of information simultaneously. These packaging images present the CD-ROM encyclopaedia as a piece of new – digital, multimodal – technology of information storage, presentation, and communication. They suggest that the consumer of the CD-ROM already is or will soon become a member of the new digital literacy culture. These images also suggest that the intended user is a consumer of information presented in multiple modes (multimedia, hypertext) rather than a reader of 'traditional' linear print texts.

Screenshots of the *Hutchinson Multimedia Encyclopedia*: interfaces →



The ***Hutchinson Multimedia Encyclopedia*** CD-ROM packaging: back cover



Screenshots of the *Birds of Australia 5.0*: interfaces ←

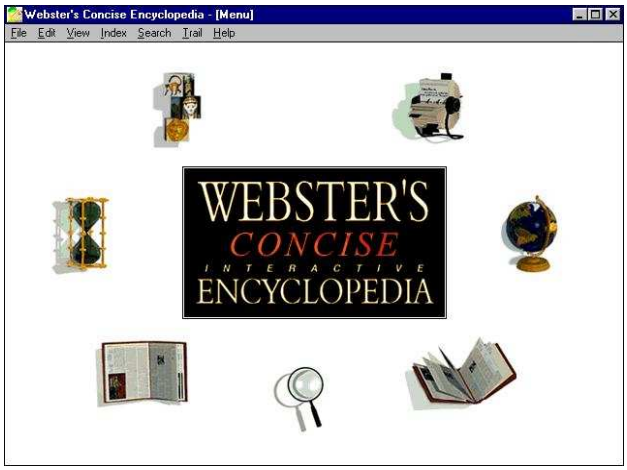
The ***Birds of Australia 5.0*** CD-ROM packaging: back cover

Figure 7.3 **Encyclopaedia's images on CD-ROM packaging**

A CD-ROM encyclopaedia can also be represented by the interface images. For example, the main menu images may represent the entire software product (a CD-ROM encyclopaedia) and its specific sections and tools ('Articles', 'Search', 'Timeline', and so on) (Figure 7.4). These images offer two different constructions of the encyclopaedia and its user.

On the one hand, the range of options displayed on a CD-ROM encyclopaedia's main menu interface shows how the CD-ROM encyclopaedia differs from its print counterpart. The main menu shows that an encyclopaedia published in the CD-ROM format is more than just a collection of articles to read. It is also a tool that facilitates information searching (search engine); a tool that facilitates the use of information (a project creation tool); a tool that presents information in different modes and genres, including virtual tours and interactive games; and a tool that provides access to multiple reference sources. The image of a CD-ROM encyclopaedia – as it is created by the main menu – constructs the user of a CD-ROM encyclopaedia as a member of a digital literacy culture, a culture in which such traditional literacy activities as reading an encyclopaedia are transformed into viewing, listening, travelling, and playing.

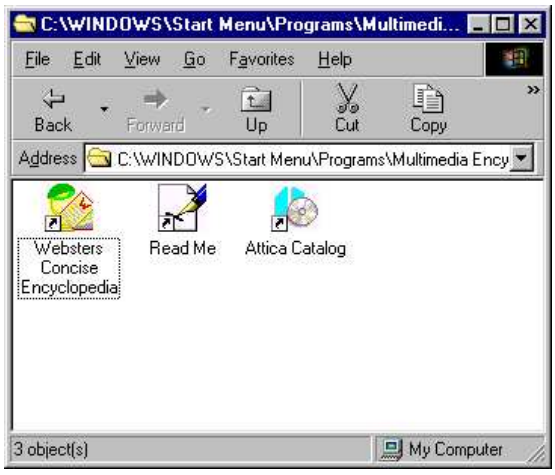
On the other hand, the main menu images of the encyclopaedia (a collection of articles) suggest that the user of a CD-ROM encyclopaedia is also a member of the traditional – print – literacy culture. In the menus, the 'Encyclopedia' or the 'Articles' options are usually represented by images of print volumes, closed or opened (see icons in Figure 7.4). For example, the "Program Manager" interface on the ***Webster's Concise Interactive Encyclopedia*** CD-ROM displays an image that represents the encyclopaedia in a traditional' setting. The image shows a desk lamp and an open book. Such images may work as a means of connecting the use of reference sources published in the CD-ROM format with a more traditional, bookish literacy culture.



(a) Main menu in ***Webster's Concise Interactive Encyclopedia***



(b) Main menu in the ***Hutchinson Multimedia Encyclopedia***

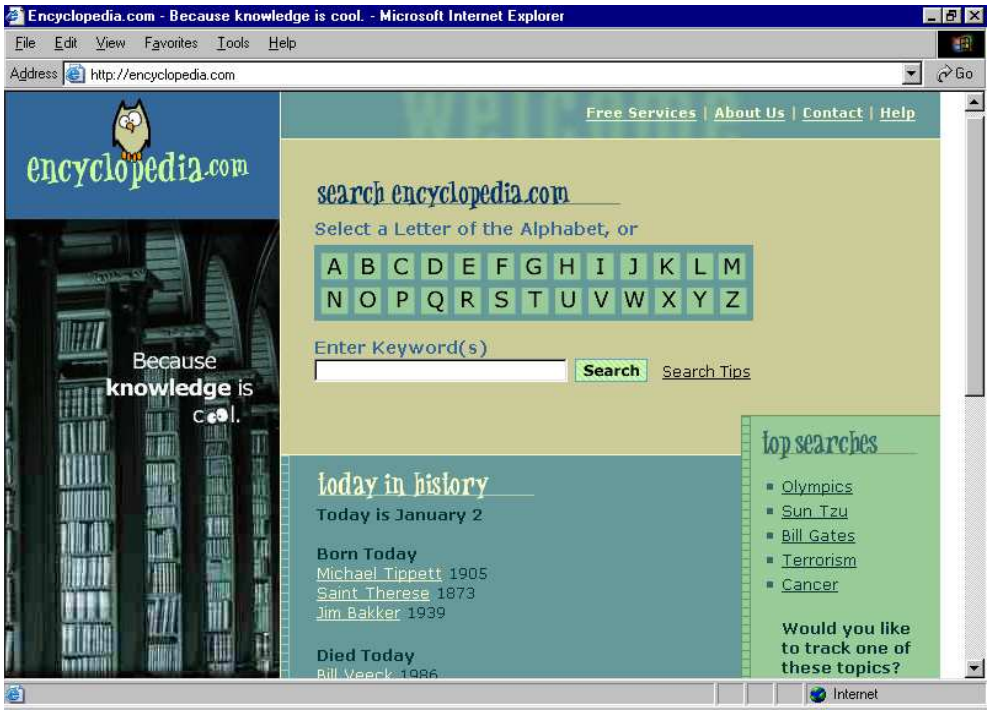


(c) Program Manager in ***Webster's Concise Interactive Encyclopedia***

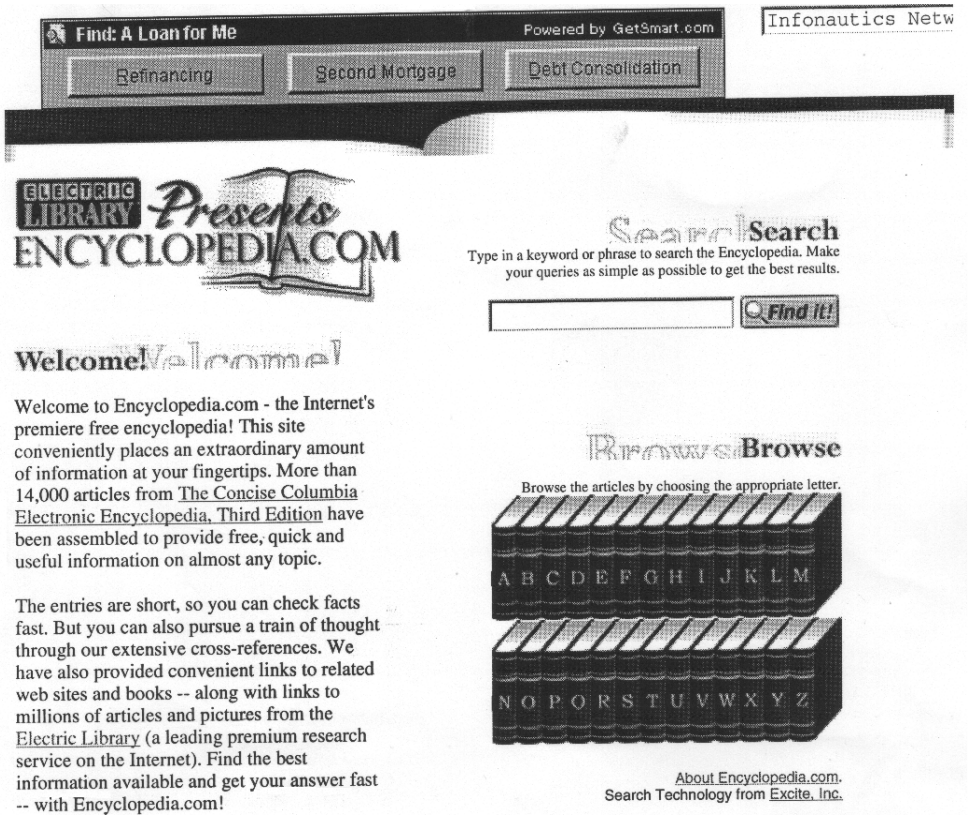
Figure 7.4 **Encyclopaedia's images in CD-ROM main menus**

Images of print literacy technology are also encountered on the websites of online encyclopaedias and children's Internet search tools. For example, the homepage of *Encyclopaedia.com* (*Encyclopaedia.com*, "Homepage", 2004) displays an image of a library interior (Figure 7.5). This image can be interpreted as a symbolic representation of the quantity of information that is available to the user of an online encyclopaedia. It is interesting that a few years ago (for example, in 1999, when I visited this site for the first time) an encyclopaedia was represented on the homepage of *Encyclopaedia.com* (*Encyclopaedia.com*, "Homepage", 1999) by an image of a bookshelf displaying several volumes. Later, the design of the entire website was changed. Now, the visitor encounters, instead of a rather schematic drawing of a bookshelf with several volumes, a realistic picture of a castle-like library interior with an inserted cartoon character (the owl). Even the previous image could be perceived as a representation of a literacy culture that is not for everybody. The current image (an old castle, Gothic architecture, and an owl – the symbol of wisdom) represents an even more privileged and specific literacy culture.

The images of print literacy (volumes, bookshelves, a library interior) as the symbolic representations of an encyclopaedia connect the user of the 'new', post-print, digital literacy technology with the 'old', print literacy technology and construct the user as a member of an exclusive literacy culture. It may also be the case that the entire *Encyclopedia.com* homepage aims to appeal to youth by referring to the contemporary mainstream (popular) culture in which such symbols and interiors are encountered by young people and children in popular fantasy books, films, and digital games (e.g., the Harry Potter series, Lord of the Rings, and so on).



(a) ***Encyclopedia.com***: homepage (2004)



(b) ***Encyclopedia.com***: homepage (1999)

Figure 7.5 **The images of *Encyclopedia.com***

However, it seems that the general trend in the ways that encyclopaedias, information and knowledge are represented on the Internet is a trend to avoid images of print literacy. For example, when I visited *Microsoft Encarta Online* in 2003 (*Microsoft Encarta Online*, "Reference", 2003), the 'Encarta Encyclopedia' option on the website's main menu was symbolically represented by an image of a book. When I visited *Microsoft Encarta Online* in 2004, the website's design had been updated. Now, the 'Encarta Encyclopedia' option was replaced by the 'Encyclopaedia Article Center' option with no icon at all. Even animated host characters seem to be moving further away from the print literacy culture. For example, when I visited a children's Internet search tool *WebWise* in 2000, its host character – Bruce the Spider – was shown with a book in his paws. Bruce the Spider addressed the visitor with the following question: "Can't find it?". In relation to this question, the image of Bruce holding the book could be interpreted as a suggestion that the book is the place to look for 'it', where 'it' is any information required. When I visited *WebWise* in 2004, the book was no longer there. Now, his paws free, Bruce the Spider is able to provide "instant answers" to the visitor's questions. However, these should be "Internet questions" only: "Ask Bruce! Instant answers to your Internet questions" (*WebWise*, "Homepage", 2004).

7.2.3 The interface images of literacy

Interface images are images that symbolically represent command options, tools, and database sections (Figure 7.6). Unlike images in the promotional texts, the images that are used as icons for menu options, command buttons, and toolbar options are designed to be functional. Ideally, the software user should understand them intuitively. This is particularly important in children's software. I see interface images as the representations of socioculturally specific construction of reality and as constitutive of the user rather than as neutral graphic symbols facilitating navigation and the use of the tools. I examine the images of literacy encountered in the CD-ROM encyclopaedias' subject/topic menus; images on the toolbar and command menus; and images representing the database categories in Web directories (I focus on the icons presented on the *Yahooligans!* homepage).



Figure 7.6 **The interface images of literacy**

Images of literacy in the subject/topic menus

I consider images of literacy used in the icons in the CD-ROM encyclopaedias' subject/topic menus a specific type of interface images of literacy. They differ in terms of the genre of images. The images on the toolbar and menu icons and the Web directories' icons are either highly abstract, schematic, or cartoon-like images. These are images without perspective; typically, they do not show human (or human-like) participants of literacy events and/or settings in which a literacy event occurs. They mainly show literacy tools, surfaces for reading and writing, and literacy-related symbols. The images representing a CD-ROM encyclopaedia's database sections (subjects/topics) can be photographs, drawings or pictures. Due to this, the images of literacy encountered among the subject/topic menus demonstrate the greatest variety in terms of the constituents of literacy events shown on the images. For example, there are images which show human participants in literacy events: an old man reading a book; a man writing on a blackboard; and others. There are images that show the settings of literacy events: a classroom, an office, a street, and so on. The subject/topic images demonstrate the most variety in terms of the images of literacy technologies and cultures.

Images of pre-print and/or privileged literacy technologies and cultures, in particular, are typical for the CD-ROM encyclopaedias' subject/topic menus. In these menus, they are often used to represent such subjects as classical literature, mythology, history, religion, or geographical discoveries (see Figure 7.2). Such subjects as mythology or religion, for example, can be represented by the images of a scroll or a medieval manuscript. Classical literature can be represented by an image of a quill pen and a book or by a picture of a classical author writing with such a pen. Geography can be represented by images of an old map or globe. Some of these images show literacy tools, artefacts, and symbols that may not be familiar to the contemporary student. Therefore, they may not be so helpful if the user attempts to understand the icon's meaning intuitively.

The presence of images that may be beyond the everyday experience of the majority of users can be explained by the twofold role of the subject/topic menus. On the one hand, the subject/topic menu is offered to the user as a search tool. It is supposed to facilitate the user's information searching by browsing (it should help the user to find the database section that most likely contains the information required). Therefore, the subject/topic menu images – similarly to toolbar and menu images – must be meaningful and easily understood by the users. On the other hand, the CD-ROM encyclopaedias' subject/topic menus represent knowledge. As such, they may perform an educational

function by telling the user about the represented knowledge area. Therefore, the display of literacy artefacts, tools and settings from different cultures and times may contribute to the user's awareness of literacy cultures which are outside his/her everyday experience.

Images of literacy on toolbars and command menus

The toolbar and menu icons represent particular software functions and tools and are used in order to operate the software. The images of literacy artefacts and tools encountered among the toolbar and menu icons imply ideas about the represented artefacts and tools and about the users' identities. This deserves particular attention in the context of the software producers' claims that these products are addressed to everybody. There are images of literacy that can be problematic for some users. Some images, in order to be understood, require a rather extended and, perhaps, privileged, education and a wide general knowledge. For example, the toolbar of *Webster's Encyclopedia of Australia 2000* displays an image of the moon with a few letters written on it as an icon symbolising the 'Hide Text' option. In order to grasp the meaning of this icon, the user must know that only one side of the moon can be seen from Earth while the other side is always hidden.

There are images of literacy tools and artefacts that are more likely to be encountered in such settings as museums or some universities' libraries rather than in everyday life and in the majority of schools and homes. These are mainly images of pre-print literacy tools and artefacts (quills, scrolls, medieval manuscripts' pages, ancient maps) or images of literacy tools and artefacts that are not currently popular (a blackboard and a chalk, a fountain pen, a sample of calligraphic writing, a set of gold-bound volumes).

For example, the main menu of *Animals, A Multimedia Encyclopedia* displays an image of three solid encyclopaedia-like volumes with golden bindings as an icon for the option 'Bookshelf' (Figure 7.7). The 'Bookshelf' icon provides a link to the glossary that contains definitions of such words as *invertebrate*. The image implies that whenever the child-user meets an unknown term, he/she virtually stretches the hand to the virtual bookshelf, picks up a virtual dictionary and finds out what the term means. This image may also be considered as selective. It may be perceived as an image of a particular setting characterised by the availability of expensive books used as fundamental, authoritative sources of information. Not every library possesses books of such appearance (with golden bindings), let alone every household. That is, the image of this particular setting may presume or create a certain identity of the user as a person who not only has access to such artefacts but has also been socialised into a particular culture.

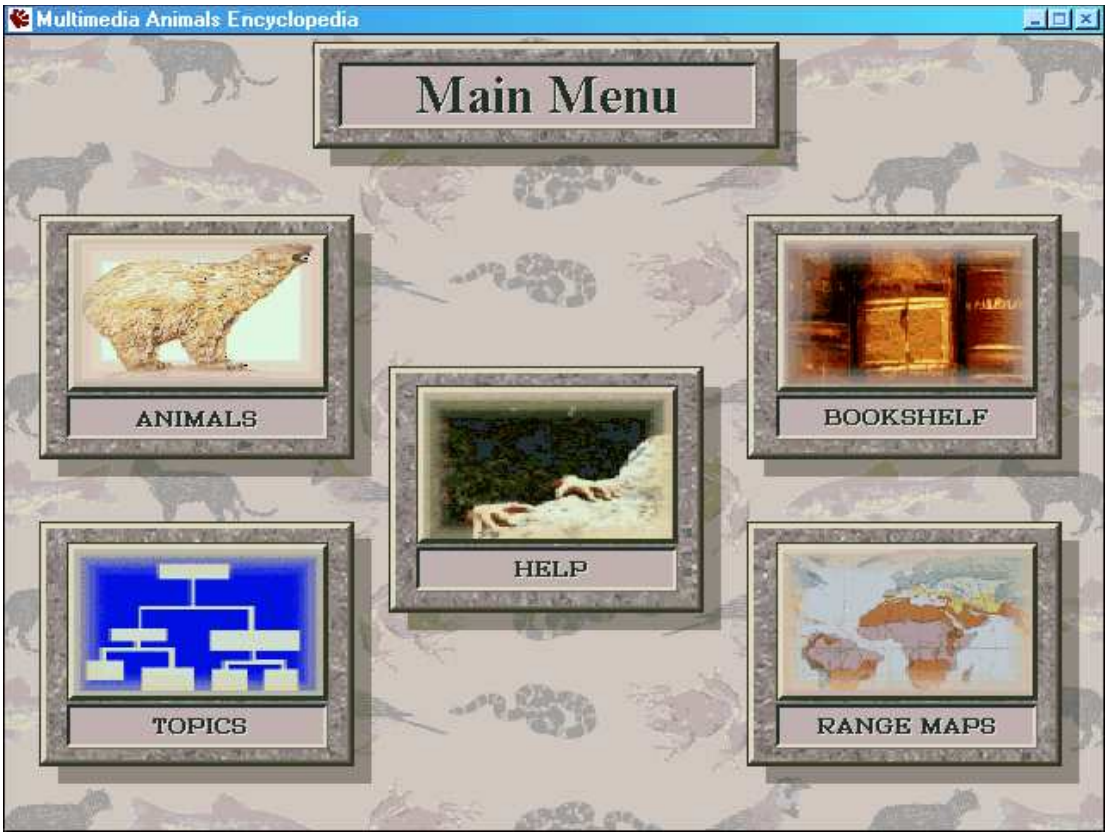


***Figure 7.7 Animals, A Multimedia Encyclopedia*: the main menu**

Turning to a bookshelf when one meets an unknown word is an action developed within a rather distinct, refined literacy culture. It may be expected that the image of a bookshelf as an icon for the operation of finding the meaning of an unknown word will explain more about the capabilities of the given CD-ROM to the child who belongs to such a culture while being less meaningful to somebody who does not belong to the same culture.

Other culturally exclusive images can also be problematic for some groups of users. For example, an icon for the 'Hide Menu' option in *Webster's Encyclopedia of Australia 2000* (this option enables the user to close a roll-up menu) shows an image of a waiter carrying something on a plate. This image implies that the intended user is familiar with this custom. However, being culturally specific, this image may not be understood by some groups of users.

Images of literacy on the Yahooligans! homepage

The selection of images of particular literacy technologies for representing certain activities or certain fields of knowledge may reflect the software creators' idea of the place

of different literacy technologies in contemporary life. For example, the homepage of *Yahooligans!* (*Yahooligans!*, "Homepage", 2000) contains six icons (Figure 7.8).



Figure 7.8 **The *Yahooligans!* homepage: images of literacy technologies**

The *Yahooligans!* homepage icons are:

- a Globe and three human figures is the icon for the topic 'Around the World' which provides links to information on countries, food, holidays;
- a TV set with a musical note on the screen and a couple of viewers is the icon for 'Art & Entertainment': TV, movies, jokes, music;
- a computer is the icon for 'Computers & Games': games, web, screensavers;
- a book, an apple and a blackboard is the icon for 'School Bell': language arts, math, social studies;
- a conical flask and a dinosaur is the icon for 'Science & Nature': space, animals, dinosaurs;
- a pair of sports shoes, a ball, and a helmet is the icon for 'Sports & Recreation': baseball, outdoors, wrestling.[3]

[3] In this chapter, I focus only on images of literacy. Other images used in reference products, in particular those that are offered to the global audience, also deserve critical examination as being selective, non-neutral, and culturally specific. For instance, the images for the 'Sports & Recreation' category are good examples of the selective, non-neutral, and culturally specific nature of interface icons. These images can be interpreted as being selective of sports and recreation activities in both gender and age terms. Two out of three images represent sports that are played mainly by males (soccer) or exclusively by males (American football). These images are non-neutral because they represent sports and recreation as activities for males, activities that involve violence, and, therefore, activities that are mainly for adults. Also, they are activities that the majority

These images construct the intended user as surrounded by the old (a book, a globe, a blackboard) and the new (a TV set, a computer) technologies of information presentation and communication. The images of the new, electronic and digital technologies of information presentation and communication are used in order to represent fields associated with entertainment and games, such as 'Computers & Games' and 'Art & Entertainment'. The images of the old and the new literacy technologies representing particular practices, activities, and knowledge areas construct what they stand for.

For example, in the analysed *Yahooligans!* icons, the image of a book as an icon for the topic 'School Bell' can be interpreted as locating print literacy within the field of school-related activities rather than within the field of leisure and recreational activity. Simultaneously, the images of such literacy technologies as print and handwriting (a book and a blackboard) may construct schooling as an 'old-fashioned' or even an 'obsolete' activity – due to it being connected with literacy technologies of the pre-digital era. Even science is presented as being a less modern field in comparison to games, art, and entertainment due to the fact that science is represented by an image of such a traditional and 'unsophisticated' tool of scientific research as a conical flask and an image of such an 'archaic' object of study as a dinosaur.

These two images (a conical flask and a dinosaur) imply that the visitor may have multiple identities. The image of a dinosaur implies that the visitor is a primary school student or even a pre-school child, since dinosaurs have become almost as popular as teddy bears: there are soft toys and picture books showing these pre-historical creatures. The image of a conical flask implies that the visitor is a secondary school student who has been exposed to chemical equipment. However, even secondary school students may find this image rather exclusive since students are more likely to use test tubes rather than conical flasks. These images may also be addressed to an adult/parent visitor who may feel more comfortable on this website upon finding traditional images.

---

of the population prefers to enjoy as viewers. Therefore, these images may also contribute to the construction of the *Yahooligans!* visitor as a consumer of information about sports and, more generally, as a client of information services rather than as a person who enjoys an active lifestyle. These images are culturally specific. They reflect particular countries' preferences of sports: summer sports and ball games rather than, for example, winter sports and athletics. Not all visitors can understand this icon's meaning 'intuitively'. For example, some visitors may not be aware of the symbolic meaning of a helmet since such helmets are used in American football only (at least, this is what my teenage sons told me when I asked them about this icon). Therefore, the icon for 'Sports and Recreation' may be exclusive of a few groups of visitors. Actually, the icon offered on a global children's Web directory seems to exclude such groups as non-Americans, females, and children.

My analysis of the images of literacy conducted in this section has shown that these images may be used for different purposes in particular types of texts. In promotional texts, the images of both print and post-print literacies are used to construct the most attractive representation of the product and to influence the consumer's needs and desires. Both the images of digital literacy technology and the images of print technology entail particular literacy-related values and locate the intended consumer of these products within two different but equally valuable and appealing literacy cultures. Even if some images represent a rather exclusive literacy culture outside the actual experience of the majority of intended consumers this may not necessarily work as a means of excluding these consumers. The images may refer to the broader cultural context of contemporary youth. Also, they may highlight the value of this culture and 'invite' the consumer to join it. These images construct electronic encyclopaedias as belonging to both the digital and print literacy cultures. These images may mean that electronic encyclopaedias provide an access to both literacy traditions. Such a construction may appeal to both young people and their parents and teachers, thus contributing to the consumer appeal of these products.

The different types of images of literacy may intersect with each other, and such intersections have certain patterns. For example, images of settings of literacy events are often images of settings that may be described as culturally specific or exclusive. The images of pre-print literacy occupy a significant place amongst images of literacy artefacts presented in the CD-ROM and online encyclopaedias and Internet search tools. Images of a privileged or exclusive literacy culture and pre-print literacy technology can also be encountered amongst toolbar icons and menu options. When such images are used in toolbars and command menus, they may appear problematic for some users. These images, therefore, may exclude some users.

The use of visual images instead of verbal signs is based on the idea that all users share a conventional understanding of images as symbolic representations of certain meanings. It might be expected that images used in the educational products addressed to the widest possible audience should be easily recognised by their users. However, the creators of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools sometimes use images that are culturally specific. Those who do not recognise the images due to the absence of these images' prototypes in their everyday experience may be disadvantaged.

Images of literacy are not the only ways in which CD-ROM and online encyclopaedias and Internet search tools contribute to the construction of the user as a

literate subject. These products may also do this by offering constructions of particular literacy-related activities. In the following sections, I focus on the constructions of project creation, information searching, and information consumption (reading an encyclopaedia article).

7.3 Project Creation

In this section, I study the discursive construction of an activity that is identified as project creation. I examine two products marketed as helping Australian students create school projects: *Maximedia School Project* CD-ROMs and the *Webster's Encyclopaedia of Australia 2000* CD-ROM. I explore these products in order to answer the following questions:

- How is the user constructed as a project creator?
- What actions comprise the activity of project creation?
- What are the main constituents of a project?
- How are the constituents of a project constructed?

My analysis focuses on the patterns of transitivity, voice and modality and on visual representations of literacy activities in the linguistic texts instructing the user how to create a project. The category of transitivity, together with the categories of voice and modality, is an important means of the discursive construction of subjects and reality (Fairclough, 1992; Janks, 1997; Lemke, 1990, 1995; van Dijk, 1993). These categories construct the world of experience as composed of different types of processes, and construct events and processes in terms of agency (Halliday, 1985a). An analysis of the patterns of transitivity, voice, and modality enables me to consider:

- whether the project creation is constructed as being composed of material processes or other types of processes (mental, existential, verbal, relational, and behavioural);
- how particular constituents of the project (information, image, text) are constructed as being involved in the different types of processes; and
- how the user and the tool are positioned in terms of agency.

I begin by examining the constructions that are offered in the print texts of the instruction guides attached to the *Maximedia School Project* CD-ROMs. Then I consider how project creation is constructed within the interfaces of the "Project Creator" tool offered to the users of the *Webster's Encyclopaedia of Australia 2000* CD-ROM. The analysis of print texts enables me to set up a case against which I interpret the constructions of project creation in computer-mediated texts. Both the print and computer-mediated texts employ linguistic and visual means. Different types of semiotic means and representational modes have their possibilities and their restrictions (Kress 1997, 2000a). For example, in the visual mode, it is easier to represent material and concrete processes rather than mental and abstract processes, and it is easier to represent the spatial rather than temporal (dynamic) relationships between the participants of a process. My analysis aims to reveal how the usage of visual means may affect the user's understanding of what it means to create a project.

7.3.1 Maximedia Instruction Guide

There are three CD-ROMs in the *Maximedia School Project* CD-ROMs. Each CD-ROM is attached to a booklet that instructs the user in how to install the CD-ROM, outlines the available tools and resources, and instructs the user in how to operate the given tools and resources in order to create a school project. The texts of the booklets attached to the CD-ROMs are very similar although they have different project titles as examples: "The Explorers Burke and Wills"; "Governor Arthur Phillip"; and "Snakes of Australia". In this section I use examples from the text which instructs student users in how to create the "Governor Arthur Phillip" project (*Maximedia School Project No 2*, "Instruction Guide", 1999).[4]

The "Instruction Guide" text is addressed to the student who is using the *Maximedia School Project No 2* CD-ROM in order to create a school project. "Instruction Guide" is composed of three parts. Part 1 "Installing" instructs in the installation of the software. This part is not analysed here. I focus on Part 2 "The Main Menu" text and Part 3 "Creating Your Project" text.

[4] Throughout this chapter, this text is referred to as "Instruction Guide".

"The Main Menu" text

The two-page "The Main Menu" text outlines how the *Maximedia School Project No 2* CD-ROM may be able to help a student create his/her school project. Below is the first part of the text:

> The Maximedia School Project CD-ROM Main Menu is shown below. This will be your "home base" when exploring the wealth of information and images contained on the School Project CD-ROM. … The first four buttons on the Main menu offer information and pictures on a specific topic. For instance, from the button marked "Australian Aborigines" you can access many useful pictures, as well as comprehensive information on Aboriginal society, culture, history and Aborigines today. To make it easy to find the information you want, the School Project CD-ROM offers hyperlinked menus and indexes, as well as powerful Search Engines. Simply copy and paste relevant information into your project page, ready for editing and rewriting. PART 3: CREATING YOUR PROJECT (on page 7) contains step-by-step instructions which explain how to include information in your project. Illustrating your project is also easy using the many great images contained on the CD-ROM. You will find photographs, drawings and engravings which can be included in your project. To add an image to your project, simply cut-and-paste or drag-and-drop it into your project page – then position and resize the image until your project looks just the way you want! The step-by-step instructions in PART 3 will show you how easy it is to include images in your project. (*Maximedia School Project No 2*, "Instruction Guide", 1999, pp. 5 -6)

This text suggests that, in order to create a school project, the student ('you') can do the following: *access* the 'wealth of information and images'; *find* the information using hyperlinked menus, indexes, and 'powerful Search Engines'; *copy* and *paste* relevant information into the project page, thus *including* it in the project; *illustrate* the project; *include* photographs, drawings and engravings in the project; *add* images to the project by *cutting-and-pasting* or *dragging-and-dropping* them; and *position* and *resize* images in order to get a project that looks "just the way you want!" The analysis of transitivity in this text is shown in Table 7.1.

Table 7.1 shows that the majority of the processes (14 out of 16) that comprise the complex activity of project creation are material processes that relate to concrete physical aspects of project creation: *access, copy, cut, paste, add, drag, drop, position, resize.* Any processes that may relate to the mental aspects of project creation (such as comprehending information or making decisions regarding its relevance for the project) are not mentioned in this text. The only mental processes mentioned are those that relate to feeling (*want*) and perception (*view*). As a result, "The Main Menu" text constructs the student project creator as a performer of concrete physical actions rather than as a thinker or an analyst.

Table 7.1 **"The Main Menu" text: transitivity and modality**

Participant	Process	Transitivity	Modality
you	can access	material	possibility
you	want	mental	statement
[you]	copy	material	offer/command
[you]	paste	material	offer/command
you	will find	material	statement
[you]	cut-and-paste	material	offer/command
[you]	drag-and-drop	material	offer/command
[you]	position	material	offer/command
[you]	resize	material	offer/command
you	can access	material	possibility
you	will find	material	statement
[you]	discover	material	offer/command
you	can view	mental	possibility
[you]	access	material	offer/command

I now turn from processes to the constituents of a project and examine how the constituents of the project creation activity are constructed in "The Main Menu" text. These constituents are *information* and *images*, where information refers to linguistic texts. In the text, information and images are presented as two different things that are involved in different processes, have different attributes, and are used for different purposes (see Table 7.2).

Table 7.2 **"The Main Menu" text: information and images**

Participant	Process[5]	Transitivity	Attribute
INFORMATION	**Access**	material	comprehensive
		material	relevant
	find	material	the latest
	copy	material	
	paste	material	
	edit	material	
	rewrite	material	
	include		
IMAGES/PICTURES	**access**	material	useful
	find	material	beautiful
	include	material	
	add	material	
	cut	material	
	paste	material	
	drag	material	
	drop	material	
	position	material	
	resize	material	

[5] In the 'Process' column, I indicate with bold font those processes that are common for both information and images.

Table 7.2 shows that both the information (linguistic texts) and the images are 'resources' that are *found* and *accessed*. Both are 'entities' that are *included* in the project with such concrete physical actions as *copying, cutting, pasting, dragging* and *dropping*. Both information and images can be changed. However, changing information and changing images is not the same. Changing information (linguistic texts) may involve some meaning making: information can be *edited* and even *rewritten*. Changing images involves simple manipulation with the images' size and location: images can be *resized* and *positioned* differently on a page but they cannot be changed in any other way. The difference between information and images is also manifested by different attributes assigned to information and images. Information is described as being *comprehensive, relevant,* and *the latest*. Images are described as being *useful* and *beautiful* (although the latter attribute cannot be applied to every picture – see, for example, Figure 7.9). These descriptions imply that only the linguistic texts contain information, while images do not contain information and are *used* for aesthetic purposes only as a decorative element.

Interestingly, it can be argued that the images contained in the *Maximedia School Project* CD-ROMs may be a richer source of information on some topics than the linguistic text. For example, pictures showing historical life scenes in Figure 7.9 provide a lot of information about Australia in the past. The viewer may learn, for example, how people belonged to different groups (convicts, officers, soldiers); what early Australian settlements looked like; how convicts were punished; how they were transported through the Australian desert under convoy; and how they worked. These pictures may illustrate better than words the striking social division that existed in Australia at that time, the harsh conditions in which some people were living, and the human suffering and hard labour that gave the beginning to the contemporary history of Australia. Looking at the pictures may help the viewers feel that the changes which Australia has undergone since those times are, indeed, dramatic. These pictures may also be made objects of critical viewing and analysis. The student project creator may interrogate them in terms of whose points of view are reflected in the pictures; consider how the artist's choice and interpretation of topics and characters may work as a means of transferring certain values and ideologies; and suggest how else the portraits and life scenes shown in the pictures can be perceived. "The Main Menu" text, however, does not encourage the students to approach pictures as sources of information or as objects of critical viewing.

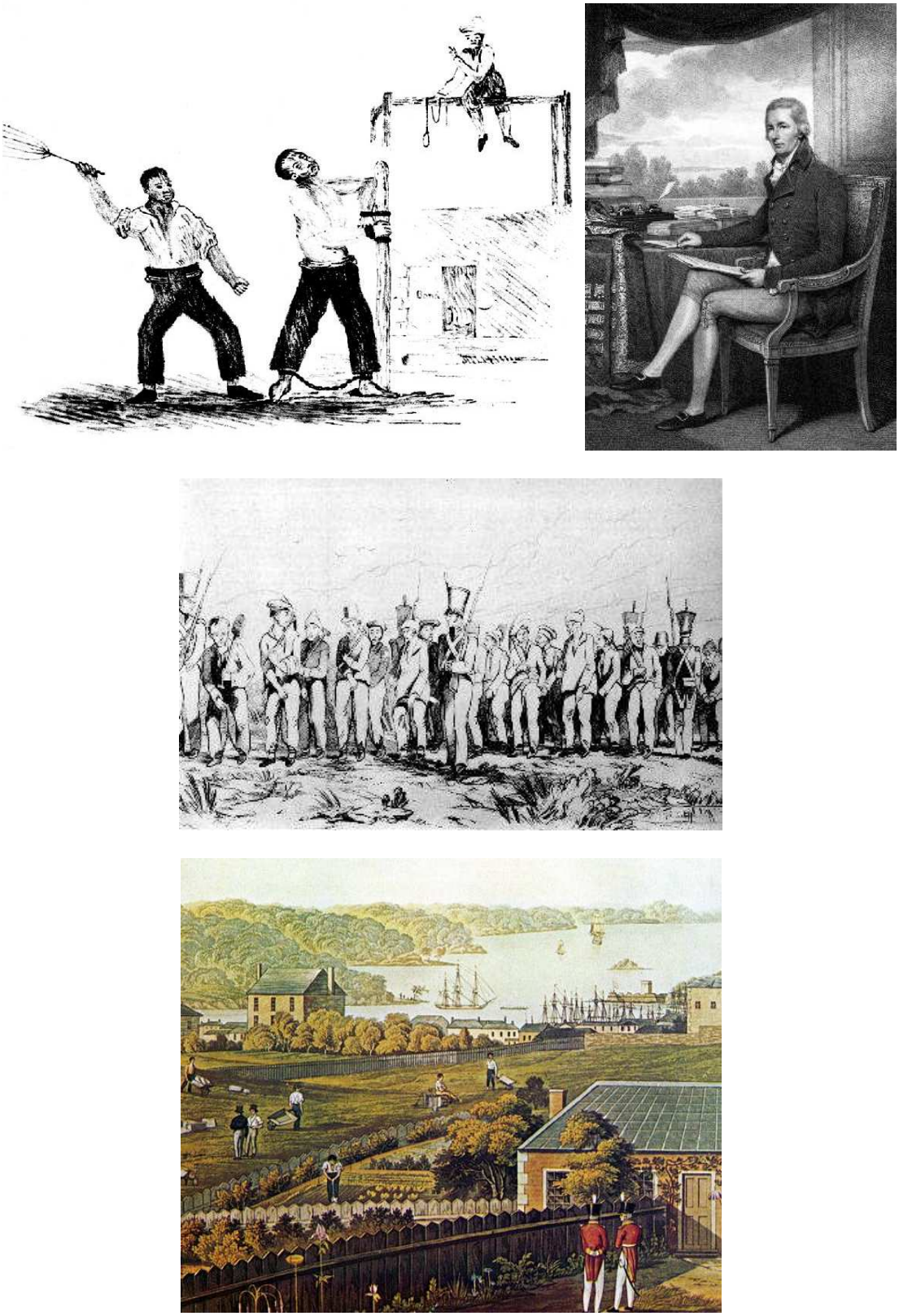


***Figure 7.9 Maximedia School Project No 2* CD-ROM: examples of images**

"The Main Menu" text is followed by the "Creating Your Project" text which instructs the student how to create a project step-by-step. This fifteen-page set of instructions further develops the outlined constructions of project creation.

The "Creating Your Project" text

The "Creating Your Project" text provides detailed instructions on how to create a project using the *Maximedia School Project* CD-ROM. Below are a few examples from this text:

> Your computer makes it easy to create an information-packed school project, and then present it in an attractive way.
> The first step when creating your school project is to open your wordprocessor. …
> You will see a wordprocessor page open on your screen. It may cover up your Main Menu for the moment, but don't worry about this now. This "page" will become your project – on it you will place all the information and pictures you like, edit, rewrite and resize these, and finally present your project.
> Let's say you are researching a project about Australia's first governor, Arthur Phillip.
> The first thing to place on your page will be the title of the project. Type this in and spend a few minutes finding the right size and font, and positioning it where you want. Use your wordprocessor's Help file if you have any trouble.
> (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 7)

An analysis of the patterns of transitivity in this text (see Table 7.3) shows that the user is constructed in the "Creating Your Project" text, in a similar way to "The Main Menu" text, mainly as having to perform concrete physical actions: *click, select, highlight, type, place, take, maximise*, and so on (49 out of 110). Among these actions, clicking is the most frequent action to be made. Even those words that might relate to mental processes are used to refer to concrete physical action. For example, *select* does not always mean *choose* (pick out from a greater number something that one decides is more suitable or desirable) as in the following: "Before pasting the picture, choose where you want it to go" (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 21). Rather, *select* means a series of concrete physical actions, such as *moving* the cursor to a menu option or a toolbar button, and *clicking* on the button: "To copy the highlighted text to your project page, select "Edit", then "Copy" on the toolbar (as shown in the screenshot below)" (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 12).

Table 7.3 **The "Creating Your Project" text: transitivity**

Transitivity	Meaning	Process[6]	Total
Material	**Concrete physical actions**	CLICK [19] SELECT [5] HIGHLIGHT [4] MAXIMISE [3] TYPE [3] PLACE [2] TAKE [2] open close copy paste turn press hold drag resize enlarge	**48**

Material	**Abstract processes**	USE [8]
		CHOOSE [5]
		SPEND [2]
		ACCESS [2]
		begin
		try
		repeat
		present
		miss
		select
		search
		collect
		add
			26

Material/Mental	**Processes that are realised with physical actions and involve meaning making**	REWRITE [2] write read re-read edit research	**7**
Mental	**Needs, desires and feelings**	NEED [5] WANT [5] require worry like	**13**
Mental	**Perception (visual)**	SEE [7] NOTICE [4]	**11**
Mental	**Thinking, remembering and decision making**	forget remember note find [useful] decide	**5**

[6] In Table 7.3, the processes that are encountered in the text more than once are printed in capital letters. Numbers in brackets show how frequently they are used in the text.

Another most common (29 out of 110) construction of the user is through mental processes and processes that, being realised through physical actions, may involve meaning making. The majority (13 out of 29) of the mental processes mentioned in the text relate to needs, desires, and feelings (***need, want, require, worry, like***). The second largest group (11 out of 29) of mental processes are processes that relate to visual perception (***see, notice***). Due to this, the user is constructed, similarly to "The Main Menu" text, as perceiving and feeling. However, unlike in "The Main Menu" text, the user is also constructed with mental processes (5 out of 29) that relate to thinking (***forget, remember, note, find [useful], decide***) and with material processes that involve meaning making (***write, re-write, read, re-read, edit, research***). Due to this, project creation is constructed in the "Instruction Guide" text as a multifaceted activity that involves not only usage of tools but also thinking, decision making and meaning making.

In comparison to "The Main Menu" text, the "Creating Your Project" text offers a more complicated construction of such an important constituent of a project as a picture. As in "The Main Menu" text, the pict ure is constructed as a decorative element of a project:

> You'll need pictures to illustrate your project, and make it look more interesting and attractive. This CD-ROM contains hundreds of great pictures, in colour and black-and-white, for you to choose from. (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 16)

Unlike "The Main Menu" text, however, the 'Create Your Project' text suggests that pictures can add meaning to the project. Therefore, the decision regarding their inclusion in the project is to be made not only on the basis of them looking attractive but also on the basis of their informative value:

> However, we would like to take a closer look at the picture before we use it. To do this, highlight the picture by clicking on it. Then, in the Toolbar click on "Image", then on "Display Original"…. From this large view we can see that the picture shows a ship of the First Fleet in the distance, as well as the group of sailors which has rowed Phillip ashore on the right. This picture will look especially good in our project, as it shows an important moment in Phillip's life. (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 15)

To sum up, the 'Create Your Project' text offers a rather multifaceted construction of project creation, a construction that may encourage the student user of the *Maximedia*

School Project CD-ROMs to pay attention to the meanings of texts and images and to use the materials stored on the CD-ROMs as raw information that has to be processed mentally and worked upon (re-read and re-written). However, this construction, although being present in the "Creating Your Project" text, is not that salient due to such features of this text as the text structure and, in particular, the visual representations of the process of project creation.

The "Creating Your Project" text consists of three sections: 'Layout'; 'Information'; and 'Images'. This structure implies that project creation is an activity which focuses on three elements: layout, information, and images. By making 'Layout' the first subsection, the text suggests that the first thing to do in order to create a school project is to create a word document using a wordprocessor. The text encourages the student user to think of the creation of the project as work on a page layout rather than as research and composition. The layout is presented as the starting point of the project creation, as the site of its creation, and as a goal to be reached:

> You will see a wordprocessor page open on your screen....
> This "page" will become your project – on it you will place all the information and pictures you like, edit, rewrite and resize these, and finally present your project. (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 7)

The instrumental and the operational computer literacy aspect of project creation is made particularly salient due to the fact that the 'Create Your Project' text not only 'tells' how to create the project layout but also 'shows' how to do it. Visually, the process of project creation is represented by images of *artefacts* and *tools*, for example, by images of project page layouts, resources (texts and images), search boxes, menus, and command buttons (see Figure 7.10). These images can be interpreted as images of *actions* required in order to operate the software, such as clicking buttons or selecting menu options. Also, they can be interpreted as images of literacy activities. For example, an image of an arrow pointing at a toolbar icon and an image of a search box with a keyword typed in represent the action of information searching (Figure 7.10).

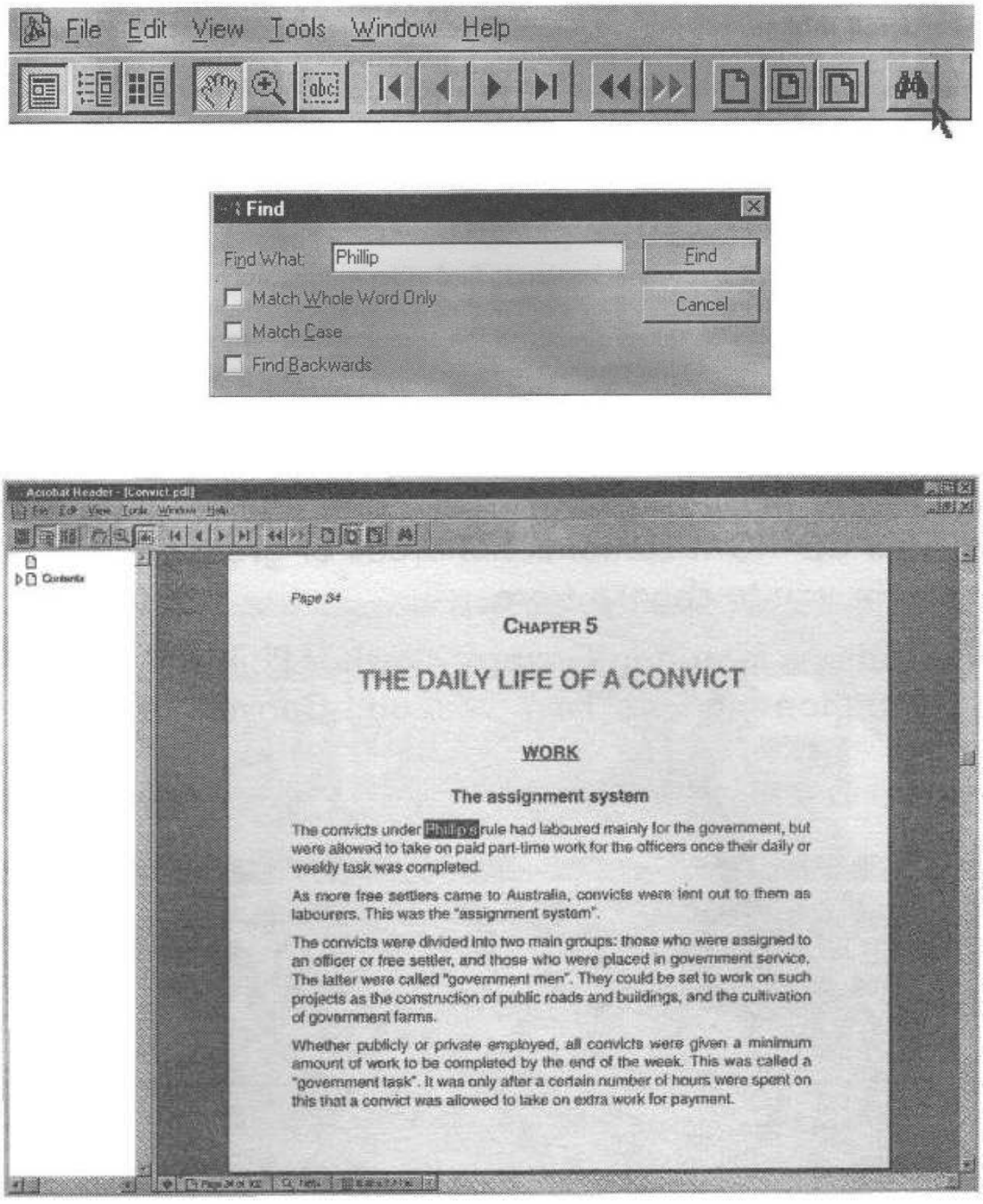


Figure 7.10 **Finding information: visual representation**

The images of artefacts, tools, and actions are combined in order to represent the activities comprising the creation of a school project. In the "Creating Your Project" text, the creation of a school project is presented as comprised of several stages, such as:

1. *Start researching the project*. This stage involves such activities as opening a wordprocessor and placing the title of the project on the page.
2. *Information searching*. This involves choosing an option from the main menu and finding the required entry in the contents.
3. *Including information into the project*. This involves reading the entry, deciding whether the information is relevant for the project, and copying and pasting the chosen text (information).
4. *Adding more information*. This stage involves using a search engine in order to find more information on the CD-ROM and collecting information from other sources (books, encyclopaedias, and so on).
5. *Writing the project*. This stage involves rewriting the information that has been copied from the CD-ROM and using information that has been collected from other sources (writing the project "in your own words").
6. *Finding illustrations for the project.* This involves choosing an option from the main menu, looking through the picture gallery and/or using the search engine in order to find all images relating to the project topic, reading the picture notes and deciding whether to use the pictures.
7. *Including pictures in the project*. This involves taking a closer look at the picture, copying the picture, and pasting and positioning it on the page.
8. *Producing the project*. This involves selecting the font and font size on the wordprocessor, adding a border, and printing out the project.

The activities that comprise the project creation stages are, in their turn, composed of more specific concrete actions that the user has to perform in order to operate software, such as maximising, using arrows, seeing, clicking on buttons, typing in words, and so on. The user is shown how to perform these actions: what toolbar buttons to click on, what options to select, what to look at, and so on (see, for example, images showing how to find a picture in Figure 7.11).

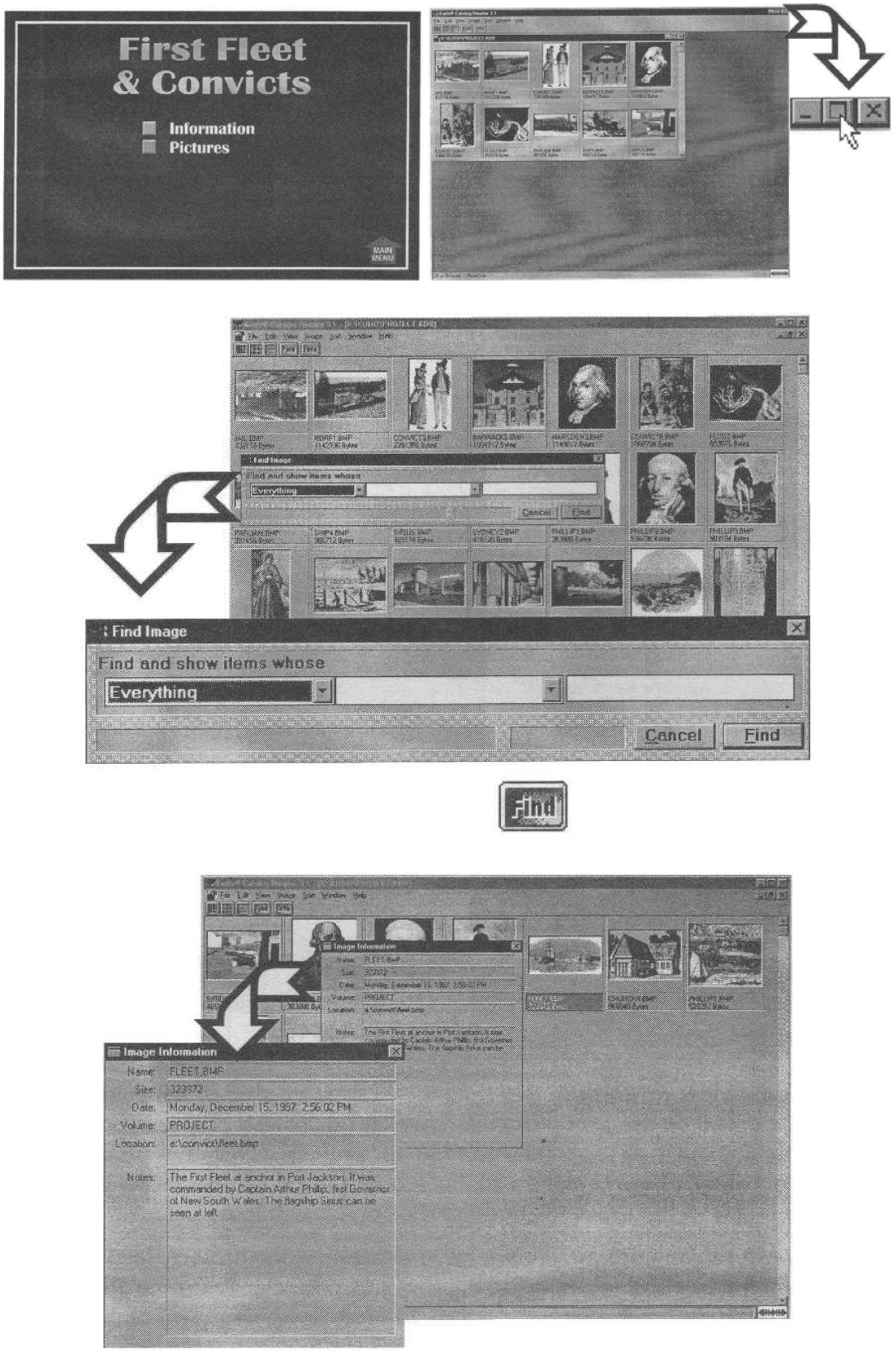


Figure 7.11 **Finding a picture: visual representation**

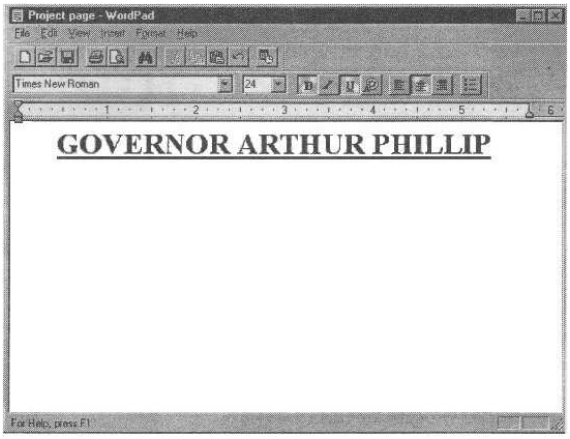
Some activities comprising project creation, such as rewriting, reading, or searching are too complex and abstract (involving cognitive, mental actions) to be represented visually. Visually, they can be represented by images that display the results of the activity (e.g., a piece of a written text) rather than the activity itself, or by images showing tools that are used in order to perform this activity in a computer-mediated mode. The images highlight concrete physical actions that are part of literacy activities and, in particular, those actions that relate to operating the tool. This highlighting results in the overrepresentation of the instrumental aspects of computer-mediated project creation. For example, reading is represented by images of toolbar buttons that the user has to click on in order to scroll through a text. An activity identified as 'start researching the project' is represented by a picture of the word document interface displaying a blank screen with the project title at the top (Figure 7.12). This constructs the first stage of researching as creating a word document and typing in the project title. Rewriting is represented by two images of the project page (Figure 7.12) displaying two pieces of text, the latter of which is claimed to have been rewritten:

> Page through the contents section to find other entries, such as "Chapter 4, A DESPERATE FOOTHOLD: Arthur Phillip and the first five years". Click on this hyperlinked entry to be taken directly to the section which refers to this heading. Again, if you wish to add information from this section to your project page, follow the steps above for copying and pasting.
> Your project should now look something like this: [image] (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 13)

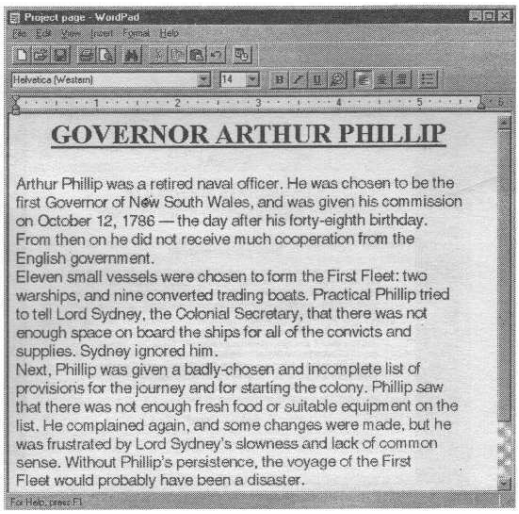
> If you require further information, collect it from other sources, such as books, encyclopaedias and so on. Once you have enough information start writing the project in your own words, as we have done below: [image] (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 15)

The images, however, do not show or explain the actual process of rewriting. They do not even clearly indicate that the text has been rewritten (compare image (B) and image (C) in Figure 7.12).

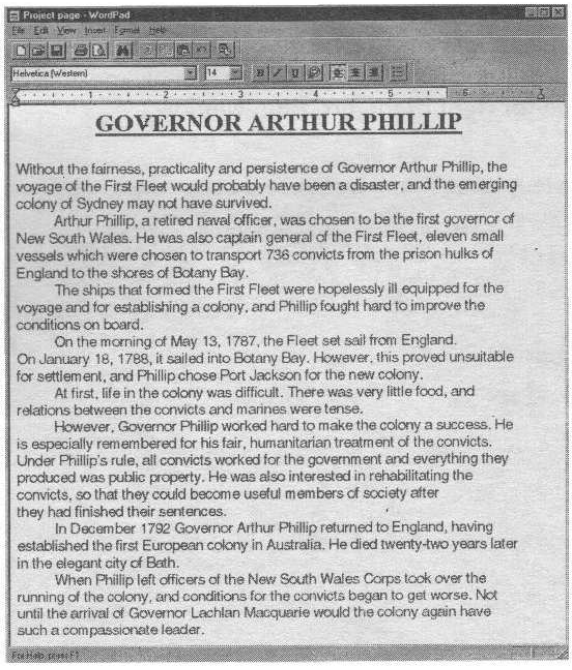
As the above quote shows, the linguistic text mentions some activities that relate to meaning making. For example, it mentions such activities as collecting further information, which involves collecting information from other resources (books, encyclopaedias, and so on), and rewriting information "in your own words."



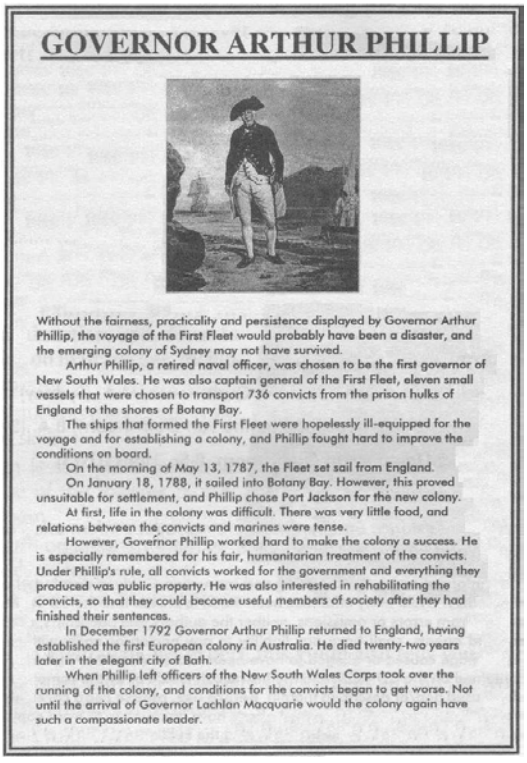
(a) Starting the project



(b) Including information into the project



(c) Writing the project



(d) Decorating the project

Figure 7.12 **Project writing: visual representation**

However, due to the use of visual means, the process of project creation is presented as a mainly instrumental activity composed of concrete physical actions relating to computer literacy (clicking on toolbar buttons, selecting options in drop-down menus, and so on). The images construct both 'information' (linguistic text) and 'pictures' as objects of concrete physical actions, such as highlighting, copying, pasting, maximizing, minimizing, placing and positioning on a page. For example, 'finding more about pictures' is described in the "Instruction Guide" as an activity that involves reading the notes attached to the pictures and making a decision about including relevant pictures in a project. Visually, however, this activity is constructed as being composed of actions required in order to operate the software. 'Finding more about pictures' is represented by images of a picture gallery, command buttons, and enlarged pictures with drop-down menus and highlighted menu options.

The construction of project creation as an instrumental activity can be explained by the fact that the main purpose of such texts as the "Instruction Guide" text is to instruct the user how to operate software rather than to teach how to create a project. The instruction on how to operate the software requires the use of visual means, which results in highlighting operational aspects of the process of project creation mediated by the software. The highlighting of the operational aspects might be considered natural and neutral if the "Instruction Guide" was offered to the student user only as a text that instructs how to operate the software. However, the "Instruction Guide" pretends to be more than just a technological instruction by identifying the actions described on its pages as researching a project and a school project creation. This instruction is addressed both to a generic user of the software and to an Australian student creating a school project. It aims to teach the user how to create a school project by using a CD-ROM as a project creation tool. Because of this twofold purpose, the "Instruction Guide" focuses on the details of s oftware operation, which results in highlighting and silencing instrumental aspects of the process of project creation.

It can be suggested that any instruction on how to perform certain literacy activities with the help of technological tools will be shaped by such a twofold purpose. Therefore, it may be inevitable that such instructions will overemphasise the operational computer literacy and the instrumental aspects of literacy activities, and will present literacy activities as composed of concrete physical actions rather than as mental activities relating to meaning making. This has to be taken into account when ICT-mediated educational products are assessed in terms of their potential contribution to the construction of literacy

and their users as literate subjects. The ICT-mediated products may help their users develop high-order literacy skills and abilities by creating a rich textual (hypertext and multimedia) environment and by offering sophisticated tools that facilitate the creative and productive use of information. However, on their way to that environment and in the process of learning how to master those tools, the users are exposed to instructions and guides which (necessarily) offer the instrumental, operational, technological constructions of literacy, creativity, text, image, project, and so on.

It can be argued that instructions and guides represent a discursive practice that is marginal in comparison to the computer-mediated discursive and textual practice whereby the user is supposed to acquire high-order literacy skills and abilities. These marginal texts, nevertheless, may affect the user's understanding of certain literacy-related activities quite significantly because these texts offer their constructions explicitly. They offer constructions of literacy activities that are specific, concrete, and well structured. They present writing and project creation as activities that require such little effort as clicking a button. Finally, these constructions are presented as the only or the main thing to know.

It can also be argued that not every user and, particularly, not every child user, will bother reading the instruction booklets. However, the user does not have to read instructions in order to encounter operational technological constructions of literacy. In the next subsection, I show that such constructions are offered to the user in the process of actual software use.

7.3.2 Project Creator

"Project Creator" is a tool that comes as part of *Webster's Encyclopedia of Australia 2000*. In the process of using "Project Creator", the user encounters several constructions of project creation. They are represented by:

- toolbar buttons that the user should click in order to access tools for project creation, editing, and printing;
- the 'Projects' roll-up menu that enables the user to operate the tools; and
- a Help text that explains what each menu option can be used for and instructs in how to use it.

Figure 7.13 shows the toolbar buttons, the "Project Creator" interface and the "Projects Roll-up" Help text.

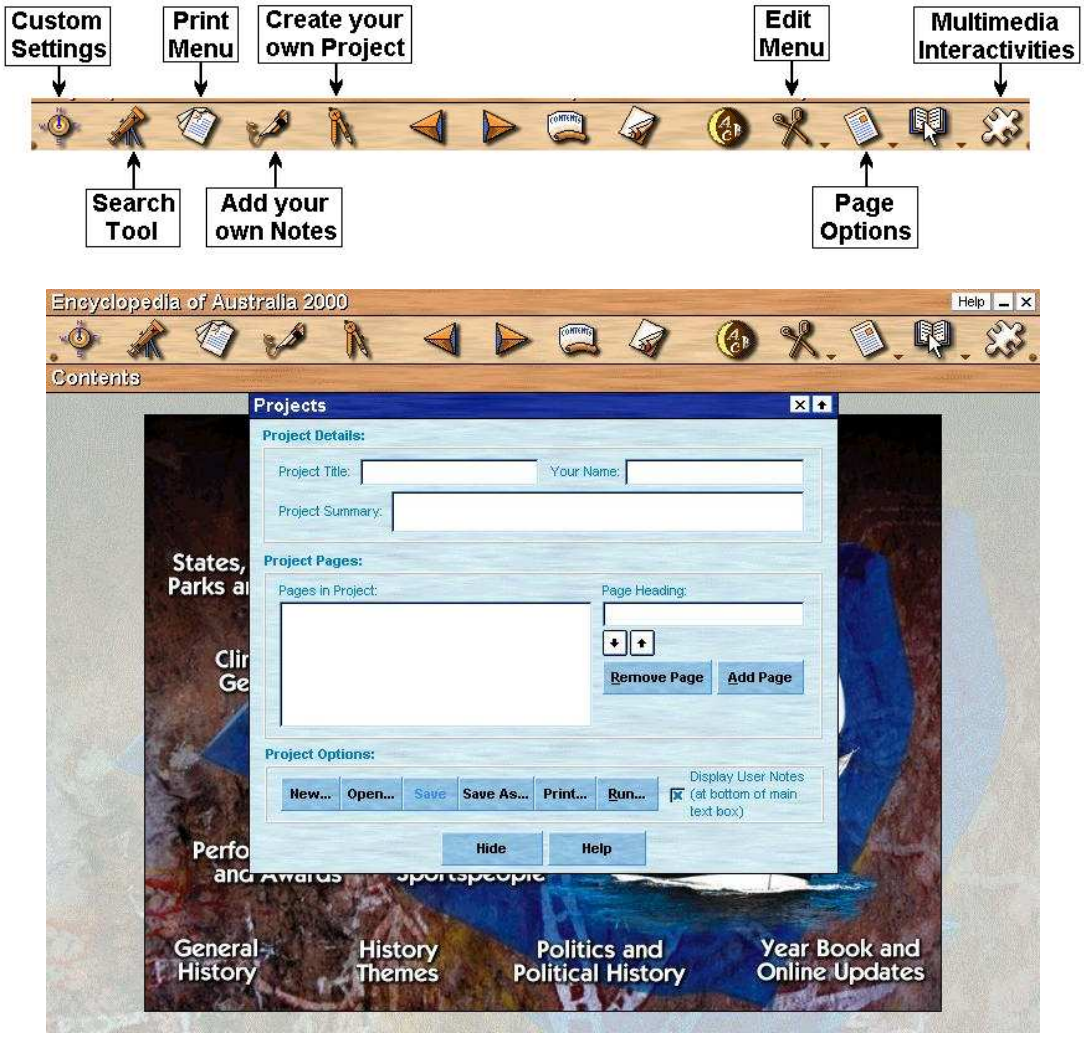


***Figure 7.13 Webster's Encyclopedia of Australia 2000*: "Project Creator"**

Toolbar images

On the toolbar of the *Webster's Encyclopedia of Australia 2000* CD-ROM (Figure 7.13), the activities that may relate to the creation of a project are represented by the following images: sheets of paper as an icon for the 'Print menu' option; a fountain pen writing the letter *E* as an icon for the 'Add your own notes' option; a compass as an icon for the 'Create your own project' option; scissors as an icon for the 'Edit' option; and a sheet of paper as an icon for the 'Page Options' option.

These images construct the activities relating to project creation by emphasising some of their aspects and silencing or hiding others, as any visual image does (Kress & van Leeuwin, 1990). For example, the image of scissors as an icon for editing constructs editing as work on the materiality of text rather than on its meaning. The image of a fountain pen (which is not an everyday literacy tool nowadays) for the 'Add your own notes' option may imply that adding one's own notes is a rather unusual or sophisticated activity that the user of this CD-ROM may be involved in. The 'Create your own project' option is represented by the image of a compass. The image of the compass – an instrument used for drawing circles and measuring distances on a map or chart – may be a neutral representation of the activities involved in project creation within a technical field, such as engineering. The choice of this image in the CD-ROM encyclopaedia introduced to the user as a helper in 'those school projects' can be interpreted as the case of the colonisation of the field of literacy typical for the humanities by the notion of literacy developed in the technical and scientific fields.

Apart from the meanings that the outlined activities obtain due to the choice of images that represent them on the toolbar, the entire set of toolbar images offers a particular construction of project creation. The very fact of being presented on the toolbar with specific icons may imply that such activities as project creation, editing, adding your own notes, and printing are of equal significance. It may imply that project creation is a process that does not necessarily involve adding one's own notes or editing.

The "Projects" interface

The tool for project creation on the *Webster's Encyclopedia of Australia 2000* CD-ROM is represented by the "Projects" roll-up (see Figure 7.13). The "Projects" roll-up is composed of three separate boxes, which presents project creation as a process consisting of three stages:

- creation of a cover page – this stage is represented by the 'Project Details' box;
- working on the project content – this stage is represented by the 'Project Pages' box; and
- the production and presentation of the project – this stage is represented by the 'Project Options' box.

The 'Project Details' box displays a set of options which construct the first stage – the creation of a cover page – as composed of the following actions: typing a project title; typing the author's name; and typing the project summary. These are not entirely physical actions. In order to type a project title and, in particular, a project summary, the user may need to think about the content of his/her project. However, these options are not obligatory. A project summary and the author's name are optional elements that may or may not be shown on the project cover page.[7] The fact that the project summary is optional means that the creation of a cover page involves mainly typing rather than any kind of thinking about the topic explored in the project.

The next stage – working on the project pages[8] – is represented by the 'Project Pages' box. The options displayed in this box construct the act of working on the pages as composed of concrete physical actions, such as: selecting a page name from the list of previously selected pages; removing a page; adding a page; and typing a new heading for a selected page. In this list of actions, typing a new heading is the only change that the user is able to make to the encyclopaedia articles that he/she decides to include in the project. There are no options enabling the user to do anything else to the texts of the selected articles, for example, to rearrange paragraphs or rewrite them.

The 'Project Options' box represents the final stage of project creation. The options displayed in this box emphasise such activities as saving the created document and the production of the project as an artefact that can be presented to the 'public'. In the 'Project Options' box, the final stage of project creation is presented as a material process composed of such concrete physical actions as *open*, *save*, *save as*, *print*, and *run*. The main emphasis is on the modes in which a project can be presented. The multimedia representations are given to the user as a package: each page plays until the sound or

[7] Having printed out a default cover page, I discovered that there is one element that is necessarily present on the cover page. It is information about the copyright owner of the cover page design, which is Webster's Publishing Inc.

[8] In this product, the word *page* refers to an encyclopaedia article that is supposed to have been selected by the user.

videoclip on that page has finished. The only option available to the creator of the project at the stage of its on-screen presentation is to establish how long the sound or video clips will play for.

This option represents a project as a multimedia product that is to be watched and listened to rather than read. The rather insignificant role of linguistic texts and reading in the project is demonstrated, for example, by the presence of the 'Show Text Box During Documentary' option. The presence of this option means that sound, image, and video are the main elements of the project while text can be optional. Similarly, making the 'User's Own Notes' optional and placing them at the bottom of the page may encourage the user to think that creating a project means using encyclopaedia articles without changing them in any way other than, perhaps, attaching one's own comment as a kind of a footnote.

The "Print" interface

In the "Print" roll-up (Figure 7.14), the construction of a project is further shifted to the fields of media production and intellectual property. For example, the 'Options' drop-down list lets the user choose which page elements he/she wants to print.

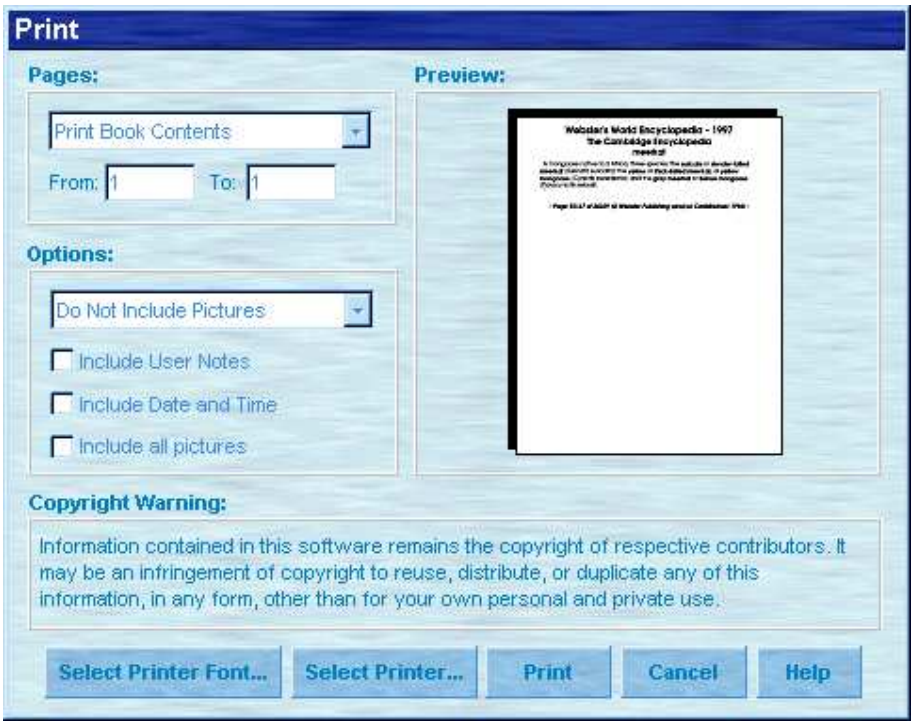


***Figure 7.14 Webster's Encyclopedia of Australia 2000*: "Print"**

The following options are offered: print only text and not include the pictures; print the pictures without the text; print the text and include the picture at maximum size; and print the text and include thumbnails of the pictures. The list implies that an encyclopaedia article consists of two separate elements – text and picture.

Texts and pictures can be used in similar ways. Texts can be either not included in the text or printed out intact. The same can be done with the pictures. In fact, the user can do more with pictures – he/she can change their sizes while the texts must remain intact. Other changes or, rather, additions that can be introduced are the printing of the student user's own notes to a page and/or adding the date and time to it. Both of these are optional. This means that the resulting project may contain not a single word written by the student project creator.

The construction of text offered in the "Print" roll-up forces the user to act upon a linguistic text as upon an image, that is, as an indiscrete entity that can be either removed or included in a project as it is, without any changes. Compare this construction with the constructions of information and images in the "Instruction Guide" text. In "Instruction Guide", information (linguistic text) is constructed as different from images, the main difference being that information can be involved in such activities as meaning making and rewriting.

The construction of text as a 'thing' that may be involved only in such actions as reusing, duplication, and distributing is closely related to the concept of information as a commodity.[9] The implicit reference to the commodity concept of information naturally entails the legal discourse of copyright. The most noticeable element of the "Print" roll-up is a piece of text placed under the heading "Copyright Warning":

> Information contained in this software remains the copyright of respective contributors. It may be an infringement of copyright to reuse, distribute, or duplicate any of this information, in any form, other than for your own personal and private use. (***Webster's Encyclopedia of Australia 2000***, "Print" [Roll-up])

There is nothing in this text that would indicate that its addressee is a school student who uses this product and information for educational purposes. The above quote

[9] There are two general approaches to information: positivist and constructivist (Lievrouw & Farb, 2003). According to the positivist concept, information is a material good, a 'commodity' that is distributed as any other material good, and is always somebody's intellectual property. According to the constructivist concept, information is a subjective phenomenon that is constructed, at least to some extent, by the user.

differs radically from the texts displayed on the CD-ROM packaging. This quote locates the activity of the project creation within the field of intellectual property legislation rather than within education. In contrast, the warning made in the "Instruction Guide" booklet has more educational value:

> IMPORTANT: Remember that you must rewrite the information you copy in your own words. Using the information exactly as someone else has written it is called "plagiarism". As well as being illegal, copying word-for-word will make your project seem like someone else's work. Rather, be sure to use the information you collect from this CD-ROM and other sources (books, encyclopaedias etc.) as a basis for your own work. (*Maximedia School Project No 2*, "Instruction Guide", 1999, p. 13)

This warning is shaped not only by the legal discourse of copyright but also by a moral discourse of literacy pedagogy. The student user is advised that it is necessary to rewrite information not only because copying would be a violation of somebody's ownership rights (plagiarism) but also because it is important to be able to draw upon multiple sources in order to express one's own ideas rather than copy other people's texts.

The *Maximedia School Project* "Instruction Guide" text instructed the user that information should be rewritten 'in your own words' and that the information for the project should be collected not only from the attached CD-ROM but also from other sources (books and encyclopaedias). In this context, the warning about plagiarism looks like a friendly reminder that project creation is not the same as the copying of information and images. On the contrary, the *Webster's Encyclopedia of Australia 2000* "Project Creator" tool makes it practically impossible to change the texts of encyclopaedia articles copied from the CD-ROM database and does not encourage the user to add his/her own notes. Taking this into account, the quoted copyright warning looks both hypocritical and misleading. This warning implies that information is allowed to be copied, if it is not distributed in commercial purposes.

The "Projects Roll-up" text

The user of *Webster's Encyclopedia of Australia 2000* may access the Help texts (Figure 7.13). In comparison to the interface texts that only name actions and objects, Help texts provide more detailed descriptions of these actions and objects:

Page Heading text box

When you print or present a project, you may want to use page headings that are different to those used in the Encyclopedia. You can do this by changing the page names in the Page Heading text box. To change a page name, select the page from the Pages in Project list that you would like to change and type a new name into the text box. (*Webster's Encyclopedia of Australia 2000*, "Projects Roll-up")

It might be expected that the Help texts offer a more multifaceted construction of project creation than the tools' interfaces, and that these texts would offer constructions relating not only to the operational aspects of computer-mediated literacy activities but also to meaning making. However, the patterns of transitivity (Table 7.4) in the "Projects Roll-up" text show that it constructs project creation mainly with material processes (25 out of 34). These are material processes realised via such physical actions as *typing*, *printing*, *presenting*, *selecting*, *moving*, and so on. Table 7.4 shows that the user is constructed with material processes (14 out of 19) and, less frequently, with mental processes (4 out of 19) and a verbal process (1 out of 19). When the mental processes are mentioned, they relate to visual perception (*notice*) and feeling (*like*, *want*) but not to thinking.

The Help texts also construct the user as a project creator by positioning the user in relation to the project creation tool. There are two participants in the "Projects Roll-up" text: the human participant (user) identified with a second person pronoun *you*; and the non-human participant (the entire tool and its particular options, boxes, and buttons). The transitivity analysis shows that both the user and the tool are constructed mainly with material processes (see column 2 in Table 7.5). The main difference is that the user is constructed not only with material processes but also with mental and verbal processes while the tool is constructed with material and with relational processes (see columns 2-6 in Table 7.5).

Table 7.4 **The "Projects Roll-up" text: transitivity and modality**

	Participant	Process	Transitivity	Modality
USER	You	can use	material	possibility
	you	notice	mental	statement
	[you]	type	material	offer/command
	you	may call	verbal	possibility
	you	may want	mental	possibility
	[you]	type	material	offer/command
	you	print	material	statement
	you	present	material	statement
	you	may want	mental	possibility
	you	can do	material	possibility
	[you]	select	material	offer/command
	[you]	type	material	offer/command
	you	like	mental	statement
	you	add	material	statement
	you	change	material	statement
	[you]	select	material	offer/command
	[you]	use	material	offer/command
	[you]	use	material	offer/command
	[you]	use	material	offer/command
TOOL	the projects roll-up	has	relational	statement
	the right-hand button	lets	material	statement
	the Hide button	hides	material	statement
	this option	is	relational	statement
	it [this option]	determines	material	statement
	[Pages in Project list] box	contains	relational	statement
	the original page name	remains	relational	statement
	[Remove Page] button	removes	material	statement
	[The "Up" and "Down"] buttons	move	material	statement
	it	provides	material	statement
	[Add Page text] box	adds	material	statement
	[Save As] option	allows	material	statement
	The project	print	material	statement
	[Run] option	runs	material	statement
	The project	runs	material	statement

Table 7.5 **The "Projects Roll-up" text: the user and the tool**

Participant	Material Processes	Mental Processes	Verbal Processes	Relational Processes	Statement	Offer Command	Possibility
1	2	3	4	5	6	7	8
User	14	4	1	–	6	8	5
Tool	12	–	–	3	15	–	–

Both the user and the tool are constructed as active doers. However, the tool is always positioned as an active participant while the user is positioned 8 times as a receiver of offers/commands, and 5 times as a participant who *is allowed* to do something (see columns 7 and 8 in Table 7.5). It is the tool that provides the means to create a project. It is the tool that *allows* or *lets* the user do what he/she wants, while the user – due to the use of imperatives addressed to *you* – is positioned as having to take orders and to execute commands. By positioning the tool ("Project Creator") as a more active and powerful participant of project creation, Help texts may contribute to the user's vision of his/her role as obediently following the tool's suggestions and orders.

In "Instruction Guide" and "Project Creator", project creation is constructed as a process of meaning making and as an instrumental activity involving the use of the computer as a means of textual production, the latter construction being dominant. The constructions of information and images offered in the "Instruction Guide" text encourage students to think about meanings only when they work with linguistic texts, while images are supposed to be used for decoration. These constructions do not facilitate the acquisition of multimodal literacy as an ability to use various semiotic resources in the process of meaning making.

7.4 Information searching

In this section, I analyse constructions of searching and discuss how these constructions correspond to understandings of literacy in the information society. The analysis is informed by ideas relating to the phenomena of superabundant and unfiltered information, characteristic of the digital age (Postman, 1993; Shenk, 1997). Due to the abundant information, information searching in the electronic environment should be something more complex than typing in search queries. For example, it requires some degree of knowledge about search engines. The information searcher needs some knowledge of Boolean logic and an awareness of the possibilities and restrictions of different search engines. Apart from this, as Gilster (1997) argues, the information searcher needs to distinguish between facts and opinions; to understand the necessity to draw on multiple sources; to understand the difference between hard journalism, editorial opinion, and personal viewpoints; to understand the importance of background information; and to comprehend the necessity of contextualising the issue or topic within a broader context.

Critical literacy is another important literacy required in the information age. Educational researchers argue that contemporary students need to be able to critically approach multimodal texts and hypertexts (Beavis, 2000a; Burbules, 1997; Burbules & Callister, 2000) and suggest that critical hypertext reading requires an ability to question the connections provided in the hypertext, to make one's own connections, and "to interrogate the silences and absences of the Internet" (Burbules & Callister, 2000, p. 33).

In this section, I aim to understand which of the above mentioned aspects of information searching in the electronic environment (entering keywords; knowledge of how search engines work; knowledge allowing an assessment of information sources in terms of their credibility; and an ability to contextualise one's search and critically 'read' search results) are offered to the user in selected CD-ROMs and Internet search tools. Firstly, I consider how information searching is constructed by the icons representing the search options.

Search icons

Icons for the search options can be found on both the toolbar and the search tool menus (see Figure 7.15).



Figure 7.15 **Search icons**

The majority of search icons are pictures of such instruments as magnifying glasses, binoculars, and telescopes. For example, the 'Search' icon on the *Webster's Encyclopedia of Australia 2000* toolbar shows a telescope. How does this image constitute searching? What aspects of searching does it highlight and/or make invisible? In a dictionary, *search* is defined as having two meanings: "1 : to look into or over carefully or thoroughly in an

effort to find or discover something (…) 2 : to uncover, find, or come to know by inquiry or scrutiny -- usually used with *out*" (*Merriam-Webster Online,* 2004). *Telescope* is defined as "a usually tubular optical instrument for viewing distant objects by means of the refraction of light rays through a lens or the reflection of light rays by a concave mirror" (*Merriam-Webster Online,* 2004). The image of a telescope as an icon for the search option constitutes searching as the use of tools that augment human visual abilities and entails the more concrete meaning of search, searching as looking rather than coming to know by inquiry.

A similar construction of searching is brought to the user by icons showing images of binoculars and magnifying glasses. These images construct information searching as an activity that is augmented by visual instruments. It also constructs the information searcher as being empowered by these instruments and, therefore, as being capable of performing a very thorough, detailed search. This construction may create the illusion that technology provides access to all information that 'is there' (although it may be so far away that people need special tools in order to find it). The search icons may contribute to the uncritical acquisition of the positivist concept of information as something that *exists* (and, therefore, can be taken and consumed) rather than as something that yet needs to *be constructed* by the user.

The main search menu

When the user of *Webster's Encyclopedia of Australia 2000* clicks on the 'Search' icon, a main search menu appears. Search menus enable the user to search particular sections of a database. For example, the main menu on the *Webster's Encyclopedia of Australia 2000* CD-ROM displays a range of options which enable the user to search the database for a word, an article, a picture, movies and animations, tables and charts, all media, and biographies (Figure 7.16). These options encourage the user to think about a search as a search for information presented in a particular mode: linguistic ('Word', 'Article'); visual ('Picture'); and multimodal ('Movies and Animation', 'Tables and Charts', 'All Media').

The menu options construct information searching as, first of all, a search for information presented in a particular mode (linguistic/textual, visual, multimodal). This construction is supported by icons representing specific search options. These icons display symbolic images of the technologies of information presentation and communication (Figure 7.16). An image of a text seen through a magnifying glass represents the 'Search Word' option. An image of a page with text and a picture represents the 'Search Article'

option. An image of a face represents 'Search Picture'. A reel of film represents the 'Search Movies and Animations' option, and a colourful chart represents the 'Search Tables and Charts' option.

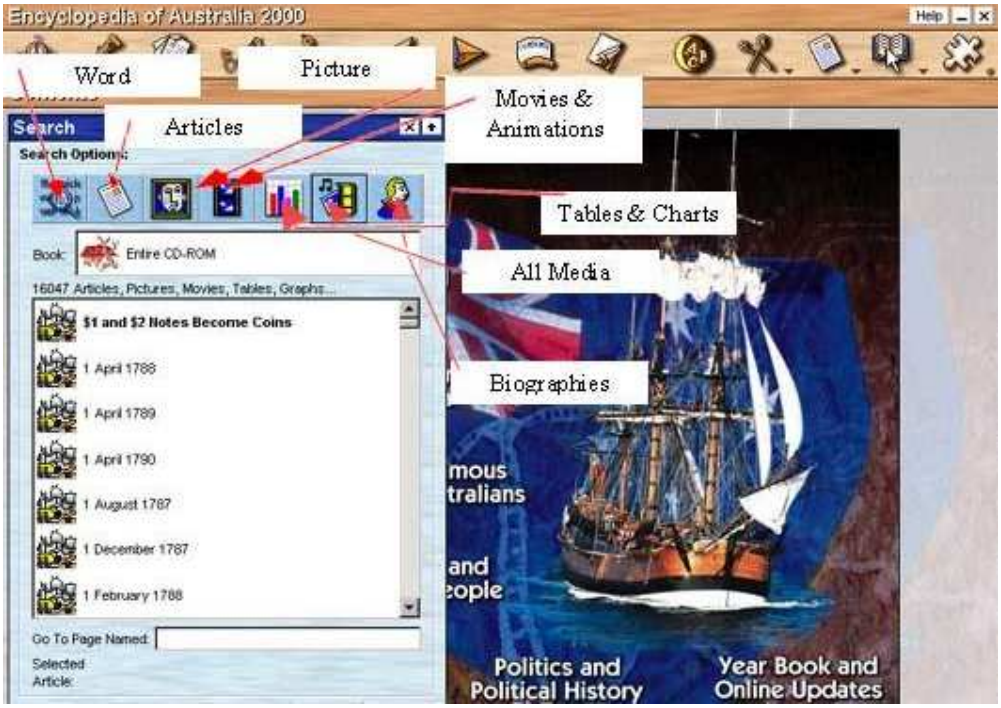


***Figure 7.16 Webster's Encyclopedia of Australia 2000*: the media search options**

The 'Search Biographies' option seems to belong to a different classification, the classification by subjects such as 'Climate', 'Flora and Fauna', 'Sports', and so on. The placement of 'Search Biographies' amongst the mode-oriented search options can be explained by the software creators' intention to combine media categorisation with categorisation by importance, implying that biographies is the most frequently required kind of information. It might be noticed, however, that the placement of 'Biographies' in a list of mode-oriented options may encourage the user to think about biographies as a (written) mode of information representation rather than as a literary (or documentary) genre. The user may be encouraged to make an emphasis on 'written' in the meaning of biography (biography is "a usually written history of a person's life" (*Merriam-Webster Online*, 2004).

The examined search menu options imply that the first thing the user needs to know about searching is that the information is presented in a particular mode and that the first

step in narrowing down one's search is the indication of this mode. However, thinking about information in terms of its mode of representation is important and natural within such fields as software development and computer and information sciences (see, for example, Capurro & Hjørland, 2003; Cornelius, 2002).[10] The legitimisation of this approach within broader contexts, educational contexts in particular, should be questioned.

The "Search Roll-up" text

The text available via the 'Help' button from the 'Search' roll-up menu explains the meanings of each command button in the 'Search' roll-up menu and instructs the user in how to search for information:

> This is the *Search* button.
> In the **Search** roll-up you will see a toolbar across the top. The toolbar lets you display articles that contain a particular word, picture, movie, or table. The articles are displayed in the *Article* list box below the toolbar. …
> Across the top of the dialog box is a series of buttons that let you select a subject for searching. …
> ***Movie button***
> This button creates a list, in alphabetical order, of all pages that contain a table or chart….
> ***Book menu***
> *Webster's Encyclopedia of Australia* is made up of a number of different books or chapters. When searching for information you can search the entire Encyclopedia or just one particular chapter. To do this, select the chapter you want from the **Book** menu.
> (*Webster's Encyclopedia of Australia 2000*, "Search Roll-up" [Help text]).

In the "Search Roll-up" Help text, the user is constructed as being involved in activities that are composed mainly of concrete physical actions (18 out of 25), such as *clicking* (11), *typing* (3), *selecting* (2), *highlighting* and *moving*. Also, the information searcher is constructed with mental processes (7 out of 25). These are processes relating to perception (*see* (4)) and feeling (*want* (3)) rather than thinking (Table 7.6).

[10] In those fields, information searching in digital environment is approached in terms of the mode of information presentation because different programming languages are used in order to develop software for the storage of texts, images, audio, and video.

Table 7.6 **The "Search Roll-up" text: transitivity and modality**

	Participant	Process	Transitivity	Modality
USER	You	select	Material	statement
	[you]	click	material	offer/command
	you	can click	material	possibility
	[you]	click	material	offer/command
	[you]	type	material	offer/command
	[you]	click	material	offer/command
	you	click	material	statement
	you	click	material	statement
	you	click	material	statement
	you	can search	material	possibility
	[you]	select	material	offer/command
	[you]	click	material	offer/command
	[you]	type	material	offer/command
	you	find	material	offer/command
	[you]	highlight	material	offer/command
	[you]	click	material	offer/command
	you	type	material	statement
	you	click	material	statement
	you	see	mental	statement
	you	can see	mental	possibility
	you	see	mental	statement
	you	see	mental	statement
	you	want	mental	statement
	you	want	mental	statement
	you	want	mental	statement
TOOL	toolbar	lets	material	statement
	search roll-up	rolls up	material	statement
	buttons	let	material	statement
	[movie] button	creates	material	statement
	the *Article* list box	highlights	material	statement
	tooltip	lets	material	statement
	the Encyclopedia	displays	material	statement

The analysis of the patterns of transitivity shows that both the user and the tool are constructed with material processes that represent physical actions. The difference between the human and non-human participants of an information search mediated by a search tool is that the tool is constructed only with material processes while the human participant (*you*) is also constructed with mental processes. However, these are the processes relating to perception and emotion rather than thinking. The user is positioned as a receiver of offers/commands 10 times, and is allowed to do something in 3 cases. The tools (toolbar, buttons, the Encyclopedia, and so on) are constructed as active participants of the process of searching. These participants are constructed mainly with material processes that mean concrete actions such as *highlight*, *display*, and *roll-up*. The modality is always that of a statement.

The patterns of modality show that the tool is positioned as having more agency than the human participant. The user is positioned mainly as a receiver of offers/commands and as a participant who is allowed to do something (see columns 5 and 6 in Table 7.7). The tool is a participant that allows (lets) the user to do something: "If the name of a page is too long to display in the *Article* list the Tooltip lets you see the entire name" (*Webster's Encyclopedia of Australia 2000*, "Search Roll-up" [Help text]).

Table 7.7 **The "Search Roll-up" text: the user and the tool**

Participant	Material Processes	Mental Processes	Statement	Offer Command	Possibility
1	2	3	4	5	6
User	18	7	12	10	3
Tool	7	–	7	–	–

Due to the choice of the material and mental processes and modality, the human participant of information searching is once again constructed mainly as a user of the software (the user of a tool) rather than as an information searcher involved in a cognitive activity. The mental processes relating to perception and feeling rather than thinking construct the user as a passive participant of the process of information searching.

The information searcher: multiple constructions

The *Webster's Encyclopedia of Australia 2000* CD-ROM offers multiple constructions of searching and the user as an information searcher (see Table 7.8). The texts located on the CD-ROM packaging construct information searching as the use of a powerful computer-mediated technology of information access. They also present searching as easy and instant access to any required information. The toolbar icon showing a picture of a telescope constructs searching as a physical, perceptual activity that is facilitated and augmented by an optical tool. In the main search menu, searching is constructed as an activity shaped by the multimedia technologies of information presentation. The 'Help' text constructs searching mostly in terms of operational literacy, as a process of using the software. Accordingly, the user is constructed as: a consumer of a high-quality technological product; a subject empowered by technology; a user of tools augmenting a human's visual

ability; a user of multimedia; and a software user who is positioned as a rather passive participant in the search process.

Table 7.8 **The information searcher: multiple constructions**

Types of texts	Construction of information searching	Construction of the user
CD-ROM packaging	Use of powerful technology (search engines)	Information searcher empowered by technology
Toolbar icon	Use of tools augmenting human visual ability	The user of optical instruments
Media search menu	Search for information presented in different modes	The user of digital technologies of information access
Help text	Operating software	Software user

These constructions are offered to the student user at different stages in a hierarchical hypertext structure. Figure 7.17 shows the hierarchy of the constructions of the search in *Webster's Encyclopedia of Australia 2000*. The hierarchy means that some constructions of the search are more likely to be encountered by the user than others. For example, the construction offered by the toolbar icon (identified as Step A in Figure 7.17) will necessarily be encountered by any user of this product.

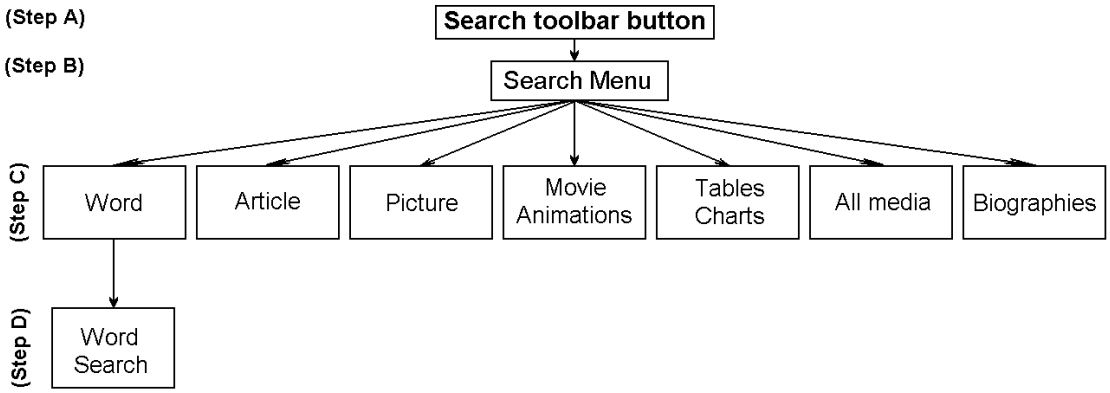


***Figure 7.17 Webster's Encyclopedia of Australia 2000*: the search tool's structure**

The constructions offered in the main search menu (Step B) and in the menus that enable the user to search for information presented in particular modes (Step C) are to be encountered in the process of the search. The construction offered in the Help text can be encountered only if the user needs or wishes to have detailed instructions on how to find information.

Due to the hierarchy, the constructions of a search as the use of powerful technologies/tools and the user as an information searcher empowered by technology are likely to be the most salient constructions. The user may never encounter the Help text that may give him/her an idea that being a user of powerful technological tools also means being dependent on these tools.

Apart from being constructed by images and Help texts, information searching is constructed by the texts of the search tools' interfaces, such as the interfaces of tools for a Boolean search and the interfaces of tools for a 'natural language' search. I begin by examining how information searching is constructed in the Boolean search tool offered to the users of the *Webster's Concise Interactive Encyclopedia* CD-ROM (see Figure 7.18).

The Boolean search tool interface

In Figure 7.18, the interface displays text boxes in which search keywords are to be typed, and Boolean (logic) operators the user can apply in order to establish logical connections between keywords. The user has only to choose and then press whatever operator he/she wants. The interface can be interpreted as a text that offers (or requests) the user to perform such actions as *typing* keywords and *pressing* buttons. These simple actions may result in the construction of a rather extended search query (compare the top and the bottom pictures in Figure 7.18).

Although the *Webster's Concise Interactive Encyclopedia* search tool enables the user to use only two operators (*and/or*), the search tool's interface creates the impression that it is possible to perform an all-embracing search. This is due to the number of combinations that can be created by simply typing keywords and pressing buttons. The information literally seems to be attached to the user's fingertips.

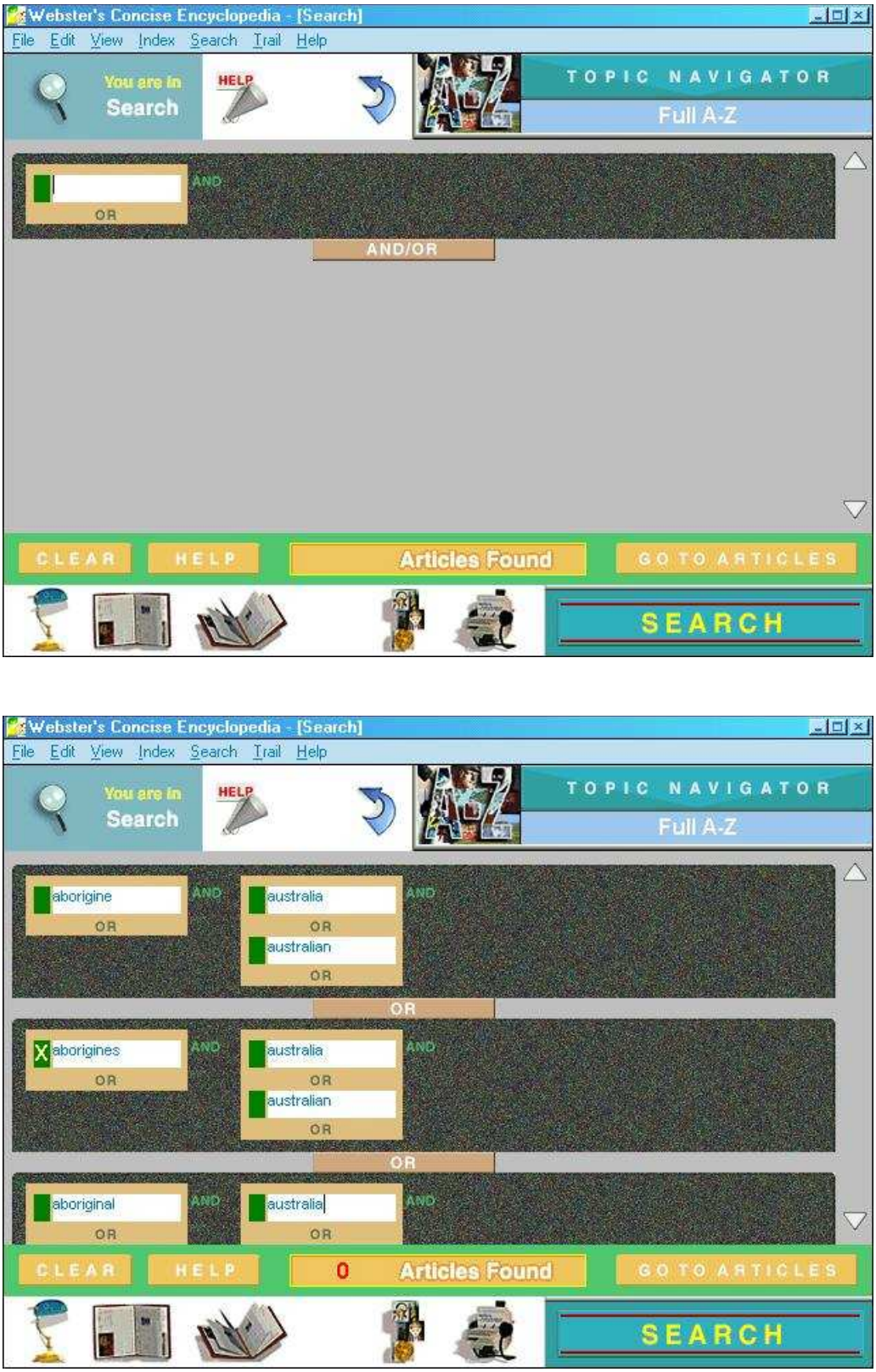


***Figure 7.18 Webster's Concise Interactive Encyclopedia*: the Boolean search tool**

The search tool consisting of empty text boxes is not very explicit as to what should be taken into account when constructing the search combinations. Most importantly, it does not advise the user that his/her search results may very much depend not only on his/her choice of keywords but also on his/her choice of these words' morphological forms. For example, several different sets of articles for a project about the indigenous peoples of Australia can be found depending on which of the following six separate search queries are used:

```
<Aborigine>
<Aborigines AND Australia>
<Aborigines AND Australian>
<Aboriginal AND Australia>
<Aboriginal AND Australian>
<Aboriginals>
```

Figure 7.19 shows the ways in which the results are different for these six searches. It shows that there are no articles that would be obtained regardless of the morphological forms of words used in the query. Even such an insignificant variation of a search query as *Australia/Australian* comes up with significantly different search results: compare, for example, the results of a search for `<Aboriginal AND Australian>` (circle 4 in Figure 7.19) and results for `<Aboriginal AND Australia>` (circle 5 in Figure 7.19). The comparison shows that these two searches result in sets composed of a different number of articles (18 and 10 respectively) and containing only six articles common to each query ("Dreamtime"; "Aboriginal art"; "Australian art"; "Australia"; "Musgrave Range"; and "Oceanic art").

Figure 7.19 shows that some search queries result in more matches than others. For example, such a query as `<Aboriginals>` resulted in only two titles: "Tasmania formerly" and "Ayers Rock" (see circle 6 in Figure 7.19). The `<Aborigines AND Australian>` query resulted in twenty titles (see circle 2 in Figure 7.19). However, the latter set, including an article on "Durkheim" (which only mentions the indigenous peoples of Australia), does not include such an article as "Tasmania formerly". Meanwhile, the "Tasmania formerly" article provides information relating to one of the saddest pages in the history of Australia and would be very relevant for the project focusing on Australian Aborigines.

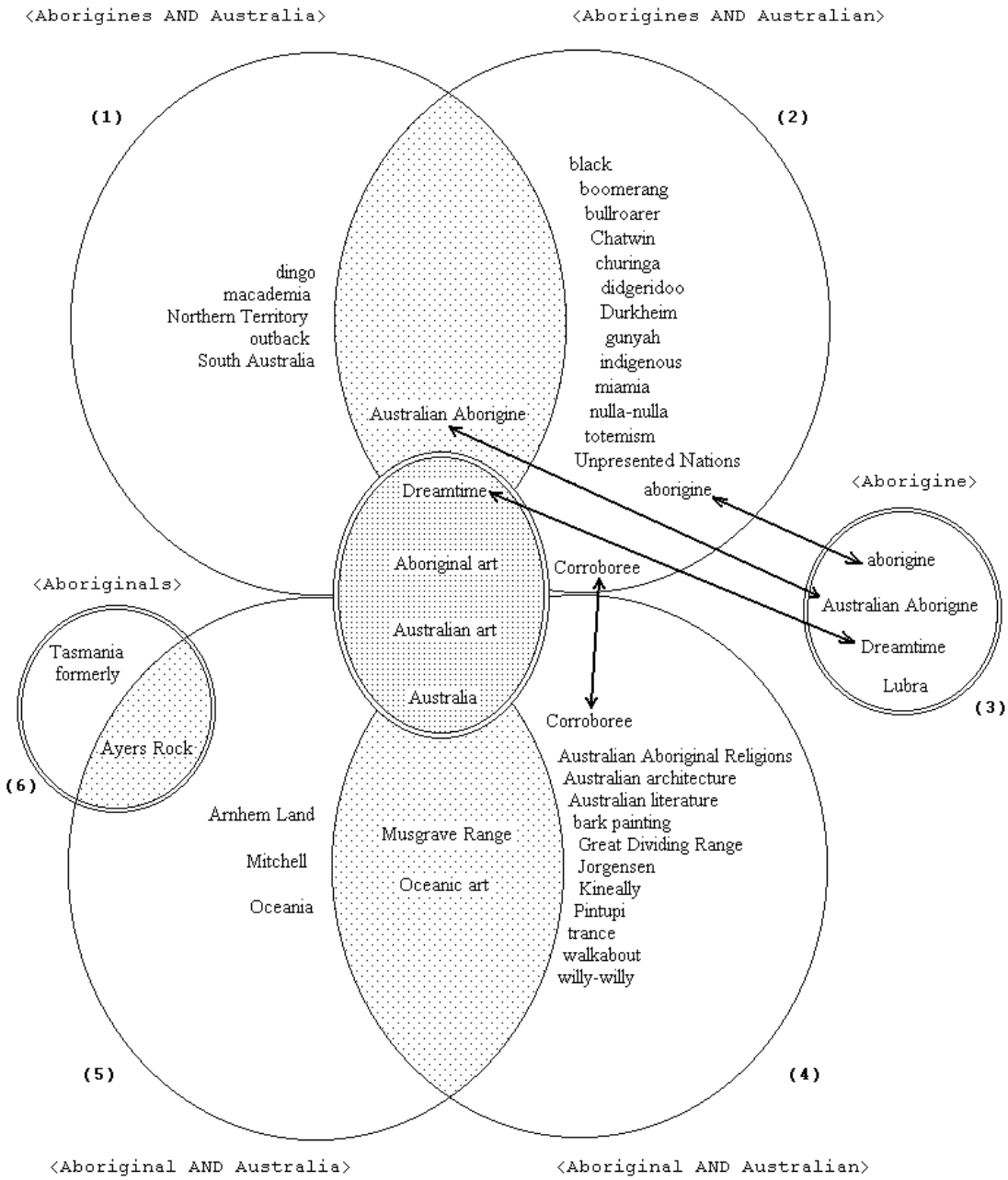


Figure 7.19 **The "Australian Aborigines" project: search results**

Encircled are titles of articles obtained in the process of searching the ***Webster's Concise Interactive Encyclopaedia*** CD-ROM for information about Australian Aborigines. Each of the circles 1-6 includes a set of titles obtained for one of the six search queries shown in angled brackets. The arrows and shadowed areas within the circles indicate titles that were common for two or more search queries.

The above examples demonstrate that a single search query (or even a few search queries out of all possible) may not enable the user to obtain all important information relating to the project and available on the CD-ROM. In order to obtain all the information that is there, the user has to construct a search query that would contain as many combinations as possible of all the keywords in different forms (including such unusual forms as *aboriginals*), for example:

```
<Aborigine
 OR
 Aborigines AND Australia
 OR
 Aborigines AND Australian
 OR
 Aboriginal AND Australia
 OR
 Aboriginal AND Australian
 OR
 Aboriginals>
```

In spite of the claims addressed to the consumers of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools, it may appear that, in order to receive as much information as possible when using the powerful search tool, it is not enough to simply type keywords into text boxes and press buttons displaying Boolean operators. As the above example indicates, finding information with a Boolean search tool requires the searcher to have advanced computer literacy and information literacy skills (particularly in the field of search engines) as well as some degree of knowledge about natural language, logic, and the field of inquiry. For example, it may be necessary to think about all the possible morphological forms in which a keyword may exist in English. As McLean (2000) argues in her study of the role of language in cyberseeking with Boolean search tools:

> Computer assisted searching mechanisms are extremely helpful in aiding searchers towards helpful search outcomes… In the end, however, the machine cannot make value decisions or decide on the logical interplay between the linguistic elements involved: that is the computer cannot think or decide which is the best question to ask about a subject… Skilful questioning, not the glitz of infomechanics, is the basis of the *power* or *empowerment* that comes to the individual with the mastery of

> the techniques of information searching. It requires both linguistic and logical skills, and as Socrates knew, lies at the heart of true learning. (McLean, 2000, p. 98)

These requirements or, rather, conditions of a successful search are not given to the user explicitly in the tool. The Boolean search window constructs searching as an activity composed of physical actions rather than as a process governed by a carefully developed search strategy. The latter aspect may be hidden from the user, partly because promotional texts convince the user to rely upon technology and because they connect information searching with the user's fingertips rather than with his/her head. In the promotional texts, the CD-ROM encyclopaedia is presented as a powerful tool that makes information searching easy and instant. In the process of using the product, the user encounters the construction of the information searching as a process of visual perception that is augmented by tools and as a set of concrete physical actions required in order to operate the tools. The information searcher is constructed as being empowered by the technology. The user is encouraged to think that, due to the digital technologies of information searching, human beings can now delegate the tiresome and time-consuming activity of looking through information sources to powerful tools.

Icons showing a magnifying glass or binoculars do capture the potential of these tools as augmenting human abilities but they do not capture other aspects of information searching, for example, the development of search strategies. These icons can be misleading, especially taking into account that the notion of information searching is offered to the user in a broader context, a context composed of messages created in the promotional and help texts. Promotional texts inform the user only about his/her right to be empowered by the search tool that makes information searching easy, instant, and comprehensive. These texts do not remind the user about his/her need or duty to be information literate. The Help texts' construction of information searching as a computer's activity may affect the users' understanding of the necessity to acquire more complex information literacy skills.

The natural language search tool interface

The Boolean search tool's interface represents a communication between the user and the tool in machine terms (Boolean logic operators). Hence, such search tools may encourage the user to try to extend his/her information literacy skills. However, they may also

encourage the user to prefer search tools that allow a natural language search, such as the *Ask Jeeves for Kids* search tool: "All you have to do is 'Ask'" (see Figure 7.20).



***Figure 7.20 Ask Jeeves for Kids*: the natural language search tool**

The interface of a natural language search tool simulates a dialogue between the user and another human or an animated character (see Figure 7.20). In the natural language search tool, the formulation of a search query is represented as a dialogue between the host and the visitor/user, in which the host may ask the visitor/user to reformulate his/her question or to choose his/her question from a list. This simulated dialogue constructs the information search as a process of clarifying one's questions. For example, entering such a question as "What will be technologies of the future?" generated the following response from Jeeves:

> You asked: What will be technologies of the future?
> Please pick the best question.
> What are some predictions for future technology? [Ask!]
> What is the latest news coverage on [text box for typing a keyword]? [Ask!]

> Where can I find a jet pack? [Ask!]
> What do kids think will happen in the future? [Ask!]
> Where can I find a concise encyclopedia article on [text box for typing a keyword]? [Ask!]
> Check out these links from our metasearch partners:
> 8 matches by Education World:
> Go to [options to select]
> Ask a new question
> [empty text box] Ask!
> (*Ask Jeeves for Kids*, "You asked", 2000)

The suggestion to clarify questions and to check spelling can be caused by a lack of database entries that match actual search entries, rather than by a fault with the search entries. Nevertheless, the user is not informed about such a possibility. On the contrary, using natural language search tools is embedded in a context composed of promotional texts claiming the product/service to be the most powerful search tool and the most advanced piece of information technology as, for example, in the following text on the 'About Us' page:

> Ask Jeeves for Kids™ is the fastest and easiest way to find answers to questions. Ask Jeeves for Kids allows you to ask a question in plain English and, after interacting with you to confirm the question, Ask Jeeves for Kids takes you to one and only one web site that answers your question.… With Ask Jeeves for Kids, unlike other search engines, users type in a question in plain English and then Ask Jeeves for Kids presents a list of matched questions (usually just a few). After the user selects the closest match, Ask Jeeves for Kids takes them directly to a site that was selected by the Ask Jeeves for Kids research staff as being an appropriate answer to the question. The user is never presented with a dreaded response such as "2348 matches to your query"! For example, if you ask "Who is th e king of Siam?", Ask Jeeves for Kids would respond with "Who is the head of state of Thailand?". When you click on that question, Ask Jeeves for Kids takes you to a particular page on a site that answers the question. …
> Ask Jeeves for Kids uses sophisticated natural language processing to understand and match users' questions to an extensive knowledge base. The Ask Jeeves for Kids knowledge base consists of thousands of question templates and millions of researched answer links to web sites.
> (*Ask Jeeves for Kids*, "About Us", 2000)

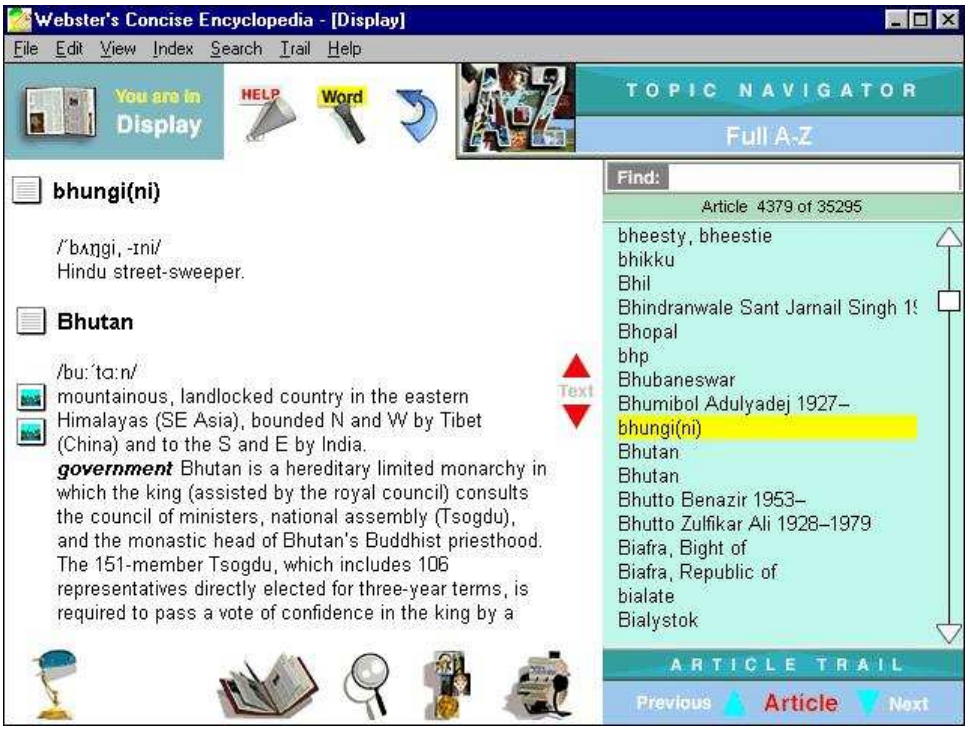
These claims construct search tools as being infallible: they are so smart that they can understand natural language and make connections to the existing knowledge base (e.g., Thailand instead of Siam). Within this context, the tool's request to choose another question or to check the initial entry for any spelling mistakes constructs the user as being

incompetent, inattentive, and even illiterate. In the process of interaction, the user may find him/herself positioned in relation to a virtual community of other users of the tool. This is done by informing the user what questions have been asked by other users and what questions should be asked in order to belong to the group that seeks information on the hot topics. Also, the user is positioned in relation to a community of people who are interested in the same subject. The tool suggests the user to choose from the questions that other people have already formulated and asked, although the suggested variants may be quite far from the user's intended question or even be completely different.

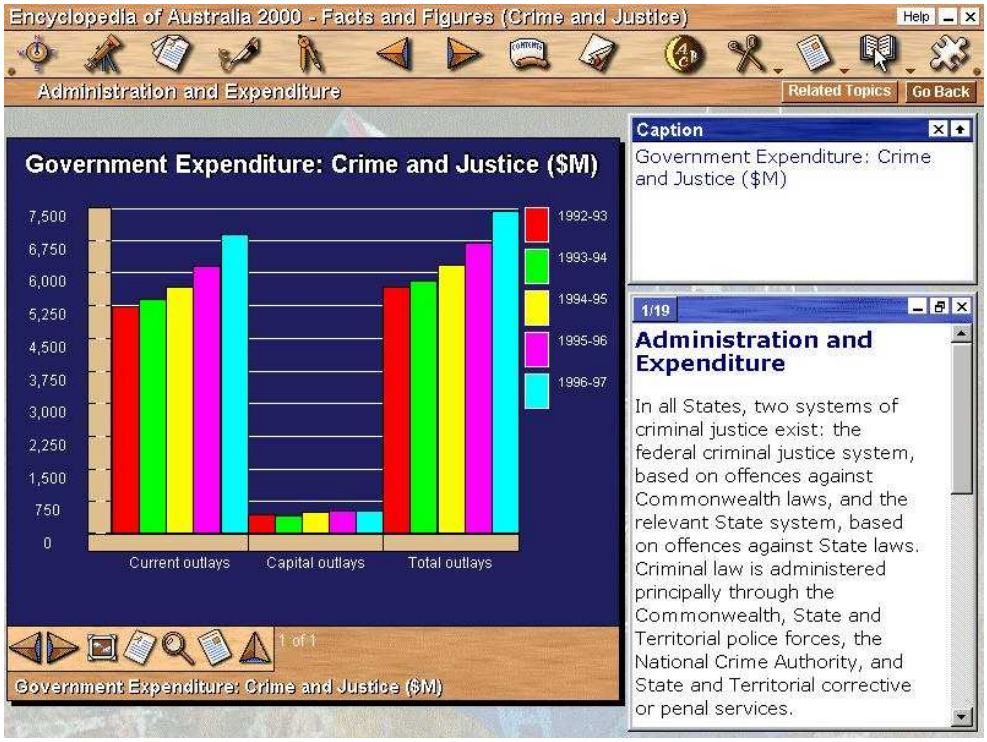
7.5 Reading an encyclopaedia article

In this section, I explore how 'reading' is constructed in multimedia CD-ROM encyclopaedias. My analysis is set up within the context formed by the promotional claims that CD-ROM encyclopaedias stimulate and facilitate learning because CD-ROM technology allows the presentation of information in multiple modes. This claim is informed by the idea that presenting information in multiple modes can help students who have cognitive abilities other than linguistic. This issue deserves a separate study that is beyond the scope of this thesis and requires different research methods. However, understanding the effects of multimedia technologies of information presentation upon students may benefit from studying what kind of reading may be encouraged by CD-ROM encyclopaedias.

In multimedia CD-ROM encyclopaedias, articles are composed of a linguistic text and hyperlinks to pictures, audio records, and video clips (Figure 7.21). The icons let the user know that there is additional information presented in a non-linguistic mode. Therefore, reading an article in a CD-ROM encyclopaedia also means viewing and listening. Figure 7.21 shows the interface of an article in *Webster's Concise Interactive Encyclopedia*. The article is composed of a linguistic text and two icons situated in the left-hand margin of the article. These icons indicate that the article also contains two pictures. The user of the *Webster's Concise Interactive Encyclopedia* CD-ROM is able to choose whether to view those pictures or not.



(a) ***Webster's Concise Interactive Encyclopedia***: the multimedia links in an article



(b) ***Webster's Encyclopedia of Australia 2000***: the picture is the main element of the article

Figure 7.21 **The multimedia CD-ROM encyclopaedia article**

In some CD-ROM encyclopaedias, the visual rather than the linguistic mode is the main mode of information presentation. For example, in *Webster's Encyclopedia of Australia 2000* (Figure 7.21) the linguistic text is an optional element of an article: it may be displayed or not, depending on the user's choice. An article's interface displays six icons. The majority of icons represent tools that enable the user to navigate the picture gallery, enlarge a picture, copy it to the clipboard, display it at full size, zoom into it, and so on.

Some article interfaces do not display any extended texts at all. For example, the article interface in *Animals, A Multimedia Encyclopedia* consists of three rectangles (Figure 7.22). The left-hand rectangle displays a picture of an animal. The right-hand rectangle displays a menu that enables the user to obtain information on a specific topic.



***Figure 7.22 Animals, A Multimedia Encyclopedia*: the article interface**

The menu displays a set of options for the user to choose from: 'Illustration'; 'Habitat'; 'Range Map'; 'Classification'; 'Diet'; 'Sound'; 'Size'; 'Conservation Status'; 'Common

Name'; and 'Scientific Name'. The required informati on is displayed in the rectangle down below.

The article's menu in *Animals, A Multimedia Encyclopedia* seems impersonal and neutral. For example, there is nothing in the menu that would indicate that the intended user of this product is a child. Nevertheless, it does offer a particular construction of the user's identity. It constructs the child user as a scientist (a zoologist) by offering a rigid grid for thinking about animals. The universal set of command buttons that accompanies each animal picture encourages the child user to think about animals in such terms as: appearance (illustration); habitat; range map; classification; diet; size; conservation status; description; common name and scientific name. So, the menu is not a neutral tool that enables the user to operate the software – it is a discursive practice which makes the *Animals, A Multimedia Encyclopedia* CD-ROM a pedagogical site of the construction of contemporary students. The menu naturalises a rather selective and socioculturally specific identity of a student of zoology. The suggested grid reproduces a scientific worldview and discourse that have been criticised in the sociology of knowledge, the history of ideas, and the postmodernist deconstruction of science. For example, it brings to the user an idea of anthropocentrism: when the user presses the 'Size' button, the size of the animal is shown in comparison to the size of a human (most likely a male human).

Another example is the presence of the 'Conservation status' button. By pressing this button, the user is provided with information about whether a given species is endangered and why, including such reasons as the impact of the human civilization. This information goes far beyond the disciplinary boundaries of zoology and, in particular, beyond taxonomic knowledge about animals. The conservation status information entails political, sociocultural, and ideological issues. Because of these issues, the place of knowledge about an animal's conservation status is expected to be different fro m the place of knowledge about this animal's physical features and its place in the taxonomy of vertebrates. However, all these issues are presented as 'natural' by placing the 'Conservation status' button among the 'Size', 'Habitat', and 'Range map' butto ns. The menu implies that being an endangered species (mainly due to the anthropological factor) is as natural an attribute of the animals as their size and habitat. In this way, the ICT-mediated product that is being offered almost as entertainment software is, in fact, a site of considerable cultural and pedagogical significance.

The article's main menu is used in order to obtain information in different modes. Clicking on the option buttons may result in the appearance of a linguistic text, an image,

or a sound. Information in linguistic mode occupies a comparatively humble place amongst the other types of information provided to the user of this product. The linguistic texts are often written as a list rather than as coherent prose. The user can also listen to how the animal's common and scientific names are pronounced. The main mode of information presentation is visual: the user is able to see an illustration of the animal; read about its size and see it in comparison to a human; read about and see a picture of its habitat and range map; read about its place in classification; read about and view its diet; and read about its conservation status. The product seems to be able to facilitate children's acquisition of information by representing it in a variety of modes, with the visual mode predominating. However, the way in which the examined piece of software links information represented in different modes can decrease its learning potential.

In some cases, the visually represented information does not correspond to the facts about an animal.[11] For example, a picture of a chimpanzee and a leopard in the trees stands for 'Habitat: dense vegetation'. Whenever an animal's habitat is identified as dense vegetation, a chimpanzee and a leopard appear in the illustration box. For instance, it appears when the user clicks on the 'Habitat' button in an article about a quokka, an animal that inhabits the south part of Western Australia (see Figure 7.23). The quokka's habitat is identified as dense vegetation and is illustrated with an image of a chimpanzee and a leopard in the trees although these animals do not inhabit the same area as a quokka. Such a habitat as 'surface waters' is linked to an image showing such specifically Australian animals as a koala, a kangaroo and a platypus. These animals cannot be expected in an article about an animal that lives in the European region. For example, it cannot be expected in an article about a European anchovy. However, because the habitat of a European anchovy is identified as surface waters, it is illustrated with an image of a koala, a kangaroo and a platypus (see Figure 7.24).

Having read this multimodal encyclopaedia, the child user may assume that there are chimpanzees and leopards in Western Australia and that the European anchovy is co-habiting with Australian animals. In order to avoid this, the child may need to explore the animal kingdom in *Animals, A Multimedia Encyclopaedia* in the company of someone who can explain which animals can and cannot be found in certain places, someone who can turn the child's attention to the fact that the European Anchovy inhabits shallow sea waters while platypus inhabits shallow fresh water, and so on.

[11] This may happen because images that illustrate animals' habitats are linked to the names of the habitats (such as 'surface waters' or 'dense vegetation') rather than to the articles.

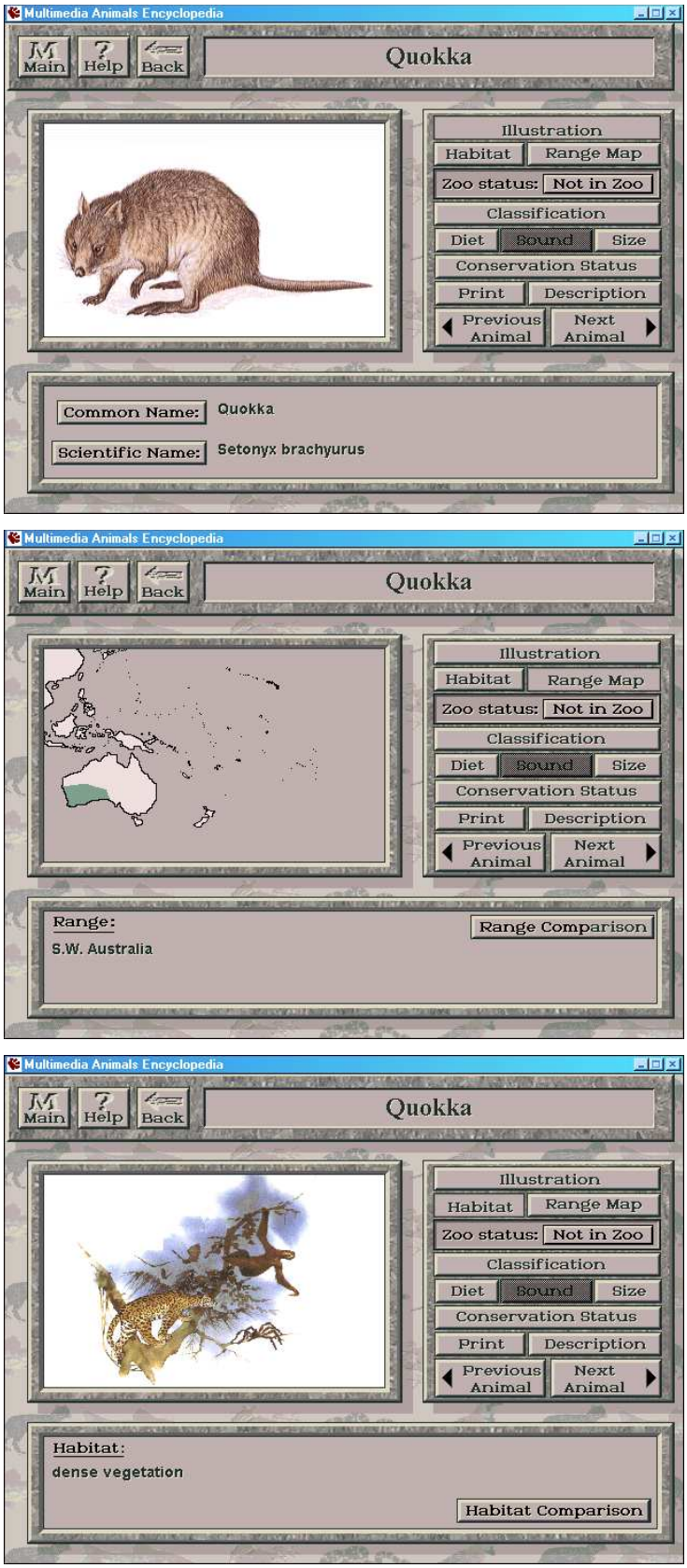


***Figure 7.23 Animals, A Multimedia Encyclopedia*: the "Quokka" article**

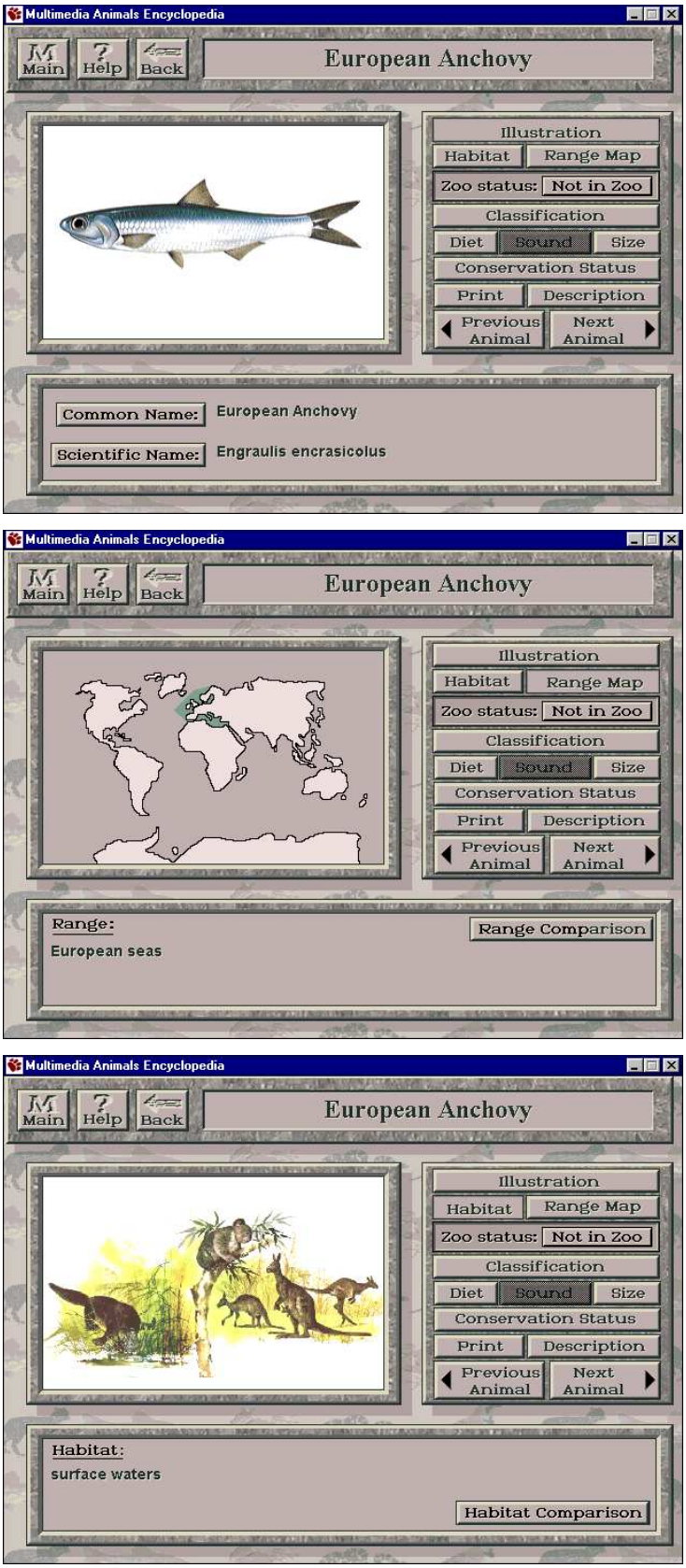


***Figure 7.24 Animals, A Multimedia Encyclopedia*: the "European Anchovy" article**

Apart from an expertise in zoology, the child user may also need access to a computer expert who can explain how databases are created and why leopards and quokkas, and koalas and European anchovy are brought together.

The analysed examples have shown that multimedia and hypertext do not guarantee a better pedagogy. On the contrary, they may further disadvantage those children who do not have access to additional expertise or guidance. For example, imagine a student who has put an image of an Amazonian-like landscape in a project about Australian rodents, and there is nobody around who could revise the project before it is submitted to a teacher.

In the articles' interfaces, reading the article is constructed as a multimodal and hypertext literacy practice that includes reading, viewing, and listening. In some CD-ROM and online encyclopaedias and Internet search tools, the linguistic mode of information presentation is not the dominant mode. The linguistic text may be optional, and an encyclopaedia article may comprise of information presented by such means as images, video clips, and audio records. It may be concluded that CD-ROM and online encyclopaedias and Internet search tools encourage their users to employ the abilities and skills of consuming information presented in different modes. By doing so, these products might contribute to the development of visual literacy, multimodal literacy, and hypertext literacy or, at least, to the awareness of the need for such literacies. However, an analysis of the texts telling the user about information sources in CD-ROM and online encyclopaedias and Internet search tools has demonstrated that the producers of these products and services tend to present the very fact of using diverse and non-linguistic media as the end rather than the means of information presentation and communication. In other words, the texts that mediate the consumption of information sources in CD-ROM and online encyclopaedias and Internet search tools may encourage the user to think that the very fact of using non-linguistic modes of information presentation is more important than the meaning and the value of the information presented.

7.6 Conclusion

In this chapter, I have shown that CD-ROM encyclopaedias, online encyclopaedias and Internet search tools are not only reference works but also practices of literacy education. In the promotional texts, the processes of project creation, consumption of information sources, and information searching are constructed as being easy, fun, and empowering. It

is claimed that the most important conditions of successful report writing or project creation are easy access to a large (unrestricted) amount of information or, on the contrary, access to high-quality information carefully selected by experts and the use of powerful and latest technologies of information presentation. However, the construction of literacy offered in the studied CD-ROM and online encyclopaedias and Internet search tools does not facilitate access to literacy required in the information society.

The images of literacy presented in the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools function as a means of constructing the users of these tools as members of particular literate cultures. Visual representations of literacy may affect what constitutes typical literacy practicies. The images of literacy also construct the user as a sociocultural subject. They offer constructions that can exclude some groups of users. The analysis of the constructions of the user implied in the images of literacy in the CD-ROM, online encyclopaedias and Internet search tools shows that these products – seemingly addressed to a universal audience – are actually addressed to a particular user group (those who have access to experts and cultural capital), thus providing additional benefits and enhancing learning for some and disadvantaging or excluding others. These may be users who have not been socialised into privileged literacy cultures and those who have no access to the technological expertise that might explain the restrictions of ICT-mediated search tools. These users may misunderstand the representations of literacy-related concepts offered in the CD-ROM encyclopaedias, online encyclopaedias and Internet search tools.

My analysis of texts mediating information searching shows that search tools are not just neutral instruments for finding paths to information. They construct their user as a particular kind of information searcher. For example, presenting information searching as a process that involves an optical instrument emphasises the visual aspect of searching. The use of such means as search windows and/or dialogue boxes results in the construction of information searching as the typing of keywords, pressing command buttons, and selecting questions from a list. These constructions do not highlight all aspects of the search, in particular those that require high-order information literacy skills and abilities. The construction of information searching offered in CD-ROM encyclopaedias, online encyclopaedias and Internet search tools may disadvantage those users who do not already know how to do research and/or those who do not have access to experts. In order to be really empowered by information searching tools, users need to know more about information searching and search tools, even if those are natural language search tools.

However, the broader discursive context, in which the tools for information searching are offered to the user, does not encourage users to become more technologically literate.

In the CD-ROM and online encyclopaedias and Internet search tools, the constructions of project creation and information searching are intertwined with the construction of the user as a subject empowered by technology, which entails an idea that the user has power over information, texts, and knowledge. This power is understood as an ability to move, arrange, access, include or exclude texts and pictures. However, such a construction represents a very limited contribution to the formation of the abilities and skills required by multimodal and/or critical literacies.

In studies of literacy, empowering literacies include those that invite the possibility of mastering the genres and languages of the mainstream/dominant sociocultural groups and those that offer the option of critical reading and writing (see Janks, 1995; Kamler, 2001; Lankshear & McLaren, 1993; Muspratt, A. Luke, & Freebody, 1997). The conception of critical literacy as an empowering literacy relates to the power of text/discourse/language, and the ways of resisting and/or overcoming this power. Empowering literacies are those that provide the ability to critically approach texts and discourses as constructing the world and the subject and to create alternative visions rather than passively accept the offered ones. This strategy makes the creation of personal narratives and accounts about subjective experiences particularly valuable within the critical literacy as these are the ways of providing alternative readings/writings. An empowering critical literacy involves an ability to understand how meaning systems reproduce domination (Janks, 1998); an ability to problematise dominant discourses and find a balance between diversity and access to those discourses (Janks, 2000); and an ability to reflect upon one's embodiment in a particular context, to explore multiple frameworks, to think about 'other' voices and to be deconstructive (Kamler, 1997, 2001). In order to do this, the literate subject (reader and writer) need to be involved in both 'engaged' and 'estranged' (Janks, 1997) relationships towards a text.

How can the notion of dealing with texts provided, for example, in CD-ROM encyclopaedias, contribute to the development of these kinds of reading and writing? The present analysis shows that the child user of a reference CD-ROM is positioned as a powerful subject in relation to the texts that might be involved in the process of creating a project. However, this is not the kind of power that is required in order to be a critically literate subject. The presentation of literacy activities with such terms as 'click, cut and paste', 'simply drag and drop' may be interpreted as the construction of the chil d as a

powerful subject who does not need to defend himself/herself from the power of text anymore because technology makes it possible to use text without being engaged in it.

CD-ROMs that are marketed as helping to create school projects mainly offer an operational construction of project creation. Project creation is presented as a process of using powerful tools. The student user is encouraged to think that it is possible to create a project without much engagement with the meaning of the texts. The student user is also encouraged to think of project creation in terms of the layout design, text decoration, and multimedia presentation, and to think of 'writing' as copying and pasting texts written by others. Compare this with the critical pedagogy of writing that aims to teach writing as a politicised project and challenges the concept of "the student writer as a rational, coherent and unitary individual and her writing as a neutral vehicle for expressing the thoughts and emotions of a unique individual consciousness" (Kamler, 2001, p. 173). As Kamler argues, writing pedagogy should incorporate multiple frameworks: process, genre, linguistic, critical discourse analytic, and poststructuralist feminist. In the context of such works in the field of writing pedagogy, the literacy 'teaching' offered, for example, in "Instruction Guide" and "Project Creator" can be considered as a reproduction of a partial, selected, and old-fashioned pedagogy. One of the characteristic features of this pedagogy is not only that it reaffirms the concept of writing as a "neutral vehicle" but that it avoids references to individuality and uniqueness of the student writer. The individuality and uniqueness are made practically unthinkable due to the provision of pre-determining project templates.

In Chapter Six, I have shown that multimedia is one of the main points in selling CD-ROM and online encyclopaedias and Internet search tools as educational products. It is claimed that the capability of CD-ROM and online encyclopaedias and Internet search tools to present information in non-linguistic modes makes the student user more motivated, and makes learning easy and fun. The implied or explicitly expressed conclusion is that these (and other) ICT-mediated educational products enable both parents and teachers to reduce their participation in the education of the student user by making a financial contribution (by purchasing the educational products on offer). The analysis of CD-ROM encyclopaedias, online encyclopaedias and Internet search tools conducted in this chapter points to the necessity of questioning these claims. It shows that the multimedia technology of information presentation makes it particularly important that the student user has access to expert knowledge about the issues and subjects he/she tries to explore with the help of a CD-ROM, online encyclopaedias and Internet search tools.

Chapter Eight Conclusion

In this concluding chapter I discuss the contribution of this research to critical educational studies of ICTs. I reiterate the argument that has been developed throughout the thesis, situate it within a broader context of sociocultural educational studies of ICTs, outline my major findings, and discuss how this research can inform current educational studies. In particular, I discuss how the emergent insights from this project might inform the development of an educational vision of ICTs. I do this with a view to developing a critical technological literacy that may be useful in teaching and using ICT-mediated products in schools and homes. I also seek to identify the ICT-related issues that need further educational inquiry and a more detailed investigation, and suggest how the methodology of critical discourse analysis may be useful in this kind of research.

Educators and technology: re-constructing the argument

Throughout the 1980s and 1990s, literature concerned with education and ICTs frequently discussed the possibility of replacing the institution of schooling with virtual schooling. I commenced this study in 1999, when it became clear that schools would survive and would integrate ICTs into the curriculum although, perhaps, with varying degrees of success. It had also become clear that this integration, as well as the wide use of ICTs in homes, have created new challenges, issues, and needs, from reconsidering some fundamental concepts, such as subjectivity, text, literacy, and pedagogy to the need to understand the broad sociocultural implications of ICTs. Since the end of 1990s, a significant number of educational researchers have contributed to the task of coming to terms with the challenges of ICTs for schooling and literacy education, the necessity to develop new pedagogical metaphors and approaches that enhance the potential of new media, and to the urgent need to design new relationships with ICTs (Barrell & Hammett, 1999; Bigum, 2002, 2004; Hagood, 2003; Lankshear & Bigum, 1999; Lankshear & Knobel, 2003; C. Luke, 1996d,

2003; Thomson & Comber, 2003). These studies have resulted in a deeper understanding of the ICT-generated challenges and issues.

In educational studies of ICTs and literacy, two major issues are subject to debate: how to integrate the ICTs in school-located practices of literacy teaching and how to provide more equal access to the new literacies (see, for example, Comber & Green, 1999a, 1999b; Gee, 2000; Lankshear, 1997; Lankshear & Snyder, 2000). It has been argued that students may acquire some kind of new literacies or may even have a different mindset due to them having been exposed to ICTs from their early childhood (Green, Reid, & Bigum, 1998; Kress, 2003; Lankshear & Knobel, 2003).

Comber and Green (1999a), Gee (2000), Lankshear (1997), and other literacy researchers show that educators' search for pedagogies genuinely integrating the ICTs in schools is closely linked to issues of equity since the acquisition of superficial and operational aspects of new literacy opens only a narrow pathway to low-valued, routine work. Therefore, educators sharing the critical and the social justice agenda have to develop a more conscious (reflexive) approach to new technologies. As Lankshear and Knobel (2003) argue, it is necessary that educators not focus on the superficial features of new technologies because this may result in subverting new ICT-mediated literacy tools to old pedagogies and/or in using ICTs merely as icons of digital literate culture. This involves a critical re-examination of the constructions of ICTs and their users that have been created in the media discourse and in educational policy discourse (Buckingham, Scanlon, & Sefton-Green, 2001; Kenway, 1995; Nixon, 1998, 1999; Selfe, 1999; Selwyn, 2000, 2002). Such a re-examination helps educators understand how the fields of the ICTs and education are interacting and changing and realise why they may need to develop their own vision of ICTs, a vision that would enable them to critically assess ICTs in terms of their pedagogical and broader sociocultural implications. My study aims to contribute to such an envisioning.

Understanding that ICTs are non-neutral and that they may have multiple (and not always the desired) effects has resulted in educators wanting to teach students to be critical 'consumers' of textual formations mediated by ICTs (see, for example, Burbules & Callister, 2000; Zammit, 1999). It has also resulted in an understanding that educators and students should not only critically read/view texts mediated by the ICTs but also critically 'read' technology itself, or, to use Selfe's (1999) expression, to develop critical technological literacy. Social constructivist, cultural, and critical studies of technology have revealed that ICTs embody different views, and that those views are particular,

socioculturally specific, and shaped by the interests of the producers and marketers more than by the interests of users (Bigum & Green, 1993; Rushkoff, 1999; Turkle, 1997). In order not to submit to the producers' views, it is necessary to be critically technologically literate and to approach ICTs as sociocultural constructs rather than as neutral tools. This understanding is necessary in order for educators to be able to assess specific ICT-mediated products in terms of their possible effects.

Another issue that has been identified in sociocultural educational studies of ICTs is the issue of the effects of ICTs on students' literacies and subjectivities. It has been argued that these effects may be multiple and may differ according to the students' and children's differential access to literacy and to cultural capital. For example, some researchers have shown that computer games may have beneficial effects through socialising children users into a rather sophisticated and innovative literacy culture (Gee, 2003). However, critical educational researchers are far from considering ICTs as necessarily beneficial – see, for example, a discussion on the complex and yet-to-be understood mindset and literacy skills of young people ('insiders') in Lankshear and Knobel (2003). The fact that some computer games embody a good pedagogy does not guarantee that they all do. The fact that some children can learn something valuable from ICTs does not guarantee that the entire generation of 'insiders' will necessarily possess the skills and abilities that open them pathways to high-order symbolic work. The implication is that it is necessary to collect knowledge about specific ICTs and specific ICT-mediated products. In this study, I have provided an example of such a critical assessment.

In the context of the ICT-generated complexities, challenges, and issues, the fact that children spend their days in real classrooms should not be considered as indication that education is any less at risk of being colonised by the ICTs. The process of the colonisation of education by ICTs has not materialised as the replacement of real teachers and classrooms with 'artificial teachers' and 'virtual classrooms'. However, as criti cal discourse analytic studies have shown, this colonisation can take place in the process of the naturalisation of constructions shaped by the interests and needs of the ICTs' producers and marketeers (Green & Bigum, 1993; Kenway, 1995).[1] Therefore, in order to understand how the ICT ideologies are reshaping the educational landscape and pedagogical and

[1] Also see, for example, Roszak (1986) about the changing notion of thinking under the influence of the discourse of computer development and the artificial intelligence; the changing concepts of creativity and artistic production in Sefton-Green and Buckingham (1998); the changing concept of transparency in Turkle (1997); and the proliferation of a technological concept of communication in educational field in Resnyansky (2002).

literate subjects, it is necessary to reveal the discursive sites and ways in which these constructions are offered to educators, students, and parents.

Critical studies of discursive changes surrounding the technologisation of homes, schools, and workplaces have shown that these sites are multiple and that the processes of re-constructing subjects (children, teachers, and parents) and education-related concepts (teaching, learning, literacy, pedagogy) are complex and multifaceted (Buckingham, et al., 2001; Comber & Green, 1999a; Kenway, 1995; Nixon, 1999; Selwyn, 2000, 2002). It has been shown, for example, that the wide implementation of technology in education, as well as its use for educational purposes at home, are supported by the media and promotional discourse characterised by the unrestricted use of quality epithets and by grounding images of technology and its intended consumers within the most attractive and powerful cultural symbols, fantasies, and desires (see, for example, Nixon, 1998). Technology is constructed as powerful and empowering, as providing the world of knowledge at your fingertips, and as making it possible to produce high-quality projects and reports without really investigating the substance of a subject and avoiding tiresome routine work.

In popular technology and education magazines, the ICTs industry's representatives present their activities, goals and products as similar to those in the educational field[2] and try to convince the educational community that their goal is to satisfy the needs of their end users – students, teachers, and parents. However, even if the intentions of the ICTs' producers to satisfy the users' needs were genuine, the practical realisation of these intentions may not be entirely within their will and capability. The designers and producers of technological products are restricted by previous technological development in the fields of computer hardware, communication devices, and programming languages.[3] They are also restricted by the positivist methodology that has been dominating the field for decades (Jakob & Albrechtsen, 1999; Julien, 1999; Olsson, 1999; T. Wilson, 2000); by organisational conditions; and by their own subjective views, needs, values, and tastes (Cawson, Haddon, & Miles, 1995; Introna, 1999). Therefore, the designer's vision of a

[2] For example, in one issue of *Educational Computing and Technology*, Peter Stibbons (1997), Director of Development for Anglia Multimedia, a company which produces software for schools, links the production of CD-ROMs and their use in the educational context. According to the author, the teachers and the producers of CD-ROMs have such common concerns as the scarcity of material resources, the advantage of having access to an 'immaterial world of bits', and the speed. Therefore, the experience of creating CD-ROMs is claimed to be a valuable source of methods and techniques for educators to be used in schools to present information and motivate the students.

[3] See Marchionini (1995), Mayhew (1992), Preece, Rogers, and Sharp (2002), and Reiss (2000) on the issues that are encountered by interface and information system designers aiming to implement in practice the conception of user-friendly technology.

product is always a particular, situated vision. For these reasons each particular user community, including educators, needs to be able to critically assess the interpretations of ICTs and specific ICT-mediated products offered to them and be able to develop its own vision of ICTs (Burbules & Callister, 2000; Haas, 1996; Selfe, 1999). As I show in the literature review, many educational researchers now consider ICT-mediated products as pedagogical practices. Not only those products that are designed for computer-assisted learning and instruction have been approached as pedagogical practices. Educational researchers have applied a similar analysis to computer and video games (Beavis, 2000; Gee, 2003) and to the Internet (Bingham, Valentine, & Holloway, 1999; Lankshear & Knobel, 1997b, 2003). My intention in this study is to make visible another group of ICT-mediated educational products – CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools for children – as discursive practices of subjectivity formation and literacy education.

Critical educational research

Within the field of educational research, this study is positioned within critical research informed by poststructuralist and postmodernist theories, a social theory of discourse, and critical discourse analysis in particular. This study is driven by my commitment to the task of extending critical educational research into ICTs and understanding broader sociocultural implications of the technologisation of literate and pedagogical practices. I consider as my predecessors those researchers who studied multiple discursive practices contributing to the formation of social, pedagogical, and literate subjects and to the production and reproduction of the social order, power relations and, in particular, the subjects' unequal access to the most advanced and empowering literacies. My research is within the educational research project that intends, as Boran and Comber (2001) put it:

> to open up conversation and to challenge progressive and critical educators to explore further how our pedagogies position different young people: to ask what kinds of inquiries we are fostering and what kinds of knowledge builders we are educating. It will have done its work if educators look again at what is going on in the name of inquiry, in the name of literacy, and ultimately in the name of education. (Boran & Comber, 2001, p. xvii).

My intention is to contribute to the extension of this critical project into ICT-mediated discursive practices in order for the educators to better understand what the ICTs are doing "in the name of education" and to increase educators' and students' agency in relation to ICTs. Given the necessary limitations of doctoral research, I have studied only a small selection of ICT-mediated products that are offered to contemporary students, their parents, and teachers as facilitating learning and schooling. I focused on CD-ROM encyclopaedias and, to a lesser extent, on online encyclopaedias and children's Internet search tools. In media and advertising, CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools for children are presented as educational helpers. In educational literature, they are mainly approached as reference works and/or as pieces of computer technology of information storage, access, and presentation. Here I suggest that they can be approached as discursive practices of subjectivity construction and literacy teaching. I explore how the intended consumer/user is constructed in these products as a social and a literate subject.

I undertake my exploration of these constructions against the claims made in the promotional texts about these products' educational value. I contest these products' promises to empower their users and these products' claims that everybody will benefit from them. Firstly, I demonstrate that CD-ROM encyclopaedias, online encyclopaedias, and Internet search engines are selective of their users. The intended 'every' user is someone who belongs to a rather well resourced social and economic group and is socialised into a particular literacy culture. Secondly, these products do not provide equal access to the literacy skills associated with the most advanced literacies. My general conclusion is that the child/student user needs access to experts and to cultural capital in order to benefit from the literacy education provided by these products. However, these prerequisites are not made explicit in these products. Rather, these prerequisites are made almost unthinkable through these products being presented as powerful technologies and the user as a subject empowered by these technologies. Finally, these products may contribute to the colonisation of education by (deterministic) popular, media and professional discourses on technology. The texts encountered by the user in the process of consuming these products tend to present the advantages of computer-mediated technologies of information storage, access and presentation as automatically providing educational success, better learning, and higher school achievements. Children and students are usually constructed as technology users who have needs and interests generic to software users of all generations and occupations.

Reference electronic products may also be considered another illustration of the broader process of a production of "suitable poststructuralist child or adult subjects" (for an analysis of this process see Gee, 2001). Similarly to the "quality discourse" (Gee, 2001), the discourses that dominate in/around ICT-mediated educational products analysed in this thesis produce subjects by foregrounding some features of the ICTs and backgrounding others. Further proliferation of these discourses and their naturalisation may disadvantage those children who have insufficient access to cultural capital, knowledge and skills that are needed in contemporary society. The patterns of literacy activity elicited in some electronic reference products may send false messages about what counts as researching and creating a project. As Janks (2000) argues, in language and literacy education it is important to reach a balance between providing access to dominant forms of language and literacy and, at the same time, promoting diversity and critical reconstruction of texts and discourses. Critically and technologically literate educators need to ensure that students' usage of the ICT-mediated educational products provides access to the most valuable literacies and knowledge. I believe that my study shows why educators cannot rely on ICTs as providers of literacy education required in the information age.

Critical discourse analysis of electronic reference products and search tools: findings

As C. Luke (2003) notes, the texts of the new technologies are complex, hybrid, systems that "require multimethodological and interdisciplinary analyses of the social and cultural, and the semiotic and linguistic. New media and complex connectivity generate new research questions that require new analytic tools as well as innovative combinations of the old with the new ones" (C. Luke, 2003. p. 401). This task requires collective efforts and cannot be accomplished by one researcher. Here I demonstrate how critical discourse analysis can be used in the process of critically interrogating CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. Critical discourse analysis, as adopted in this thesis, allows me to show that these ICT-mediated products contribute to the construction of the user and literacy in several ways: by offering constructions of the intended user's identity, by positioning the user as a participant in social interaction, and by shaping the literacy activities that the user may undertake. This methodology also enables me to problematise such seemingly neutral tools (represented by textual formations) as menus, indexes, navigation and hypertext links, and search tools' dialog boxes and to show that they are offering selective discursive constructions of the user and the represented activities and objects.

In Chapter Five, I explore children's software review websites as contributing to the formation of public thinking about CD-ROM encyclopaedias. I argue that the texts encountered on the software review websites promote them as interactive multimedia products that provide success to everybody because they deliver powerful tools for accessing resources and for producing literacy artefacts, and because they create a rich and motivating learning environment. Children's software review websites do not just provide information about the educational value of CD-ROM encyclopaedias (their content and what they may offer in order to facilitate learning and schoolwork), they also provide information about prices, compare prices, and inform the reader where these products can be purchased. In this way, the intended teacher and/or parent reader of review websites is constructed as an informed buyer of technological products. In the reviews, the CD-ROM encyclopaedia is constructed as an advanced technology of information access and presentation, and the user is constructed as empowered by this technology. This construction is made against the background of a bigger picture of the progressive development of digital technologies of information storage, search, and retrieval. I argue that the construction of CD-ROM encyclopaedias as technological tools contributes to these products being invisible as practices of subjectivity formation and literacy education. I also argue that the critical questioning of software review websites may be deflected due to the presentation of those websites as objective, neutral, and reliable sources of information.

In Chapter Six, I explore CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools as practices of subjectivity formation. I show that they influence subjectivity formation by offering discursive constructions of the intended consumer's identity, by implying what the user's needs are, and by positioning the user as a participant in social interaction. The construction of the user as a subject empowered by the ICTs is the most salient. However, the explicitly offered identity constructions may contradict the subject positions that are set up for the user in these products. Often, the construction of ICTs as powerful and empowering is only made possible by silencing the fact that, in order to be truly empowered by ICTs rather than being submissive, the user needs advanced literacy skills and access to privileged cultural capital. Instead, the student users (as well as the teachers and parents) are told by the texts surrounding the purchase and the use of these products that the main objective is to get hold of the products that will automatically satisfy the users' needs, will enhance learning, and will provide school success to everyone. The texts silence the idea that the student, in order to be empowered by ICT-

mediated products, may need to be able to know something more than just how to operate the software; that parents and teachers may need to do more than just spend money on these products; and that different subjects may benefit unequally from these products because of these subjects' unequal access to requisite cultural capital, literacy skills, and technological expertise. These texts make it less possible to ask about those requirements and conditions.

In Chapter Seven, I explore the constructions of literacy and the user as a literate subject inherent in CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. I made a case that these products contribute to the user's literacy education in two ways: firstly, by offering representations of literacy cultures and literacy technologies that imply who the user is as a member of a social and a literate culture, and, secondly, by instructing the user how to perform such literacy activities as project creation, information searching, and reading an encyclopaedic article. This study demonstrates that the instructions addressed to the user do not contribute to the acquisition of the notions and skills required in order to be a literate member of the contemporary society, such as multimodal literacy and critical literacy. These products require the user to already have been socialised into diverse and multifaceted literacy cultures. However, it may be difficult to understand this because of the dominance of the marketing construction of these products as advanced and powerful literacy tools and helpers that provide instant educational success.

ICTs are a complex and multifaceted phenomena, and they have multiple uses in education. Accordingly, their contribution to the formation of subjectivity and to the acquisition of literacy can be approached in multiple ways. My approach highlights the interface texts that mediate the usage of ICT-mediated educational products for information searching, reading encyclopaedic articles, and project creation. I examine texts varying from search queries formulated in order to find information about these products to the constructions of information searching provided in CD-ROM encyclopaedias and children's Internet search tools; from CD-ROM encyclopaedia reviews to the descriptions of online encyclopaedias' links; and from promotional texts and images that can be found on products' packaging to the 'purely functional' interface icons and menu options essential to operating the software. Unobtrusively, these texts work to construct contemporary students and children as generic software users, as consumers of advanced and powerful technology, as clients of pay-based information services, and as learners empowered by technology. These texts also contribute to the users' literacy education. It

may be said that they represent a partial and unobtrusive realisation of the futuristic projects of the 'virtual classroom' or the 'artificial teacher'. However, the pedagogies and literacies reproduced in these products do not correspond to those required in the information age.

Further research and practice

As I have stated earlier in this chapter, I consider the present study a part of a broader project that is realised by the social constructivist studies of technology, critical and sociocultural educational research, and the critical studies of language and discourse. This broader project, as I envision it, is about the critique of the ICTs as sociocultural phenomena and practices. Ongoing critique is necessary in order to develop critical technological literacy and to increase educators', parents', and students' agency in relation to ICTs (Burbules & Callister, 2000; Gee, 2003; Selfe, 1999).

I believe it is extremely important that this project is informed by in-depth studies of the discursive practices of particular ICT-mediated educational products. This is necessary in order to avoid the technological determinism which is based on the idea that the effects and outcomes of ICTs are determined by their 'intrinsic' qualities identified by their producers and by technoenthusiasts; the qualities identified in terms of the media and the mode of information presentation and communication as well as in terms of the capability of search engines and storage capacity measured in temporal units, bytes, and the amount of words and images. My goal is to problematise the constructions of the intended user offered in ICT-mediated products, and to problematise the products themselves as pedagogical discursive practices. In highlighting and critically analysing some seemingly neutral texts, such as the tools' interfaces, Help texts and hypertext hierarchies, as practices of the discursive construction of the user, I show that these texts are not neutral, that they construct and educate users in the process of them operating the software. The educational community needs also to be aware that students, when they interact with software, are acquiring a specific experience of social interaction.

This study may inform the development of critical technological literacy among teachers and students. Menus, indexes and search tools' interfaces offer particular, partial, culturally and ideologically loaded constructions. These tools, therefore, can and should be made objects of analysis in critical literacy lessons. This analysis may help students better understand how technology affects their information searching and information consumption.

The study of children's software review websites can be used in order to understand the construction of the 'truths' about educational ICT-mediated products on the World Wide Web. I indicate the discursive means and techniques that work to naturalise discourses in the promotional practices situated on the Internet (e.g., children's software review websites). Knowledge of these means and techniques is necessary in order to problematise the entire discursive practice of becoming informed about CD-ROM encyclopaedias as well as about other technological products. Educators need to be aware that the tool (an Internet search engine, a website's index, or a subject menu) they use in order to find information about educational software is also an instance of a discursive practice of the construction of the software, its users, and the information searchers themselves. This study of the construction of the user of CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools as a sociocultural subject, consumer, and learner, may also inform further exploration of the constructions of the contemporary children's and students' identities, needs, and desires that are offered in ICT-mediated products.

The very idea that CD-ROM encyclopaedias, online encyclopaedias and Internet search tools construct literacy-related activities and objects, and the user as a literate subject, can be used in order to further explore the effects of ICTs on literacy education. In this study, I have explored how the user is constructed as a member of a literate culture by focusing on the representations (images) of literacy cultures and technologies. This direction of research can be extended into other products and can be made more multifaceted, particularly by focusing on the interaction between the culturally specific and the global representations.

My study focuses on three literacy-related activities: project creation, information searching, and encyclopaedic article reading. I study how these activities are constructed in various texts that mediate the use of electronic reference products and search tools. As my study indicates, the offered constructions do not correspond to the multidimensional concepts of new literacies that are circulating in sociocultural and critical literacy studies. A broader range of ICT-mediated educational products can be explored in order to understand how literacy-related activities are constructed in those products. This task is important in the context of the search for a methodological approach to an understanding of how ICTs can affect literacy. My study might inform future research by showing where and how literacy 'instruction' and the construction of the user as a member of a literate culture articulate in the process of using ICT-mediated products. This thesis interrogates

both the constructions of these products and these products as computer-mediated discursive practices of literacy teaching. My analysis suggests that ICT-mediated products may work as yet another social filter in the contemporary society, a filter that does not allow some subjects accessing necessary literacy knowledge and skills by silencing their very existence.

Further exploration of the effects of ICT-mediated products on literacy could proceed in yet another direction. It may be explored, for example, how the experience of the communicative exchange provided by ICT-mediated products affects the users' concepts of language. This direction of research – the effects of ICT-mediated products on the user's understanding of what language is – is important because different literacies are informed by different concepts of language (see Hasan, 1996a; Knobel, 1999). An analysis of the speech roles assigned to the user makes it possible to draw a conclusion about the potential contribution of ICT-mediated products to the contemporary children's concept of language. Elsewhere (Resnyansky, 2004) I have suggested that in the process of operating software, the user, due to his/her positioning as a demander of services and a sender of commands/orders, obtains mainly an experience of using language as a means for getting things done rather than as a means of information creation and exchange.[4] It could be suggested, therefore, that the examined ICT-mediated products cannot contribute to their users' acquisition of critical literacy since critical literacy is based upon the concept of language as a means of meaning making rather than as a means for getting things done.

This research has implications for educational policy makers, researchers working in the areas of education, literacy, and educational technology, and for the professional development of teachers and student teachers. My critical analysis of a number of multimedia CD-ROM encyclopaedias, online encyclopaedias and Internet search engines shows that it is important for teachers to attend to the pedagogical effects of those products and their possible contribution to the formation of the notions of reading, writing, creating a project, and doing research. My exploration of CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools may also inform several methodological issues and problems that are associated with the development of an educational vision of ICTs. It shows that it is necessary to move past the print-oriented tradition that encourages educators to focus only on the content of information sources[5] and, at the same time, to avoid the technological determinism that explains the effects of ICT-mediated products

[4] See Halliday (1985a) for connecting these two concepts with communicative roles and speech functions.
[5] See Gee (2003) for a detailed discussion of this issue.

only by the features and qualities of technology. I study CD-ROM encyclopaedias, online encyclopaedias, and Internet search tools. They are traditionally considered as information sources and information technologies. However, my study shows that they can be approached not only in terms of the content they deliver and/or in terms of their capabilities as tools for information search and retrieval. My study shows that they can (and should) be approached as pedagogical discursive practices that may affect the user's understanding of how to perform an information search, how to consume information presented in different modes, and how to use the information in order to write a report or create a project.

I suggest that the educational assessment of ICT-mediated products should focus not only on the content of information sources and the capabilities of technological tools but also on the discursive practices that mediate the consumption of those sources and the use of those tools. Such an approach may help educators identify those aspects of software that can result in students' acquisition of unintended notions and skills. For example, subject menus and command menus offer particular representations of the world of knowledge and of literacy-related activities. The teachers can use these particular, selective, and culturally specific representations of knowledge and literacy as a starting point in teaching students to approach ICTs more critically. This study, therefore, may inform critical literacy classrooms: critical literacy teachers may help students question such 'purely functional' textual formations as menus, indexes, toolbars, and Web categories in order "to dig into them to uncover seemingly hidden meanings and ideologies" (Hammett, 1999). Also, teachers' awareness of the non -neutrality of tools that mediate the students' usage of electronic encyclopaedias and the Internet can help assess reports and projects more carefully. It can help teachers distinguish between those 'failures' that might be caused by the student's individual qualities as a learner and those that might be caused by the student's reliance on technology.

This thesis demonstrates the necessity for, and provides examples of, approaching ICT-mediated products as discursive practices that contribute to the production of social subjects and to the socialisation of contemporary students into particular literacy traditions. On the basis of this study, recommendations can be made to the producers of reference CD-ROMs and the creators of children's Internet search tools. This study also questions the current (quite persistent) vision of ICTs as the educators' helper acting completely within the purposes and the philosophy of education. It may also help educators ask

questions shaped by their own interests and concerns, better understand what technology is capable of, and become critically technologically literate.

The current educational studies of ICTs, literacy, and pedagogy (Lankshear & Knobel, 2003; Gee, 2003; Thomson & Comber, 2003) show that the effects of ICTs are not predetermined and that there are multiple ways in which young people and educators may turn ICTs to their own purposes. They show, for example, that educators and students may successfully use new technologies to build knowledge communities (Comber & Green, 1999b; Thomson & Comber, 2003). They show that educators may use computer games in order to teach complex literacy skills (Beavis, 2000a, 2000b) and that they may learn from the pedagogies embodied in the computer and video games (Gee, 2003). Also, these studies indicate that, in order for the ICTs to be pedagogically valuable, they need to be situated within a rich, innovative, critical and constructive pedagogical environment. They show that using ICTs in education requires an engaged and creative participation of students and educators, children and parents, as well as the re-examination of the traditional models of schooling and teaching. My study may support this trend by showing the limited concept of literacy that some ICT-mediated products offer to their users, and by revealing the fact that, in order to benefit from these products, the user needs to have access to the cultural capital and literacy expertise.

This study suggests how CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools can be explored as the discursive practices constitutive of social and literate subjects. It also provides a set of methods that can be used for the analysis of other ICT-mediated products in terms of their impact on the formation of subjectivity and literacy. Highlighting specific texts that may be encountered in the process of using these products as well as showing that they are non-neutral, selective, and ideologically loaded, can be used both for teachers' education about ICTs and for helping teachers develop a critical technological literacy. It can also be used by teachers in order to show their students what elements of ICT-mediated educational products can be made objects of critical reading and inquiry.

References

Adler, R. (1997). *The future of advertising: New approaches to the attention economy*. Washington DC: The Aspen Institute.

Akrich, M. (1992). The description of technical objects. In W. E. Bijker, & J. Law (Eds.), *Shaping technology/building society: Studies in sociological change* (pp. 205-224). Cambridge, MA: The MIT Press.

Alexander, J., & Tate, M. A. (1999). *Evaluating Web resources*. Retrieved February 7, 2002, from http://www2.widener.edu/Wolfgram-Memorial-Library/webevaluation/webeval.htm

Alloway, N., & Gilbert, P. (1997). Everything is dangerous: working with the "boys and literacy" agenda. *English in Australia, 119-120,* 35-45.

AltaVista [Internet search engine]. Retrieved from http://www.altavista.com/

Amazon.com [Website]. Retrieved January 22, 2003, from http://www.amazon.com

Amazon.com. "Children's Software Revue". (2002). Retrieved January 22, 2003, from http://www.amazon.co.uk/exec/obidos/tg/stores/feature/feature/-/software/158722/026-1475158-0442002

Animals, A Multimedia Encyclopedia [CD-ROM]. (1998). Seven Hills, NSW: Nodtronics, Eurekasoftware.

Animals, A Multimedia Encyclopedia. "Introduction". (1998). Seven Hills, NSW: Nodtronics, Eurekasoftware.

Armitage, J. (1999). Resisting the neoliberal discourse of technology: the politics of cyberculture in the age of the virtual class. In A. Kroker, & M. Kroker (Eds.), *Ctheory: Theory, Technology and Culture, 22(1-2),* Article No. 68. Retrieved May 4, 2004, from http://www.ctheory.net/text_file.asp?pick=111

Armstrong, C. J., & Large J. A. (Eds.). (1990). *CD-ROM information products: The evaluative guide and directory: Vol. 1.* Aldershot: Gower.

Armstrong, C. J., & Large, J. A. (Eds.). (1991). *CD-ROM information products: The evaluative guide: Vol. 2.* Aldershot: Gower.

Ask Jeeves [Internet search engine]. Retrieved from http://www.ask.com/

Ask Jeeves for Kids [Internet search engine]. Retrieved from http://www.ajkids.com/

Ask Jeeves for Kids. "About Us". (2000). Retrieved June 8, 2000, from http://www.ajkids.com/hr_site/AboutUs.asp

Ask Jeeves for Kids. "You asked" [Search results for <What will be technologies of the future?> search query]. (2000). Retrieved June 8, 2000, from http://www.ajkids.com/

Atkinson, J. M., & Heritage, J. (Eds.). (1984). *Structures of social action: Studies in conversation analysis.* Cambridge: Cambridge University Press.

Austin, H. (1997). Literature for school: theorising 'the child' in talk and text. *Language and Education, 11(2),* 77-95.

Australia 2000 – Commemorative Edition. (1999). Singapore: Webster Publishing.

Australian Bureau of Statistics. (2003). Measures of a knowledge-based economy and society, Australia. Retrieved October 16, 2004, from http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/5FD96B99B19469ACCA256D97002C8643; http://www.abs.gov.au/Ausstats/abs@.nsf/Lookup/1FF46C75CD45F5CECA256D97002C8642

Bakhtin, M. M. (1981). Discourse in the novel (C. Emerson, & M. Holquist, Trans.). In M. Holquist (Ed.), *The dialogic imagination: Four essays* (pp. 259-422). Austin, TX: University of Texas Press.

Bakhtin, M. (1984). *Problems of Dostoevsky's poetics*. (C. Emerson, Trans. & Ed.). Minneapolis: University of Minnesota Press.

Bakhtin, M. M. (1986). *Speech genres and other late essays*. (C. Emerson, & M. Holquist, Eds., V. McGee, Trans.). Austin, TX: University of Texas Press.

Baker, C. D., & Freebody, P. (1989). *Children's first schoolbooks: Introductions to the culture of literacy.* Oxford: Basil Blackwell.

Baker, C., & Luke, A. (Eds.). (1991) *Towards a critical sociology of reading pedagogy*. Amsterdam; Philadelphia: John Benjamins.

Barrell, B., & Hammett, R. F. (1999). Hypermedia as a medium for textual resistance. *English in Education, 33(3),* 21-30.

Barthes, R. (1992). The death of the author (S. Heath, Trans.). In P. Rice, & P. Waugh (Eds.), *Modern literary theory: A reader* (pp. 114-121). London: Edward Arnold.

Barthes, R. (1979). From work to text (J. V. Harari, Trans.). In J. V. Harari (Ed.), *Textual strategies: Perspectives in post-structuralist criticism* (pp. 73-81). Ithaca, NY: Cornell University Press.

Bartleby.com [Website]. (2003). Retrieved May 24, 2003, from http://www.bartleby.com

Bartleby.com. "Columbia Encyclopedia". (2001). Retrieved May 24, 2003, from http://www.bartleby.com/65/

Barton, D., & Hamilton, M. (1998). *Local literacies: Reading and writing in one community*. London: Routledge.

Barton, D., Hamilton, M., & Ivanič, R. (Eds.). (2000). *Situated literacies: Reading and writing in context*. London; New York: Routledge.

Barton, D., & Ivanič, R. (Eds.). (1991). *Writing in the community*. Newbury Park, CA: Sage.

Beavis, C. (2000a). Computer games as class readers: developing literacy skills for the twenty-first century. *The English and Media Magazine, 41*, 31-35.

Beavis, C. (2000b). Youth culture and the texts of the new technologies: reading the research. In J. McLeod, & K. Malone (Eds.), *Researching Youth* (pp. 111-120). Hobart: Australian Clearinghouse on Youth Studies.

Becker, H. J. (1991). Encyclopedias on CD-ROM: two orders of magnitude more than any other educational software has ever delivered before. *Educational Technology, 31(2)*, 7-20.

Benson, D. J., & Hughes, J. A. (1983). *The perspective of ethnomethodology*. London: Longmans.

Berger, P., & Kinnell, S. K. (1994). Educational CD-ROMs: a progress report for the disc-interested. *School Library Journal, 40(10)*, 26-31.

Berkman, R. (2000). *Find it fast*. New York: Harper Resource.

Bernstein, B. (1990). *The structuring of pedagogic discourse, Vol. 4: Class, codes and control*. London: Routledge.

Bernstein, B. (1996). *Pedagogy, symbolic control and identity: Theory, research, critique*. London: Taylor and Francis.

Besnier, N., & Street, B. (1994). Aspects of literacy. In T. Ingold (Ed.), *Companion encyclopedia of anthropology. Humanity, culture and social life*. (pp. 527-562). London: Routledge.

Bigelow, B. (2001). On the road to cultural bias: a critique of The Oregon Trail CD-ROM. In B. Comber, & A. Simpson (Eds.), *Negotiating critical literacies in classrooms* (pp. 101-118) Mahwah, NJ: Erlbaum.

Bigum, C. (1987). *Natural intelligence meets artificial stupidity*. Geelong, Victoria: Deakin University.

Bigum, C. (1997). Teachers and computers: in control or being controlled? *Australian Journal of Education, 41(3)*, 247-261.

Bigum, C. (2002). Design sensibilities, schools and the new computing and communication technologies. In I. Snyder (Ed.), *Silicon literacies: Communication, innovation and education in the electronic era* (pp. 130-140). London: Routledge.

Bigum, C. (2004). Rethinking schools and community: the knowledge producing school. In S. Marshall, W. Taylor, & X.-H. Yu (Eds.), *Using community informatics to transform regions* (pp. 52-66). Hershey, PA; London: Idea Group.

Bigum, C., & Green, B. (1993). Technologising literacy: or, interrupting the dream of reason. In A. Luke, & P. Gilbert (Eds.), *Literacy in contexts: Australian perspectives and issues* (pp. 4-28). St Leonards, NSW: Allen & Unwin.

Bigum, C., & Kenway, J. (1996a). *New technologies and education: Some possible scenarios*. Geelong, Victoria: Deakin Centre for Education and Change, Faculty of Education, Deakin University.

Bigum, C., & Kenway, J. (1996b). *The new information technologies in schools: Making plans or having options*. Geelong, Victoria: Deakin Centre for Education and Change, Faculty of Education, Deakin University.

Bijker, W., Pinch, T., & Hughes, T. (Eds.). (1987). *The social construction of technological systems: New directions in the sociology and history of technology*. Cambridge, MA: MIT Press.

Bingham, N., Valentine, G., & Holloway, S. L. (1999). Where do you want to go tomorrow? Connecting children and the Internet. *Environment and Planning D: Society and Space, 17*, 655-672.

Birds of Australia 5.0 [CD-ROM]. (1999). Natural Learning.

Bokarev, T. (Ed.). (2002). *Энциклопедия Интернет-рекламы* [The Encyclopaedia of Internet advertising]. Retrieved March 16, 2002, from http://book.promo.ru/book/

Bolinger, D. (1980). *Language, the loaded weapon: The use and abuse of language today*. London; New York: Longman.

Bolter, J. D. (1991). *Writing space: The computer, hypertext and the history of writing*. Hillsdale, NJ: Erlbaum.

Boran, S., & Comber, B. (2001). (Eds.). *Critiquing whole language and classroom inquiry*. Urbana, IL: National Council of Teachers of English.

Bourdieu, P. (1991). *Language and symbolic power* (J. B. Thompson, Ed., G. Raymond & M. Adamson, Trans.). Cambridge: Harvard University Press.

Bourdieu P., & Passeron, J. (1977). *Reproduction in education, society and culture.* London: Sage.

Bowker, G. C., & Star, S. L. (1999). *Sorting things out: Classification and its consequences.* Cambridge, MA: MIT Press.

Branham C. (1997). *Web Page Types*. Retrieved February 6, 2002, from http://www.slu.edu/departments/english/research/page04.html

Brey, P. (1997). Social constructivism for philosophers of technology: a shopper's guide. *Techné: Journal of the Society for Philosophy and Technology, 2(3-4)*, 56-79. Retrieved February 27, 2001 from http://scholar.lib.vt.edu/ejournals/SPT/v2n3n4/brey.html

Britannica Online [Online encyclopaedia]. Retrieved from http://www.britannica.com

Britannica Online. "Homepa ge". (2004). Retrieved November 26, 2004, from http://www.britannica.com

Britannica Online. "Britannica Online Subscription Form". (2001). Retrieved May 24, 2003, from https://safe.britannica.com/subscribe/

Bruce, B. C. (1999). Speaking the unspeakable about 21st century technologies. In G. E. Hawisher, & C. L. Selfe (Eds.), *Passions, pedagogies and 21st century technologies* (pp. 221-228). Longan, UT: Utah State University Press.

Bruner, J. (1960). *The process of education*. Cambridge, MA: Harvard University Press.

Bruner, J. (1986). *Actual minds, possible worlds*. Cambridge, MA: Harvard University Press.

Buckingham, D., Scanlon, M., & Sefton-Green, J. (2001). Selling the digital dream: marketing educational technology to teachers and parents. In A. Loveless, & V. Ellis (Eds.), *ICT, pedagogy and the curriculum: Subject to change* (pp. 20-40). London; New York: Routledge/Falmer.

Burbules, N. C. (1997). Rhetorics of the Web: hyperreading and critical literacy. In I. Snyder (Ed.), *Page to screen: Taking literacy into the electronic era* (pp. 102-122). St Leonards, NSW: Allen & Unwin.

Burbules, N. C., & Callister, T. A., Jr. (2000). *Watch IT: The risks and promises of new information technologies for education*. Boulder, CO: Westview Press.

Burman, E., & Parker, I. (1993). Introduction. Discourse analysis: the turn to the text. In E. Burman, & I. Parker (Eds.), *Discourse analytic research: Repertoires and readings of texts in action* (pp. 1-13). London; New York: Routledge.

Callon, M. (1987). Society in the making: the study of technology as a tool for sociological analysis. In W. E. Bijker, T. P. Hughes, & T. J. Pinch (Eds.), *The social construction of technological systems: New direction in the sociology and history of technology* (pp. 83-103). Cambridge, MA: The MIT Press.

Callon, M., & Latour, B. (1992). Don't throw the baby out with the bath school! A reply to Collins and Yearly. In A. Pickering (Ed.), *Science as practice and culture* (pp. 343-368). Chicago: University of Chicago Press.

Capurro, R. & Hjørland, B. (2003). In B. Cronin (Ed.), *Annual review of information science and technology: Vol. 37* (pp. 343-412). Medford, NJ: Information Today.

Carrington, V. (2001a). Literacy instruction: a Bourdieuian perspective. In P. Freebody, S. Muspratt, & B. Dwyer (Eds.), *Difference, silence, and textual practice: Studies in critical literacy* (pp. 265-285). Cresskill, NJ: Hampton Press.

Carrington, V. (2001b). Emergent home literacies: a challenge for educators. *The Australian Journal of Language and Literacy, 24(2),* 88-100.

Castells, M. (1996). *The information age: Economy, society and culture: Vol. 1. The rise of the network society.* Cambridge, MA; Oxford, UK: Blackwell.

Cawson, A., Haddon, L., & Miles, I. (1995). *The shape of things to consume: Delivering information technology into the home*. Aldershot, UK; Brookfield, USA; Hong Kong; Singapore; Sydney: Avebury.

ccclearn [Website]. Retrieved January 16, 2002, from http://www.ccclearn.com [Currently available from http://www.pearsondigital.com/]

ccclearn. "How to Evaluate Learning Software". (2001). Retrieved January 16, 2002, from http://www.ccclearn.com/resources/how_to.html [Currently unavailable]

Chadwick, G. (2002). Why computers are failing in the education of our children. *Educational Technology, 42(5),* 35-40.

Children's Software Review [Website]. Retrieved January 16, 2002, from http://www.childrenssoftwarereview.com/ [Currently unavailable]

Children's Software Revue [Website]. Retrieved June 3, 1999, from http://www.microweb.com/pepsite/Revue/ [Currently unavailable]

Children's Software Revue. "About Children's Software Revue". (1999). Retrieved June 3, 1999, from http://www.childrenssoftware.com/aboutcsr.html

Children's Software Revue. "Software Evaluation Instrument". (1995). Retrieved June 3, 1999, from http://www.microweb.com/pepsite/Revue/evaluation.html

Christie, F. (1997). Curriculum macrogenres as forms of initiation into a culture. In F. Christie, & J. R. Martin (Eds.), *Genre and institutions: Social processes in the workplace and school* (pp. 134-160). London: Cassell.

Christie, F., & Martin, J. R. (Eds.). (1997). *Genre and institutions: Social processes in the workplace and school*. London; Washington, DC: Cassell.

Cicourel, A. V. (1973). *Cognitive sociology: Language and meaning in social interaction.* Harmondsworth: Penguin.

Clark , R., Fairclough, N., Ivanič, R., & Martin-Jones, M. (1988). *Critical language awareness*. Lancaster: University of Lancaster.

Columbia Electronic Encyclopedia [Online encyclopaedia]. (2001). Retrieved February 25, 2004, from http://www.bartleby.com/65/

Comber, B. (1996). *The discursive construction of literacy in a disadvantaged school.* Unpublished doctoral thesis, James Cook University, Townsville, Queensland.

Comber, B. (1997). Managerial discourses: tracking the local effects on teachers' and students' work in literacy lessons. *Discourse: Studies in the Cultural Politics of Education, 18(3)*, 389-407.

Comber, B. (1998). Problematising 'background': (re)constructing categories in educational research. *The Australian Educational Researcher, 25(4)*, 1-22.

Comber, B., & Green, B. (1999a). *Information technology, literacy and educational disadvantage research and development project: Vol. 1. More than just a literacy?* Adelaide, SA: The Department of Education, Training and Employment of South Australia.

Comber, B., & Green, B. (1999b). *Information technology, literacy and educational disadvantage research and development project: Vol. 2. Site studies.* Adelaide, SA: The Department of Education, Training and Employment of South Australia.

Cope, B., & Kalantzis, M. (Eds.). (2000). *Multiliteracies: Literacy learning and the design of social futures*. South Yarra: Macmillan.

Cope, W., & Kalantzis, M. (Eds.). (1993). *The literacies of power and the powers of literacy*. London: The Falmer Press.

Cormack, P. (2004). *Adolescence, schooling and English/literacy: Formations of a problem in early twentieth century South Australia.* Unpublished doctoral thesis, University of South Australia, Adelaide, SA.

Cormack, P., & Comber, B. (1996). Writing the teacher: the South Australian junior primary English teacher, 1962-1995. In B. Green, & C. Beavis (Eds.), *Teaching the English subjects: Essays on English curriculum history and Australian schooling* (pp. 118-144). Geelong, Victoria: Deakin University Press.

Cornelius, I. (2002). Theorizing information for information science. In B. Cronin (Ed.), *Annual review of information science and technology: Vol. 36* (pp. 393-426). Medford, NJ: Information Today.

Davenport, E., & Hall, H. (2002). Organizational knowledge and communities of practice. In B. Cronin (Ed.), *Annual review of information science and technology: Vol. 36* (pp. 171-228). Medford, NJ: Information Today.

Davis, S., & Botkin, J. (1994). *The monster under the bed: How business is mastering the opportunity of knowledge for profit*. New York: Simon and Schuster.

deCastell, S., Luke, A., & Luke, C. (1989). *Language, authority and criticism: Readings on the school textbook*. London, New York, Philadelphia: The Falmer Press.

Derrida, J. (1978). Structure, sign and play in the discourse of the human sciences (A. Bass, Trans.). In *Writing and difference* (pp. 278-293). London: Routledge and Kegan Paul.

DiscoverySchool.com [Website]. Retrieved from http://school.discovery.com

DiscoverySchool.com. "About Us". (2002). Retrieved May 26, 2004, from http://school.discovery.com/info/aboutus.html

DiscoverySchool.com. "All Educational Software". (2003). Retrieved November 17, 2004, from http://school.discovery.com/parents/reviewcorner/software/all_listing.html

DiscoverySchool.com. "Homepage". (2003). Retrieved May 25, 2004, from http://school.discovery.com

DiscoverySchool.com. "How We Rate Products". (2002). Retrieved January 23, 2002, from http://school.discovery.com/parents/reviewcorner/softwareevaluation.html

DiscoverySchool.com. "On TV". (2004). Retrieved May 25, 2004, from http://school.discovery.com/ontv/

DiscoverySchool.com. "Site Map". (2003). Retrieved May 25, 2004, from http://school.discovery.com/info/sitemap.html

Downes, T. (1997). A matter of equity: computers in Australian homes. *Australian Educational Computing, 12(2)*, 7-13.

Downes, T. (1998). *Children's use of computers in their home*. Unpublished doctoral thesis, The University of Western Sydney, Macarthur, NSW.

Downes, T., & Zammit, K. (2001). New literacies for connected learning in global classrooms. In H. G. Taylor, & P. Hogenbirk (Eds.), *Information and communication technologies in education: The school of the future: IFIP TC 3 WG 3.1 International Conference on the Bookmark of the School of the Future, April 9-14, 2000, Vidna Del Mar, Chile* (pp. 113-128). Deventer, The Netherlands: Kluwer Academic Publishers.

EdNA Online [Website]. Retrieved February 21, 2002, from http://www.edna.edu.au

EdNA Online. "Discover ySchool.com". (2002). Retrieved February 21, 2002, from http://www.edna.edu.au/go/browse/0:schooled:ict:choice

EdSoftware (Educational Software Institute Online) [Website]. (2001). Retrieved January 16, 2002, from http://www.edsoftware.com/ [Currently available from http://www.higheredsoftware.com/]

Education hot-links [Website]. (2001, November). Retrieved January 22, 2002, from http://www.edsitewa.iinet.net.au/educationhotlinks.html [Currently available from http://www.edsite.com.au/educationhotlinks.html]

Electric Library (eLibrary) [Website]. (2000). Retrieved April 18, 2002, from http://www.elibrary.com/id/150/220/ [*Electric Library* is now known as *HighBeam™ Research* and the reference is redirected to http://www.highbeam.com/library/index.asp]

Electric Library. "Ask eLibrary". (2003). Retrieved January 7, 2004, from ask.elibrary.com

Ellul, J. (1964*). The technological society* (J. Wilkinson, Trans.). New York: Vintage Books.

"Encyclopedia". (2001). Retrieved April 4, 2001, from http://www.britannica.com

Encyclopedia.com [Online encyclopaedia]. Retrieved from http://www.encyclopedia.com/

Encyclopedia.com. "Free Services". (2004). Retrieved July 13, 2004, from http://www.encyclopedia.com/

Encyclopaedia.com. "Homepage". (1999). Retrieved June 7, 2001, from http://www.encyclopedia.com/

Encyclopaedia.com. "Homepage". (2004). Retrieved July 13, 2004, from http://www.encyclopedia.com/

Ennew, J. (1994). Time for children or time for adults. In J. Qvortrup, M. Bardy, G. Sgritta, & H. Wintersberger (Eds.). *Childhood matters: Social theory, practice and politics* (pp. 125-143). Aldershot, UK: Avebury.

Eraut, M. (1988). What has happened to learning design. In H. Mathias, N. Rushby, & R. Budgett (Eds.), *Aspects of educational technology XXI: Designing new systems and technologies for learning*. London: Kogan Paul.

EvaluTech [Website]. Retrieved from http://www.evalutech.sreb.org/

Fact Monster [Web directory]. Retrieved from http://www.factmonster.com/

Fairclough, N. (1989). *Language and power*. London; New York: Longman.

Fairclough, N. (1992). *Discourse and social change*. London: Polity Press.

Fairclough, N. (1993). Critical discourse analysis and the marketization of public discourse: the universities. *Discourse & Society, 4(2),* 133-168.

Free Internet Encyclopedia [Web directory]. (1999). Retrieved January 16, 2002, from http://www.cam-info.net/enc.html

Feenberg, A., & Hannay, A. (Eds.). (1995). *Technology and the politics of knowledge*. Bloomington: Indiana University Press.

Fensel. D. (2001). *Ontologies: A silver bullet for knowledge management and electronic commerce*. Berlin; Heidelberg; New York: Springer-Verlag.

Foucault, M. (1966). *The order of things* (A. Sheridan, Trans.). New York: Random House.

Foucault, M. (1972). *The archaeology of knowledge* (A. M. Sheridan Smith, Trans.). London: Tavistock.

Foucault, M. (1973). *The birth of the clinic: An archaeology of medical perception* (A. M. Sheridan Smith, Trans.). New York: Pantheon Books.

Foucault, M. (1977). *Discipline and punish: The birth of the prison* (A. Sheridan, Trans.). London: Penguin.

Foucault, M. (1983). The subject and power. In H. L. Dreyfus & P. Rabinow (Eds.), *Michel Foucault: Beyond structuralism and hermeneutics* (pp. 208-226). Chicago: University of Chicago Press.

Foucault, M. (1984). The order of discourse. In M. Shapiro (Ed.), *Language and politics* (pp. 108-138). Oxford: Basil Blackwell.

Freebody, P., & Luke, A. (1990). 'Literacies' programs: debates and demands in cultural context. *Prospect: An Australian Journal of TESOL, 5(3),* 7-16.

Fuller, M., & Jenkins, H. (1995). Nintendo and new world travel writing: a dialogue. In S. Jones (Ed.), *Cybersociety: Computer-mediated communication and community* (pp. 57-72). Thousand Oaks, CA: Sage.

Furlong, R. (1995). There's no place like home. In M. Lister (Ed.), *The photographic image in digital culture* (pp. 170-187). London: Routledge.

Furlong, J., Furlong, R., Facer, K., & Sutherland, R. (2000). The National Grid for Learning: a curriculum without walls? *Cambridge Journal of Education, 30(1),* 91-110.

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. NY: Basic Books

Gardner, P. (1997). *Managing technology in the middle school classroom*. Cheltenham, Victoria: Hawker Brownlow Education.

Garfinkel, H. (1967). *Studies in ethnomethodology*. Englewood Cliffs, NJ: Prentice-Hall.

Garfinkel, H. (1986). *Ethnomethodological studies of work.* London: Routledge & Kegan Paul.

Gee, J. P. (1992). *The social mind: Language, ideology, and social practice*. New York: Bergin and Garvey.

Gee, J. P. (1996). *Social linguistics and literacies: Ideology in discourses*. London: Taylor & Francis.

Gee, J. P. (2000). New people in new worlds: networks, the new capitalism and schools. In B. Cope, & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 43-68). South Yarra: Macmillan.

Gee, J. P. (2001). Quality, science, and the lifeworld: the alignment of business and education. In P. Freebody, S. Muspratt, & B. Dwyer (Eds.), *Difference, silence, and textual practice: Studies in critical literacy*. Cresskill, NJ: Hampton Press, pp. 359-382.

Gee, J. P. (2003). *Power up: What video games have to teach us about learning and literacy*. London: Palgrave/Macmillan.

Gee, J. P., Hull, G., & Lankshear, C. (1996). *The new work order: Behind the language of the new capitalism.* Sydney: Allen & Unwin.

Gershenfeld, N. (1999). *When things start to think*. New York: Henry Holt.

Gilding, T. (1998). Salvaging pedagogy in the swamp of technology. *ONLINE-ED, 1*. Retrieved May 5, 1999, from http://www.edfac.unimelb.edu.au/online-ed/mailouts/1998/may1.html

Gilster, P. (1997). *Digital Literacy*. New York: John Wiley.

Giroux, H. (1994). *Disturbing pleasures: Learning popular culture*. New York; London: Routledge.

Goguen, J. (2001). Social aspects of technology and science. Chapter 2: Technological determinism. Retrieved September 11, 2004, from http://www.cs.ucsd.edu/users/goguen/courses/275f00/s2.html

Goldhaber, M. (1996). M. H. Goldhaber's principles of the new economy. Retrieved January 8, 2004, from http://www.well.com/ user/mgoldh/principles.html

Goldhaber, M. (1997). The attention economy and the net. *First Monday, 2(4)*. Retrieved January 8, 2004, from http://firstmonday.org/issues/issue2_4/goldhaber/index.html

Goldhaber, M. (1998). The attention economy will change everything. *Telepolis*. Retrieved January 8, 2004, from http://www.heise.de/tp/r4/artikel/1/1419/1.html

Goody, J. (1968). *Literacy in traditional societies*. Cambridge: Cambridge University Press.

Goody, J. (1986). *The logic of writing and the organization of society*. Cambridge: Cambridge University Press.

Google. [Internet search engine]. Retrieved from www.google.com

Google. "All About Google". (2000). Retrieved October 30, 2000, from http://www.google.com/about.html [Currently unavailable from this location. See about Google at http://www.google.com/googlefriends/oct2000.html]

Google. "GameZone's KidZone!" (2004). Retrieved June 17, 2004, from http://www.google.com/search?hl=en&ie=UTF-8&q=gamezone

Google. "Infoplease". (2004).Retrieved July 13, 2004, from http://www.google.com.au/search?hl=en&ie=UTF-8&q=infoplease&meta=

Google. "Welcome to DiscoverySchool.com". (2004). Retrieved June 20, 2004, from http://www.google.com.au/search?q=discoveryschool&ie=UTF-8&hl=en&meta=

Gore, J. (1993). *The struggle for pedagogies: Critical and feminist discourses as regimes of truth*. New York: Routledge.

Graff, H. J. (1987). *The legacies of literacy: Continuities and contradictions in Western culture and society*. Indiana: Bloomington.

Green, B. (1988). Subject-specific literacy and school learning: a focus on writing. *Australian Journal of Education, 32(2)*, 156-179.

Green, B. (Ed.). (1993). *Curriculum, technology and textual practice*. Geelong, Victoria: Deakin University Press.

Green, B., & Beavis, C. (1998). Researching new literacies, new technologies, new kids, new times, new…. *The Australian Educational Researcher, 25(3)*, i-vii.

Green, B., Reid, J.-A., & Bigum, C. (1998). Teaching the Nintendo generation? Children, computer culture and popular technologies. In S. Howard (Ed.), *Wired-up: Young people and the electronic media* (pp. 19-41). London: UCL Press.

Grint, K., & Woolgar, S. (1995). On some failures of nerve in constructivist and feminist analyses of technology. *Science, Technology, & Human Values, 20*, 286-310.

"Guides to Search Engines for Children". Retrieved March 22, 2004, from http://www.searchability.com/children.htm

Haas, C. (1996). *Writing technology: Studies on the materiality of literacy*. Mahwah, NJ: Earlbaum.

Haddon, L. (1988). The home computer: the making of a consumer electronic. *Science as Culture, 2,* 7-51.

Hager, T. (1993). A rhetoric of hypertextual inventio. *Writing on the Edge, 4(2),* 103-115.

Hagood, M. G. (2003). New media and online literacies: no age left behind. *Reading Research Quarterly, 38(3),* 387-391.

Halliday, M. A. K. (1978). *Language as social semiotic*. London: Edward Arnold.

Halliday, M. A. K. (1985a). *An introduction to functional grammar*. London: Edward Arnold.

Halliday, M. A. K. (1985b). *Spoken and written language*. Victoria: Deakin University.

Halliday, M. A. K., & Martin, J. R. (1993). *Writing science: Literacy and discursive power*. London: The Falmer Press.

Hamilton, M. (1999). Expanding the new literacy studies: using photographs to explore literacy as social practice. In D. Barton, M. Hamilton, & R. Ivanič (Eds.), *Situated literacies: Reading and writing in context* (pp. 16-34). London; New York: Routledge.

Hammett, R. F. (1999). Rethinking English language arts teaching: implications of curricula and computer technologies. *REaD Literacy Conference, May 13-14 (Reading, English and Drama)*. Retrieved December 20, 2004 from http://www.mun.ca/educ/faculty/mwatch/win99/hammett.htm

Hasan, R. (1978). Text in the systemic-functional model. In W. Dressler (Ed.), *Current trends in textlinguistics* (pp. 228-246). Berlin: Walter de Gruyter.

Hasan, R. (1996a). Literacy, everyday talk and society. In R. Hasan, & G. Williams (Eds.), *Literacy in society* (pp. 377-424). London; New York: Longman.

Hasan, R. (1996b). Speech genre, semiotic mediation and the development of higher mental functions. In C. Cloran, D. Butt, & G. Williams (Eds.), *Ways of saying, ways of meaning: Selected papers by Ruqaiya Hasan* (pp. 152-190). London: Cassell.

Hasan, R., & Williams, G. (1996). *Literacy and society*. London; New York: Longman.

Havelock, E. (1986). *The muse learns to write: Reflections on orality and literacy from antiquity to the present.* London: Yale University Press.

Hawisher, G., & Moran, C. (1993). Electronic mail and the writing instructor. *College English, 55(6),* 627-643.

Heath, S. B. (1982a). Protean shapes in literacy events. In D. Tannen (Ed.), *Spoken and written language: Exploring orality and literacy* (pp. 91-117). Norwood, NJ: Ablex.

Heath, S. B. (1982b). What no bedtime story means: narrative skills at home and at school. *Language in Society, 11*, 49-76.

Heath, S. B. (1983). *Ways with words: Language, life, and work in communities and classrooms.* Cambridge: Cambridge University Press.

Hedberg, J. G. (1989). CD-ROM: expanding and shrinking resource based learning. *Australian Journal of Educational Technology, 5(1),* 56-75. Retrieved December 12, 2004, from http://www.ascilite.org.au/ajet/ajet5/hedberg1.html

Heim, M. (1987). *Electric language: A philosophical study of word processing.* New Haven, CT: Yale University Press.

Heim, M. (1993). *The metaphysics of virtual reality*. Oxford: Oxford University Press.

Hodge, R., & Kress, G. (1988). *Social semiotics.* London: Polity Press.

Honeycutt, L. (1997). Writing technology: studies on the materiality of literacy. [Review of the book by Christina Haas *Writing technology: Studies on the materiality of literacy*]. Retrieved May 4, 2001, from http://tc.eserver.org/15029.html

Hutchinson Multimedia Encyclopedia [CD-ROM]. (1997). Focus Multimedia.

Infoplease (Information Please: On-line Dictionary, Internet Encyclopedia, & Almanac Reference) [Online encyclopaedia]. Retrieved from www.infoplease.com

Introna, L. D. (1999). Context, power, bodies and information: exploring the 'entangled' contexts of information. In T. D. Wilson, & D. K. Allen, *Exploring the contexts of information behaviour: Proceedings of the Second International Conference on Research in Information Needs. Seeking and Use in Different Contexts, 13-15 August, 1998, Sheffield, UK* (pp. 1-9). London; Los Angeles, CA: Taylor Graham.

ISLMC, the Internet School Library Media Center [Website]. Retrieved from http://falcon.jmu.edu/~ramseyil/

ISLMC, the Internet School Library Media Center. "ISLMC Acquisitions & Selection Resources for School Libraries, K–12". (2002). Retrieved January 16, 2002, from http://falcon.jmu.edu/~ramseyil/selection.htm

IT Reviews [Website]. Retrieved from http://www.itreviews.co.uk

IT Reviews. "The Hutchinson Encyclopedia 2001". (2002). Retrieved January 16, 2002, from http://www.itreviews.co.uk/software/s96.htm

Ivy's Search Engines for Kids [Website]. Retrieved March 8, 2004, from http://www.ivyjoy.com/rayne/kidssearch.html

Jakob, E. K., & Albrechtsen, H. (1999). When essence becomes function: post-structuralist implications for an ecological theory of organizational classification systems. In T. D. Wilson, & D. K. Allen, *Exploring the contexts of information behaviour:*

Proceedings of the Second International Conference on Research in Information Needs. Seeking and Use in Different Contexts, 13-15 August, 1998, Sheffield, UK (pp. 519-534). London; Los Angeles, CA: Taylor Graham.

James, A., & Prout, A. (Eds.). (1990). *Constructing and reconstructing childhood: Contemporary issues in the sociological study of childhood*. London; New York; Philadelphia: The Falmer Press.

Janks, H. (1995). *The research and development of critical language awareness materials for use in South African secondary schools.* Unpublished doctoral thesis, Lancaster University, UK.

Janks, H. (1997). Critical discourse analysis as a research tool. *Discourse: Studies in the Cultural Politics of Education, 18(3),* 329-342.

Janks, H. (1998). Reading womanpower. *Pretexts: Studies in Writing and Culture, 7(2),* 195-211.

Janks, H. (2000). Domination, access, diversity and design: a synthesis for critical literacy education. *Educational Review, 52(2),* 175-186.

Jenks, C. (Ed.). (1982). *The sociology of childhood: Essential readings*. London: Batsford.

Johnson, S. (1997). *Interface culture*. San Francisco: HarperEdge.

Johnson-Eilola, J. (1994). Reading and writing in hypertext: vertigo and euphoria. In C. L. Selfe, & S. Hilligoss (Eds.), *Literacy and computers* (pp. 195-219). New York: Modern Language Association.

Johnson-Eilola, J. (1997). Living on the surface: learning in the age of global communication networks. In I. Snyder (Ed.), *Page to screen: Taking literacy into the electronic era* (pp. 185-210). St Leonards, NSW: Allen & Unwin.

Jonassen, D. H. (1996). *Computers in the classroom: Mindtools for critical thinking*. Columbus, OH: Merill/Prentice-Hall.

Jones, S. (Ed.). (1995). *Cybersociety: Computer-mediated communication and community*. Thousand Oaks, CA: Sage.

Jones, S. (Ed.). (1998). *Cybersociety 2.0: Revisiting computer-mediated communication and community.* Thousand Oaks, CA; London; New Delhi: Sage.

Joyce, M. (1995). *Of two minds: Hypertext pedagogy and poetics (studies in literature and science).* Ann Arbor, MI: University of Michigan Press.

Julien, H. (1999). Where to from here? Results of an empirical study and user-centred implications for system design. In T. D. Wilson, & D. K. Allen, *Exploring the contexts of information behaviour: Proceedings of the Second International Conference on Research in Information Needs. Seeking and Use in Different*

Contexts, 13-15 August, 1998, Sheffield, UK (pp. 586-596). London; Los Angeles, CA: Taylor Graham.

Kale, J., & Luke, A. (1991). Doing things with words: early language socialisation. In E. Furniss, & P. Green (Eds.), *The literacy agenda: Issues for nineties* (pp. 1-16). South Yarra: Eleanor Curtain.

Kamler, B. (1994). Lessons about language and gender. *The Australian Journal of Language and Literacy, 17(2),* 129-138.

Kamler, B. (1996). *Critical discourse analysis : A conversation with Norman Fairclough.* Geelong, Victoria: Deakin Centre for Education and Change, Faculty of Education, Deakin University.

Kamler, B. (1997). Text as body, body as text. *Discourse: Studies in the Cultural Politics of Education, 18(3),* 369-388.

Kamler, B. (2001). *Relocating the personal: A critical writing pedagogy.* Albany: State University of New York Press.

Kamler, B., Comber, B., & Cook, J. (Eds.). (1997). *Discourse: Studies in the Cultural Politics of Education, 18(3).*

Kamler, B., MacLean, R., Reid, J.-A., & Simpson, A. (1994). *Shaping up nicely: The formation of schoolgirls and schoolboys in the first month of school.* Canberra, Australian Capital Territory: Department of Education, Employment and Training.

Kamler, B., & Woods, B. (1987). *Two pathways to literacy*. Canberra, Australian Capital Territory: Australian Association for the Teaching of English.

Kellner, D. (1995). *Media culture: Cultural studies, identity and politics between the modern and the postmodern*. London; New York: Routledge.

Kenney, J. (1997, May 2). The age of the barbarian: teachers and librarians should ban printers if students are to make most of CD-ROM reference works. *Times Educational Supplement.* Retrieved October 5, 2000, from http://www.tes.co.uk/search/story/?story_id=46723

Kenway, J. (1995). Reality bytes: education, markets and the information superhighway. *The Australian Educational Researcher, 22(1),* 35-65.

Kenway, J., Fitzclarence, L., Collier, J., & Bigum, C. (1996). *Changing education: Consumer contexts, cultures and kids*. Geelong, Victoria: Deakin Centre for Education and Change, Faculty of Education, Deakin University.

Kids Search Engines [Website]. Retrieved from http://polk.ga.net/westside/Kidsearch/

Kister, K. (1998, November 15). Encyclopedists head for cyberspace. *Library Journal.* Retrieved April 4, 2001, from http://www.britannica.com:80/magazine?ebsco_id=61347

Kling, R. (1992). Audiences, narratives, and human values in social studies of technology. *Science, Technology & Human Values, 17*, 349-365.

Kling, R. (Ed.). (1996). *Computerization and controversy: Value conflicts and social choices*. San Diego, CA; London, UK: Academic Press.

Knobel, M. (1999). *Everyday literacies: Students, discourse, and social practice*. New York: Peter Lang.

Knobel, M., & Lankshear, C. (1998). Ways with windows: what different people do with the same equipment. First published in the proceedings of the *First Joint National Conference of the Australian Association for the Teaching of English, the Australian Literacy Educators' Association, and the Australian School Library Association*. Darwin, NT: Northern Territory Department of Education. Retrieved April 2, 2001, from http://www.geocities.com/Athens/Academy/1160/ways.html

Kress, G. (1994). *Learning to write*. London, New York: Routledge & Kegan Paul.

Kress, G. (1997). *Before writing: Rethinking the paths to literacy*. London; New York: Routledge.

Kress, G. (1999). "English" at the crossroads: rethinking curricula of communication in the context of the turn to the visual. In G. E. Hawisher, & C. L. Selfe (Eds.), *Passions, pedagogies and 21st century technologies* (pp. 66-88). Longan, Utah: Utah State University Press.

Kress, G. (2000a). Design and transformation: new theories of meaning. In B. Cope, & M. Kalantzis (Eds.). *Multiliteracies: Literacy learning and the design of social futures* (pp. 153-161). South Yarra: Macmillan.

Kress, G. (2000b). Multimodality. In B. Cope, & M. Kalantzis (Eds.). *Multiliteracies: Literacy learning and the design of social futures* (pp. 182-202). South Yarra: Macmillan.

Kress, G. (2003). *Literacy in the new media age*. London; New York: Routledge.

Kress, G., & van Leeuwen, T. (1990). *Reading images*. Geelong, Victoria: Deakin University Press.

Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago; London: The University of Chicago Press.

Landow, G. P. (1992). *Hypertext: The convergence of contemporary critical theory and technology*. Baltimore, MD: Johns Hopkins University Press.

Landow, G. P. (1997). *Hypertext 2.0: The convergence of contemporary critical theory and technology*. Baltimore, MD: Johns Hopkins University Press.

Landow, G., & Delany, P. (1993). *The digital word: Text-based computing in the humanities*. Cambridge: MIT Press.

Lanham, R. (1993). *The electronic word: Democracy, technology and the arts*. Chicago: University of Chicago Press.

Lanham, R. (1994). The economics of attention. *Proceedings of 124th Annual Meeting, Association of Research Libraries*. Retrieved June 2, 2000, from http://www.arl.org/arl/proceedings/124/ps2econ.html

Lankshear, C. (with Gee, J., Knobel, M., & Searle, C.). (1997). *Changing literacies*. Buckingham; Philadelphia: Open University Press.

Lankshear, C. (1998). Meanings of literacy in contemporary educational reform proposals. *Educational Theory, 48(3)*, 351-372.

Lankshear, C., & Bigum, C. (1999). Literacies and new technologies in school settings. *Pedagogy, Culture and Society, 7 (3)*, 445-465.

Lankshear, C., Bigum, C., Durrant, C., Green, B., Honan, E., Morgan, W., et al. (1997). *Digital rhetorics: Literacies and technologies in classrooms – current practices and future directions*. Canberra, Australian Capital Territory: Department of Employment, Education, Training and Youth Affairs.

Lankshear, C., & Knobel, M. (1997a). Literacies, texts and difference in the electronic age. In C. Lankshear (with J. Gee, M. Knobel, & C. Searle), *Changing literacies* (pp. 133-163). Buckingham, Philadelphia: Open University Press.

Lankshear, C., & Knobel, M. (1997b). Different worlds? Technology-mediated classroom learning and students' social practices with new technologies in home and community settings. In C. Lankshear (with J. Gee, M. Knobel, & C. Searle), *Changing literacies* (pp. 164-187). Buckingham, Philadelphia: Open University Press.

Lankshear, C., & Knobel, M. (1998). Critical literacy and new technologies. Paper presented at the *American Education Research Association*, San Diego. Retrieved April 2, 2001, from http://www.geocities.com/Athens/Academy/1160/critlitnewtechs.html

Lankshear, C., & Knobel, M. (2000). Mapping postmodern literacies: a preliminary chart. *The Journal of Literacy and Technology, 1(1)*. Retrieved April 2, 2001, from http://www.literacyandtechnology.org/v1n1/lk.html

Lankshear, C., & Knobel, M. (2002). Do we have your attention? New literacies, digital technologies and the education of adolescents. In D. E. Alvermann (Ed.), *Adolescents and literacies in a digital world* (pp. 19-39). New York: Peter Lang.

Lankshear, C., & Knobel, M. (2003). *New literacies: Changing knowledge and classroom learning*. Buckingham; Philadelphia: Open University Press.

Lankshear, C., & McLaren, P. (Eds.). (1993). *Critical literacy: Politics, praxis and the postmodern*. Albany, NY: State University of New York Press.

Lankshear, C., & Snyder, I. (with Green, B.). (2000). *Teachers and technoliteracy: Managing literacy, technology and learning in schools*. St Leonards, NSW: Allen & Unwin.

Lash, S. (Ed.). (1991). *Post-structuralist and postmodernist sociology*. Sussex: Edward Elgar.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Cambridge, MA: Harvard University Press.

Latour, B. (1996). *Aramis or the love of technology* (C. Porter, Trans.). Cambridge, MA: Harvard University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation (Learning in doing: Social, cognitive & computational perspectives)*. NY: Cambridge University Press.

Learning Links (Canton Public Library Kids Pages) [Web directory]. Retrieved March 22, 2004, from http://www.cantonpl.org/kids/learning.html

Learning Network. "Welcome to the learning network". (2001). Retrieved February 7, 2002, from http://www.learningnetwork.com/ [Currently unavailable]

Lemke, J. L. (1990). *Talking science: Language, learning and values*. Norwood, NJ: Ablex.

Lemke, J. L. (1995). *Textual politics: Discourse and social dynamics*. London; Bristol, PA: Taylor & Francis.

Lemke, J. L. (1998). Multimedia literacy demands of the scientific curriculum. *Linguistics and Education: An International Research Journal, 10(3)*, 247-271.

Lievrouw, L. A., & Farb, S. E. (2003). Information and equity. In B. Cronin (Ed.), *Annual review of information science and technology: Vol. 37* (pp. 499-539). Medford, NJ: Information Today.

Livingstone, S., & Bovil, M. (1999). Report of the Research Project 'Children, Young People and the Changing Media Environment'. In *Young people, new media*. London: London School of Economics and Political Science.

LoBianco, J., & Freebody, P. (1997). *Australian literacies: Informing national policy on literacy education*. Melbourne: Language Australia.

Luke, A. (1991). The political economy of reading instruction. In C. Baker, & A. Luke (Eds.), *Towards a critical sociology of reading pedagogy* (pp. 3-26). Amsterdam; Philadelphia: John Benjamins.

Luke, A. (1994). *The social construction of literacy in the primary school*. South Melbourne: Macmillan.

Luke, A. (1995). Text and discourse in education: an introduction to critical discourse analysis. In M. Apple (Ed.), *Review of research in education* (pp. 1-46). Washington, DC: American Educational Research Association.

Luke, A. (1997). Social perspectives on primers and textbooks. In R. Venezky, D. A. Wagner, & B. Street (Eds.). *Literacy: An international handbook* (pp. 186-191). Westview Press.

Luke, A., & Kapitzke, C. (1994). Pedagogy and paradox: teaching interpretation in a religious community. In H. Parret (Ed.), *Pretending to communicate* (pp. 124-140). Berlin; New York: Walter de Gruyter.

Luke, A., & Luke, C. (1994). Pedagogy. In R. E. Asher, & J. M. Simpson (Eds.), *The encyclopedia of language and linguistics: Vol. 6* (pp. 2994-2997). Tarrytown, NY: Pergamon.

Luke, C. (1989). *Pedagogy, printing and protestantism: The discourse on childhood*. Albany, NY: State University of New York Press.

Luke, C. (Ed.). (1996a). *Feminisms and pedagogies of everyday life*. Albany, NY: State University of New York Press.

Luke, C. (1996b). Introduction. In C. Luke (Ed.), *Feminisms and pedagogies of everyday life* (pp. 1-27). Albany, NY: State University of New York Press.

Luke, C. (1996c). Childhood and parenting in children's popular culture and childcare magazines. In C. Luke (Ed.), *Feminisms and pedagogies of everyday life* (pp. 167-187). Albany, NY: State University of New York Press.

Luke, C. (1996d). ekstasis@cyberia. *Discourse: Studies in the Cultural Politics of Education, 17(2),* 187-207.

Luke, C. (2000). Cyber-schooling and technological change: multiliteracies for new times. In B. Cope, & M. Kalantzis (Eds.), *Multiliteracies: Literacy learning and the design of social futures* (pp. 69-91). South Yarra: Macmillan.

Luke, C. (2003). Pedagogy, connectivity, multimodality, and interdisciplinarity. *Reading Research Quarterly, 38(3),* 397-403.

Luke, C., & Luke, A. (1995a). Cultural shifts and trends: issues for schooling. In B. Lingard, & F. Rizvi (Eds.), *External environmental scan* (pp. 8-13). Brisbane: Education Department of Queensland.

Luke, C., & Luke, A. (1995b). Lust naming? Educational discourse and the politics of identity. In G. Noblitt, W. Pink, & P. Wexler (Eds.), *The futures of the sociology of education* (pp. 357-380). Creskill, NJ: Hampton Press.

Lyon, L., & Silverstein, R. (2001). *PR and MarCom – Working together to influence customers*. Retrieved January 30, 2002 from http://archive.chipcenter.com/columns/COL_20011109F.html

Lyotard, J.-F. (1984). *The postmodern condition: A report on knowledge* (G. Bennington & B. Massumi, Trans.). Minneapolis: University of Minnesota Press.

MacGregor, R. C. (1993). Are we recognising the organisational impact on educational software design? *Australian Journal of Educational Technology, 9(1),* 59-68. Retrieved December 12, 2004, from http://www.ascilite.org.au/ajet/ajet9/macgregor.html

MacKenzie, D. (1990). *Inventing accuracy: A historical sociology of nuclear missile guidance*. Cambridge, MA: MIT Press.

MacKenzie, D., & Wajcman, J., (Eds.). (1985). *The social shaping of technology*. Milton Keynes: Open University Press.

MacLeod, R. (2000). Attention marketing in the network economy. In *The impact of networking: Marketing relationships in the new economy. Congress 2000 – The Impact of Networking; ESOMAR Congress 2000 Vienna, Austria, September 2000.* Retrieved November 25, 2004, from http://www.esomar.nl/congress2000/congress2000_programme.htm

Marchionini, G. (1995). *Information seeking in electronic environments*. New York, NY: Cambridge University Press.

Martin, J. R. (1992). *English text: System and structure*. Philadelphia; Amsterdam: Lohn Benjamins.

Martin-Barbero, J. (1993). *Communication, culture and hegemony: From media to medations* (E. Fox & R. A. White, Trans.). London; Newbury Park: Sage.

Maximedia School Project No 1 [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 1. "Working Around Stopwords and Other Exclusions" [Help text]. (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 2 [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 2. "Instruction Guide". (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 3 [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Mayhew, D. J. (1992). *Principles and guidelines in software user interface design.* Englewood Cliffs, NJ: Prentice Hall.

McDonald, G. (1998). Get smart! (Reference materials online and on CD-ROM). *PC World, 16(1),* 287(3). Retrieved October 5, 2000 from http://www.pcworld.com/

McHoul, A., & Luke, A. (1989). Discourse as language and politics: an introduction to the philology of political culture in Australia. *Journal of Pragmatics, 13,* 323-332.

McLean, J. (2000). Cyberseeing: language and the quest for information. In D. Gibbs, & K.-L. Krause (Eds.), *Cyberlines: Languages and cultures of the Internet* (pp. 79-101). Albert Park, Victoria: James Nicholas.

McLuhan, M. (1962). *The Gutenberg galaxy: The making of typographic man*. London: Routledge & Kegan Paul.

McLuhan, M., & Powers, B. (1989). *The global village: Transformations in world life and media in the 21st century*. Oxford: Oxford University Press.

Merriam-Webster Online (2004). Retrieved September 19, 2004, from http://www.m-w.com/

Microsoft Encarta Encyclopedia Deluxe 2001 [CD-ROM]. Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Encarta Researcher". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Learning". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Report Writing Guide – Organize". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Report Writing Guide – Produce". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Report Writing Guide – Search". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Report Writing Guide – The Five-Paragraph Report". (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Welcome to Encarta Researcher!" (2001). Microsoft Corporation.

Microsoft Encarta Encyclopedia Deluxe 2001. "Write". (2001). Microsoft Corporation.

Microsoft Encarta Interactive World Atlas [CD-ROM]. (2001). Microsoft Corporation.

Microsoft Encarta Online [Online encyclopaedia]. Retrieved November 27, 2003, from http://encarta.msn.com/EncartaHome.asp

Microsoft Encarta Online. "Reference". (2003). Retrieved November 27, 2003, from http://encarta.msn.com/encnet/features/reference.aspx

Microsoft Encarta Reference Suite 2001 – Australian Edition.[1] (2001). Microsoft Corporation.

[1] This package includes *Microsoft Encarta Encyclopedia Deluxe 2001* [3 CD-ROMs], *Microsoft Encarta Interactive World Atlas* [2 CD-ROMs], and *Microsoft Encarta World English Dictionary* [1 CD-ROM].

Moran, T. P. (1981). An applied psychology of the user. *ACM Computing Surveys, 13(1)*, 1-11. Retrieved October 28, 2002, from http://delivery.acm.org/10.1145/360000/356836/p1-moran.pdf?key1=356836&key2=5562487011&coll=GUIDE&dl=GUIDE&CFID=37615285&CFTOKEN=36743910

Murdoch, K. (1992). *Integrating naturally: Units of work for environmental education*. Dellasta, Mt Waverley: Victoria.

Murdoch, K. & Wilson, J. (2004). *Learning Links*. Melbourne: Curriculum Corporation.

Murdock, G., Hartmann, P., & Gray, P. (1992). Contexualising home computing: resources and practices. In R. Silverstone, & E. Hirsch (Eds.), *Consuming technologies: Media and information in domestic spaces* (pp. 146-162). London: Routledge.

Muspratt, A., Luke, A., & Freebody, P. (Eds.). (1997). *Constructing critical literacies*. Cresskill, NJ; Sydney: Hampton Press; Allen & Unwin.

New London Group. (1996). A pedagogy of multiliteracies: designing social futures. *Harvard Education Review, 66(1)*, 60-92.

Negroponte, N. (1995). *Being digital*. New York: Vintage Books.

Nielsen, J. (2000). *Designing Web usability: The practice of simplicity*. Indianopolis: New Riders Publishing.

Nixon, H. (1998). Fun and games are serious business. In J. Sefton-Green (Ed.), *Digital diversions: Youth cultures in the age of multi-media* (pp. 21-42). London: UCL Press.

Nixon, H. (1999). *Creating a clever, computer-literate nation: A cultural study of the media, young people and new technologies of information and communication in Australia 1994-1998*. Unpublished doctoral thesis, the University of Queensland.

Noble, G. (1999). Domesticating technology: learning to live with your computer. *Australian Journal of Communication, 26(2)*, 59-76.

Norman, D. A. (1998). *The invisible computer*. Cambridge, MA: MIT Press.

NWREL's Northwest Educational Technology Consortium [Website]. Retrieved from http://www.netc.org/presentations/

O'Bannon, B. (1997). CD-ROM integration peaks student interest in inquiry. *Computers in the Schools, 13(3-4)*, 127-134. Retrieved October 6, 2000, from http://www.haworthpress.com/web/CITS/)

Oliver, R. (1996). Information access and retrieval from electronic information sources: what do our students need to learn? *Access, 10(1)*, 20-22. Retrieved October 6, 2000, from http://elrond.scam.ecu.edu.au/oliver/docs/96/ACCESSdo.pdf

Oliver, R., & Herrington, J. (1995). Developing effective hypermedia instructional materials. *Australian Journal of Educational Technology, 11(2),* 8-22. Retrieved December 12, 2004, from http://www.ascilite.org.au/ajet/ajet11/oliver.html

Oliver, R., & Perzylo, L. (1994). Children's information skills: making effective use of multimedia sources. *Educational and Training Technology International, 31(3),* 219-230.

Olsen, L. (1995). La bizarre: a multimedia presentation. *The Australian Library Journal, 44(1),* 13-21.

Olson, J. (2000). Trojan horse or teacher's pet? Computers and the culture of the school. *Journal of Curriculum Studies, 32(1),* 1-8.

Olsson, M. (1999). Discourse: a new theoretical framework for examining information behaviour in its social context. In T. D. Wilson, & D. K. Allen, *Exploring the contexts of information behaviour: Proceedings of the Second International Conference on Research in Information Needs. Seeking and Use in Different Contexts, 13-15 August, 1998, Sheffield, UK* (pp. 136-149). London; Los Angeles, CA: Taylor Graham.

Ong, W. J. (1982). *Orality and literacy: The technologizing of the word*. London; New York: Methuen.

Overmode. "World Encyclopedia 2000 CD-ROM". (2002). Retrieved January 23, 2002, from http://www.overmode.com.au/software_edu.htm [Currently unavailable]

Palumbo, D. B., & Prater, D. (1993). The role of hypermedia in synthesis writing. *Computers and Composition, 10(2),* 59-70.

Papert, S. (1980). *Mindstorms: Children, computers, and powerful ideas*. New York: Basic Books.

Pedersen, J. (2001). Technological determinism and the school. *Journal of Educational Enquiry, 2(1),* 61-65. Retrieved March 17, 2003, from http://www.education.unisa.edu.au/JEE

Pellone, G. (1995). Educational software design: a literature review. *Australian Journal of Educational Technology, 11(1),* 68-84. Retrieved December 12, 2004, from http://www.ascilite.org.au/ajet/ajet11/pellone.html

Peters, M., & Lankshear, C. (1996). Critical literacy and digital texts. *Educational Theory, 46(1),* 51-70.

Pfaffenberger, B. (1992). Technological dramas. *Science, Technology & Human Values, 17,* 282-312.

Pham, B. (1998). Quality evaluation of educational multimedia systems. *Australian Journal of Educational Technology, 14(2),* 107-121. Retrieved December 12, 2004, from http://www.ascilite.org.au/ajet/ajet14/pham.html

Poster, M. (1990). *The mode of information: Poststructuralism and social context*. London: Polity Press.

Postman, N. (1982). *The disappearance of childhood*. New York: Delacorte Press.

Postman, N. (1993). *Technopoly: The surrender of culture to technology*. New York: Vintage Books.

Potter, J. (1997). *Representing reality: Discourse, rhetoric and social construction*. London; Thousand Oaks; New Delhi: Sage.

Poynton, C. (1985). *Language and gender: Making the difference*. Geelong, Victoria: Deakin University Press.

Poynton, C. (1990). *Address and the semiotics of social relations: A systemic-functional account of address forms and practices in Australian English*. Unpublished doctoral thesis, University of Sydney.

Preece, J., Rogers, Y., & Sharp, H. (2002). *Interaction design: Beyond human-computer interaction*. New York: John Wiley.

Queensland Government. (2000). *Literate futures: Report of the literacy review for Queensland state schools.* The State of Queensland, Department of Education. Retrieved October 30, 2004, from http://education.qld.gov.au/curriculum/learning/literate-futures/pdfs/lf-review.pdf

Qvortrup, J., Bardy, M., Sgritta, G., & Wintersberger, H. (Eds.). (1994). *Childhood matters: Social theory, practice and politics.* Aldershot, UK: Avebury.

Recio, E. M. (2001). Discourse on information, technology and the global noosphere. Retrieved May 4, 2001, from http://polywog.navpoint.com/sociology/globalization/asgn1/asgn1.html

Reiss, E. (2000). *Practical information architecture: A hands-on approach to structuring successful websites.* Harlow, UK: Addison-Wesley.

Resnyansky, L. (2002). Computer-mediated communication in higher education: educators' agency in relation to technology. *Journal of Educational Enquiry, 3(1),* 35-59. Retrieved September 30, 2003, from http://www.education.unisa.edu.au/JEE

Resnyansky, L. (2004). Electronic encyclopaedias and Internet search tools: information sources, tools, and pedagogical practices. Paper presented at the *27th International Convention MIPRO, Conference on Computers in Education (CE), 25-27 May 2004, Opatja, Croatia*: http://www.mipro.hr/ece.htm

Rodenburg, D. (1999, November-December). Web-based learning: extending the paradigm. *The Technology Source*. Retrieved January 12, 2004, from http://horizon.unc.edu/TS/editor/81.html

Ross, A. (1991). *Strange weather: Culture, science and technology in the age of limits*. London: Verso.

Roszak, T. (1986). *The cult of information: The folklore of computers and the true art of thinking*. New York: Pantheon Books.

Rothery J., & Stenglin, M. (1997). Entertaining and instructing: exploring experience through story. In F. Christie, & J. R. Martin (Eds.), *Genre and institutions: Social processes in the workplace and school* (pp. 231-263). London; Washington: Cassell.

Ruopp, R., Gal, S., Drayton, B., & Pfister, M. (1993). *LabNet: Toward a community of practice*. Hillsdale, NJ: Erlbaum.

Rushkoff, D. (1997). *Children of chaos: Surviving the end of the world as we know it*. London: Harper Collins.

Rushkoff, D. (1999). Chapter 7. Virtual marketing. In D. Rushkoff, *Coercion: Why we listen to what 'they' say* (pp. 257-296). NY: Riverhead Books. Retrieved April 21, 2001, from http://www.mindjack.com/rushkoff/coercion.html

Sader, M., & Lewis, A. (Eds.). (1995). *Encyclopedias, atlases and dictionaries*. New Providence, NJ: R. R. Bowker.

Schamber, L. (1988). The novice user and CD-ROM database services. In *ERIC Clearinghouse on Information Resources*. Syracuse, NY. Retrieved November 19, 2002, from http://www.ericdigests.org/ (ERIC Identifier: ED300032; Publication date: 1988-05-00)

Schegloff, E. A. (1987). Analyzing single episodes of interaction: an exercise in conversation analysis. *Social Psychology Quarterly, 50*,101-114.

School House Software Review [Website]. (1997). Retrieved from http://www.worldvillage.com/wv/school/html/scholrev.htm

School House Software Review. Cunningham, R. (1997a). "Big Blue Hits Big Time with New Learning Tool: A Review of World Book 1997 Multimedia Encyclopedia (Deluxe Edition)". Retrieved January 16, 2002, from http://www.worldvillage.com/wv/school/html/reviews/wb97encyclopedia.htm

School House Software Review. Cunningham, R. (1997a). "Who Says Learning Can't Be Fun? A Review of Ultimate Children's Encyclopedia". Retrieved January 16, 2002, from http://www.worldvillage.com/wv/school/html/reviews/uce.htm

"Search Engine Terms". (1999). Retrieved May 5, 2004, from http://www.cadenza.org/search_engine_terms/

Sefton-Green, J. (1998). Introduction: being young in the digital age. In J. Sefton-Green (Ed.), *Digital diversions: Youth cultures in the age of multimedia* (pp. 1-20). London: UCL Press.

Sefton-Green, J. (2002). Cementing the virtual relationship: children's TV goes online. In D. Buckingham (Ed.), *Small screens: Television for children* (pp. 185-207). London: Continuum Press.

Sefton-Green, J., & Buckingham, D. (1998). Digital visions: children's 'creative' uses of multi-media technologies. In J. Sefton-Green (Ed.), *Digital diversions: Youth cultures in the age of multimedia* (pp. 62-83). London: UCL Press.

Selfe, C. (1999). Technology and literacy: a story about the perils of not paying attention. *College Composition and Communication, 50(3)*, 411-436.

Selwyn, N. (2000). The National Grid for Learning: panacea or panopticon? *British Journal of Sociology of Education, 21(2)*, 243-255.

Selwyn, N. (2002). Learning to love the micro: the discursive construction of 'educational' computing in the UK, 1979-89. *British Journal of Sociology of Education, 23(3)*, 427-443.

Sharpe, T., & Dieter, E. (1999). Visual literacy and the Internet. In J. Callow (Ed.), *Image matters: Visual texts in the classroom* (pp. 95-108). Newtown, NSW: Primary English Teaching Association.

Shenk, D. (1997). *Surviving the information glut.* San Francisco, CA: HarperEdge.

Shenton, A. K., & Dixon, P. (2003). A comparison of youngsters' use of CD-ROM and the Internet as information resources. *Journal of the American Society for Information Science and Technology, 54(11)*, 1029-1049. Retrieved January 21, 2004, from http://www3.interscience.wiley.com/cgi-bin/fulltext/104538773/HTMLSTART

Silverstone, R., & Hirsch, E. (Eds.). (1992). *Consuming technologies: Media and information in domestic spaces.* London; New York: Routledge.

Singer, L. A. (1993). CD-ROM technology: an essential tool for today's students. *CD-ROM Professional, 6(5)*, 162(2). Retrieved August 16, 1999, from http://emedialive.com/cdrompro/

Slatin, J. M. (1990). Reading hypertext: order and coherence in a new medium. *College English, 52(8)*, 870-883.

Smith, D. E. (1993). *Texts, facts and femininity: Exploring the relations of ruling*. London: Routledge.

Smith, D. E. (1999). *Writing the social: Critique, theory and investigation*. Toronto: University of Toronto Press.

Snyder, I. (1996). *Hypertext: The electronic labyrinth.* Melbourne: Melbourne University Press.

Snyder, I. (Ed.). (1997). *Page to screen: Taking literacy into the electronic era*. St Leonards, NSW: Allen & Unwin.

Snyder, I. (2000). Literacy and technology studies: past, present, future. *The Australian Educational Researcher, 27(2)*, 97-119.

Star, S. L. (Ed.). (1995). *The sociological review monographs: Vol. 42*. Oxford, UK; Cambridge, MA: Blackwell Publishers.

Steedman, C. (1995). *Strange dislocations: Childhood and the idea of human interiority, 1780-1930*. Cambridge, MA: Harvard University Press.

Stibbons, P. (1997, July). CD-ROM development. *Educational Computing and Technology*, 23-25.

Street, B. (Ed.). (1993). *Literacy in cross-cultural perspective*. Cambridge: Cambridge University Press.

Street, B. (1995). *Social literacies: Critical approaches to literacy in development, ethnography and education*. London; New York: Longman.

Sullivan, D. (2004). Kids search engines. Retrieved February 25, 2004, from http://searchenginewatch.com/links/article.php/2156191

Sun Bunnies Boutique [Website]. (2004, June 17). Retrieved June 18, 2004, from http://stores.ebay.com/Sun-Bunnies-Boutique_W0QQsspagenameZl2QQtZkm

SuperKids Educational Software Review [Website]. Retrieved from http://www.superkids.com

SuperKids Educational Software Review. "About SuperKids". (2002). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/aboutsks.html

SuperKids Educational Software Review. "About SuperKids' Reviews". (2002). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/criteria.shtml)

SuperKids Educational Software Review. "Features". (2004). Retrieved June 18, 2004, from http://www.superkids.com/aweb/pages/features/feature1.html

SuperKids Educational Software Review. "Homepage". (2002). Retrieved January 16, 2002, from http://www.superkids.com

SuperKids Educational Software Review. "Homepage". (2004a). Retrieved May 31, 2004, from http://www.superkids.com

SuperKids Educational Software Review. "Homepage". (2004b). Retrieved June 18, 2004, from http://www.superkids.com

SuperKids Educational Software Review. "Kids Evaluation Form". (1996). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/kids.html

SuperKids Educational Software Review. "Microsoft Encarta Encyclopedia Deluxe 2000". (2002). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/encyclo/5/encarta/merge.shtml

SuperKids Educational Software Review. "Parent Evaluation Form". (1996). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/parent.html

SuperKids Educational Software Review. "Reviews". (2004). Retrieved June 18, 2004, from http://www.superkids.com/aweb/pages/reviews/reviews.shtml

SuperKids Educational Software Review. "Subject Index". (2004). Retrieved June 18, 2004, from http://www.superkids.com/aweb/pages/reviews/subjects.shtml

SuperKids Educational Software Review. "Teacher Evalua tion Form". (1996). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/teacher.html

SuperKids Educational Software Review. "World Book Millennium 2000 Deluxe Edition". (2002). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/encyclo/5/worldbk/merge.shtml

SuperKids Educational Software Review. "Year 2000 Grolier Multimedia Encyclopedia Deluxe". (2002). Retrieved January 16, 2002, from http://www.superkids.com/aweb/pages/reviews/encyclo/5/grolier/merge.shtml

Talja, S. (1997). Constituting 'information' and 'user' as research objects: a theory of knowledge formations as an alternative to the information-man theory. In P. Vakkari, R. Savolainen, & B. Dervin (Eds.), *Information seeking in context. Proceedings of an International Conference on Research in Information Needs, Seeking and Use in Different Contexts, 14-16 August, 1996, Tampere, Finland* (pp. 67-80). London: Taylor Graham.

Tech Corps [Website]. Retrieved January 22, 2002, from http://techcorps.org/

Tech Corps. "Children's Software". (2002). Retrieved January 22, 2002, from http://www.techcorps.org/resources/children.html

TekMom Search Tools for Students [Website]. Retrieved June 18, 2004, from http://www.tekmom.com/search/index.html

The Edutainment Page! [Website]. Retrieved January 22, 2002, from http://www.edutainment.com.au [Currently unavailable from this location]

The Edutainment Page! "1994 Microsoft Encarta". (1997). Retrieved January 23, 200 2, from http://www.edutainment.com.au/encta94.html

The Edutainment Page! "Microsoft Encarta 1995". (1997). Retrieved January 23, 2002, from http://www.edutainment.com.au/encarta.html

The Edutainment Page! "The Britannica CD, ON-line, and Electronic Index". (1997). Retrieved January 23, 2002, from http://www.edutainment.com.au/rbrit.html

The Edutainment Page! "Webster's Interactive Encyclopaedia". (1997). Retrieved January 23, 2002, from http://www.edutainment.com.au/web.html

The Encyclopedia of Great Artists [CD-ROM]. (1995). Staffordshire, UK: Focus Multimedia.

The Review Zone [Website]. Retrieved from http://www.thereviewzone.com

The Review Zone. "About The Review Zone". (2000). Retrieved January 23, 2002, from http://www.thereviewzone.com/abouttrz.html

The Review Zone. "CD-ROM Titles for Teaching, Reference and Family Productivity". (2002). Retrieved January 23, 2002, from http://www.thereviewzone.com/teaching-tools-index.html

The Review Zone. "Homepage". (2004). Retrieved June 10, 2004, from http://www.thereviewzone.com

The Review Zone. "The Review Zone CD-ROM Reviews". (2003). Retrieved June 17, 2004, from http://www.thereviewzone.com/reviews-index.html

The Review Zone. Velgos, T. (1998a). "Encarta 98 Encyclopedia Deluxe". Retrieved January 23, 2002, from http://www.thereviewzone.com/encartadeluxe98.html

The Review Zone. Velgos, T. (1998b). "World Book 1998 Multimedia Encyclopedia – Deluxe Edition". Retrieved January 23, 2002, from http://www.thereviewzone.com/worldbook98.html

The San Diego Science Alliance Guide and Links to On-Line and CD-ROM Encyclopedias [Website]. (2003). Retrieved July 13, 2004, from http://www.sdsa.org/Links/encyclop.html

The World's Best 10000 Clipart Images [CD-ROM]. (1998). Richmond, Victoria: Sprintsoftware.

Thomson, P., & Comber, B. (2003). Deficient "disadvantaged students" or media-savvy meaning makers? Engaging new metaphors for redesigning classrooms and pedagogies. *McGill Journal of Education, 38(2),* 305-327.

Thompson, J. B. (1995). *The media and modernity: A social theory of the media*. Cambridge, UK: Polity Press.

Thumlert, K. (1997). *Hypertextuality and sociocultural contexts for education*. Retrieved May 20, 2001, from http://home1.gte.net/grnjeans/htext.htm

Tiffin, J., & Rajasingham, L. (1995). *In search of the virtual class: Education in an information society*. London; New York: Routledge.

Tobin, J. (1998). An American *otaku* (or, a boy's virtual life on the Net). In J. Sefton-Green (Ed.), *Digital diversions: Youth cultures in the age of multimedia* (pp.106-127). London: UCL Press.

Tuman, M. (1992). *Word perfect: Literacy in the computer age*. London: The Falmer Press.

Turkle, S. (1984). *The second self: Computers and the human spirit*. London: Granada.

Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet*. New York: Simon & Schuster.

Turkle, S. (1997). Seeing through computers: education in a culture of simulation. *The American Prospect, 8(31)*. Retrieved May 7, 2001, from http://www.prospect.org/print/V8/31/turkle-s.html

Tyler, D. (1993). Making better children. In D. Meredyth, & D. Tyler (Eds.), *Child and citizen: Genealogies of schooling and subjectivity*. Institute of Cultural Studies, Queensland: Griffith University. Retrieved December 12, 2004, from http://www.academyanalyticarts.org/tyler.htm

Ulmer, G. L. (1992). Grammatology (in the stacks) of hypermedia: a simulation. In M. C. Tuman (Ed.), *Literacy online: The promise (and peril) of reading and writing with computers* (pp. 139-158). Pittsburgh, PA: University of Pittsburgh Press.

Valentine, G., Holloway, S., & Bingham, N. (2000). Transforming cyberspace: children's interventions in the new public sphere. In S. Holloway, & G. Valentine (Eds.), *Children's geographies* (pp. 156-173). London; New York: Routledge.

van Dijk, T. A. (1993). Principles of critical discourse analysis. *Discourse & Society, 4*, 249-283.

Veel, R., & Coffin, C. (1996). Learning to think like an historian: the language of secondary school history. In R. Hasan, & G. Williams (Eds.), *Literacy in Society* (pp. 191-231). London; New York: Longman.

Voloshinov, V. N.[2] (1986). *Marxism and the philosophy of language* (L. Matejka and I. R. Titunik, Trans.). Cambridge, MA: Harvard University Press.

Walkerdine, V. (1984). Developmental psychology and the child-centred pedagogy: the insertion of Piaget into early education. In J. Henriques, W. Hollway, C. Urwin, C. Venn, & V. Walkerdine (Eds.), *Changing the subject: Psychology, social regulation and subjectivity* (pp. 153-202). London: Methuen.

Ward, C. (1994). Opportunities for childhoods in late twentieth century Britain. In B. Mayall (Ed.), *Children's childhoods: Observed and experienced*. London: The Falmer Press.

[2] Also known as Vološinov V. N.

Way Cool Software Reviews [Website]. Retrieved from http://www.ucc.uconn.edu/~wwwpcse/wcool.htm [Currently unavailable]

Way Cool Software Reviews. "Evaluation Form". (1997). Retrieved January 22, 2000, from http://www.ucc.uconn.edu/~wwwpcse/wcform.html [Currently unavailable]

Webster's Concise Interactive Encyclopedia [CD-ROM]. (1996). Softkey, The Learning Company.

Webster's Encylopedia of Australia 2000 [CD-ROM]. Brookvale, NSW: Infosentials, Webster Publishing.

Webster's Encylopedia of Australia 2000. "Project Creator". Brookvale, NSW: Infosentials, Webster Publishing.

Webster's Encylopedia of Australia 2000. "Print". Brookvale, NSW: Infosentials, Webster Publishing.

Webster's Encylopedia of Australia 2000. "Projects Roll-up" [Help text]. Brookvale, NSW: Infosentials, Webster Publishing.

Webster's Encylopedia of Australia 2000. "Search Roll-up" [Help text]. Brookvale, NSW: Infosentials, Webster Publishing.

WebWise [Web directory]. Retrieved from http://www.bbc.co.uk/webwise/

WebWise. "Homepage". (2004). Retrieved August 21, 2004, from http://www.bbc.co.uk/webwise/

Wertheim, M. (1999). *The pearly gates of cyberspace: A history of space from Dante to the Internet*. New York: W. W. Norton.

Wertsch, J. (1991). *Voices of the mind: A sociocultural approach to mediated action*. London; Sydney; Singapore: Harvester Wheatsheaf.

What Happened When in Australia [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Who Did What in Australia [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Willinsky, J. (2000). *If only we knew: Increasing the public value of social science research*. New York: Routledge.

Willinsky, J. (2001). *After literacy: Essays*. New York: Peter Lang.

Wilson, M. (2004). Understanding the international ICT and Development discourse: assumptions and implications. Retrieved September 10, 2004, from http://link.wits.ac.za/journal/j0301-merridy-fin.pdf

Wilson, T. D. (2000). Human information behavior. *Informing Science. Special Issue on Information Science Research, 3(2)*, 49-55. Retrieved April 23, 2004, from http://inform.nu/Articles/Vol3/v3n2p49-56.pdf

Winner, L. (1991). Upon opening the black box and finding it empty: social constructivism and the philosophy of technology. In J. Pitt, & E. Lugo (Eds.), *The technology of discovery and the discovery of technology* (pp. 503-519). Blacksburg, VA: Virginia Polytechnic Institute and State University.

Woolgar, S. (1991). The turn to technology in social studies of science. *Science, Technology & Human Values, 16*, 20-50.

Yahoo! [Web directory]. Retrieved from http://www.yahoo.com/

Yahooligans! [Web directory]. Retrieved from http://www.yahooligans.com/

Yahooligans! "Homepage". (2000). Retrieved August 18, 2003, from http://yahooligans.yahoo.com/

Yahooligans! "Parents' Guide: Safe Surfing with Your Family". (2000). Retrieved June 8, 2000, from http://yahooligans.yahoo.com/parents/

Young, D. (2003). Discourses on communication technology in Canadian and European broadcasting policy debates. *European Journal of Communication, 18(2)*, pp. 209-240.

Zammit, K. (1999). Click. Click. Reading and viewing CD-ROMs. In J. Callow (Ed.), *Image matters: Visual texts in the classroom* (pp. 85-94). Newtown, NSW: Primary English Teaching Association.

Appendix A
CD-ROM encyclopaedias, online encyclopaedias, and children's Internet search tools

CD-ROM encyclopaedias

Animals, A Multimedia Encyclopedia. (1998). Seven Hills, NSW: Nodtronics, Eurekasoftware.

Birds of Australia 5.0. (1999). Natural Learning.

Hutchinson Multimedia Encyclopedia. (1997). Focus Multimedia.

Maximedia School Project No 1. (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 2. (1999). Kiama, NSW: Maximedia.

Maximedia School Project No 3. (1999). Kiama, NSW: Maximedia.

Microsoft Encarta Reference Suite 2001 – Australian Edition (2001). Microsoft Corporation. This package includes *Microsoft Encarta Encyclopedia Deluxe 2001* [3 CD-ROMs], *Microsoft Encarta Interactive World Atlas* [2 CD-ROMs], and *Microsoft Encarta World English Dictionary* [1 CD-ROM].

The Encyclopedia of Great Artists. (1995). Staffordshire, UK: Focus Multimedia.

The World's Best 10000 Clipart Images. (1998). Richmond, Victoria: Sprintsoftware.

Webster's Concise Interactive Encyclopedia. (1996). Softkey, The Learning Company.

Webster's Encylopedia of Australia 2000. Brookvale, NSW: Infosentials, Webster Publishing.

What Happened When in Australia. (1999). Kiama, NSW: Maximedia.

Who Did What in Australia [CD-ROM]. (1999). Kiama, NSW: Maximedia.

Online encyclopaedias

Britannica Online: http://www.britannica.com

Columbia Electronic Encyclopedia: http://www.bartleby.com/65/

Electric Library (eLibrary): http://www.elibrary.com/id/150/220/ [*eLibrary* is now known as *HighBeam™ Research* and the reference is redirected to http://www.highbeam.com/library/index.asp]

Encyclopedia.com: http://www.encyclopedia.com/

Infoplease (Information Please: On-line Dictionary, Internet Encyclopedia, & Almanac Reference): www.infoplease.com

Microsoft Encarta Online: http://encarta.msn.com/EncartaHome.asp

Children's Internet search tools

Ask Jeeves for Kids [Internet search engine]: http://www.ajkids.com/

Fact Monster [Web directory]: http://www.factmonster.com/

Free Internet Encyclopedia [Web directory]: http://www.cam-info.net/enc.html

Learning Links (Canton Public Library Kids Pages) [Web directory]: http://www.cantonpl.org/kids/learning.html

WebWise [Web directory]: http://www.bbc.co.uk/webwise/

Yahooligans! [Web directory]: http://www.yahooligans.com/

Appendix B
Children's software review websites, educational resources websites, and the websites of publishing companies and online stores

Software review websites

Aussiereviews.com: http://www.aussiereviews.com

ccclearn: http://www.ccclearn.com [Currently available from http://www.pearsondigital.com/]

Children's Software Review: http://www.childrenssoftwarereview.com/ [Currently unavailable]

Children's Software Revue: http://www.microweb.com/pepsite/Revue/ [Currently unavailable]

CMIS Evaluation: http://www.eddept.wa.edu.au/cmis/eval/index.htm

CNET.com: http://www.cnet.com

DiscoverySchool.com: http://school.discovery.com

Education hot-links: http://www.edsitewa.iinet.net.au/educationhotlinks.html [Currently available from http://www.edsite.com.au/educationhotlinks.html]

IT Reviews: http://www.itreviews.co.uk

Overmode: http://www.overmode.com.au [Currently unavailable]

ReviewFinder: http://www.reviewfinder.com

School House Software Review: http://www.worldvillage.com/wv/school/html/scholrev.htm

SuperKids Educational Software Review: http://www.superkids.com

The Edutainment Page!: http://www.edutainment.com.au

The Review Zone: http://www.thereviewzone.com

Way Cool Software Reviews: http://www.ucc.uconn.edu/~wwwpcse/wcool.htm [Currently unavailable]

Educational resources websites

EdNA Online: http://www.edna.edu.au

EdSoftware (Educational Software Institute Online): http://www.edsoftware.com/ [Currently available from http://www.higheredsoftware.com/]

Education hot-links: http://www.edsitewa.iinet.net.au/educationhotlinks.html [Currently available from http://www.edsite.com.au/educationhotlinks.html]

EvaluTech: http://www.evalutech.sreb.org/

IRC Reviews (Instructional Resource Center, Fort Hays State University College of Education (US): http://www.fhsu.edu/irc/reviews.html

ISLMC, the Internet School Library Media Center: http://falcon.jmu.edu/~ramseyil/

Ivy's Search Engines for Kids: http://www.ivyjoy.com/rayne/kidssearch.html

Kids Search Engines: http://polk.ga.net/westside/Kidsearch/

Learnall.net: http://www.learnall.net

Learning Network: http://www.learningnetwork.com/ [Currently unavailable]

NWREL's Northwest Educational Technology Consortium: http://www.netc.org/presentations/

P.E.P.: http://www.microweb.com/pepsite/ [Currently unavailable]

Software Review Connections: http://www.fhsu.edu/irc/reviews.html

Tech Corps: http://techcorps.org/

The websites of online stores and publishing companies

Amazon.com: http://www.amazon.com

Bartleby.com: http://www.bartleby.com

Dataworks: http://www.dataworks.com.au

Scholastic: http://scholastic.com/

Sprint Software: http://www.programurl.com/software/sprint.htm

Webster Publishing: http://www.websterpublishing.com

Appendix C
Reviews of CD-ROM encyclopaedias

"1994 Microsoft Encarta". Retrieved January 23, 2002, from *The Edutainment Page!*: http://www.edutainment.com.au/encta94.html

"Big Blue Hits Big Time with New Learning Tool: A Review of World Book 1997 Multimedia Encyclopedia (Deluxe Edition)". Retrieved January 16, 2002, from *School House Software Review*: http://www.worldvillage.com/wv/school/html/reviews/wb97encyclopedia.htm

"Britannica CD 2.0". Retrieved January 23, 2002, from *The Edutainment Page*: http://www.edutainment.com.au/96brit.html

"Columbia Encyclopedia, Sixth Edition". Retrieved January 16, 2002, from *Bartleby.com*: http://www.bartleby.com/65/

"Compton's Encyclopedia 2000 Deluxe". Retrieved January 16, 2002, from *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/compton/merge.shtml

"Encarta 98 Encyclopedia Deluxe". Retrieved January 23, 2002, from *The Review Zone*: http://www.thereviewzone.com/encartadeluxe98.html

"Grolier Multimedia Encyclopedia 1998 Deluxe". Retrieved January 23, 2002, from *The Review Zone*: http://www.thereviewzone.com/reviews-index.html

"Microsoft Encarta 1995". Retrieved January 23, 2002, from *The Edutainment Page!*: http://www.edutainment.com.au/encarta.html

"Microsoft Encarta 96 – World English Edition". Retrieved January 23, 2002, from *The Edutainment Page*: http://www.edutainment.com.au/96enc2.html

"Microsoft Encarta Encyclopedia Deluxe 2000". Retrieved January 16, 2002, from *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/encarta/merge.shtml

"Microsoft Encarta Reference Library 2002". Retrieved January 22, 2002, from *CNET.com*: http://reviews.cnet.com/4505-3514_7-6358120-2.html?legacy=cnet

"Microsoft Encarta Reference Suite Deluxe 2001". (2002). Retrieved January 23, 2002, from DiscoverySchool.com Website:

http://school.discovery.com/parents/reviewcorner/software/fsencartarefdlx2001.html

"The Australian Infopedia". Retrieved January 23, 2002, from *The Edutainment Page!*: http://www.edutainment.com.au/infoped.html

"The Britannica CD, On-line, and Electronic Index". Retrieved January 23, 2002, from *The Edutainment Page!*: http://www.edutainment.com.au/rbrit.html

"The Encyclopedia of Australia 1996". Retrieved January 22, 2002, from *CMIS Evaluation*: http://www.eddept.wa.edu.au/centoff/cmis/eval/technology/software/sf37.htm

"The Hutchinson Encyclopedia 2001". Retrieved January 16, 2002, from *IT Reviews*: http://www.itreviews.co.uk/software/s96.htm

"Webster's Interactive Encyclopedia". Retrieved January 23, 2002, from *The Edutainment Page!*: http://www.edutainment.com.au/web.html

"Who Says Learning Can't Be Fun? A Review of Ultimate Children's Encyclopedia". Retrieved January 16, 2002, from *School House Software Review*: http://www.worldvillage.com/wv/school/html/reviews/uce.htm

"World Book 1998 Multimedia Encyclopedia - Deluxe Edition". Retrieved January 23, 2002, from *The Review Zone*: http://www.thereviewzone.com/worldbook98.html

"World Book Millenium 2000 Deluxe Edition". Retrieved January 16, 2002, from *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/worldbk/merge.shtml

"World Encyclopedia 2000 CD-ROM". Retrieved January 23, 2002, from *Overmode*: http://www.overmode.com.au/software_edu.htm

"Year 2000 Grolier Multimedia Encyclopedia Deluxe". Retrieved January 16, 2002, from *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/grolier/merge.shtml

Appendix D
CD-ROM encyclopaedias reviewed on the World Wide Web

1994 Microsoft Encarta. Reviewed on *The Edutainment Page!*:
http://www.edutainment.com.au/encta94.html

Britannica CD 2.0. Reviewed on *The Edutainment Page*:
http://www.edutainment.com.au/96brit.html

Britannica 97. Reviewed on *The Review Zone*: http://www.thereviewzone.com/reviews-index.html

Britannica 98. Reviewed on *The Review Zone*: http://www.thereviewzone.com/reviews-index.html

Compton's Encyclopedia 2000 Deluxe. Reviewed on *SuperKids Educational Software Review*:
http://www.superkids.com/aweb/pages/reviews/encyclo/encyclo/5/sw_sum1.shtml

Encarta 98 Encyclopedia Deluxe. Reviewed on *The Review Zone*:
http://www.thereviewzone.com/encartadeluxe98.html

Encyclopedia Britannica 2001 Deluxe CD/DVD. Reviewed on *ReviewFinder*:
http://www.reviewfinder.com/8/8798.asp

Encyclopedia Britannica 2002. Reviewed on *ReviewFinder*:
http://www.reviewfinder.com/8/8798.asp

Encyclopedia of Australia 1996. Reviewed on *CMIS Evaluation*:
http://www.eddept.wa.edu.au/centoff/cmis/eval/technology/software/sf37.htm

Encyclopedia of Australia 2000. Reviewed on *Overmode*: http://overmode.com.au

Europress Encyclopedia 1999. Reviewed on *ReviewFinder*:
http://www.reviewfinder.com/8/8798.asp

Grolier Multimedia Encyclopedia 1998 Deluxe. Reviewed on *The Review Zone*:
http://www.thereviewzone.com/reviews-index.html

Grolier Multimedia Encyclopedia 2000 Deluxe. Reviewed on *SuperKids Educational Software Review*:
http://www.superkids.com/aweb/pages/reviews/encyclo/5/sw_sum1.shtml

Hutchinson Encyclopedia 2001. Reviewed on *ReviewFinder*: http://www.reviewfinder.com/8/8798.asp; and on *IT Reviews*: http://www.itreviews.co.uk/software/s96.htm

Microsoft Encarta 1995. Reviewed on *The Edutainment Page!*: http://www.edutainment.com.au/encarta.html

Microsoft Encarta 96 – World English Edition. Reviewed on *The Edutainment Page*: http://www.edutainment.com.au/96enc2.html

Microsift Encarta 97 Encyclopedia. Reviewed on *ReviewFinder*: http://www.reviewfinder.com/8/8798.asp

Microsift Encarta 98 Encyclopedia Deluxe. Reviewed on *ReviewFinder*: http://www.reviewfinder.com/8/8798.asp; and on *The Review Zone*: http://www.thereviewzone.com/reviews-index.html

Microsift Encarta Encyclopedia Deluxe 2000. Reviewed on *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/sw_sum1.shtml

Microsoft Encarta Reference Library 2002. Reviewed on *CNET.com*: http://www.cnet.com/coftware/0-3227902-1205-6358120.html

Microsift Encarta Reference Suite Deluxe 2001. Reviewed on *DiscoverySchool.com*: http://school.discovery.com/parents/reviewcorner/software/fsencartarefdlx2001.html

The Australian Infopedia. Reviewed on *The Edutainment Page!*: http://www.edutainment.com.au/infoped.html

Webster's Interactive Encyclopedia. Reviewed on *The Edutainment Page!*: http://www.edutainment.com.au/web.html

World Book 1997 Multimedia Encyclopedia - Deluxe Edition. Reviewed on *School House Software Review*: http://www.worldvillage.com/wv/school/html/reviews/wb97encyclopedia.htm; and on *School House Software Review*: http://www.worldvillage.com/wv/school/html/reviews/wb97encyclopedia.htm

World Book 1998 Multimedia Encyclopedia Deluxe Edition. Reviewed on *The Review Zone*: http://www.thereviewzone.com/reviews-index.html

World Book Millenium 2000 Deluxe Edition. Reviewed on *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/sw_sum1.shtml

World Encyclopedia 2000. Reviewed on *Overmode*: http://www.overmode.com.au/software_edu.htm

Ultimate Children's Encyclopedia. Reviewed on *School House Software Review*: http://www.worldvillage.com/wv/school/html/reviews/wb97encyclopedia.htm

Year 2000 Grolier Multimedia Encyclopedia Deluxe. Reviewed on *SuperKids Educational Software Review*: http://www.superkids.com/aweb/pages/reviews/encyclo/5/grolier/merge.shtml