

THE INTEGRATED, ACCESSIBLE LIBRARY A Model Of Service Development For The 21st Century

**The Final Report of the REVIEL
(Resources for Visually Impaired Users of the Electronic
Library)Project**

British Library Research & Innovation Report 168

Peter Brophy

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Jenny Craven

**Centre for Research in Library & Information Management
The Manchester Metropolitan University**

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The Integrated Accessible Library: a model of service development for the 21st century.

**Peter Brophy
Jenny Craven**

**Centre for Research in Library & Information Management (CERLIM)
Department of Information & Communications
The Manchester Metropolitan University
Geoffrey Manton Building
Manchester
M15 6LL
Tel: +161-247-6142
Fax: +161-247-6351
Email: cerlim@mmu.ac.uk
WWW: <http://www.mmu.ac.uk/h-ss/cerlim/>**

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Preface

As we enter the Information Age, we risk excluding 1 million of our citizens. These are people who have some form of serious visual impairment. Many are elderly and relatively isolated, others are young people in work; or even younger children: people who need access to information and to works of imagination: novels, plays, poetry, pictures, video and new multimedia packages. The information and communications technology revolution ought to be a passport to inclusiveness: instead it risks perpetrating inequality. Libraries – the access points to information for so many of us – are failing to keep up with the technology of access.

The opportunities are there. What is needed is a national lead, an initiative which will place **accessibility** at the forefront and challenge every library in the country to offer all of its users equal services. What is needed is a **National Accessible Library Service**.

That is the vision of the REVEL Project Final Report. The Resources for Visually Impaired Users of the Electronic Library Project carried out intensive investigations of both current services and the potential of technology over a two-year period. It found small pockets of excellent practice, but large areas where the issues were simply unknown. Technology is advancing fast: in higher education it has produced the remarkable *Electronic Libraries Project*, while public libraries are about to launch new services based on the vision of the Library & Information Commission's Report, *New Library*. To couple such advances with national, regional and local commitments to accessibility would be an achievement to be proud of.

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Executive Summary

This Report makes the case for a national initiative to make all library and information services accessible to people who are blind or have a visual impairment - at least a million people in the UK alone. It suggests that, in addition to local delivery through local centres, national agencies are needed to:

- Develop policy, co-ordinate the provision of services, promote standards, encourage training and act as a focus for international co-operation;
- Act as a resource databank, both through centralised collection development and through the co-ordination of distributed resources;
- Provide technical advice, including the dissemination of research results.

To achieve accessibility of library services in the Information Age, national, regional and local government all have a role to play, as have the higher education funding councils and individual educational institutions and other organisations. The National Accessible Library Service would be a cross-sectoral achievement, drawing on specialist sources but also encouraging accessibility of the National Distributed Electronic Resource.

The Resources for Visually Impaired Users of the Electronic Library (REVIEL) Project has investigated the current state of accessible services and explored what would be needed to achieve national excellence in this field. A model is presented in this, the Final Report of the Project, which if implemented would enable libraries to fulfil their responsibilities to provide inclusive services, ensuring that no-one is excluded because of their visual impairment. As we move into increasingly electronic information environments, in which visual images are playing an increasing role as carriers of content, inclusion cannot be achieved by default or by wishful thinking or by small bands of committed volunteers. Making all library and information services accessible should be on the agenda of every information professional and every policy maker. Working together, we can reach the goal of accessible services.

The Report is presented in four parts:

- Part I presents an outline of the proposed National Accessible Library Service – the NALS;
- Part II provides background information about visual impairment, about the current accessibility of library services and about work ongoing in this field. It also draws attention to legal and policy issues;
- Part III presents the elements of the accessible library of the future, blending the requirement to provide both traditional and electronic services (the concept of the hybrid library) with accessibility to services and the provision of accessible formats;

- Part IV draws together a number of implementation issues and makes suggestions for further research and development which will be required if the NALS is to be established.

The Report forms a major milestone in the Manchester Metropolitan University Centre for Research in Library & Information Management's long term research and development programme in the area of accessibility.

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Any errors, misunderstandings or omissions remain the responsibility of the Research Team.

Peter Brophy
Jenny Craven
May 1999

Part I A National Initiative: the National Accessible Library Service (NALS)

At the beginning of this Report we state our major recommendation. This may seem unusual, but we do so because we believe that it presents a vision of how accessible library services could be developed in the UK, given the political and professional will, and because it provides the background to the remainder of the Report. We would prefer readers to be fully aware of our conclusions as they read the rest of the Report, and hope that the many different aspects of accessibility and of library services will be placed into context by it.

The National Accessible Library Service (NALS)

There are immense opportunities to end the exclusion of people with visual impairments from full participation as users of information and literature through the development of an integrated, well-designed, national service which integrates both traditional and electronic library services. The **UK National Accessible Library Service (NALS)** would be a co-operative enterprise drawing on the strengths of all sectors to serve all citizens who have need of its services. It should not be limited to any one sector, such as higher education, nor to use for particular purposes, such as education. Its dual focus would be on encouraging all content suppliers and brokers, including libraries, to take accessibility seriously and on facilitating access to material in appropriate formats.

NALS would take its place as a part of the enabling infrastructure of the UK's Distributed National Electronic Resource (DNER), drawing on distributed resources as far as possible and making maximum use of electronic formats where these are suitable for delivery and access by blind and visually impaired people. But it would in essence be a **hybrid** service, using traditional and electronic formats as appropriate to the needs of its users.

The model proposed for the NALS is as follows:

- A National Co-ordinating Agency with responsibilities for:
 - Policy development
 - The development of an agreed minimum service standard for all agencies providing 'library' services to blind and visually impaired people
 - Co-ordination with cognate national initiatives, such as the National Grid for Learning (NGfL) and 'New Library: the People's Network'
 - Co-ordination of training, for both librarians and end users, again setting national standards
 - Agreement on metadata standards for accessible formats, within international conventions
 - Co-ordination of collection development, including with other agencies on priorities for transcription in order to build up the national accessible resource in a planned fashion
 - Promotion of accessible Web, and other, design standards
 - Operation of a 'kite-mark' scheme for accessible library services which meet the minimum standards
 - Collection of appropriate statistics on demand for, provision of and supply of accessible library services
 - Representation internationally
- A Resource Databank Hub, offering services including:

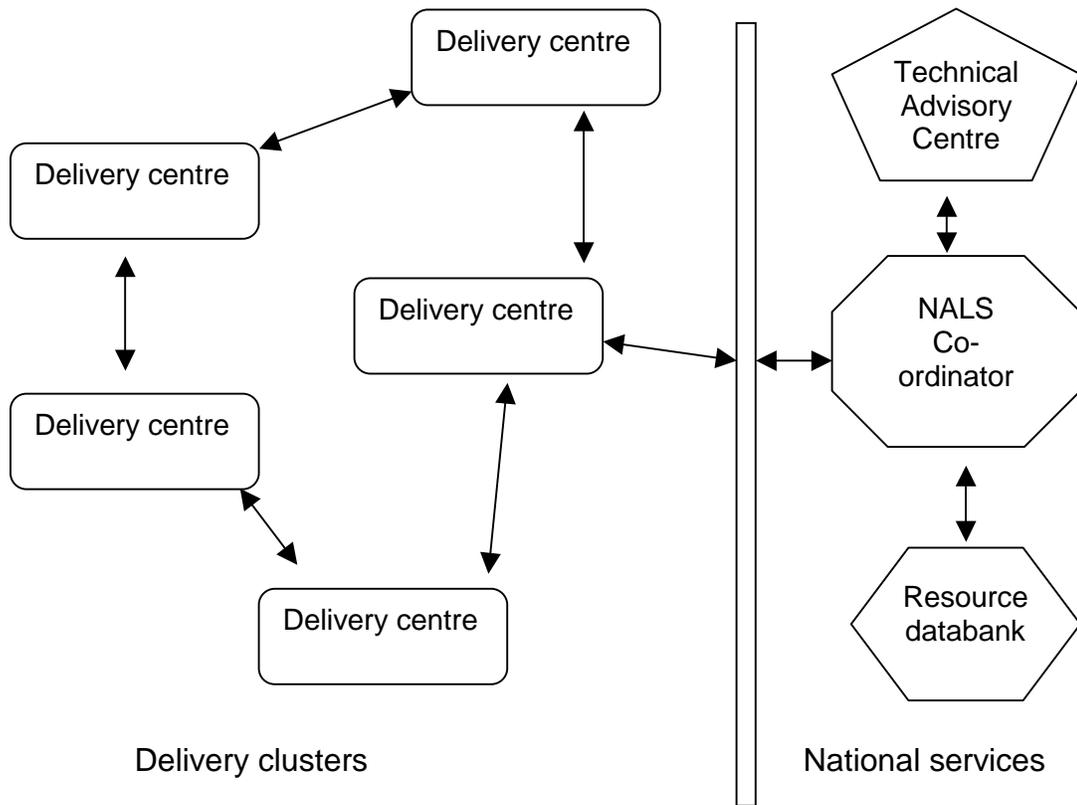
- A growing stock of materials in traditional formats (braille, Moon, etc.)
- Delivery capability for all formats
- A stock of, together with access to, significant electronic materials for which permission to use is available, including resource delivery capability
- Legal deposit of alternative formats
- A catalogue of its holdings, with Z39.50 capability
- Co-ordination of collection descriptions
- A specialist Web-based gateway identifying quality-assured resources, linked to the National Resource Discovery Network Centre (NRDC) services
- Maintenance of a user authentication and user profiling system
- Agreements with delivery agencies
- Digitisation expertise (capability could be outsourced)
- Access to copyright clearance expertise, including the development of blanket permission agreements with publishers (probably through an arrangement with the Higher Education Resources On-Demand (HERON) service)
- A Technical Advisory Centre with responsibility for
 - Ensuring that latest advances are disseminated (especially with regard to content accessibility)
 - Monitoring standards
 - Technical advice to Delivery Agencies, for example on transcription
 - A programme of research & development tightly focused on achieving accessibility within the hybrid (traditional + electronic) library environment
- A series of clusters of Delivery Agencies, which could be
 - Geographical, involving public, academic libraries and other centres within, for example, a metropolitan area
 - Domain, including commercial organisations, academic institutions and learned societies.

each offering services to blind and visually-impaired users which meet or exceed national standards, and some developing specific expertise to be shared across the network.

It should be noted that, apart from the Delivery Agencies, the above roles could be undertaken either by a single agency or by a number of separate agencies. The model is illustrated on the next page [the illustration repeats the text description above and is not essential to the description].

This Report makes the case for a national initiative to make this model a reality. The REVIEL Project's work on accessibility and the findings of its component phases are described in Part II as background to the design of the NALS. In Part III we describe the key issues from the wider perspective of information and

communications technology development, networked information services, and research into the concept of the 'hybrid library'. In Part IV we consider the implementation issues raised by our core recommendation, and the further areas of work which need to be explored.



National Accessible Library Service (NALS) Model
[For a text description, see previous page]

Part II

In this Part of the Report, the background to accessible services is described. The descriptions encompass both work undertaken directly by REVIEL and the work of other projects and agencies. The aim is to provide a summary of the issues which need to be considered and addressed if library and information services are to be fully accessible.

1. Introduction

Social inclusion is one of the key issues of our age. One of the hallmarks of a civilised society is its commitment to ensuring that all of its citizens can play a full part in its life, and that none are excluded by reason of birth, belief, aptitude or circumstance. Exclusion takes many forms and must be countered in many different ways. In this Report we are concerned with countering the exclusion from access to information (a term we use to include works of imagination as well as factual materials) which can all too easily occur when individuals do not have so-called 'normal' vision – when the assumptions that society too often makes about what is the 'norm' in terms of visual ability result in insuperable barriers to access. Our domain is libraries and information services, and our concern is that all such services should, in their entirety, be as accessible to blind and visually impaired people as to anyone else.

The rapid development of networked information and communications technologies provides opportunities for radical changes in the services which can be delivered to all information users, including those who need to use 'accessible' formats and systems in order to overcome visual or other disability. While the concepts outlined in this Report are widely applicable to other disabilities, the REVEL Project was primarily concerned with services to those with a visual impairment.

The principles underlying the REVEL Project are:

inclusiveness, equity and independence: visually impaired persons should be included as full users of services through appropriate policies and design; they should have equity of access both to services in general and to information services in particular; they should be able to access and use services independently, without additional intermediaries¹.

The development of digital information sources and systems poses a number of difficulties for the designers of accessible systems. In particular, there is a strong movement (for example in the European Commission's new Framework V research and development programme) towards focusing on multimedia content, driven in part by the World Wide Web which makes heavy use of visual as well as textual content. While in its formative years the Web's use of visual images was largely 'decorative', more and more it uses each medium to carry significant content, so that a person unable to access one medium (whether it be visual, aural or even textual) is unable to use the resource effectively. The World Wide Web Consortium (W3C), the body responsible for Web standards, has made a strong commitment to accessibility in its standards, but too often the issue is ignored or given low priority by content publishers.

¹ This text is taken from the original Project Proposal document.

In these circumstances there are two possible approaches to the design of accessible library services. The first concentrates on providing tools (such as voice output) and encouraging the use of good practice (such as providing explanations of images in accompanying text) to enable people with a visual impairment to access information from 'standard' information sources, even where they use visual images. The second approach is to take the standard sources and 'translate' them into accessible formats, before delivering them to the user – akin to the translation of printed text into braille or Moon in the traditional library context. At the same time, both 'traditional' and electronic resources will be needed for many years to come if libraries are to offer access to a full range of resources. It follows that, almost certainly, it is the combination of all these approaches that will provide the most comprehensive accessible library service in the future, and the one which preserves an essential element of choice for the user. The issue of 'hybrid' services is considered in more detail in section 13 below.

It should be emphasised that while this Report refers to 'information sources' the term is used in its widest sense to include not only 'factual' documents, but works of creative imagination (novels, poetry, etc.), representations of museum or gallery objects and presentations (for example, both performances and scripts). Many of these non-factual and non-textual resources present particular problems.

The design of accessible library services needs to consider the opportunities of networked information systems as well as their problems. For example, information in electronic formats can be used by many people at once, not just by the user who happened to be first in the queue. Further, information can be delivered to the user, or at least to a nearby centre, far more easily and cheaply than by conventional means, and this process can be user driven, with the user able to 'pull' information sources down from a central fileserver, rather than a human intermediary having to retrieve and arrange delivery. Of course these benefits depend on the availability of adequate infrastructure, including both networks and end-user hardware/software systems, and on these being affordable.

It is particularly timely to consider these issues now:

- Government policy lays great stress on inclusion and at combating exclusion, while encouraging the rapid development of new technologies.
- The explosion of interest in networked digital information has brought vastly increased resources to bear on solving problems of access for all citizens.
- The National Grid for Learning (NGfL), with its emphasis on the training of librarians to play their part in delivering the learning society, provides evidence of the wider significance of these issues.

- 'New Library' has demonstrated that the public library service has the potential to provide the network of learning access centres needed to bring lifelong learning to every citizen.
- The Electronic Libraries (eLib) Programme in higher education has enormously increased our understanding of the technical, organisational and implementation issues surrounding digital libraries.

This Report suggests that the provision of accessible information and library services in the Information Age is a national issue, which can only be tackled effectively by national action. Indeed it could be regarded as a test case for the effectiveness of the type of inter-library planning and delivery mechanisms which are promoted within the Library & Information Commission's strategy documents, *New Library*² and *Building the New Library*³.

The REVEL Project has shown that individual libraries are rarely effective in providing appropriate services to people with visual impairments. Although there are honourable exceptions, the knowledge, skills and commitment needed to provide effective services to what is usually a very small client group are often lacking. Where successful services have been developed they are nearly always housed in separate units, staffed by specialists⁴. It is time to design services which can take their place in the mainstream by exploiting the opportunities of networked services and IT-based end-user access. National leadership and national co-ordination are needed to achieve this.

² Library and Information Commission *New Library: The People's Network*, London: Library and Information Commission, 1997.

[<http://www.ukoln.ac.uk/services/lic/newlibrary/full.html/>]

³ Library and Information Commission. *Building the New Library Network: a report to government*. London: Library & Information Commission, 1998.

[<http://www.lic.gov.uk/publications/tgapp1.html>]

⁴ So, to take the example of the North West Region, two of the best-developed services in the public library and academic library sectors are the units at Manchester Central Library and at the University of Central Lancashire, each housed in its own accommodation within the Library building.

2. The REVIEL Project

Funded by the British Library Research & Innovation Centre and the Joint Information Systems Committee of the Higher Education Funding Councils, the REsources for Visually Impaired users of the Electronic Library (REVIEL) Project⁵ sought to move forward the provision of information services to blind and visually impaired people in the UK. Its primary initial focus has been on higher education, though as the project progressed the synergies with other sectors became obvious. REVIEL's ultimate aim was to promote the development of a national, networked virtual library of resources accessible to, and where necessary designed for, visually impaired persons.

The project has followed a number of structured phases, beginning with an initial survey of all higher education libraries in the UK. The survey identified those libraries which then offered a specific library and information support service for students and staff with a visual impairment. Follow-up interviews with staff of selected institutions which have developed such services provided a baseline for the next part of the work.

Concurrently the project developed its links with other key researchers and providers in the field. In the UK (and Europe), the Royal National Institute for the Blind (RNIB) and the National Library for the Blind (NLB) are key players. Two major research & development projects: TEsting Systems using Telematics for Library Access for Blind and visually handicapped readers (TESTLAB) and the Pilot Interlending Project (PIP) also proved to have considerable synergy with REVIEL. REVIEL staff have also played hosts to expert visitors from as far afield as Seattle.

A study was undertaken of the advice currently available to service & system designers concerning good design principles for electronic information services. This resulted in a set of guidelines, which in the light of rapid developments in World Wide Web design and use, and in particular with the World Wide Web Consortium's development of its own guidelines, has been systematically reviewed and updated. Information was also gathered on advice currently available to service and system designers concerning good design principles. Much of this information can be found from Internet sources (e.g. both Microsoft and Apple maintain specific pages on these issues) and links to relevant websites including projects and initiatives, guidelines on web design and relevant institutions are available on the REVIEL project website⁶.

The REVIEL project has examined a wide range of electronic information services available to UK higher education from the viewpoint of access by

⁵ The REVIEL Project web page will be found at : <http://www.mmu.ac.uk/h-ss/cerlim/projects/reviel.htm>

⁶ <http://www.mmu.ac.uk/h-ss/cerlim/projects/reviel/resource.htm>

visually impaired people. Most effort has been concentrated on web sites, and a variety of tools were used to analyse their accessibility. A group of visually impaired users was also enlisted to add a 'human element' to the analysis. The users were asked to look at a number of sites using access technology, and then comment on the site in terms of ease of access and navigation. The results of all stages of the analysis have informed this Report and in particular the overall design for a NALS.

An important phase of the project has been an analysis of the standards being used for encoding materials in specific formats (e.g. audio, braille, tactile) by institutions and other providers. Particular attention was paid to the suitability of the standards used for the networked environment. Parallel investigation of the bibliographic standards being used to describe these materials has also formed an important part of the project's work.

The final phase of the REVIEL project entailed a detailed study of the feasibility of developing a virtual library of networked resources in formats suitable for persons with a visual impairment. This phase encompassed exploitation of the earlier findings of the project and the development of a generic, but implementable, model. Recommendations for further work which needs to be undertaken to develop the virtual library concept and to provide an ongoing advisory service for system designers were also developed.

In this Part of our Report we provide background information to set the scene, both by providing information on visual impairment and its effects and by reporting on our investigations into accessibility issues which arise with current library and information services. We have also drawn attention to selected organisations working in the field and to major accessibility initiatives around the world. The following Part examines the elements needed to create accessible library services.

3. What is Visual Impairment?

3.1. Definition of visual impairment

The official definition of blindness, used in the UK to determine whether a person may be registered as blind, is “so blind as to be unable to perform any work for which eyesight is essential”⁷. There is no legal definition of partial sight, but according to the RNIB a person can be registered as partially sighted if they are “substantially and permanently handicapped by congenitally defective vision or in whose case illness or injury has caused defective vision of a substantial and permanently handicapped character”⁸. There are also medical definitions of partial sight and blindness which are used by ophthalmologists to determine whether to certify a person as ‘registrable’. Using a scale from 20/20 vision to zero, a level of 6/60 is recognised as the threshold for registration: this leaves a large number of people with significant sight loss who have difficulties interacting with traditional print and traditional libraries.

Terminology relating to blind and visually impaired people has developed considerably over the years. One of the main reasons for this has been the desire to describe people who experience degrees of sight loss in terms which are “not derogatory and avoid social stigma”⁹. Terms which have generally been used include: blind, partially sighted, visually impaired people, visually handicapped, print impaired. The RNIB has also recommended using the term ‘people with serious sight problems’ when referring to people who are blind or partially sighted. Terms which should not be used include ‘the blind’ and ‘the visually impaired’.

For the purpose of consistency, this report will use the term ‘blind and visually impaired’ to relate to anyone with a serious sight problem and to anyone who has difficulty in reading text, whether on screen or on paper, because of a visual impairment. Account has also been taken of the fact that people experience different types of sight loss (see below) which in turn means that their needs will also be different and highlights the necessity to provide people with choices as to how they access information. While it was beyond the scope of the Project to consider broader issues, such as accessibility for people with dyslexia, it is worth noting that many of the principles of design for accessibility for blind and visually impaired people offer major benefits to a broader accessibility agenda. It has often been remarked: “good design for accessibility is good design”.

⁷ National Assistance Act (1948) quoted by the RNIB website at: <http://www.rnib.org.uk/ew/under.htm>

⁸ Definitions taken from the RNIB website at: <http://www.rnib.org.uk/ew/under.htm>

⁹ Craddock, P. *Project Libra: the provision and use of reading aids for the visually impaired and other print handicapped people in UK public libraries. The British Library Information and Research Report 91*, London: The British Library, 1996.

3.2. Types of visual impairment

Total blindness is actually quite rare with only an estimated 12% of registered blind people “seeing nothing at all”¹⁰. Most people with visual impairment suffer from partial sight loss or some kind of visual impairment, most often caused by disease or deterioration of the eye in old age. The most common causes of visual impairment are:

- Macular disease: removes central vision.
- Cataract: overall loss of colour, loss of outline and problems with glare such as that caused by sunshine. This is often a temporary condition given the success of modern medical procedures.
- Diabetic retinopathy: patches of vision are lost according to the areas of damaged retina.
- Glaucoma: as if looking through a telescope.
- Hemianopia: dramatic loss of sight from a stroke – one half normal, one half lost.
- CMV retinitis: similar to cataract (front of eye) and retinal (back of eye) disorders.¹¹

Many of these conditions, if untreated, can lead to total loss of sight. There are of course many other causes of sight loss, those outlined above being just a sample. In order to simplify the description, visual loss can also be divided into four main types by its effects:

- Total blindness.
- Central vision loss.
- Peripheral vision loss.
- General lowered acuity without field losses¹².

The needs of people who have little or no sight are generally different from those experienced by people with partial sight and each may affect an individual in different ways. Carey states that “the case of totally blind people is clear and bleak enough but that of people with residual vision presents a set of complex problems”¹³. Godber goes on to express the danger of slotting blind and visually

¹⁰ Taken from a presentation by Gill Burrington at the *REVIEL Expert Workshop, December 1998*.

¹¹ Simulations of some of the different kind of ‘blindness’ experienced can be viewed at: <http://www.rnib.org.uk/linksite/abarnes.htm>

¹² Collins, J. Understanding the problems of being partially sighted, In Hogg, F.N. (ed.), *Looking ahead: a practical look at new developments in library and information services for visually impaired persons. Papers presented at the second international conference on library services to visually impaired persons, held at the University of Nottingham, 15 – 18 July 1994*. Leicester: Ulverscroft, 1994.

¹³ Carey, K. Comparative disadvantage and special opportunities and the information technology revolution: general considerations and the examination of visual impairment as a case study. *Aslib Proceedings*, 49 (4) April 1997, pp.77-81.

impaired people into a “single homogenous group”¹⁴ as this may create a false impression that their needs can be easily met through production of products for ‘the blind’ or ‘the visually impaired’. Clearly the belief that one product or one service will meet the needs of all is misguided. It follows that terminology adopted should not only be such that it “adequately describes people and yet is socially acceptable”¹⁵ but that it also takes individuality into account.

3.3. UK statistics relating to visually impaired people

The RNIB has estimated that almost a million people over the age of 16 are eligible for registration as blind or partially sighted although only a third are actually registered. Of those eligible, 66% are aged 75 or over, with 72% being women. Estimates for the number of visually impaired children in the UK are hard to establish. The RNIB estimate numbers at around 22,000¹⁶, and the Office of Population Censuses and Surveys uses a similar estimate.

Of Britain’s population of 58.4 million, Burrington quotes the following statistics relating to people over 16 years of age with visual impairment:

- 1 million eligible to be registered blind or partially sighted.
- 4% of blind people have no light perception.
- 1.7 million people are unable to read standard print.
- 36% of blind people can read large print.
- 30% of blind and partially sighted people use audio tape for their information needs.
- 97% of people over 65 years wear glasses.
- 90% of visually impaired people are aged 65 and over¹⁷.

The above figures are based on the number of *registered* blind and visually impaired people and are thus only an estimated figure. The true number is likely to be considerably more, with the growing number of older people suffering some kind of sight loss coupled with the fact that some people who may well be eligible, for a variety of reasons choose not to go through with registration. On the other hand, some people may not be eligible for registration, but nonetheless may have difficulty in reading the printed word. It is worth bearing in mind that if plans to make learning a lifelong experience come to fruition, many more elderly people who are suffering some degree of visual impairment are likely to become active users of information resources and of IT-based information and library systems.

¹⁴ Godber, J. How open is your Opac? *Library Technology*, 4 (1) February 1999. p.12.

¹⁵ Craddock, P.1996. *op cit*.

¹⁶ Data is provided by the RNIB on its web site and is regularly updated. See www.rnib.org.uk/wesupply/fctsheet/authuk.htm

¹⁷ Taken from a presentation by Gill Burrington, given at the *REVIEL Expert Workshop*, December 1998.

4. Organisations Serving Blind and Visually impaired People

Organisations which are dedicated to addressing the needs of and raising awareness about the rights of blind and visually impaired people exist world-wide. This chapter gives a brief introduction to some of the key organisations in the field, both in the UK and North America, but it is **not** intended as a comprehensive directory of even the significant organisations in the field.

4.1. Royal National Institute for the Blind (RNIB)¹⁸

The RNIB is one of the United Kingdom's largest charities, providing over 60 services to blind and visually impaired people throughout the country. The RNIB provides information and advice and has an extensive web site. One of the most visited RNIB web pages, for example, provides information about eye conditions while another set of pages provides advice on products and services. The RNIB has one of the largest braille printing houses in the world, selling books, periodicals and braille music to blind people at subsidised rates. In 1998 it produced around 38 million pages in braille. The RNIB also aims to "challenge all who put barriers in the path of blind and partially sighted people".¹⁹ This could include the production of web pages which are inaccessible to blind and visually impaired people and to challenge this, advice and guidelines are offered on designing accessible websites based on the W3C developments. The RNIB offers a website accessibility audit service and until recently made available a website checker (see Chapter 8).

The RNIB's talking book service has 55,000 members and despatches nearly three million items each year. Its cassette library with over 15,000 titles covering academic and general non-fiction subjects supports 4,000 students and people in employment. Its braille library has 80,000 volumes. It operates five regionally-based multimedia transcription services producing texts and diagrams in large print, braille, Moon, audio and electronic formats. As a publisher, it is responsible for 40 magazines and periodicals produced in braille and Moon.

4.2. National Library for the Blind (NLB)²⁰

Established in 1882, the National Library for the Blind (NLB) is a free library service which provides access to literature and library services for visually impaired people.

The NLB provides materials in braille and Moon. Books in braille can be delivered to members on a next day service or can be downloaded electronically from the NLB website where copyright permission has been obtained. The NLB is committed to meeting the changing needs of its readers and to develop its services

¹⁸ RNIB website: <http://www.rnib.org.uk/>

¹⁹ Taken from the RNIB website *op. cit.*

²⁰ NLB website: <http://www.nlbuk.org/>

accordingly. The most recent development has been the Fiction Café²¹ which is a virtual bookshop available on the NLB website offering features such as book reviews, book ordering and links to national and international library partners. A particular concern of current developments is to extend their services to any new readers who do not currently make use of the NLB services. In May 1999, NLB and RNIB jointly organised the National Touch Reading Day.

4.3. CALIBRE²²

Calibre is one of the major providers of recorded books for the blind in the UK. It has over 5,000 titles available, and they are provided free to blind and partially-sighted children and adults. It has 13,000 members and dispatches around 1,600 cassettes a day. It is entirely funded from public donations.

4.4. The Talking Newspaper Association (TNAUK)²³

TNAUK is responsible for recording over 200 national newspapers and magazines onto audio cassette for use by blind and visually-impaired people. It produces and sends out around 2.5 million cassettes a year and estimates that these reach around 200,000 people. It acts as an umbrella organisation for over 500 local Talking Newspaper voluntary groups and is increasingly making use of information and communications technologies to extend the range of formats available. Its wholly-owned subsidiary, Talking Newspaper Enterprises, produces alternative formats for a wide range of government departments, educational bodies and commercial and industrial firms.

4.5. The IFLA Section of Libraries for the Blind²⁴

The International Federation of Library Associations and Institutions (IFLA) was established to provide librarians around the world with a forum for exchanging ideas, promoting international cooperation, and sharing research and development in all fields of library activity. IFLA is made up of a number of divisions, sections and round tables. The IFLA Section of Libraries for the Blind is concerned with the provision of library services to blind and others who have difficulty in reading print. The main goals of the Section of Libraries for the Blind are to promote national and international collaboration in this field and to encourage the access of information to all blind and visually impaired persons. This includes the development of standardised materials, bibliographic control and the identification of alternative format collections as well as work on overcoming problems of copyright clearance.

²¹ <http://www.nlbuk.org/fiction-cafe/>

²² <http://www.luna.co.uk/~npharris/calibre1.html/>

²³ <http://www.tnel.co.uk/tnauk.html/>

²⁴ <http://www.ifla.org/VII/s31/slb.htm/>

4.6. Disability Information Systems in Higher Education (DISinHE)²⁵

Based at the University of Dundee, the JISC funded DISinHE Centre works with higher education institutions and other relevant bodies to create a culture where technical support to students and staff with disabilities becomes part of the standard provision of support available. DISinHE also provides advice on policy and strategy issues to institutions in the higher education sector and JISC.

DISinHE is in the process of developing a database of key people throughout the UK who can provide technical support to students and staff with disabilities. It aims to provide examples of good practice and to provide information on current and completed research projects in the field. Most recently, DISinHE has been involved in the production of a handbook on guidelines for accessible courseware, commissioned by the Teaching and Learning Technology Project²⁶.

4.7. The National Bureau for Students with Disabilities (Skill)²⁷

Skill provides advice and support to disabled students, to their families and to people working in the field. It offers an information service including a number of information leaflets and pamphlets on subjects such as the provision of specialist equipment and improving access for disabled people. It also runs events and courses aimed at raising awareness of disability issues and provides a consultancy service. On a national level, Skill aims to influence government policy through liaison with government and government agencies and through the participation in relevant bodies such as the National Council for Vocational Qualifications.

4.8. Share the Vision²⁸

Share the Vision (STV) was established in 1989 by RNIB. It is now a company limited by guarantee and funded by RNIB, NLB and Calibre. It has also received grant aid from the Guide Dogs for the Blind Association and the Ulverscroft Foundation. Other members of the company are the Society of Chief librarians, the British Library, the Library Association, TNAUK and the Scottish Library and Information Council. The aim of the partnership is to promote access to information and library services for visually impaired people and to work on the development and improvement of services to this group. STV's objectives include encouraging collaboration between national library and information providers and public libraries. It is committed to influencing policy both at national and local levels in order to develop and improve library service delivery. It has run events

²⁵ Further details about DISinHE can be found on the DISinHE website: www.disinhe.ac.uk

²⁶ Higher Education Funding Council for England, Scottish Higher Education Funding Council, Higher Education Funding Council for Wales, Department of Education Northern Ireland and Disability Information Systems in Higher Education Centre *Guidelines for Accessible Courseware* Bristol: Higher Education Funding Council for England, February 1999.

²⁷ The Skill website is at: <http://www.skill.org.uk>

²⁸ Share the Vision: Kent County Central Library, Springfield, Maidstone, Kent ME14 2LH

such as workshops and seminars to provide support for public library authorities in developing their plans and policies. STV also actively promotes the training of library and information workers in disability awareness.

4.9. eEquip²⁹

Set up by to co-ordinate and develop work to improve provision for disabled students in UK higher education, the main focus of eEquip is on raising awareness of good practice in academic services. The eEquip team produces a twice yearly Bulletin which includes articles from experts in the field of disability support as well as relevant news and events.

4.10. WEBB (West of England, Bath and Bristol) Accessibility Project³⁰

Funded by the HEFCE programme on special initiatives, the project is an example of the kind of initiative which this programme has encouraged. Encompassing three universities: West of England, Bath and Bristol, known collectively as WEBB, the aim of the project is to enable the universities to work in collaboration to develop cross-university assessment facilities and to provide support for students with disabilities. Support includes a note taking system for deaf students and also testing of materials for students with dyslexia. The project also runs staff development and training programmes.

Each university already had existing established mechanisms for support, but the collaboration of the project has enabled them to pool resources and further develop provision for disabled students.

4.11. On-Line³¹

Part funded by the European Union Horizon Initiative, On-Line is an example of a regional initiative concerned with the issue of accessibility to electronic information. It promotes the use of accessible web design and aims to raise awareness of the importance of accessible information through a number of events. These include a programme of training focussing on the use of the Internet and how to make web pages accessible. On-Line also is the founder member of the Disability Technology Forum, a regional group comprising organisations in the North West who are interested in how IT can help and support disabled people.

The project has transnational contacts which aim to promote the sharing of innovative ideas and approaches across national boundaries. Contacts include the CEPES³² project in Spain which seeks to improve economic and social

²⁹ Further details from: eEquip Co-ordinator, Coventry University, Alma Street, Coventry CV1 5FB. HEFCE's own special initiatives programme is described at <http://www.hefce.ac.uk/Research/Initiats/default.htm/>

³⁰ WEBB Accessibility Project, University of the West of England.

³¹ Project website: <http://on-line.org.uk>

³² <http://www.cepes.es/>

inclusion through telematics and the FIARP³³ organisation in Sardinia which represents people with Retinitus Pigmentosa.

4.12. Non-UK Organisations

4.12.1. Library of Congress National Library Service for the Blind & Physically Handicapped(NLS)³⁴

NLS is the leading national library service for people with visual impairment in the United States and is funded by the federal government – its budget for 1999 is just under \$47,000,000. It provides a free service of material in braille and on audio, and operates through a network of 57 regional and 81 local libraries. US copyright law permits NLS to make braille and audio copies of books and periodicals (without having to seek individual permission). As in the UK, there is a free postage scheme to enable materials to be sent to and returned by borrowers free of charge. NLS produces some material in languages other than English to cater for the needs of minorities. NLS also has a significant research and development programme and has a useful web site providing pointers to a wide range of resources.

4.12.2. Recording for the Blind & Dyslexic (RFBD)³⁵

RFBD concentrates on the transcription and loan of educational materials, covering everything from elementary to postgraduate levels. It offers around 75,000 titles in either audio or electronic formats, and has an extensive list of accessible reference books. Books are recorded by volunteers, usually with expertise in the subject matter concerned. There are about 36,000 users.

4.12.3. American Printing House for the Blind (APH)³⁶

APH is the official US supplier of accessible materials for students below college level in the United States. It transcribes materials into braille, large print, audio etc., produces a large range of teaching products and undertakes extensive research and development. Some resources are supplied through NLS while others are purchased by state educational authorities for use in schools etc. APH maintains *Louis*, an online catalogue of accessible resources (named after Louis Braille) with around 135,000 entries, searchable across the Internet and containing details of the holdings of about 200 organisations which offer such resources.

³³ <http://www.fiarp.it/>

³⁴ NLS: <http://lcweb.loc.gov/nls/nls.html/>

³⁵ RFBD: <http://www.rfbd.org/>

³⁶ APH: <http://www.aph.org/>

4.12.4. TRACE (University of Wisconsin)³⁷.

TRACE is widely regarded as the leading US Centre for research and development in accessible technologies. Founded in 1971, it forms part of the Department of Industrial Engineering at the University of Wisconsin-Madison, and is part funded by the US Department of Education's National Institute on Disability and Rehabilitation Research. In 1984 it co-ordinated the first US national initiative to promote the accessibility of computers. TRACE publishes a 'Cooperative Electronic Library' of disability expertise on CD-ROM. Among its current and recent projects are 'Talking Fingertip' (audio access to touch screen systems), information kiosk design guidelines and the Universal-Flexible Interface Protocol. TRACE's work on accessibility for Microsoft Windows was built into Windows 95 and Windows NT.

4.12.5. National Center for Accessible Media (NCAM)³⁸

NCAM is based in Boston, Massachusetts and has undertaken a wide range of work on accessibility issues. It has undertaken projects on making CD-ROMs accessible and on video captioning, as well as promoting the 'Web Access' symbol (with its accompanying alt-text tag) for sites which meet its criteria. A recent initiative, called the *Web Access Project*³⁹, has concentrated on developing and testing new methods of integrating access technologies (such as captioning and audio description) into Web sites, with particular emphasis on public broadcasting sites.

4.12.6. Centre for Applied Special Technology (CAST)⁴⁰

CAST, founded in 1984, has a long involvement in the development of assistive technology but more recently has shifted its focus towards the design of disability-friendly learning systems, including software. It is best known for its Web accessibility checker, Bobby, described in Chapter 8.

4.12.7. VISUNET⁴¹

VISUNET is a service offered by the Canadian National Institute for the Blind (CNIB). CNIB is a voluntary agency that provides services for people who are blind, visually impaired and deafblind. As well as offering advice on careers, travel, benefits etc. CNIB also provides the services of the CNIB Library for the Blind. The library offers a nationwide library and information service and is Canada's largest producer of materials in alternate formats in braille, tactile, audio, and electronic text. The VISUNET service integrates the CNIB Library's collection of materials in alternative formats with resources of other libraries around the world and on the Internet to form a virtual library for blind and visually impaired Canadians. Amongst the developments of the VISUNET service is

³⁷ Trace Center: <http://www.trace.wisc.edu/>

³⁸ NCAM: <http://www.boston.com/wgbh/pages/ncam/symbolwinner.html>

³⁹ <http://www.wgbh.org/wgbh/pages/ncam/webaccess/index.html>

⁴⁰ <http://www.cast.org/>

⁴¹ Available from the CNIB website: <http://www.cnib.ca/library/visunet.htm>

VISUTEXT, offering access to full text electronic materials collected and managed by the CNIB library.

CNIB Library for the Blind is an active participant in the Canadian Initiative on Digital Libraries and has promoted the idea of a 'virtual library for blind and visually impaired citizens of the world'⁴². VISUNET has actioned three Community Access Projects in Toronto, training blind and visually impaired users to access the Internet and use its resources through local public libraries: this model has similarities with aspects of the National Accessible Library Service concept recommended by this Report.

4.12.8. Adaptive Technology Resource Center (ATRC)⁴³.

ATRC, based at the University of Toronto, is running a series of R&D studies in the field of adaptive technology. Its current emphases include: access to the Internet and World Wide Web; alternative computer display systems; alternative computer control systems; accessible distance education and videoconferencing; equal access to computer-mediated 3D environments and exploitation of gesture recognition for access to communication. Among specific projects are A-Prompt, which is proactive in prompting web authors to improve accessibility and work on virtual reality web interfaces using VRML (Virtual Reality Modelling Language). ATRC also publishes its own accessibility web design standards and has web pages with advice on writing accessible HTML⁴⁴.

4.12.9. National Rehabilitation Information Center (NARIC)⁴⁵

Although initially set up to disseminate results of US federally-funded research projects, NARIC now provides a very extensive information service including either copies of reports or links to most active research and development in the field, and an index of staff working on US projects.

4.12.10. Equal Access to Software and Information (EASI)⁴⁶

EASI (Equal Access to Software and Information) is sponsored by the American Association for Higher Education (and funded in part by the US National Science Foundation). The aims of EASI are to provide resources and guidance to the education community in the area of access to information technologies by individuals with disabilities.

Originally formed as a special interest group within EDUCOM'S Educational Uses of Information Technology (EUIT) program, EASI became affiliated with the American Association for Higher Education in 1994 to collaborate in improving

⁴² *The Virtual Library for Blind and Visually Impaired Citizens of the World*. Paper presented to the IFLA Section of Libraries for the Blind, African Seminar, Grahamstown, South Africa, 17-19 February 1999. (Unpublished?)

⁴³ <http://www.utoronto.ca/atrc/>

⁴⁴ <http://www.utoronto.ca/atrc/rd/html/htmlvis.html/>

⁴⁵ <http://www.naric.com/naric/index.html/>

⁴⁶ <http://www.rit.edu/~easi/lib.html>

the quality of higher education. EASI runs online workshops focussing on adaptive computing technology and creating accessible web pages which both visually appealing and fully accessible to visually impaired users.

4.12.11. Global Applied Disability Research and Information Network (GLADNET)⁴⁷

GLADNET is an initiative of the Vocational Rehabilitation Branch of the International Labour Organization in Canada which provides fee paying members with access to the exchange of ideas and information across a network of research centres, universities, government departments, trade unions and organisations representing disabled people. Its main objective is the promotion of disability policy and implementation of changes in the training and employment options available to disabled persons. It is anticipated that this will be achieved through collaborative projects and through global dissemination of information via the Internet.

4.12.12. Association for the Blind of Western Australia (ABWA)⁴⁸

ABWA has developed a series of self-paced training courses for blind and visually-impaired people in the use of Microsoft software, which are widely used in Australia, New Zealand, Singapore and the USA. Courses are available in print, large print, audio tape and braille.

⁴⁷ <http://www.gladnet.org/netfact.htm>

⁴⁸ <http://www.abwa.asn.au/windows.html>

5. Making Traditional Formats Accessible

5.1. Introduction

Printed materials can be transcribed into a variety of other formats to enable access by blind and visually impaired people, although the use of graphs, diagrams and illustrations pose particular problems. The main accessible materials available to blind people are braille, Moon, audio cassette tapes and tactile images: visually impaired people may also use enhanced displays, such as large print. This section will briefly describe these traditionally available accessible materials as an introduction for readers not familiar with them; integration of each into access technology will be discussed in later sections.

5.2. Braille

Braille is a method of reading by touch, using sets of six raised dots (two across by three deep) which are displayed in different combinations, thus coding letters of the alphabet. Numbers are coded by using a numeral symbol followed by the letters A-J to represent 1-10.

There are two grades of braille in use in Britain: Grade 1 presents the alphabet letter for letter and includes punctuation, while Grade 2 presents a shorter form of braille in which combinations of letters are used to represent words. Although more difficult to learn, Grade 2 enables faster reading and cuts down on the bulk of the transcribed material. The traditional way to produce braille is on a machine like a typewriter, but with only six keys: increasingly it is being produced from computer output onto special embossers.

5.3. Moon

Similar to braille, Moon is another method of reading by touch, the difference being that Moon letters are made up of shapes based on traditional alphabet letters and punctuation marks. Moon also adopts a number of short forms for words such as 'and' and 'the'. Although not as widely used as braille, Moon is easier to read and is often the preferred method for people who have lost their sight later in life and feel that they cannot cope with learning braille. However, confusion can be caused by Moon's use of reflective images of shapes in order to cut down the number of metal blocks needed to print a page. There is considerably less material available in Moon than in braille, but because it retains a relationship with the shapes of characters it is more accessible to people who become blind during life.

5.4. Audio

Audio versions of texts are created by reading text onto audio cassette. Transcription services are provided by academic institutions, voluntary organisations and individuals who transfer printed material onto analogue cassette tape. Examples of bodies providing such services are the RNIB's regional transcription centres and local voluntary bodies affiliated to TNAUK.

There are number of problems with analogue audio tape versions of text. For example it is impossible to bookmark sections to refer back to later and referring to glossaries or references can be a lengthy process. The move toward digital production of audio text will help to alleviate such problems as well as improving the quality and lifespan of materials. It is also important to recognise that reading from text requires considerable skill, not only to ensure that the result is clear and free from hesitations and mannerisms, but to provide correct pronunciation of technical terms, to cope with abbreviations, and so on. These issues are particularly important in higher education, where knowledge of the domain may be essential to the provision of a meaningful audio version.

5.5. Tactile Images

Tactile images and drawings are diagrams created with raised outline so that the shape and texture can be felt by touch. The production of 'tactiles', however, is not simply a matter of a direct, mechanical conversion of a visual image. Care and thought are needed to enable information to be represented successfully in this form.

The raised images or sections are produced using either the 'collage' or 'swell paper' methods. The collage, 'Thermoform' or 'vacuum form' method involves cutting out pieces of card, string, wire and other materials and creating a hand-built master diagram. A machine is then used to produce each copy using a plastic film which sets to the image using either heat or a vacuum. While copies can be produced reasonably cheaply, the production of the master is extremely time-consuming and is a skilled task. Furthermore, masters are difficult to store and may deteriorate (i.e. bits fall off!). Finally, the heat and vacuum forming equipment is relatively expensive, although its amortised life cycle cost is reasonably low provided there is sufficient demand for the product.

The swell paper method is a more recent development and the equipment required is relatively cheap (a few hundred pounds). The image or diagram is either designed using a computer aided drawing package or may be photocopied or otherwise extracted from a printed document. The image is either printed directly onto the heat-sensitive 'swell' paper or photocopied onto it. The substrate used contains a sub-surface layer of alcohol, so that when it is passed through a fuser or 'Tactile Image Enhancer' dark lines and areas absorb heat more quickly and are raised. The disadvantage is that there is only one layer: areas are either raised or not. However the method is much cheaper than the collage method and it is relatively easy to archive the masters. Some users also prefer the softer outlines of the swell paper method and the retention of black on the outlines helps people with some vision.

Heated pens (or thermo pens) are also available. These can be used to draw an image directly onto the heat sensitive paper which enables the instant production of a tactile image, although this may not leave much room for error.

Tactile images are usually labelled in braille for identification purposes, and need to be stored with care to avoid flattening the raised surfaces.

The Higher Education Funding Council for England issued a Call for Proposals in February 1999 for the relocation of the National Centre for Tactile Diagrams from Loughborough University to another institution.

5.6. Large Print

Large print is one of the most common formats of adaptive text and is produced by a growing number of the mainstream publishers as well as specialist publishers such as Ulverscroft and Magna Large Print Books. Large print books generally have a font size of between 16 to 20 points, although it is possible for even larger sizes to be produced.

Large print enables people with varying degrees of sight loss access to a great number of works. Titles range from dictionaries to fiction novels. There has always been a lack of non fiction titles and of children's works in large print, especially less popular titles. Although publishers are beginning to offer a wider range of works - Ulverscroft Large Print Books for example now offer 37 new titles a month covering a range of categories, including best-selling authors – the issue of non-fiction and reference works in large print remains a major issue.

5.7. Good Design

Perhaps the simplest, yet so often the most neglected, way of providing accessibility is simply to pay attention to good design. The following good practice can go a long way to ensuring that materials are accessible to the widest range of users:

- Avoidance of the use of unnecessary 'decoration' around printed text, and especially the use of alphanumeric characters which can confuse OCR (optical character recognition) software or be distracting for a visually impaired user.
- The use of plain English (or other languages) and good grammar which will not only be easy to understand but will transcribe easily.
- The provision of alternative, explanatory text for diagrams and figures: often the gist of an argument can be followed from this source even if the image itself is inaccessible.
- Care in the selection of fonts, font sizes and layouts. *Sans serif* fonts are less fussy and easier to read for people with some visual impairment. The use of a minimum font size of 12 pt also helps. [This Report is printed in Arial 12 pt.]
- Use of colour with great care to ensure that contrast is adequate and that people with colour blindness will be able to cope. Contrast is far more important than the actual colour chosen in most cases.

- Consideration of the effect of layout: for example, densely packed type with little white space is more difficult to decipher than text where the layout is designed to aid communication.

5.8. Haptic Devices

The term 'haptic' (from the Greek *haptikos*) means 'pertaining to the sense of touch', and in this sense the tactile images discussed in section 5.5 above are 'haptic' devices. However, the term is more commonly used of the technologically-advanced devices intended for use in medicine, space science and advanced engineering. Haptic devices include gloves which provide feedback for remote control of devices, for example by an astronaut or in telemedicine.

Haptic devices are based on analysis of the way in which human skin responds to a variety of stimuli, including pressure (both generally and pressure/shape distribution), vibrations, heat, friction and slip. There is an extensive community of researchers interested in haptic devices, and useful links can be found from their web pages.⁴⁹ A team at the University of York has undertaken work in this field, including applications for use by blind and visually impaired people⁵⁰.

Although the same principles underlie haptic research and engineering as were used in earlier developments of accessibility aids for blind and visually impaired people, there is little evidence of major implementations or acceptance of advanced haptic devices. Here may be two reasons for this: firstly, they tend to be extremely expensive, but secondly blind people are seeking a change in modality (e.g. from sight to touch) rather than extending the same modality (i.e. reproducing what the operator would have felt, but remotely).

⁴⁹ A useful starting point is at <http://haptic.mech.nwu.edu/intro/tactile/>

⁵⁰ <http://www.cs.york.ac.uk/hci/aig/>

6. Making Electronic Formats Accessible

6.1. Introduction

In theory, electronic materials should be more accessible than traditional formats since the output devices can be selected to take account of the needs of the user – in other words the information content of a digitised source is (theoretically) independent of the output device. In practice this is not always the case, and problems occur where the content is held in a format which relies on a visual output device (digital video would be an obvious example). In any case much digitised text is formatted on the assumption that the output will be visual.

One of the biggest problems is that the information ‘universe’ is rapidly shifting towards multimedia as its standard. The World Wide Web is a classic example of this: where in the early days Web pages used visual images mainly for ‘decorative’ purposes, they now contain significant information content. But as the US National Council on Disability has remarked, “There is essentially no multimedia product available which has been shown to be fully accessible to individuals who are blind, and very few multimedia products that are accessible to deaf or hard-of-hearing people. While the outlook for access to multimedia for persons with low vision may be slightly better, there is still cause for concern”⁵¹.

There is a considerable range of software available to enable blind and visually impaired users to access digitised information. There are essentially two approaches: in the first, a standard screen reader (such as is used for providing voice output from any text from the screen) is used with a carefully selected browser to provide audio output. A second approach has been to provide an audio-based browser⁵². It is also possible to output in braille to a ‘braille bar’ (essentially a powered series of ‘dots’ which can be raised to form braille characters). Neither approach is entirely satisfactory and both can be defeated by poor attention to accessibility by designers.

A separate report on the accessibility of Web content, including guidelines, has been prepared by the REVEL Project team⁵³.

⁵¹ National Council on Disability *Access to Multimedia technology by People with Sensory Disabilities* March 13, 1998 <http://www.tiny.iapnet.com/fly-upload/ncd/publications/3682853.html> [Viewed 28.7.98]

⁵² Browsers such as pwWebSpeak are popular: see <http://www.prodworks.com/pww32.htm>

⁵³ REVEL Project: *Report on Guidelines and Advice on Accessible IT Systems and Content*. Version 3: February 1999.

6.2. The World Wide Web

6.2.1. Introduction

The World Wide Web (or just the 'Web') is now the primary means by which users gain access to the information content of the Internet. It is based on the presentation of *structured* documents, using a standard called the HyperText Markup Language (HTML), which can be displayed to the user by a piece of software called a browser. It is important to note that the browser must *interpret* the document's structure from the HTML tags and use that information to generate an appropriate display. The HTML page designer does not have complete control over this process: for example, in the earlier HTML standard syntax (which remains valid) the originator might tag a piece of text to instruct the browser to emphasise it. However, it was a matter for the browser whether emphasis consisted of bold, italics, underlining, or whatever. Two different browsers could thus generate two different, yet equally valid, displays. In later versions of the HTML standard the designer has gained the possibility of greater control over how the browser displays the information, including the use of forms and tables to achieve specific effects and the inclusion of 'applets' which may, for example, display a dynamic image. However, it is still recommended that content and structure should be kept separate, and the concept of Cascading Style Sheets (CSS) has been introduced to achieve this.

The current HTML standard is version 4.0, which has introduced both improvements to accessibility and difficulties arising from its more complex and more multimedia-based approach. Version 2.0 of the CSS standard has also addressed accessibility issues.

Designers have been active in pushing for these developments so as to gain more control over how their work is displayed, although the essential split between the content and its display (i.e. the document interpreted and then displayed by the browser) has been kept, thus maintaining platform independence (i.e. the designer could not and should not be able to demand that the user has a particular piece of hardware or software). The rapid acceptance of Java as the programming language for the Web has reinforced platform independence but has given designers much greater control over presentation. So, while it remains possible to use an accessibility-friendly browser to display an HTML page, there has been a loss of control over 'look and feel'.

It should also be noted that browsers do differ significantly in the way that they implement the HTML standards. For example, neither Internet Explorer nor Netscape has yet fully implemented the CSS standard agreed in 1997.

While in theory the existence of a structured specification is helpful to blind and visually impaired users, a number of developments have created major problems. Particular issues have been raised by the widespread use of *images*, of text in *columns*, of *colour*, of inappropriate *backgrounds*, of *tables* and of *frames* (this

last being essentially the display of multiple pages alongside each other to provide an element of visual parallelism). As a result research and other concerned groups world-wide have developed sets of guidelines and other services to try to ensure that web pages are accessible. In the remainder of this section we discuss these approaches.

6.2.2. Web Accessibility Initiative

Among the most important recent developments has been the launch by the World Wide Web Consortium (W3C) of the *Web Accessibility Initiative (WAI)*. W3C is the body responsible for co-ordinating developments on the Web, and in particular for encouraging the use of standards by developers. WAI was launched at the Sixth World Wide Web Conference (WWW6) at Santa Clara, California in April 1997. It is a far reaching initiative which goes beyond the question of making web pages accessible to look again at the fundamental design of the web, with the aim of ensuring that a browser can adapt its output automatically to the needs of the user, whatever those needs may be, without the loss of significant information content.

Among the organisations actively supporting the WAI are Royal National Institute for the Blind (RNIB), the World Blind Union (WBU), the European Commission, Microsoft, Sun, Netscape, Adobe, IBM and a host of research, development and support centres. It is intended that the largest part of its work will be concentrated on the *Education and Awareness* Project Area, which will make available a variety of training materials, among other actions. A *Standards* Project Area is examining the existing standards (including HTML itself, CSS, HTTP⁵⁴ and PICS⁵⁵) and a *Guidelines* Area has produced guidance notes, based on approaches promulgated by organisations like TRACE (see Section 4.12.4), giving them 'official' status. A further Area of *Development of Tools* is encouraging the development of authoring software which supports accessible formats⁵⁶. Finally a *Research and Advanced Development* Area is researching interface design, certification and labelling schemes, etc.

WAI has been conceived of as a three-year programme in the first instance, and will thus complete the first phase of its work by the year 2000.⁵⁷ However, the Guidelines are already available as a 'Proposed Recommendation', based on earlier Working Drafts⁵⁸.

⁵⁴ HTTP - Hypertext Transfer Protocol (the data transfer protocol of the Web)

⁵⁵ See Section 16.5.

⁵⁶ A Working Draft entitled *WAI Authoring Tool Guidelines* was published for comment in November 1998. See <http://www.w3.org/TR/WD-WAI-AUTOOLS/>

⁵⁷ For further information on WAI see <http://www.w3.org/pub/WWW/Disabilities/access-brief>. JISC has W3C representation through UKOLN

⁵⁸ The Proposed Recommendation is open for comment until 21st April 1999 at <http://www.w3.org/TR/WAI-WEBCONTENT/>

6.2.3. Checking Web Pages for Accessibility

6.2.3.1. *REVIEL Guidelines*

The REVIEL Project developed Guidelines for Accessible Web Pages, based on recommendations from a variety of sources. The Guidelines developed into a set of '20 Golden Rules' for Web page design; these are reproduced in Appendix I. It is suggested that the promulgation of such guidelines would be an important role for a national library service co-ordinating agency, but it is important that they are updated regularly.

6.2.3.2. *Testing for Accessibility*

CAST (Center for Applied Special Technology) based in Maryland, USA, provides a tool called 'Bobby' which enables HTML to be checked for browser (including text-based browsers like Lynx or audio-output browsers like Webspeak) compatibility⁵⁹. While 'Bobby' results need to be interpreted with care, it is useful for giving an indication of areas of possible problems. The program works by taking any URL and browser name specified by a user and provides a report on any HTML code in the specified page which may create accessibility problems. There are also sites which examine other sites' web pages and inform them of accessibility problems⁶⁰.

6.2.3.3. *Intelligent proxies*

Intelligent proxies are servers which can transform a web page before it is delivered. It is possible, for example, to use a proxy to convert PDF to ASCII or PDF to HTML⁶¹ while CAST (see above) has a product called *Joyce* which an individual can install to perform automatic 'on the fly' conversion⁶².

6.2.4. Java and JavaScript

Java applications have mushroomed over the last few years, and there has been great concern that they will make attempts to improve accessibility even more difficult. Microsoft has now launched *Active Accessibility for Java* which consists of a specification and a set of Java interfaces which can be integrated with accessibility software to ensure that products which utilise Java are accessible: to date there is little evidence of their widespread use. TRACE has produced guidelines on *Java and JavaScript (including Dynamic HTML) Accessibility*⁶³.

⁵⁹ See <http://www.cast.org/bobby/>

⁶⁰ See, for example, <http://www.yuri.org/webable/index.html>

⁶¹ See, for example, <http://www.adobe.com/prodindex/acrobat/access.html>

⁶² A fuller description of proxies is given in Engelen, J. and Bormans, G. Access to visual interfaces by disabled persons *Linking Information Systems: an International Seminar*, Rome, 2nd April 1997.

⁶³ <http://www.trace.wisc.edu/world/java/java.htm> and
<http://www.trace.wisc.edu/world/java/jscript.htm>

6.3. Document Format Standards

6.3.1. Introduction

A key issue for the accessible library of the future is how to exploit the wide range of document standards that have emerged in the networked environment in such a way that both short-term delivery of accessible content and long-term flexibility are secured. In this section, we briefly describe the major standards in use and comment on the issues that they raise.

6.3.2. ASCII

ASCII is the simplest form of digitised text, consisting only of coded character strings. There is no structure and no coding of display requirements (e.g. font, font-size, layout). Although ASCII is very accessible, its lack of structure makes it unsuitable for anything other than the simplest data.

6.3.3. Word Processor Formats

Virtually every word processor has its own format (and confusingly the same file extension is sometimes used for different formats, and certainly for different versions of the same document). Rich Text Format (.RTF) is an attempt to define a common standard and generally works well provided that advanced word processor features have not been used. RTF can be used successfully as an intermediate standard in braille production and is a useful common standard for accessibility applications.

The main accessibility problems of word processor formats (apart from differing standards and conventions) are to do with their use of complex features like embedded images, tables and files, although the use of formatting to convey information also makes for accessibility problems.

6.3.4. PDF

Although a proprietary format belonging to Adobe, Portable Document Format (.PDF) is a very popular standard for document interchange. It has a number of accessibility problems, not least that it is essentially a page image. However, it is now possible to extract the content from the display (Adobe's free Reader software can do this), and then examine the content using another piece of software. Of course structural information is lost when this is done.

6.3.5. SGML

Standard Generalised Markup Language (SGML) is an ISO standard⁶⁴ which provides a systematic way to define different types of document. Using the SGML definition, software can automatically process a document and display it in an unambiguous way.

⁶⁴ ISO 8879:1986

The SGML standard includes provision for the formal definition of a document type through a 'Document Type Definition' or 'DTD'. The DTD provides a list of the element types and their relationships, as well as the entities and attributes allowed in the document.

One problem with SGML is that it is potentially very complex and thus expensive to create and process. It is important as a 'base' standard and because of other standards, like XML, which are based upon it.

6.3.6. XML

eXtensible Markup Language (XML) is undoubtedly an important development for library and information services. It is a generic 'language', based on SGML but considerably simpler to create and to parse, which (according to the World Wide Web Consortium) is designed "to make it easy and straightforward to use SGML on the Web: easy to define document types, easy to author and manage SGML-defined documents, and easy to transmit and share them across the Web". Unlike HTML, XML is not a single internationally-agreed standard. Rather it provides the framework within which groups and communities can define their own DTDs and thus communicate between themselves. This has great potential for the accessibility community.

One of the important advantages of XML is that it enables metadata (see section 16 below) to be embedded in the document – in effect the information content and its description and its structure and its semantics are all contained within the XML 'wrapper'. Because of this there is considerable prospect of XML offering real advantages for accessibility even without an 'accessibility DTD', since software should be able to interpret the whole document and then 'display' it in an appropriate way.

6.3.7. HTML

HyperText Markup Language (HTML) is an officially recognised application of SGML: the HTML syntax is formally defined by the HTML DTD. Its accessibility issues are described in section 6.2 above, but it should be noted that these apply equally where the document is held in an Intranet, rather than the World Wide Web, or where it is used as a local format.

6.3.8. Image Formats

There are a wide variety of formats used for visual images, as indicated by the examples below.

<i>Still images:</i>	.BMP, .PCX, .TIF, .EPS, .GIF, .JPG, .JPEG, .JPE.
<i>Video Images:</i>	.AVI, .MMM, .MOV, .QT (QuickTime), .MPEG, .MPG, .MPE, .M1V (all Motion Pictures Expert Group).

For accessibility there is little to choose between formats from the perspective of visual impairment, since images are almost by definition inaccessible. The key issues are firstly the provision of adequate text descriptions and secondly the design of the image to make it accessible to people with a degree of visual impairment. However, neither of these issues is related to format.

6.3.9. Audio Formats

6.3.9.1. *General*

There are a wide variety of digital audio formats in use, although most do not provide any structure to the content and are therefore rather like an audio equivalent of ASCII. Formats include .WAV (MS Windows 'wave' format), .TSP (TrueSpeech), .RAM (RealAudio), MP2 (.MPEG related audio format), .MID and .RMI (MIDI – Musical Instrument Digital Interface) and various Macintosh/Unix formats like .AU, .AIF, .AIFF, .SND.

While the provision of an audio file may assist accessibility, these formats' lack of structural information make them of very limited use.

6.3.9.2. *DAISY*

The Digital Audio based Information SYstem (DAISY) is a project that was initiated by the Swedish Library of Talking Books and Braille to develop a standard way to record audio digitally for use by people with a visual impairment: this is sometimes referred to as a 'Digital talking Book' or DTB standard. There are many advantages to digitised approaches to audio content. Unlike analogue recordings, they could carry structural information within them, so that – to give one example – every page and every section in a book could be marked and found almost immediately. Furthermore, the individual user can add his/her own structure, for example by 'bookmarking' items of particular interest, and would then be able to return immediately to them.

The DAISY standard is based on the use of three more generic standards: the HTML 4.0 DTD, a specification known as the Synchronized Multimedia Integration Language (SMIL) and a Navigation Control Center (NCC). SMIL was developed to enable multimedia programmes to be displayed on the Web, by synchronising video, images, audio and text, but it can also be used to synchronise the elements of other files including the DAISY digital audio. NCC files provide the information needed to provide navigation to pages, headings etc.⁶⁵

Essentially the DAISY recording is stored as a database of elements rather than a stream of audio. The user in effect accesses the whole recording through a complex table of contents – it can be read 'sequentially', of course, but is almost infinitely flexible down to the phrase or sentence level. The MPEG standard is

⁶⁵ The DAISY standard is available at <http://www.daisy.org/technology/daisy2spec.html> [Viewed 8.12.98]

used to compress the data so that up to 50 hours of recorded speech can be fitted onto a single CD-ROM. A number of playback devices are available, the first commercial product being the PlexTalk Digital Reading Machine which is essentially a mobile CD-ROM player with additional controls to enable use of DAISY functionality.

Although it is expected that most DAISY-compliant products will utilise CD-ROM for the present, one of the exciting features of this technology is that it is in principle networkable. The possibility, given adequate bandwidth, of downloading DAISY files offers a radical new service model for libraries serving people with visual impairments. Again this is an area where a national co-ordinating agency could offer the leadership to turn potential into reality.

7. Library Services for Blind and Visually impaired People

Library provision for blind and visually impaired people has not been given a particularly high priority in the past. In 1983/84, a British Library funded survey⁶⁶ revealed that many public libraries simply took the view that blind people were being adequately served by external agencies such as the RNIB and the NLB. The survey also revealed that although the needs of disabled people in general were taken into consideration, most did not identify blind people as a target group.

The assumption that blind and visually impaired user needs are being adequately met by outside agencies may or may not be true, but Craddock argues that as these people are members of the public and therefore rate payers, they are also entitled to the same services from the local library as sighted users. Libraries must therefore develop their policies and procedures to encompass all groups and to redress the balance of service provision to one that is “presented not for particular client groups but for people with individual and personal needs”⁶⁷. This view is also advocated by Carey, who states that because needs vary, the use of technology to meet such needs must be a flexible one “according to the environment in which it is being used”⁶⁸. All of these views are in line with current UK government policy on inclusiveness.

7.1. Support

A number of support mechanisms are in place to assist disabled people and the providers of services to them. Support may include grants to help with the acquisition of equipment and materials, free postal schemes, advice and support on the use of assistive aids or advice on benefits and rights. In higher education, support may be available from within the institution itself or via a range of outside agencies.

7.1.1. The Disabled Students' Allowance (DSA)

The DSA provides higher education students with an allowance to cover additional costs incurred because of their disability, which may include costs incurred in gaining access to information resources, such as the provision of tactile diagrams, the acquisition of special equipment, or personal assistance. Revised regulations concerning who is eligible for the DSA are currently under discussion in government. It seems likely that the new regulations will “detach disabled students' allowances from the grant system and attach them to the loans system”⁶⁹. The advantage of this is that eligibility will not be affected by previous study records or receipt of DSAs. At the end of April 1999 it was

⁶⁶ Craddock, P. Public Libraries and blind people. *Health Libraries Review*, 3 (1),1986, p.15.

⁶⁷ Craddock, P. 1986, op.cit. p.18

⁶⁸ Carey, K. Comparative disadvantage and special opportunities and the information technology revolution. *Aslib Proceedings*, 49 (4),1997, p.79.

⁶⁹ *Update on DSAs*. Email message from SKILL to dis-forum, dated 11 February,1999

announced that restrictions on the availability of DSAs to mature students aged 50 and over were to be lifted.

The National Bureau for Students with Disabilities (Skill) is currently lobbying Government to extend eligibility for DSAs to part-time, postgraduate and second-degree students.

A significant problem with the DSA method of support is that students only qualify for such an award at university level rather than throughout their lives. This differs from an award-winning approach in the USA promulgated by the *DO-IT Programme*⁷⁰ in Washington State where support is attached to the individual throughout life rather than to the institution they happen to be studying at. For example students may retain equipment acquired while at primary school level (rather than the equipment belonging to the school) and thus maintain a level of consistency in skills learned in using the support equipment of their choice.

7.1.2. The Post Office Articles for the Blind Scheme

The Articles for the Blind Scheme operates under the 1989 Inland Post Scheme which allows for certain items to be sent free of charge. Items can only be sent to or from organisations which have entered into special arrangements with the Post Office. The RNIB has expressed concern that if the Post Office was to be privatised then this scheme may come under threat and has urged that whatever the ownership, free postal services to blind people should at the very least continue to be maintained.

7.1.3. Support from External Agencies

At present libraries rely heavily on the support of external agencies such as the RNIB, TNAUK and NLB to provide their users with the support they need to access information. Support could include the provision of braille and Moon books, braille transcription services, or talking books and newspapers.

The *REVIEL* project's survey of UK Higher Education Institution library services for visually impaired people contained a section on *referral procedures*. 40% of respondents indicated that their library made use of specialist external agencies. The university library itself was in many instances also be able to refer students to internal support mechanisms such as the university Learning Support Department or Student Services Division, so that this figure is probably an underestimate. It was noticeable that libraries with the best-developed services were also those most active in using external support agencies: this is a useful pointer to the type of national-regional-local co-ordination which might work best on a broader scale.

External support agencies included Access Centres for advice on the provision of specialist equipment, and the *RNIB* for advice on software and for the loan of

⁷⁰ The DO-IT website is at: <http://weber.u.washington.edu/~doit/>

books on tape. Access Centres normally operate within the location of a university or universities (Manchester, for example has four universities which use the services of the combined Access Summit). Services are available to people working with disabled students and to the students themselves, although they usually need to fit into a stated criteria, for example students with a disability who has been assessed as needing support during their studies. The types of services offer could include notetaking, transcription, reading or IT tutoring support.

A number of external organisations exist to provide advice and support to disabled people and their families. The *National Bureau for Students with Disabilities (Skill)* and *DISinHE* are just two examples of organisations which offer support within higher education. Further information on organisations active in this field is given in Chapter 4 above.

The use of external agencies in the public sector has been addressed by *Share the Vision (STV)*. One of the aims of *STV* is to encourage public libraries to become more of a focal point for access to library and information services for visually impaired people and to look at strategies for improving service delivery at both national and local level. Whilst *STV* recognises the impracticalities of the public library offering all the services provided by agencies such as the *RNIB* or the *TNAUK*, its aim is to enable users to have a single access point from which such services can be obtained. To meet this objective *STV* emphasises the need for libraries to ensure good collaborative relationships with local and national agencies.

7.2. Library service provision

This section summarises the findings of a number of surveys and other studies which were undertaken in order to provide a clearer picture of library service development for visually impaired people. *REVEL* undertook two surveys, one to identify existing and planned future levels of support in higher education libraries and another to identify the level and type of information available to anyone visiting higher education institution websites relating to support for blind and visually impaired students. *REVEL* surveys were supplemented with interviews and discussions with specialist providers. Finally, the *RNIB* has conducted several surveys to identify the state of the art of services for blind and visually impaired users in public libraries and we have drawn on these results.

7.2.1. UK Higher Education Libraries: Support for Blind and Visually Impaired Users

Phase 1 of the *REVEL Project*⁷¹ involved a survey of all higher education institutions in the UK to identify those that offer a specific library/information support service for students and staff with a visual impairment and to determine

⁷¹ Details of each phase of the project are available on the *REVEL* website at: <http://www.mmu.ac.uk/h-ss/cerlim/projects/reviel.htm>

the level of support for blind or visually impaired users in using print or electronic materials. Questionnaires were distributed to 126 libraries in universities and higher education institutions in the UK. A total of 51% were returned, all indicating that they offered some kind of service, although the levels of service offered between institutions varied enormously.

There are some excellent instances of academic library services being developed for blind and visually impaired students and staff. For example:

- The *University of Central Lancashire's Specialised Learning Resources Unit (SLRU)*⁷² offers the following facilities:
 - Transcription of library materials into braille, large print, tactile diagrams or computer disk
 - Recording onto audio tape
 - Organisation of personal readers
 - Provision of reading machines (scanners with voice output)
 - Provision of an OPAC terminal with voice and large screen output
 - Access to educational interpreters
- The *University of the West of England's FACE Project*⁷³ has developed online guides, set up reference enquiry and SDI systems and undertaken a detailed survey of the needs of disabled students. The results of this analysis showed very considerable demand for services such as voice output from CD-ROM databases⁷⁴.

The REVEL questionnaire also asked all recipients about the future development of library service provision for blind and visually impaired users in their institution. 45% of the respondents stated that the library would be undertaking some form of service development for its blind and visually impaired users. Respondents listed a number of planned service developments including the purchase and updating of equipment, provision of materials in alternative formats, involvement in projects and working groups to look into improved services, staff training, promotion of awareness in this area and general service expansion.

22% of the respondents indicated that although they had no plans at present to develop their library services for blind and visually impaired users, they were considering it or were waiting to see if demand for services increased before committing to further development. Others stated that they were interested in developing their services but were dependent on extra funding. 23% of the respondents stated that the library had no plans to develop its services for blind and visually impaired users. Of all these, only one commented on their decision, citing that the lack of a formal university policy or strategy in this area as the reason they were unable to plan for further development.

⁷² <http://www.uclan.ac.uk/library/libspec1.htm/>

⁷³ <http://www.uwe.ac.uk/library/itdev/face/bkggrnd.htm/>

⁷⁴ <http://www.uwe.ac.uk/library/itdev/face/survey98.htm/>

7.2.2. Information on support for visually impaired users in UK Higher Education

A random sample of UK higher education university websites was analysed to determine the level of support available to users with a visual impairment. Bearing in mind that universities are increasingly using the World Wide Web to promote their courses and facilities, the focus of this analysis was to establish whether the university website made any indication of what services were available for its blind and visually impaired users, thus enabling the individual to make an informed decision on which university would be likely to provide them with an appropriate level of support.

Out of a total of 180 higher education institution's websites listed in the UK, a random sample of 86 websites were accessed. Each site was assessed to determine the information provided firstly at university level and then more specifically regarding library support and service provision for blind and visually impaired users.

On a general level of provision within the university, 44% specifically mentioned provision for visually impaired users, while 35% mentioned general provision for disabled users. However, 21% made no mention of support or provision of services at all. 38% indicated that the library provided support for visually impaired people, 13% mentioned support for disabled users in general and just under 50% of the sample made no indication of library services provision in this area.

Information regarding support and provision of services to visually impaired people was not always easy to access and information for disabled users was often not clearly displayed. In many cases the users would need to access information via a series of search commands or by extensive exploration of the site, possibly indicating that information on services for blind and visually impaired users is not given a high priority and certainly indicating a lack of awareness of the difficulties for visually impaired users if information has to be tracked through a lengthy hierarchy. Naturally university web designers are developing and updating sites constantly and it is hoped therefore that as awareness of the importance of timely, accurate and accessible information grows, information for visually impaired users will also improve.

7.2.3. Public Library Support

In the early 1980s, the British Library funded a survey of public library provision for blind people - blind people being defined as those "with a greater degree of visual impairment than would be associated with the description partially sighted"⁷⁵. The findings from this survey identified that in general the needs of blind people were not seen as specific, but were included in general disability

⁷⁵ Craddock, P. *The public library and blind people: a survey and review of current practice*, British Library Research and Development Department, Library & Information Research Report 36. London: The British Library, 1985.

provision. Most reported some degree of service provision, although few could provide actual statistical data. Some libraries felt that their role was more of referral rather than direct service provision to blind people and others did not feel that blind people should be a special category for provision. Many of the libraries did however provide concessions on library charges for audio cassettes and some had links with outside agencies such as talking newspaper services.

Two further surveys were conducted by the *RNIB*⁷⁶ in 1998. These looked at both local authority and library service provision to visually impaired people. The surveys revealed that 90% of the library authorities surveyed indicated that the needs of visually impaired people were included in their general disability policy, and of these, 10% has a specific policy relating the visually impaired people – these policies had generally been developed since 1990. Half the authorities surveyed also had policies relating to specific services for visually impaired people such as reading services and 62% of local authority libraries employed special service staff as part of the library team.

Just over half the authorities had a specific budget allocation for services for visually impaired people including the borrowing of audio books free of charge, postal cassette services and large print books. 62% offered additional services or equipment.

The 1998 surveys paint a rather more positive picture than the one previously conducted although there is still plenty of room for improvement. A general lack of statistics and of management information relating to blind and visually impaired users still exists. Few authorities had undertaken any detailed monitoring of library use by visually impaired people, although 26% of authorities had taken steps towards quantitative data collection, usually by introducing membership cards which simply identified whether or not a user was visually impaired. The lack of useful management information is likely to seriously affect the decision making process, for unless service providers are able to determine who they are providing services for and the needs of those users they are unlikely to be able to make informed decisions. Increased provision of services for visually impaired people is a step in the right direction, but unless the services provided are appropriate to the specific users then the time and effort employed will be wasted.

⁷⁶ *RNIB Public library services where are we now? Findings from two surveys conducted by the RNIB. Share the Vision Seminar, 22nd and 23rd September, 1998.*

8. Accessibility of current electronic information services in the UK

Phase Four of the REVIEL project consisted of a systematic review of a sample of electronic information services available to members of UK higher education institutions through JISC's datacentres and other initiatives. The analysis was undertaken to establish the accessibility to blind and visually impaired people of current services available via the World Wide Web. The outcomes were then used to aid the development of guidelines applicable to service design. No parallel detailed survey of public library services has been undertaken, but as these develop (not least under the influence of the *New Library*⁷⁷ proposals) it will be important to monitor accessibility.

Each site was assessed according to three Web Accessibility Checkers available on the Internet (see Chapter 6):

- BOBBY⁷⁸
- RNIB Webpage Accessibility Checker⁷⁹
- Lynx View⁸⁰

Bobby is a free service of CAST that will analyse single web pages for their accessibility to people with disabilities. Bobby will also examine a page's HTML to see if it is compatible with various web browsers or HTML specifications.

The RNIB Accessibility Checker worked on the basis of a number of accessibility comments, the main ones being:

- Use of tables
- Use of italics
- Background setting
- Legibility of text.

It also rated websites according to a sliding scale in terms of accessibility. The scale ranges from 0% - 25% which are considered "poor", to 100% for "highly accessible". This service was offered as a pilot scheme, free of charge via the RNIB website and although it is no longer available, the RNIB now offers a charged Web Accessibility Audit.

Lynx View is a text browser which allows web authors to see what their pages will look like when viewed with a text-mode web browser

⁷⁷ Library and Information Commission *New Library: The People's Network. op. cit.*

⁷⁸ <http://www.cast.org/bobby/>

⁷⁹ <http://www.rnib.org.uk/webcheck/wwwch.htm> (no longer available)

⁸⁰ <http://www.delorie.com/web/Lynxview.html>

Initially the analysis was performed by researchers who have no visual impairment but it was felt that in order to gain a more accurate picture it would be desirable for visually impaired people to perform the same checks. Therefore, to take the analysis a step further, a group of visually impaired people was enlisted to re-test some of the JISC services. The group consisted of people with a variety of visual impairments, the only pre-requisite being that they were all at least familiar with the use of IT, adaptive technology and the World Wide Web.

The results of the initial testing of JISC and HEI websites are detailed in this chapter, together with feedback from the visually impaired users who volunteered to test the JISC services. A brief summary is also included of some analysis undertaken of public library websites by the UK Office for Library and Information Networking (UKOLN).

8.1. Accessibility of JISC Services

Services were analysed to identify their accessibility to people who are blind or have a visual impairment. Each site was run through Bobby, RNIB and Lynx View accessibility checkers and analysed according to their recommendations.

8.1.1. Bobby

The findings highlighted a common problem amongst the JISC services analysed, namely the lack of alternative text to describe graphics, followed in severity by problems caused by the use of tables.

Some problems do not mean that a site would be completely inaccessible and Bobby provides recommendations for improvement. The use of tables, for example, is often discouraged rather than outlawed. Similarly, the use of bullet point lists is discouraged in favour of using numbered lists. These two examples show how Bobby often suggests that web designers consider using an alternative, demonstrating how simple changes to an otherwise accessible page can mean a further enhancement to access for all.

Of all the sites analysed, eleven were awarded the Bobby Approved Icon. Of these, six were rated for accessibility by the RNIB with 69%, two with 77% and one with 85%. The other sites that were awarded the Bobby Icon received a fairly low rating from the RNIB of 62% and 54%. Interestingly, two sites (Netskills and MIDAS) which did not receive a Bobby Approved Icon with 11 and 12 accessibility errors respectively, gained an RNIB rating of 69% as with the six Bobby Approved sites. This highlights the fact that such results should not be taken at face value, but require further investigation using the 'human element'.

8.1.2. RNIB Web Accessibility Checker

The most frequent comments from this source related to the use of tables, followed by questions of legibility of text.

Of the JISC sites analysed none fell below the rating scale of 51% - 75%. This means that the JISC services are viewed by the RNIB rating system as having "made a fair attempt at creating web pages which meet the RNIB's standards" although there is room for improvement. Three sites were in the top range of ratings: these were the JANET and EDINA sites which both received a 77% rating and the UKERNA site which received 85%. The comments relating to this scale were "Good. Your Webpages are close to meeting RNIB's standards. Consider whether any improvements can be made in light of the advice provided".

It should be noted that the rating given at the end of the RNIB page did not always agree with comments made by Bobby. As mentioned in the examples of the Netskills and MIDAS sites, some sites were given the same RNIB rating, but received different comments. This draws attention to the fact that what may be viewed as a problem by Bobby, is not necessarily a view shared by the RNIB accessibility checker and highlights the importance of using a number of accessibility checks in order to compare and contrast results.

8.1.3. Lynx View

Using the Lynx View program it is possible to view the web site as it would appear to a text only browser, indicating how a screen reader may interpret the page. Apart from obvious problems such as a lack of alternative text for graphics, the most common problem featured in the JISC sites was a confusing appearance to the page. This was generally due to overcrowding of text and the use of tables. Despite this, the majority of the sites were workable. The Lynx View program provides the web designer with a useful tool to perform a quick check on the accessibility of the site.

8.1.4. Conclusion

Whereas the various methods of 'programmed' analysis are a useful way of checking how accessible a web page is, it must be remembered that Bobby, Lynx and RNIB are fairly simple computer programs and do not take into account differences in human behaviour or the various levels of visual impairment that exist. For this reason it is important that the results given are not taken at face value, but are checked back with the relevant web page in order to evaluate why certain comments have been made and how appropriate the comments given are in terms of accessibility to real users.

8.2. Group testing of JISC services

To follow up the findings of the JISC analysis previously performed further feedback was provided from a small group of blind users who volunteered to take part in an evaluative session looking at a random sample of the sites which had previously been analysed. The sites were accessed via the Internet and all volunteers used the pwWebspeak access software package. Co-ordination of the session, the volunteers and the analysis, involved collaboration between a public,

academic and private sector institution, namely Bury Metro Visual Impairment Service⁸¹, CERLIM⁸² and TOUCAN⁸³ (On-line Project⁸⁴).

Ideally the volunteers would all have been experienced in using the Internet and pwWebspeak so that they could concentrate on the content rather than the access technology itself. However, in reality the volunteers had differing levels of expertise, both in Internet usage and of the software provided. It was felt however, that this merely highlighted the fact that in a real life situation variation would almost certainly be experienced, with individual users of a library and information service having different levels of expertise and individual needs.

Initially the session was planned to be a relatively structured event, with volunteers looking at the same sites and following the same navigational routes. However, due to the varying levels of expertise in using the Internet and the access software, it was not possible to run a completely structured session. Therefore, the volunteers were asked to try and keep within the list of sites provided and where appropriate a more structured search methodology was adopted. It also proved more useful to let them browse and search at their own speed, commenting and discussing throughout the session rather than running a formal feedback session at the end.

In general, the volunteers commented that sites did not provide an adequate explanation of the services they provided, what was included in the site and more importantly what their acronym stood for (COPAC⁸⁵, NISS⁸⁶ and BUBL⁸⁷ being examples). NISS, for example, simply says 'NISS – Information for Education'. It is also confusing that the URL <http://www.copac.ac.uk/> actually brings up the MIDAS home page, with COPAC itself being at <http://www.copac.ac.uk/copac/>. The volunteers also found it frustrating to have to read through a lot of text in order to get to the link they wanted. An example of this is where alternative text for an image has been included alongside the actual text. The screen reader will read not only the alternative text, but repeats of the same text as it appears on screen. When this happened at the top of every page users not only found it time consuming, but also very tiring.

While the volunteers had a reasonable degree of success in searching, the display of search results sometimes proved confusing. For example, a search on NISS using the term 'Internet' identified a number of results, but before any links to results were displayed, the screen reader had to move through lines of text

⁸¹ Bury Metro Education Service, Visual Impairment Service, Whitefield Library, Whitefield, Manchester M45 7NY

⁸² The CERLIM website is at: <http://www.mmu.ac.uk/h-ss/cerlim/>

⁸³ The TOUCAN website is at: <http://toucan-europe.co.uk>

⁸⁴ The On-Line project website is at: <http://on-line.org.uk/>

⁸⁵ COPAC: <http://www.copac.ac.uk/copac/>

⁸⁶ NISS: <http://www.niss.ac.uk/>

⁸⁷ BUBL: <http://bubl.ac.uk/>

describing bullet points (“link bullet, link bullet, link bullet”). One of the volunteers commented that when this happened he assumed the system had got stuck in a loop and that he should press ‘*ESCAPE*’ to exit, realising just in time that in fact the reader had not yet got to the pertinent information. Volunteers all experienced problems in form filling, for example in search fields. They commented that it was often not clear where to access the data entry form or where to submit the query. Inconsistent use of verbal commands was another problem encountered. For example, when using COPAC, although the front page provided information clearly, commands instructed the user to use ‘enter’ and then to use the ‘space bar’ to perform virtually the same tasks.

The session highlighted the need for standardisation in the display of information while maintaining flexibility to use preferred access technologies. A comment made by one of the volunteers was the need for *individual* access aids to meet their *individual* requirements. This would enable a person to go into any library, information centre, museum etc and adapt their own access aids to the equipment provided – not learn and re-learn according to whatever the information provider has made available.

The main conclusions to arise from the session, therefore, were the need for adherence to accessibility guidelines, for careful design of layouts and a recognition that accessibility is more about providing people with choices and the freedom to use access technology which is appropriate to their needs than about rigid solutions. The concept of individual access is reinforced by Godber who recommends that “accessibility should be designed into regular OPACs and users offered a simple choice of personal preferences on how they wish to get information”⁸⁸.

8.3. UK Higher Education Libraries’ Web Sites

8.3.1. Introduction

A systematic search was undertaken of 134 UK Higher Education library homepages, identified from the SCONUL list of member institutions and representatives⁸⁹. Each site was analysed by the Bobby Web Accessibility Check⁹⁰ and using this as a basis, individual analysis was undertaken of the site to assess its accessibility to blind and visually impaired users. Analysis was divided into a number of sections, based on the Bobby criteria for analysis and also using recommendations from the RNIB⁹¹ and the W3C⁹²: The most common accessibility errors which occurred were again the lack of alternative text for images and the use of frames.

⁸⁸ Godber, J. How open is your Opac? *Library Technology*, 4 (1), February 1999, p12.

⁸⁹ <http://www.sconul.ac.uk/rep.html>

⁹⁰ Bobby: <http://www.cast.org/bobby/>

⁹¹ RNIB Hints for designing accessible websites:

<http://www.rnib.org.uk/wedo/research/hints.htm>

⁹² World Wide Web Consortium, Web Accessibility Initiative: <http://www.w3.org/WAI/>

8.3.2. General Remarks

49 of the 134 sites were awarded the Bobby Approved Icon. Of these, a number of good examples emerged, including the University of Central England, Cheltenham and Gloucester College and the Universities of Edinburgh, Leicester and Oxford Brookes. These sites were not only Bobby Approved, but did not have any other obvious barriers to accessibility which Bobby could have missed.

Combining accessible pages with attractively presented information is a challenge to designers. As well as being accessible the Universities of Central England, Edinburgh and Oxford Brookes were also interesting to look at and easy to navigate, while other approved sites such as Huddersfield University and the School of Slavonic and East European Studies provided very simple, accessible sites, but were rather uninteresting to look at, or the home page simply provided a simple list of links to further information.

A number of questions may also arise relating to Bobby's analysis when the results are considered in the context of people who are not blind but have some degree of visual impairment. Some sites which were awarded the Bobby Icon contained elements of design which could be questionable with regard to accessibility. A good example is that of the use of inappropriate typeface and font size. Research has shown that partially-sighted people find it easier to read *sans serif* typefaces and that the font size should normally be a minimum of 11pt (and certainly no less than 10pt, as recommended by Microsoft's Logo Programme⁹³). Of the Icon Approved sites nearly 10% used very small font size and although some of these were *sans serif*, not all were. The use of a small typeface or font size could be a problem not only for people with very low vision but for anyone with a small degree of sight loss.

Another point which Bobby does not pick up on is the use of more than one hypertext link to a line. The W3C guidelines recommend that links should be placed one to a line and labelled clearly. Eleven of the approved sites used several links per line and although some used a dash or a letter to separate the links, the provision of links often appeared somewhat confusing.

Link names can also be confusing. Bobby recommends that instead of using 'click here' links, the link should form part of the description, e.g. "information on global warming". Most of the sites do adhere to this, with a few exception such as Anglia Polytechnic University and the University of Reading.

Another of the W3C recommendations which has not been applied to all of the approved sites is the provision of a contact name for the web site owner. This gives visitors the opportunity to comment on the design of the site and if necessary point out any accessibility problems. Of the 49 approved sites, 31 provided a name and/or a hypertext link.

⁹³ Microsoft Logo Programme: <http://microsoft.com/enable/dev/logo.htm>

Two of the Bobby Approved sites offer a Text Only version, one of which, Keele University, provides the Text Only option at the top of the page. This is very helpful for the visitor as it avoids wasting time travelling down the page as a screen reader would, before finding that a text alternative of the page exists. Some of the sites that did not achieve an Approved Icon did however offer a text alternative. However display of the text alternative link was at times questionable – Thames Valley University, for example, provides this option on the university home page, but it is not at the top of the page and is displayed in purple text on a black background.

Of the sites which did not provide a text alternative, a number were very text based. The use of a more textual form of website could be a way to avoid the necessity of updating both the non-text and text versions.

8.3.3. Lack of Alternative Text

The W3C makes several suggestions regarding the description of images. Firstly, it recommends that all images be fully described using the HTML ALT tag. Secondly it recommends that, where images are used for decorative purposes only, a null ALT tag should be applied – indicating that the image can be ignored. Bobby also adheres to these recommendations and has penalised 67 of the sites for omitting a text alternative description. Some of the sites had clearly forgotten to add alternative text in certain places, but had generally applied it where necessary. This highlights the importance of checking web pages for accessibility, particularly if the page is updated on a regular basis. The use of display text using image HTML sometimes confused Bobby and can be a serious accessibility problem. For example 'Help' buttons are sometimes displayed as a .gif file. Although it appears that the page is displaying text, a text browser would not pick up on this unless alternative text was provided.

Several sites contained a huge number of accessibility errors relating to the lack of alternative text. When viewing the HTML however, it was often apparent that the 'images' were actually bullet points used for lists – the National Library of Wales site, for example, contained 38 accessibility errors but most of these referred to bullet points ("pell.gif"). Although this would not be a problem in terms of accessibility, to save confusion for the web checker a null extension (ALT= " ") could have been added to the HTML. In some cases this addition would have meant that sites would be Bobby Approved – Sheffield Hallam for example contained just one accessibility error relating to missing alternative text. The Bodleian Library, which was also penalised for lacking alternative text for 15 images illustrating the hypertext links, has an interesting and informative site which could easily be made more accessible by the simple inclusion of some alternative text.

There are, however, more important errors relating to images, of which the most obvious example is the use of moving or revolving images or banners. Such objects can appear confusing to a partially sighted person and cannot be read by

a screen reader, possibly even causing the screen reader to crash. Sites such as Reading University, the Bodleian Library, the University of Lincolnshire and Humberside and the National University of Ireland included moving images. These ranged from banners moving across the page to flashing or revolving images containing text such as 'new'. The WAI Accessibility Guidelines recommendations relating to the use of such images is that moving, blinking or scrolling images should be frozen if required and where JavaScript has been used its accessibility options should be followed. However none of the sites appeared to offer this.

Providing alternative text for photographs is also important – especially when the page takes some time to download. At the least, it would be nice to know what image is being displayed. Buckingham University, for example includes a picture with no alternative text and with a file size of 86.23k (the recommended maximum file size is 30k): this took nearly 30 seconds to download in REVEL's tests.

Bobby often questions whether the alternative text used is appropriate to the image displayed. In most cases, the description matches that of the image, but there are a few sites which for some reason have included insufficient text. Buckingham University, for example, provides the alt tag with a description: 'Magnet' but does not further explain that this is in fact the university magazine. Glasgow University provides the alt tag with a description 'Merlin', but again does not explain who or what this is. Teesside University displays a photograph of the library on its web site, but the alternative text describes it as "ircty.jpg" which clearly would be of no use to the visitor. Loughborough University also has a picture of the Pilkington Library on its website, but again uses minimal text for the alternative text description – it simply says "photo".

8.3.4. Use of Tables and Frames

W3C recommends that where a page uses frames, a no-frames alternative should be offered. This is because without frames-capable browsers the visitor may have difficulty navigating the page. The WAI also suggests that where frames are used, the HTML should provide sufficient information to determine the purpose of the frames. Bobby also recommends that if frames are used, a title should be given relating to each frame.

Thirteen sites made use of frames and in all cases the frames had not been given a title. Of these only one, Thames Valley University, offered a text alternative which could only be accessed via the university home page, not from the library home page. The provision of a no-frames alternative needs to be applied in a consistent manner throughout the site and updated accordingly. This suggests that it might be easier for designers to simply create one no-frames page. Southampton University and the University of Central Lancashire are good examples of how an accessible page can still display information in an attractive way without the use of frames.

Bobby recommends that web designers avoid using tables to display text in columns. The W3C guidelines also suggests that the use of tables to control displayed format should be avoided as this could result in navigation problems when using a screen reader. Fifty four of the 134 sites used tables to display text, nineteen of which received the Approved Icon. One reason that the use of tables is popular is because it allows the designer to fit more information into a smaller space i.e. to avoid a long list. However, not all sites have adopted this method and some have still achieved a well designed page. Good examples include Southampton University, the University of West of England and Cambridge University.

8.3.5. Background colours and wallpaper.

The W3C guidelines recommend that only contrasting colours be used for text and background and the RNIB stresses that contrast is more important than the actual colour used. A number of sites had chosen colours which do not appear to contrast with one another and therefore could be inaccessible. Colours include an aqua background with white text (National Art Library), or grey background with black and burgundy text (Buckingham University Library). In one case (Trinity College Dublin Library) a small section of the page used a blue background with a different shade of blue text. Other sites included shading behind some of their text. Coventry University Library, for example, has a black background with blue shading from behind and Wolverhampton University Library displays its title with a yellow haze behind it.

The RNIB goes on to recommend that when using a coloured background it should be one solid colour, not textured or patterned. An example of this problem would be the Portsmouth University Library website, which uses a grey textured background. Background images should also be avoided if possible for although it sometimes makes the page look more attractive, it may also make it unreadable for someone with poor vision. The Bodleian Library, for example, has a drawing of the library as background, as does the University of Surrey. The Manchester Metropolitan University library website displays its links with the image of an open book behind it, and although it has the same links (in a frame) displayed to the side of the page, this uses an aqua background and navy text.

Despite the unusual choice of colours by some of the university library websites, probably the most important facility for the visitor is the ability to change the background and text to whatever is suitable for them. The RNIB recommends that users are given the ability to override colour and font size and points out that the use of style sheets for recording personal preferences would enable a person to visit a site which would automatically display the page in their chosen format.

For those visitors who perhaps have only a small degree of sight loss, the option to customise their desk top may not be appropriate to them. There are also problems with enabling alternative style sheets on a public access terminal. Bearing this in mind, web designers should be encouraged to adjust their pages

to adhere to the simple recommendations and suggestions made by the RNIB, W3C and others. To assist this progress, the REVIEL project developed a simplified and co-ordinated set of recommendations (see Appendix 1).

8.4. UK Public Library Web sites

In 1998 analysis was undertaken by UKOLN⁹⁴ of the accessibility of UK public libraries for visually impaired users. Similar to the analysis of HE websites undertaken by the REVIEL project, the UKOLN findings show that accessibility in public libraries is also somewhat patchy. Although many of the sites visited were reported to have shown a high level of awareness regarding the provision of alternative text, it seems that “this is not consistent”. Although the use of frames was less evident, the use of tables still appears to be popular (seventy seven of the ninety seven sites visited had used tables.)

The analysis concludes that “UK public library Web sites are in the early stages of development and this is reflected in the general low level of fully accessible sites”⁹⁵.

8.5. Conclusions

The analyses summarised in this Chapter suggest that, while most UK library and information services have avoided the worst accessibility problems, only a few achieve as much as they could. The existence of a national framework within which accessibility of electronic library services could be promulgated would provide a means to address this issue and to encourage greater attention to accessible design.

⁹⁴ Ormes, S. and Peacock, I. Virtually accessible to all? *Library Technology*, 4 (1), February 1999.

⁹⁵ Ormes, S. 1999, *op.cit.* p.17.

9. Legislation

9.1. UK Legislation

There is a considerable body of legislation which impinges on the provision of accessible services to people who are blind or visually impaired. For example, the *Chronically Sick and Disabled Persons Act 1970*⁹⁶ and the *Disabled Persons Act 1986*⁹⁷ contain provisions that place responsibility on local authorities to provide services to the public and thus to members of the community who have sight problems. The former, and its Amendment Act in 1976, placed responsibility on the owners of non-domestic buildings to make them, “where practicable and reasonable”⁹⁸, more accessible to disabled members of the public. Regulatory measures were subsequently introduced in 1985 to ensure the provisions were more effectively implemented.

The 1964 *Public Libraries Act* states that the provision of services to the community, regardless of ability, is a statutory requirement. More recently, the *Disability Discrimination Act (DDA), 1995* (see section 9.1.1 below) requires public service providers such as libraries to provide an equal level of services to all their customers. It states also that no extra charges can be imposed for service provision in relation to a person’s disability, for example the provision of works in large print or braille.

The *Human Rights Bill*, which incorporates the *European Convention on the Protection of Human Rights* (see section 9.2.3) into UK law and has several sections which can be related to the rights of people with disabilities, is likely to come into force in 2000, although clearly it will be some time before case law is available.

In this Chapter we examine the legislation which is most pertinent to the needs and rights of visually impaired people in the UK and in the broader European context. We will also consider copyright legislation since that is an area that requires careful attention if the access rights of visually impaired people are to be secured in an effective and efficient way.

9.1.1. The Disability Discrimination Act, 1995⁹⁹

The *DDA* defines people as disabled if they have a “physical or mental impairment which has a substantial and long-term adverse effect on (their) ability

⁹⁶ Chronically Sick and Disabled Persons Act, 1970. (c. 44)

⁹⁷ Disabled Persons Act, 1986. (c. 33)

⁹⁸ National Bureau for Students with Disabilities. *Improving access to the physical environment for all students with disabilities*. <http://www.skill.org.uk/l-sheet13.htm> (Accessed 10 February 1999).

⁹⁹ *The Disability Discrimination Act*, 1995. Chapter 50.

to carry out normal day to day activities”¹⁰⁰. This definition is intended to clarify who is and who is not eligible for protection under the legislation. However there may still be people who fall short of the *DDA*’s definition. The elderly, for example, may only have a limited degree of sight impairment but none the less have difficulty in reading the printed word or visiting the library. More generally those people whose problems are not great enough for them to be registered as blind or partially sighted may still need help and support in accessing information.

Discrimination is also defined by the *DDA* as being the less favourable treatment of a person due to their disability. The Act requires justification be put forward, for example by an employer, for treating a disabled person less favourably.

Implementation of measures outlined in the *DDA* under ‘Goods, Facilities and Services’, was to be staged between 1997 and 2005. However, the Government has recently announced that this will be accelerated and will now take place between 1999 and 2004. Service providers must have met the needs of disabled people and be providing an equitable service to all by this time. As a provider of services, public libraries must therefore provide buildings which are accessible and also alternatives to service provision for those who cannot physically visit libraries. Of course some of these provisions should have already been addressed under the requirements of the *Public Libraries Act*, but the *DDA* is seen as a way of reinforcing this right, requiring libraries to provide alternative means of accessing resources, such as reading aids and alternative formats, in order to break down barriers to the information society, in particular to information that is available electronically.

Public providers of ‘goods, facilities and services’ all come under the requirements of the *DDA*. Exemptions under this section originally included the educational provision of an institution, such as a university. However, this has proved confusing, for certain services provided in educational establishments may not come under the exemption clause – catering facilities, careers services and disabled students’ services for example, although there is no definitive list to work from. Furthermore it is clear that universities as employers will come under the terms of the Act. Where university libraries fit into this has been unclear “for while they support the educational process they can be used by students, staff and members of the public for leisure purposes as well”¹⁰¹. There have been recent developments, however, which may clarify the position of such services. Announcements by Government relating to revised implementation dates and possible changes in who will be affected reveal that it now seems likely that all services which are secondary to education, such as catering and possibly the library (although whether the library is secondary to education could be

¹⁰⁰ *The Disability Discrimination Act, 1995. A Briefing*. London: Thompsons Employment Rights Unit, nd.

¹⁰¹ Corlett, S. The ever changing face of disability discrimination: implications for post-16 education. *The Skill Journal*, (62), November 1998.

arguable!), will no longer be exempt and from 2004 will have to had made reasonable adjustments in order to provide equal access to services.

9.1.2. The Disability Rights Commission

In 1997 the Government set up a Disability Rights Task Force to look at ways of achieving enforceable rights for disabled people. Proposals made by the Task Force included the establishment of a Disability Rights Commission (DRC). The DRC will run along the same lines as the Equal Opportunities Commission (EOC) and Commission for Racial Equality (CRE) although unlike the EOC and the CRE it will only be able to advise the Secretary of State.

The DRC's main functions will be to provide:

- Advice to disabled people, business, the public and voluntary sectors.
- Conciliation services on access to goods and services and on premises.
- Assistance to individuals to secure their rights.
- Bringing representative actions.
- Undertaking formal investigations¹⁰²

Further roles and functions of the DRC are outlined in the White Paper "*Promoting disabled people's rights: creating a Disability Rights Commission fit for the 21st Century*"¹⁰³ and legislation in the form of the Disability Rights Commission Bill should "establish a Disability Rights Commission and make provision as to its functions; and for connected purposes". The Disability Rights Commission Bill had its Second Reading at the House of Lords in December 1998. Baroness Blackstone, the Minister for Education and Employment expressed the hope that this Bill would "enable disabled people to have equality of opportunity, access and self determination"¹⁰⁴.

9.1.3. Rights Brought Home¹⁰⁵

In 1997 the Government introduced a White Paper *Rights Brought Home* to explain in detail the proposals for a Human Rights Bill and the reasons for its introduction, namely to incorporate the European Convention on Human Rights (ECHR - see 9.2.3 below) into United Kingdom law. The White Paper was published as a consultation document to enable comment and discussion prior to the introduction of the Bill.

¹⁰² Corlett, S. 1998, op.cit., p.6.

¹⁰³ *Promoting disabled people's rights: creating a Disability Rights Commission fit for the 21st Century*. A summary of the White Paper is available at: <http://www.disability.gov.uk/dispr/summary.htm> (Accessed 11 February, 1999)

¹⁰⁴ *A Disability Rights Commission is long overdue*. Department for Education and Employment News: <http://www.dfee.gov.uk/news/586.htm> (Accessed 11 February, 1999).

¹⁰⁵ *Rights Brought Home: The Human Rights Bill.: White Paper*. London: Home Office, 1997. Cm 3782. (at <http://www.official-documents.co.uk/document/hoffice/rights/rights.htm>)

Introduced by the Government in October 1998, the *Human Rights Bill*¹⁰⁶ had its second reading in the House of Commons on 16 February 1999. If enacted, the Bill will seek “to give affect in domestic UK law to the rights contained in the *European Convention on Human Rights*”¹⁰⁷. This will enable citizens trying to enforce their rights to do so in the UK courts rather than through the European Court of Human Rights.

9.2. European and International Legislation¹⁰⁸

9.2.1. Equality of opportunity for people with disabilities¹⁰⁹

On 20th December 1996 a meeting of the Council of Ministers of the European Union and of representatives of Member States’ governments issued a communication: “Equality of opportunity for people with disabilities: a new European Community disability strategy”, intended to address the problems faced by disabled people with regard to equal opportunities and social inclusion. It went on to identify a number of legislative measures and documents which have respect for human rights and equalities at their core. These included:

- *The Treaty on the European Union*¹¹⁰.
- *United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities*¹¹¹.
- *European Social Policy: a way forward for the Union*¹¹².

The Resolution called on Member States to remove barriers to social inclusion which may be faced by people with disabilities and to include this group in the development and implementation and promotion of relevant policies and actions.

9.2.2. Universal Declaration on Human Rights

On the 50th Anniversary of the 1948 Universal Declaration of Human Rights in 1998¹¹³, the European Union reinforced its commitment to the protection of

¹⁰⁶ *Human Rights Bill* (HL) Bill 119 of 1997–98, Research Paper 98/24, 13 February 1998.

¹⁰⁷ *Human Rights Bill* (HL) Bill 119 of 1997-98, op.cit.

¹⁰⁸ European legislative information is obtainable from *Europa*, the European Union’s server at: <http://europa.eu.int/index-en.htm> (Accessed 12 February, 1999).

¹⁰⁹ *Resolution of the Council and of the Representatives of the Governments of the Member States meeting within the Council of 20 December 1996 on equality of opportunity for people with disabilities* (97/C 12/01).

¹¹⁰ *The Treaty on the European Union, Article F.2*. European Parliament, 1992.

¹¹¹ *United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities*, adopted by the General Assembly on 20 December 1993.

¹¹² *European social policy: a way forward for the Union*. White Paper adopted on 27 July 1994.

¹¹³ *Declaration of the European Union on the occasion of the 50th Anniversary of the Universal Declaration on Human Rights*, Vienna, December 1998.

human rights and the preservation of human dignity. The Union stated that such goals would be achieved through fulfilment of:

- *The Treaty on the European Union.*
- *The European Convention on the Protection of Human Rights and Fundamental Freedoms.*
- *The Declarations of the European Council of Luxembourg – 1991 and 1997.*

Reference was also made to the *Amsterdam Treaty* with its commitment to further the cause of human rights. Although the rights of disabled people are not specifically mentioned, this area could be interpreted to be included in the statement that “the Amsterdam Treaty will further strengthen the commitment to safeguard and promote human rights and fundamental freedoms, especially by measures against discrimination in a wide range of fields including by strengthening the possibilities of ensuring equal opportunities for men and women”¹¹⁴.

9.2.3. European Convention on the Protection of Human Rights and Fundamental Freedoms

Article 2 of the First Protocol of the European Convention on Human Rights states that “No person shall be denied the right to education”¹¹⁵. This Article is to be brought into UK law through the proposed *Human Rights Bill*, as noted in section 9.1.3 above. The Convention also states in Article 14 that it “provides a right not to be discriminated against in the enjoyment of Convention rights on any ground ...”¹¹⁶ which would appear to include the rights of disabled people.

9.3. **Copyright Legislation**

Intellectual Property Rights, and in particular copyright, are often seen as a severe barrier to the provision of accessible information. Because copyright is a blanket right which gives the rights holders almost absolute control over copying (apart from the ‘fair dealing’ provisions for single copies to be made for personal research or private study, and a few other miscellaneous provisions) it is necessary in the UK and many other countries to seek individual permission for every item that is to be transcribed. Indeed the *RNIB’s report on Copyright laws and the rights of blind people*¹¹⁷ notes that many countries make no reference in their copyright laws to the needs of visually impaired people. This is despite the

¹¹⁴ *Declaration of the European Union on the occasion of the 50th Anniversary of the Universal Declaration on Human Rights*, Vienna, December 1998

¹¹⁵ *European Convention for the Protection of Human Rights and Fundamental Freedoms: First Protocol*: <http://www.mfa.gov.tr/grupi/1pro.htm/>

¹¹⁶ Corlett, S. 1998, op.cit., p.6

¹¹⁷ *RNIB Copyright laws and the rights of blind people: a report published by the RNIB; a review of copyright legislation as it affects access to the written work through alternative formats*. RNIB, 1997.

provisions of the *Berne Convention*¹¹⁸ which allows states to pass legislation on exemptions to the exclusivity of rights, and can therefore form a basis for improvement of visually impaired peoples' access to printed works in alternative formats.

In the UK the *Copyright Designs and Patents Act, 1988*¹¹⁹ makes no mention of accessible formats. Copies of works in braille, tape, large print or electronic text can only be made under licence from the rights holder (usually the author or the publisher). Organisations serving visually impaired people must obtain permission, which can be time consuming and may also result in no response at all. In these cases it is often left to the discretion of the organisation to judge each case accordingly, often including a statement such as "the best endeavours have been used to obtain permission"¹²⁰. Where permission can be obtained, limits may often be placed on the production of multiple copies, particularly copies on tape: everything depends on the terms of agreement made between the two parties.

In some countries, legislation specifies that transfer of material into alternative formats is not an infringement of copyright and therefore does not require special permission. Countries which have adopted this approach include the Scandinavian countries, Spain, Portugal, the USA, New Zealand and Canada, although legislation differs between countries relating to issues such as use of closed formats and remuneration to rights holders. So far the UK remains out of step with these developments.

European legislation is currently under consideration. The Proposed *European Council directive on copyright and related rights in the information society*¹²¹ would contain exemptions (under Articles 2 and 3) to cover copying and communications to the public "for uses to the benefit of the visually impaired or hearing impaired persons which are directly related to the disability and of a non-commercial nature and to the extent required by the specific disability".

Although these statements have been welcomed by the visually impaired community, the Library Association still believes that it is not specific enough. The Directive passed its first reading in the European Parliament on 10th February 1999 but has met with strong criticism that the practice of copying a limited amount of material for study, teaching and research will no longer be

¹¹⁸ *Berne Convention for the Protection of Literary and Artistic Works*. (Paris Text 1971). <http://www.law.cornell.edu/treaties/berne/>

¹¹⁹ *Copyright Designs and Patents Act* London: HMSO, 1988.

¹²⁰ RNIB, 1997 *op. cit.*

¹²¹ *The proposed European Council directive on the harmonisation of certain aspects of copyright and related rights in the information society: summary of the new rights and exceptions*. COM 97/628. <http://europa.eu.int/comm/dg15/en/intprop/intprop/1100.htm/>
The Library Association's response is at http://www.la-hq.org.uk/directory/prof_issues/dcrris_1.htm/

allowed without additional payments being incurred. Access to electronic information will be hard hit, as “all viewing in an electronic world involves copying, and this is to be subject to fair remuneration”¹²². In addition the directive also fails to “guarantee copyright exemption for disabled people”¹²³ which will have serious implications relating to the copying of materials into braille and recording of digital talking books. The European Fair Practices in Copyright Campaign (EFPICC) believes that the rights of copyright users such as disabled people have been ignored and unless this first draft is amended “exemptions of any kind could be ‘blocked’”¹²⁴.

Many attempts have been made to address the copyright issue in relation to electronic document delivery. This is an important area as digitisation has provided a potentially cheap, fast and high quality method of reproducing printed text. Access to electronic information is, of course, an issue for all, not just the visually impaired community. However, the potential of electronic information to provide visually impaired people with the ability to transfer documents into formats appropriate to themselves, by themselves, at a time convenient to themselves, is immense and copyright restrictions therefore have particular impact.

The *SEDODEL* (Secure Document Delivery for Blind and Partially Sighted People) *Project*¹²⁵ aims to address the problem of access to information for visually impaired people by providing a more secure environment for works provided electronically. This is particularly pertinent to material provided via the Internet which has been described in the past as “one gigantic copying machine”¹²⁶. (For further details about the *SEDODEL* project see Section 10.4).

¹²² Patel, K. EC directive endangers learning. *The Times Higher*, February 19, 1999.

¹²³ Patel, K. op.cit.

¹²⁴ Copyright all wrong, *Library Association Record*, 101 (3), March 1999, p.144.

¹²⁵ The *SEDODEL* website is at: <http://www.arttic.com/projects/SEDODEL/>

¹²⁶ Engelen, J. et al. *Surmounting the copyright hurdle: the SEDODEL Project*. <http://www.stakes.fi/tidecong/822sedod.htm>

10. Research and Development Initiatives

There is a very wide range of organisations and research teams involved in the development of solutions to the problems of accessibility. In this Chapter we draw attention to a selection of IT-based projects which have been particularly relevant to the development of accessible library services in the UK.

10.1. EXLIB: EXpansion of European LIBrary Systems for the Visually Disadvantaged¹²⁷

The EXLIB project ran from January 1993 to June 1994. Funded partly by the Telematics for Libraries Programme of the Commission of the European Communities, it aimed to provide guidelines on standards to enable blind and visually impaired people users to obtain the same level of access to catalogues, library services and inter-library loans as sighted users.

EXLIB looked at the development of technology and telecommunications and conducted surveys in the areas of user needs, service provision, materials, formats, and storage. It also investigated issues such as legislation, education and training, and made recommendations for future development. Some of the project's recommendations were developed into practical trials, including those undertaken by the TESTLAB project (see 8.2). In general, EXLIB's reports provided an excellent baseline for IT-based accessible library services.

10.2. TESTLAB¹²⁸

Funded as a Telematics for Libraries project and set up as a direct consequence of EXLIB, TESTLAB aimed to provide access to information via the local library in a format appropriate to the individual. This would enable the user to interact with a single point of access regardless of where and how the information is produced.

The TESTLAB project comprised a series of trials in public and academic libraries in four European countries: Austria, Eire, Italy and the UK (with evaluation from organisations in the Netherlands). It also undertook a feasibility study in Greece, where at present there are no developed services for blind and visually impaired users. The trials enabled blind and visually impaired users to access library catalogues and documents in formats appropriate to their needs. Analysis of their responses formed part of the TESTLAB final reports which were published in October 1998. The project combined records from voluntary sector organisations such as RNIB with records in mainstream library catalogues within NUCAF, the National Union Catalogue of Alternative Format materials.

¹²⁷ A Telematics for Libraries Project: <http://www.echo.lu/libraries/en/projects/exlib.html>

¹²⁸ A Telematics for Libraries Project: <http://www.echo.lu/libraries/en/projects/testlab.html>

10.3. Pilot Interlending Project (PIP) ¹²⁹

Developed as the UK strand of the TESTLAB project, PIP aimed to show how the existing mainstream interlending system worked and to develop a service, complementary to existing services but including provision of alternative format materials. This was to be achieved through a national request and interlending model, drawing on resources of both local and national service providers through NUCAF. PIP partners included RNIB and STV.

The North West Regional Library Service (NWRLS) acted as co-ordinator and facilitator for:

- Training of library staff in database searching and the correlation between NUCAF and UNITY (NUCAF sat on and beside Unity, the combined regional database)
- Support literature
- Promotion and publicity
- PIP Panels
- Operational issues e.g. interlending processes between libraries
- Monitoring and evaluation.

NWRLS also acted as data provider and a number of participants were involved as the trial sites, including Bury, Lancashire, Manchester and Tameside public libraries. At all trial sites, the participation of volunteers was an essential element of the project. The project also used the services of national library services for blind and visually impaired people including RNIB, NLB, Calibre and TNAUK.

PIP ran in 5 stages:

- Establishment of NUCAF.
- Development of the OPAC using accessible software and hardware.
- Training of staff and users.
- Evaluation.
- Provision of the inter-library lending service.

10.4. SEDODEL ¹³⁰

The EC funded *Smart Card and Terminal Usability Requirements and Needs* (SATURN) project (under the Telematics for the Disabled and Elderly Programme) developed a set of data structures for use on a smart card which could be used both for user profiling and for tracking usage. The *Secure Document Delivery for Blind and Partially Sighted People* (SEDODEL) Project

¹²⁹ For further information see: Godber, J. and McDonald C. *Testing systems using telematics for library access for blind and visually handicapped readers: report on the establishment of the national catalogue and development of the OPAC*, Deliverable 3.1, Libraries Project 4003, 1997.

¹³⁰ SEDODEL website. *op.cit.*

has extended this work, and aims to address the problem of securing copyright clearance for access to information for visually impaired people. The project is looking at measures taken to protect the IPR of individuals through the development of Electronic Copyright Management Systems (ECMS). These will hopefully provide IPR owners with a more secure environment from which their works can be electronically provided. The use of ECMS should give publishers security in the knowledge that electronic copies of books can be made available to organisations serving visually impaired people and to the individuals themselves without fear of compromising IPRs by onward transmission to unauthorised users.

SEDODEL (which includes the RNIB, the British Library, the Open University and Bradford University among its participant members) is described as follows:

SEDODEL's primary objective is to create, verify and demonstrate a pilot secure document delivery service which will maintain and guarantee the rights and obligations of actors in the publishing chain and meet the needs of the visually impaired for increased access to information.

This will be achieved by integrating two technologies: Electronic Copyright Management Systems (ECMS) and accessible electronic documents. The secure service should give publishers the confidence to release to organisations of and for the blind and partially sighted (and to end users directly) electronic copies of their publications, thereby greatly enhancing access to information.

The anticipated results of SEDODEL are: practical experience in the implementation and operation of a secure delivery system for accessible electronic documents for blind and partially sighted people; the extension of the CopySMART ECMS to the needs of blind and partially sighted people; a document transformation system and associated reader to provide structured electronic documents in accessible forms; recommendations for appropriate changes to be incorporated into European copyright legislation which will address the specific needs of the visually impaired.¹³¹

10.5. ARIADNE¹³²

The EC Telematics for the Integration of Disabled and Elderly People (TIDE) Programme funded the ARIADNE project, which addressed the problems of access and navigation faced by people when visiting unfamiliar buildings. Based on state of the art approaches, the project brought together experts in the field of building design and technology to work with users in the field in the creation of viable solutions.

¹³¹ <http://www.arttic.com/projects/SEDODEL/html/summary.htm> [12.2.99]

¹³² Run under the TIDE Programme and led by the University of Reading:
<http://www.echo.lu/telematics/disabl/ariadne-txt.html>

ARIADNE aimed to enhance confidence and mobility in a number of areas:

- Access - overcoming barriers to access such as stairs and escalators, poor navigational information and design.
- Information - to the users for example in locating specific places in a building, and to building operators in the specific needs of different users.
- Navigation - through open plan areas, corridors and emergency exits.

Clearly, many of the findings of ARIADNE have direct application to libraries.

10.6. GUIB: Textual and Graphical User Interfaces for Blind People¹³³

Another of the TIDE Pilot Action Projects, GUIB aimed to provide access for blind people to the increasing range of computer applications which are provided with a graphical user interface (rather than a text based one). The project aimed to ensure continued access by blind users to the same computer systems and applications as sighted users. This would be achieved through a range of applications such as braille bars, screen readers and voice recognition software.

Working with organisations which have expertise in the areas of information technology, signal processing and technology and blindness, the project developed a prototype system, integrating different devices such as speech, braille and sound, into a multimedia user interface. Tools were also developed to enable the user to customise their applications to meet individual needs. Again, the learning from GUIB has underpinned further work in the field and its reports remain useful.

10.7. INCLUDE: INCLUsion of Disabled and Elderly people in telematics.¹³⁴

Funded by the EC TIDE Programme, the INCLUDE project was a 4 year co-operation between the main European experts on the issues of telematics applications and elderly/disabled people. The goal was to ensure that issues of importance for these groupings are optimally addressed at programme, sector and project level within the Programme. INCLUDE provided information for designers and other interested parties about 'Design for All' telematic devices and services.

10.8. MIRACLE¹³⁵

The MIRACLE project has drawn on the experiences of the TESTLAB and CANTATE projects in its aim to develop a system which will allow special libraries to access and download braille music in digital form from a central database.

¹³³ Undertaken by F. H. Papenmeier, Germany: <http://www.papenmeier.de/indexe.htm/>

¹³⁴ Further information is at: <http://www.stakes.fi/include/>

¹³⁵ A Telematics for Libraries Project:
<http://www2.echo.lu/libraries/en/projects/miracle.html>

11. Policy Issues

11.1. National Policies

A number of Government policies have emerged over the last few years which could have implications for the development of service provision to visually impaired people. Overall, the Government has stated a very strong commitment to inclusiveness, that is, to ensuring that all citizens can participate fully in our national life. Education is at the centre of this policy and the Government's commitment to lifelong learning has been reinforced in the Green Paper *The Learning Age*¹³⁶. It will be of relevance to many potential and practising lifelong learners, not least those who, for whatever reason, find it difficult or inappropriate to learn in the 'traditional' way. This could include part time workers, single parents, people in remote areas and, not least, disabled people.

The move in the UK towards a learning and information society is being encouraged by initiatives such as the *National Grid for Learning*¹³⁷ and recommendations emerging from reports such as the *New Library: the People's Network*¹³⁸ and *Building the New Library Network*¹³⁹ as well as the growing number of electronic libraries projects such as those funded by the eLib and British Library Digital Libraries programmes. Implications for visually impaired people are huge, for unless electronically provided information is rendered accessible, this group of people are in danger of becoming "society's information poor"¹⁴⁰. However, Hopkins has remarked¹⁴¹ that recognition of the needs of visually impaired people was not addressed in any of the 13 core functions identified in the *Public Libraries Review*¹⁴² despite a proposal that the (then) Department for National Heritage "should set a new comprehensive framework for public library services that will allow considerable flexibility in local choice"¹⁴³.

In this chapter we consider the implications some of the recent developments in Government policy could have for library service provision for blind and visually

¹³⁶ *The Learning Age: A Renaissance for a New Britain* (CM 3790) London: Department for Education and Employment, February 1998.

¹³⁷ Department for Education and Employment *Connecting the Learning Society: National Grid for Learning* <http://www.dfes.gov.uk/grid/index.htm/> and <http://www.dfes.gov.uk/grid/challenge/index.htm>

¹³⁸ Library and Information Commission 1997 *New Library: the People's Network. op.cit.*

¹³⁹ Library and Information Commission. *Building the New Library Network: a report to government. op. cit.*

¹⁴⁰ Walters, S. Taking everybody under the wing: opening up services at Gateshead. *Library Technology*, 4 (1), February 1999, p.15.

¹⁴¹ Hopkins, L. Partners in care: Share the Vision. *Public Library Journal*, Vol.12., No.3., 1997.

¹⁴² *Reading the Future: a review of public libraries in England*. London: Department of National Heritage, 1997.

¹⁴³ Hopkins, L. 1997. *op.cit.*

impaired people, and will consider relevant sections of reports such as the *New Library* and *Building the New Library* in terms of providing accessible electronic and networked information.

11.1.1. The Learning Age

The concept of lifelong learning is becoming increasingly important in the provision of library services, in part due to the 1998 Green Paper *The Learning Age* which established the Government's commitment to the theory of 'learning for life'. The Green Paper identified the key to success as the "continuous education and development of the human mind and imagination" and the development of a "learning culture".

Key principles of the Paper include the removal of "lifelong barriers to learning" and "putting people first". This being the case, support for lifelong learning and a learning culture must be an equitable one and *The Learning Age* states that learning must be made easier for people, including "access for someone who has a disability"¹⁴⁴ and that collaborative work with voluntary statutory bodies should be undertaken to improve "access to further and higher education and training for students with disabilities..."¹⁴⁵.

11.1.2. National Grid for Learning¹⁴⁶

The *National Grid for Learning* aims to create a national structure of electronic networks to link together learners, educators and resources. One of its targets is to provide Internet access and digital communications to all UK schools and libraries by the year 2002. For this to be a truly national initiative, account must be taken of the accessibility problems faced by people who have difficulty reading the printed word. In *Connecting the Learning Society*, the Government's consultation paper on the *National Grid for Learning*, mention is made of the importance for "strong support for equality of opportunity for all to access the Grid, and for the development of facilities for learners with special needs"¹⁴⁷. It is not yet clear how this will be made a reality.

11.1.3. New Library: the People's Network

The *New Library: the People's Network* report was prepared by the Library and Information Commission for the Department of Culture, Media and Sport. Published in October 1997, it advocated the development of networking across the UK public library sector and the use of networks to deliver a variety of content. This network would link in with the *University for Industry* and the *National Grid for Learning*. In the report's introduction, it talks about "Tomorrow's

¹⁴⁴ *The Learning Age: A Renaissance for a New Britain*. 1987, *op.cit.*, Chapter 1, Appendix section 2.

¹⁴⁵ *The Learning Age: A Renaissance for a New Britain*. 1998, *op. cit.*, Chapter 4 section 6.

¹⁴⁶ <http://www.dfee.gov.uk/grid/challenge/ngflchal.htm>

¹⁴⁷ *Connecting the Learning Society*. DfEE, October 1997. <http://www.open.gov.uk/dfee/dfeehome.htm>

new library” which is describes as being “open and accessible to all, without precondition, whether for material in printed form or for access to the wealth of resources available online”¹⁴⁸. The needs of blind and visually impaired people would thus be recognised, and indeed in Chapter 1 the report specifically mentions that “services will be adapted for use by people with impaired sight...”. Implementation of the report’s recommendations is described below.

11.1.4. The New Library Network

In 1998 the Library and Information Commission produced a follow-up report entitled *Building the New Library Network*. This publication sets out to consider the approaches needed to deliver the vision of *New Library*.

Services supported would include:

- Lifelong learning and education.
- Citizen’s information and facilities for participating in society.
- Facilities for business and the economy, training and employment.
- Facilities for researching community history.
- The national digital library.

Mention of the needs and requirements of visually impaired people appears briefly in several sections of the report. In chapter 11, for example, it recognises that as information technology gatekeepers, libraries must be able to provide visually impaired people with “independent access to a wide range of information not currently available to them”. To achieve this, the report lists one of its key features as the provision of “the option of using adaptive technologies to assist use by visually impaired people”. Appendix 12 goes on to mention specific adaptive technologies such as braille bars, voice recognition, synthetic speech output, screen magnification and large print output.

11.1.5. The Dearing Report¹⁴⁹

The Report emphasises the need to widen participation in higher education to under-represented groups and makes a number of specific disability-related recommendations:

- “....to the Funding Bodies that they provide funding for institutions to provide learning support for students with disabilities”;
- “....to the Institute for Learning and Teaching in Higher Education that it includes the learning needs of students with disabilities in its research, programme accreditation and advisory activities”;

¹⁴⁸ Library and Information Commission *New Library*, 1997. *op. cit.*

¹⁴⁹ *The National Committee of Inquiry into Higher Education Higher Education in the Learning Society*: Report of the National Committee (Chairman: Sir Ron Dearing) London: HMSO, 1997. Ref. NCIHE/97/850. ISBN 1 85838 254 8.

- "...to the Government that it extends the scope of the Disabled Students Allowance so that it is available without a parental means test and to part-time students, postgraduate students and those who have become disabled who wish to obtain a second higher education qualification" (we have noted current DSA changes in section 7.1.1).

11.1.6. The Distributed National Electronic Resource (DNER)

The concept of the DNER has emerged from discussions among participants in the eLib Programme and members of JISC's Committee on Electronic Information (CEI), and is contained within JISC's 'Five Year Strategy' for 1996-2001. The CEI's Content Working Group has described the DNER concept in the following way:

*The national electronic resource will be distributed in the sense that networked information does not need a central depository. It is recognised that data will come from many different sources and will be delivered in different ways..... The distributed nature of the resource does not imply that the collection will be unmanaged as a whole. The JISC will endeavour to develop it in a coherent, unified way; it will promote the use of appropriate standards and will support a national resource discovery agency to ensure integrated access to all forms and sources of material.*¹⁵⁰

The paper from which this quotation is taken goes on to speak of the DNER as a higher education resource, but subsequent discussions, and the publication of the *New Library* proposals, have broadened thinking towards the concept of a cross-sectoral DNER. However, there is a long way to go before this could become a reality, not least because very many of the resources made available by JISC through its datacentres are licensed for higher education staff and student use only.

Following publication of a report on the concept of a 'National Resource Discovery Agency' (NARD)¹⁵¹ and further discussion, JISC has recently awarded a contract for the establishment of a 'Resource Discovery Network Centre' (RDNC) to a consortium consisting of King's College London, UKOLN and the University of Hull. The RDNC will form the hub of a national network which will be built around the successors to eLib's subject gateways – to be known as 'faculty hubs'. The hubs will be both a focus for collection development in their subject areas and a gateway to quality assured resources. External partnerships will be encouraged, as will international co-operation. The hubs will not be limited to the

¹⁵⁰ Joint Information Systems Committee: Committee on Electronic Information: Content Working Group. *An Integrated Information Environment for Higher Education: Developing the Distributed National Electronic Resource (DNER)*. Bristol: JISC, December 1997. http://www.jisc.ac.uk/cei/dner_colpol.html

¹⁵¹ Brophy, P., Fisher, S.M., Hare, G. and Kay, D. *Towards a National Agency for Resource Discovery: Scoping Study* British Library Research and Innovation Report 58. <http://www.ukoln.ac.uk/services/papers/bl/blri058/nard.html>

harvested web resources which were the hallmark of the subject gateways, but will also be encouraged to offer communications services, to develop primary and secondary resources and to act as mirrors for valuable services hosted elsewhere.

Initially it is envisaged that hubs will cover the following domains:

- Humanities
- Biological and Medical Sciences
- Creative Arts and Industries
- Environment and Society
- Engineering Computing and Mathematics
- Physical Sciences
- Social Sciences, Business and Law
- Education and Vocational Lifelong Learning

We consider in Part IV how these developments might be paralleled by a hub or gateway to accessible resources.

11.2. Library Policy

The establishment of a culture of needs awareness and provision of equal access may be helped through the use of specific library policies relating to the provision of services to blind and visually impaired people. In 1998 the *RNIB* conducted a survey¹⁵² which looked at local authority library services and identified a number of salient points. Ninety per cent of the library authorities surveyed had the needs of visually impaired people included in their general disability policy, and of these, 10% had a specific policy relating to visually impaired people. Half the authorities surveyed also had policies relating to specific services for visually impaired people such as reading services – on the other hand, half did not!

It should be noted that because there is no nationally agreed policy, there is no standardisation in service provision. Were there to be an agreed, baseline level of services to be provided, with standardisation of equipment and some agreement on formats, users could walk into any library, whether it be an academic or public, and be sure that an agreed level of service would be available and that they would be able to use the equipment provided. There is thus a strong case for a national basic service standard, which might then be supplemented by services known to be needed by local users.

Coupled with an agreed national approach, there is a need to create a culture of awareness and accountability at local level. Service accessibility should not be

¹⁵² *RNIB Public library services where are we now? Findings from two surveys conducted by the RNIB. Share the Vision Seminar, 22nd and 23rd September, 1998. (Unpublished)*

an optional extra for libraries: it should be a core feature on which their performance is judged.

Part III Building the National Accessible Library Service

In Part I we set out our vision of the National Accessible Library Service. In Part II we provided a range of background information and perspectives as background to the current state of development of accessible library services. In Part III we move on to consider the building blocks for the accessible library of the future, starting with consideration of the users' needs, and then considering accessibility issues within a generic framework.

12. The Library User Perspective

All library users are looking for a carefully managed mix of services predicated on the need for specific content (which may be defined in various ways). While in some circumstances – including some of the needs of persons with visual impairments - the initial medium is important, in many the starting-point is the content (i.e. the user asks, 'Have you got anything on?' Or 'Have you got anything by?'). However, the user does not require 'just any' content, but is increasingly seeking some form of assurance as to the quality of the information supplied. In the traditional library this was provided by:

- Provision of stock which was published by a 'reputable' publisher.
- The sometimes taken-for-granted yet always important selection expertise of library staff; in universities this is coupled with the selection experience of academic staff, often expressed through the reading lists they use for courses.
- The equally important experience of the user (for example, where information was gleaned from a journal or reference book with which the user was familiar and whose quality was known from individual or shared experience).

It is not surprising that, as we enter the networked information age, a recurring issue with electronic media is the quality which they display. This is not the place to go into detail on this matter, but it includes issues such as timeliness, reliability, suitability and so on. It also includes the ease and certainty with which the user can assess that quality.

It follows that, from the end user's perspective, the identification of resources is not a simple matter of 'anything on this subject' but includes the ability to define the characteristics of the content. There is an open question as to the extent to which the library can guarantee quality. However, a library service should enable the end user to specify quality characteristics of the product which is to be delivered, and should have processes which at least go some way to assuring that content.

Closely linked to quality, the end user may wish to specify conditions related to his or her purpose in making the request. He or she may wish to simply view, to borrow or to buy the object. Further he/she could be interested in being a distributor (take, for example, the case of a teacher who wants the electronic copy in order to distribute it to his or her class). Each of these purposes may have conditions attached to them: thus the desire to borrow may be on condition that the book will be available tomorrow and will not be due for return for 4 weeks

(the user is about to go on holiday). The desire to acquire the electronic copy may be on condition that the cost is, say, less than £5 and gives the right to distribute copies. It is also worth noting that the user's stated or implied purpose may dictate the Library's response to a request: it is common for academic libraries to refuse to obtain leisure material by inter-library loan, for example. This brings in the notion that multiple library memberships may be needed to enable a user to fulfil a variety of purposes – in terms of accessibility we consider later how this might be overcome.

Further to these issues of content, quality and purpose, it has long been recognised that users take one of two approaches to information searching: they either know the item they require (with greater or lesser accuracy) or they are interested in a subject about which they need information. Search strategies in the traditional library are often divided for this reason into 'known item searches' and 'browsing'. To this we might add proactive SDI services which do not fit neatly into either category. So the end user may either:

- search for a known item
- browse for information in a range of information objects (or in their surrogate metadata)
- receive information objects (or their metadata) selected on his or her behalf by knowledgeable third party (whether human or machine)

These differences are important to a library as they fundamentally affect its own delivery strategy. This is particularly true for accessible materials, where browsing is much more difficult to support than known item delivery.

As noted above, form is also important in some instances. For example, an end-user who wishes to read Joseph Conrad's *Heart of Darkness* will probably wish to specify whether he or she requires:

- A printed book
- A large print book
- A printed book with illustrations
- An audio tape
- A braille copy
- A Moon copy
- An electronic copy to read (and maybe cut and paste) on a PC, which may be able to handle
 - ASCII text
 - Word processor formats
 - PDF files
 - Proprietary formats
- An accessible format electronic copy to read on a braille output device
- A specific format for use with an electronic book device
- and so on

In summary, it follows from this analysis that the issues from the end user perspective are:

- content
- quality
- purpose
- conditions
- search strategy
- form

These characteristics of a user request are as applicable to accessible information services as to any other, although obviously form takes on a particular significance. Any agency seeking to act as a library for blind and visually impaired people needs to be able to handle requests which display the full range of characteristics, and to respond accordingly. In designing services it is important that thought is given to how the library can support complex information selection using any combination of these characteristics.

13. The Hybrid Library

The concept of the 'hybrid library' has emerged within the higher education Electronic Libraries Programme (eLib) in the UK, although it is reflected in some practice in other countries (the California Digital Library being an example). It recognises that both 'traditional' (i.e. print-based) and electronic services have disadvantages. For example:

In the traditional model

- Each item must be used serially (i.e. one user at a time)
- Libraries can only stock a very restricted range of items
- Publication processes mean material is dated even when added to stock
- The cost of stocking little used items is very high
- There are high cost associated with handling physical objects
- Heavily used items wear out

In the electronic model

- The quality of sources is often uncertain or unknown
- Browsing is difficult at the detailed item level
- The economic model is uncertain, resulting in severe restrictions on accessing valuable content
- There is no consensus on achieving preservation
- The library is poor at encouraging social interaction.

As far as accessibility is concerned these two approaches have also to intersect with a blend of accessibility tools (for accessing 'standard' resources) and transcription (for changing the mode of presentation of standard resources). The accessible hybrid library thus presents even greater challenges than the straightforward hybrid model.

The concept of the hybrid library has been described by the eLib Programme Director, Chris Rusbridge, in the following terms:

*The hybrid library was designed to bring a range of technologies from different sources together in the context of a working library, and also to begin to explore integrated systems and services in both the electronic and print environments. The hybrid library should integrate access to all ... kinds of resources ... using different technologies from the digital library world, and across different media.*¹⁵³

¹⁵³ Rusbridge, C. "Towards the Hybrid Library" *D-Lib Magazine* July-August 1998. [<http://mirrored.ukoln.ac.uk/lis-journals/dlib/dlib/dlib/july98/rusbridge/07rusbridge.html>]

The concept recognises that, for a very long time to come, most real-world library services will have to cope with the provision of information in both traditional (e.g. print, braille) and electronic formats. Furthermore it is likely that the same information will be available in different formats, perhaps with different terms, conditions and prices attached to them. Managing integrated services will be a matter of very considerable complexity.

The range of services offered by libraries is of course far wider than the supply of information, even defining that term widely. Libraries also offer information skills training, expert enquiry and reference services, accommodation for study and reading, equipment and a portal to the national and international library network. The integrated, hybrid library should be able to provide all of these services, but to do so within the new networked information paradigm.

While there have been many experiments with electronic services of various types, in eLib and elsewhere, to date we have only seen the beginnings of true integrated services. Two particular issues should be highlighted at this point, partly because they underline the problems of turning experimental projects into real services, and partly because they are of particular relevance to the development of a national service such as is needed for people with visual impairment. These issues are *scalability* and *sustainability*. They may be described as follows:

Scalability refers to the ability of solutions to be implemented widely across a whole service or across the whole of a sector, such as higher education, or perhaps across all library and information services. Very many 'projects' which work well with small numbers of users fail to scale, either because the software cannot support larger numbers or because the operational and managerial overheads are too high. For example, a project which relied on users having a particular type of hardware (say a particular sound card) could not be scaled across a nation, though it might just scale across one library authority – until the users demanded access from home. More frequently it is the sheer effort required to support a service which prevents it scaling.

Sustainability is the ability of a service to be supported over the long term. Will it be possible for the project firstly to be maintained as a service and secondly to 'grow' with the needs of the users? The first point emphasises that, although extra effort may be required to set up the service, it will then need to operate with minimal overheads and minimal support as one of a portfolio of services offered by the library. The second recognises that the environment and the supporting technologies will develop and change over time, so that the new service needs to be maintained and to grow

alongside it. An example of a sustainability problem would be software which was designed exclusively for Windows 3.1.¹⁵⁴

A number of authors have suggested that the hybrid library can best be understood as a 'broker' which sits between the user and the 'information universe' - the whole range of published and semi-published literature in the world - and helps to make sense of this vastness by evaluating, selecting and presenting sources which are likely to be of particular interest to its users¹⁵⁵. Because the user population served is also selected from a 'universe' of possible users, this provides a symmetrical basic model:

User universe	User population	Library	Information population	Information universe
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where the 'information population' is shorthand for the stock, including electronic content, selected (but not necessarily held) by the library and 'user population' refers to recognised (usually registered) users of the library service. The term 'information landscape' is sometimes used to describe the presentation of the information population to the users¹⁵⁶.

Expansion of this model¹⁵⁷ suggests that the following are the key functions which need to be designed and maintained for the integrated, hybrid library to be viable. In later sections, some important aspects of these functions are explored in greater depth, but it is worth emphasising here that the hybrid library is a concept that stresses *integration of services* (though not necessarily of content) and a *holistic* approach. In other words, no one function can be developed in isolation from the rest.

The functions are:

- Selection of a *user population* and maintenance of information and intelligence about it.
- Selection of an *information population*, a set of resources to which the library will provide access. The population is selected on grounds of *quality*, including relevance to anticipated user needs. Because the available information universe is constantly changing, and users' needs are likewise constantly changing, the information population must be dynamic. In the hybrid library some resources are acquired while others are subject to access arrangements.

¹⁵⁴ Adapted from Brophy, P. Scalability and sustainability *HyLiFe Project Newsletter*, No. 1, November 1998.

¹⁵⁵ For example, Dempsey, L., Russell, R. and Murray, R. Utopian place of criticism? Brokering Access to Network Information *Journal of Documentation* 55(1), January 1999, pp. 33-70.

¹⁵⁶ Dempsey, L., Russell, R. and Murray, R. Utopian place of criticism? Brokering Access to Network Information *op. cit.*

¹⁵⁷ A paper on this subject is in preparation and will be published separately.

- Acquisition and/or creation of *metadata* to describe the information population.
- Creation of a *user interface* to enable users to interact with the metadata resources.
- Support to users in the *formulation of queries*.
- Support to enable users to *browse metadata*, in order to assess likely relevance and narrow down a search.
- Systems to enable specific items to be *discovered* i.e. to be identified uniquely.
- Systems to enable a *location* for each discovered item to be identified.
- Support for users who wish to *browse* items i.e. to examine sources at a higher level of granularity than the metadata.
- Systems to enable users to make *requests* for items. These may range from a lending counter to an online system interacting with a remote data supplier.
- Systems to handle the *delivery* of items to the user. These may range from online delivery of a file and its display through delivery by post of a physical object to retrieval from a closed access store.
- Services to enable users to make *use* of items which have been delivered to them.
- Systems to enable users to *return* and/or *release* items when they have finished with them.
- Systems which ensure the long-term *preservation* of some or all objects in the information population.
- *Advisory and enquiry* services, including information skills training
- *Management* of the service in an holistic fashion to provide efficiency, effectiveness and value for money.

These provide the basic design parameters for the integrated, accessible library. In the following Chapters we expand on these key elements.

14. The User Population

14.1. User profiling

Libraries have always maintained 'profiles' of their users, although the term has more commonly been used by industrial and commercial information services. A profile is simply a set of information about a user, and the traditional approach has been to collect such data as part of granting membership, often limiting the data to name, address and, in higher education, status. At this stage the user has also been authorised to use certain services. These records are then used to authenticate the user, typically when a request to borrow is made, when the material 'conditions' are compared with the 'user' conditions. So, for example, a 'normal' loan book is matched with a 'staff' status to determine the appropriate loan period.

In the networked environment user profiling becomes even more important, and offers the key to a range of added value services. For example, profiles provide the prospect of making the 'view' of information resources which each user sees (the information landscape) personal – the library may 'know' what type of material that particular user has accessed in the past and may tune the initial interface screens to highlight similar, new resources. Profiles also hold the key to a dynamic 'information population', since each user can be given a set of electronic privileges as part of membership – users of one type (say, those signed up with an educational provider) may be offered information sources not available to others. Perhaps most important of all, user profiles hold out the prospect of automated electronic commerce. For example, a charged service can be offered automatically if the user profile can be queried to provide the necessary credit rating.

Reference has already been made to the inappropriateness of treating all blind and visually impaired users as if they can be served by one accessibility solution. For this reason, profiles have a vital part to play in providing personalised services for such users. The NLB already keeps a record of past borrowings so as to give itself the potential to select likely material of interest to a user. This simple concept could be enhanced in an electronic environment by maintaining an automated record of subject, level, form, accessibility requirements and preferences, and so on. The profile could also be used to adjust the display requirements to suit each user.

14.2. Authentication and Authorisation

Authentication and authorisation are the processes of checking a user's identity and rights so that he is able to use a service or particular parts of it. In essence authentication processes ensure that the user is who he claims to be, while authorisation checks that the authenticated user has the necessary rights (or, possibly, has made the necessary payments) to use the service requested. In the simplest case, it involves a set of processes – usually after the user has made a

request and after the availability of the requested item has been checked – of ensuring that the user is authorised to use that particular item. Authentication may also be applied at the collection level – for example, the BIDS system performs an authentication (password) check before allowing users to access its databases, but they may then search and retrieve items without further authorisation.

A particular issue is that with many hundreds of services available, there is a danger that users will have to be issued with a password for each. To avoid this, generalised authentication schemes are being introduced – of which the ATHENS system in higher education is probably the best known in the library field. However, much more advanced systems which incorporate electronic commerce capabilities are being developed by banks, credit card companies and others. Work on digital signatories and other strong encryption techniques is of considerable significance in this field. Some libraries – for example in the Netherlands – are investigating smart card technologies for these purposes.

14.3. Accessibility Issues

Because blind and visually impaired people will, if they are to receive comprehensive services, need to access the national, distributed collection but to do so through modalities which are appropriate for them and with which they feel comfortable, sophisticated profiling has much to offer. Authentication systems which assist such users to navigate through the resources to which they have access rights, without constant interruption to check authorisation, will do much to make such usage feasible. It follows that a carefully managed mix of local and national solutions (possibly local profiles with national authentication?) will be needed to enable libraries to serve their user populations both efficiently and effectively.

15. The Information Population

For many years librarians and others have noted the rapid explosion of published information and commented on the difficulties it poses for libraries and information services attempting to provide ordered access to the world's information for their users. The advent of digital information, together with the development of world-wide information and communications networks, has brought a new order of magnitude to this problem. While in the past the library's role may have been defined in terms of the collection which it brought together, and which would largely satisfy its clientele, the modern library acts as an interface to the global wealth of information – what can be termed the 'information universe'. This includes:

- Books published in the traditional way, electronic books and mixed media books
- Journals published in paper formats, electronic and hybrid journals
- Reports, whether paper or electronic or both
- Patents, standards, etc. whether paper or electronic or both
- Official documents, including legislation, whether paper or electronic or both
- Slides and other images in analogue formats
- Images in digital formats
- Analogue audio tapes
- Digital audio
- Analogue video
- Digital video
- Collections of data e.g. in demographic databases
- Grey literature, such as 'junk' mail, election addresses, etc.
- Web sites and individual web pages
- Java applets
- Computer files of various types
- Streamed data, such as that from satellite observation or news-feeds
- Semi-published or unpublished company records
- Dynamic documents created when they are requested
- Dynamic documents updated automatically from a remote source
- and so on

While libraries can act as the interface to this wealth of information, one of their most important tasks will be to create order out of potential chaos. As in the past they will do this by selecting sources which they will offer to their users. The hybrid library selects both physical materials to hold in its own stock and virtual materials which it does not own but to which it can provide access and about which it can offer some guarantee (or at least opinion) on quality. The term 'information population' is a convenient way to describe the sources selected by a particular library from the universe of possible sources. It is worth noting that the hybrid library will retain the capability to go beyond its initial population and

will do so frequently as demands are made: but it has always done this, by buying additional items, or requesting inter-library loans to supplement its collection.

A particular issue in the electronic environment is that there is an enormous plethora of standards (and even lack of standards) concerning the way in which information objects are stored, described and presented. This issue was described in some detail in Section 6.3 in relation to accessibility of document formats, but also relates to the way in which systems communicate with one another and the terms used to describe systems, collections and objects. In essence the problem is how to ensure that the user can be presented with resources which are compatible with one another and enable common software platforms to be used, and to do so in an efficient way that, for example, does not involve the library in re-writing its interface software for every different source it wishes to access: in short the issue is one of *interoperability*.

The UK Interoperability Focus at UKOLN has been established to assist services to address this issue¹⁵⁸ and has suggested that the issue might best be viewed from five separate viewpoints. Although the Interoperability Focus does not explicitly identify this, each has accessibility implications:

- *Technical Interoperability* is concerned with the standards needed to enable systems to interact and objects to be stored, transported and communicated.
- *Semantic Interoperability* is concerned with bringing standardisation to the ways in which terms are used to describe objects or concepts. For example, the use of a thesaurus may assist interoperability at the semantic level.
- *Political/Human Interoperability* relates to the exercise of control over resources, such as decisions on whether to make them available, and to the ability of staff to handle complex systems which each pose different problems if the end product is to be brought together as an integrated service.
- *Inter-community interoperability* is concerned to facilitate sharing of information objects and collections across communities. For example, the European Commission's Fifth Framework Programme is seeking to encourage sharing across libraries, museums, art galleries and other 'memory institutions'.
- *International Interoperability* includes issues such as language and culture.

In the context of accessibility we should add a sixth viewpoint:

- *Accessible interoperability*, related to the use of common accessibility features which are designed to meet the needs of individual users i.e.

¹⁵⁸ See <http://www.ukoln.ac.uk/interop-focus/about/>

ensuring that each object presented to the user is consistent in its access requirements and does not require the user to switch, for example, between different access software.

16. Metadata

16.1. Introduction

Metadata – ‘data about data’ – consists of descriptions of information 'objects' (whether books, web pages, audio tapes or whatever). A more formal definition is:

“Metadata is data associated with objects which relieves their potential users of having to have full advance knowledge of their existence or characteristics.”¹⁵⁹

Libraries have long created metadata in the form of catalogue entries and have generally bought in further metadata, especially in relation to journal papers, in the form of published indexing and abstracting services.

In the networked information environment metadata has become even more important, since it holds the key not only to providing individuals with descriptions for them to browse but more importantly to the use of software to locate relevant information, to negotiate terms for its supply, to request it and to receive it. At present metadata of Web pages is particularly problematic: it often does not exist, and where it does it may not provide the data required (for example, it is very difficult to determine the author of a Web resource without additional indexing).

It is important to note that metadata standards need to encompass two distinct issues: the structural format of a metadata record (which fields are valid, their syntax, and so on) and the content. The latter has received considerable attention from librarians, with the development of thesauri, the Anglo-American Cataloguing Rules, various subject heading lists, etc. Metadata content for electronic media has to date been relatively poorly handled, with evidence of standardisation and the use of common conventions only just starting to emerge.

16.2. MARC

For well over a quarter of a century the MARC (MACHINE Readable Cataloguing) standard has been in use by libraries, and nearly all large libraries now make use of it, often buying in records from the national library or other suppliers. It is by far the longest established computer-readable metadata standard, but on the negative side it is not particularly well suited to describing electronic documents. MARC was designed for the exchange of bibliographic and other related information in machine readable form, although it is often regarded as an internal

¹⁵⁹ From Dempsey, L. and Heery, R. *DESIRE – Development of a European service for Information on research and Education: Specification for resource description methods. Part 1. A review of metadata: a survey of current resource description formats.* (Version 1.0 19.3.97) Bath: UKOLN, 1997. p. 5.

format also. A further complication is that MARC is really a family of formats based on ISO 2709¹⁶⁰: USMARC, UKMARC and UNIMARC are all variants.

MARC uses a structure of tagged fields and sub-fields for each element of the record and is almost always produced manually by an experienced cataloguer. The use of MARC for electronic information objects is not well-established, although the 856 field is commonly used for Uniform Resource Locators (URLs).

MARC does not provide a standard method of describing the accessibility format of information objects (e.g. that it is in braille 2). The RNIB used the 099/954 fields in the TESTLAB work with NUCAF, and there are proposals before MARBI to achieve standardisation. To date, however, nothing has been agreed.

It is worth noting that the Z39.50 'search & retrieve' standard (see 18.2 below) was developed as a means of searching remote MARC databases, although it can be used more generically. To date, most experience with Z39.50 is with MARC datasets.

16.3. Dublin Core

The Dublin Core (so-called because the first meeting of the Working Group which designed it was held in Dublin, Ohio) was originally developed to improve resource discovery on the World Wide Web and for this reason it was designed to describe Web-based documents. Unlike MARC it was deliberately designed to be simple, and uses only fifteen 'elements'. It is intended to be generic, and goes beyond the type of objects found in libraries to include museums, art galleries and other collections. For example, rather than 'author' it uses the concept of 'creator': "the person or organisation primarily responsible for the intellectual content of the resource".

From an accessibility standpoint Dublin Core offers little advancement, and there is no evidence to date that this issue has been taken on board. There is a format field, but no standard way of describing accessibility characteristics. A possible answer to this is to use what is known as 'Qualified Dublin Core', in which an element value is associated with an externally-defined scheme, but this requires agreement among all the user communities to be effective.

Development of the Dublin Core continues¹⁶¹, and it is likely to become part of the Resource Description Framework (see below).

16.4. Resource Description Framework

A more generic approach called the Resource Description Framework (RDF) is now under development by the World Wide Web Consortium (W3C) to provide a framework which can be used within any application area in the networked

¹⁶⁰ International Organization for Standardisation. Information and Documentation – Format for Information Exchange. ISO 2709: 1996

¹⁶¹ See http://purl.org/metadata/dublin_core/

information environment – including such requirements as e-commerce, digital signatures and content rating systems. The aim is to develop a robust framework such that metadata which can be processed ('understood') by software can be created to common standards.

RDF is based on a mathematical model which enables metadata statements to be grouped together as 'triples', consisting of a subject (the object being described, e.g. a particular web page), a property-type (a property of that resource e.g. an author) and a value (of that property e.g. John Smith). However, triples can also be arranged in complex structures, for example by replacing the value by another triple.

There is considerable scope within RDF for describing the accessibility features of information resources, although it is too early to say exactly how this will best be achieved.

16.5. Content labelling

Labelling provides a tag or rating to sites which can then be used by software to judge the likely nature of the content. It has been most widely implemented in connection with 'blocking' software designed to screen out undesirable (e.g. pornographic) Internet content. Labels are applied on the basis of human judgement and in accordance with a standard scheme.

The dominant scheme is the Platform for Internet Content Selection (PICS)¹⁶² which is being developed by the World Wide Web Consortium (W3C). Essentially, PICS provides a structured language for labelling of Internet content. Labels may be embedded in an HTML document (within the META tag), may be associated with a document or may be available as a separate entity referenced through a source document's URL from a 'label bureau'. It is possible for labels to be applied to individual documents or to sites (i.e. the label can apply to all documents whose URL starts with a specified string of characters). It is also possible to provide both generic and specific labels so that a site can have a more open rating than specific pages within it: the more specific label should always override the generic ones. Labels always relate to the document or site itself; never to documents referenced by it.

Each label consists of three parts:

- A *service identifier* which is the URL embedded in the label which enables any user to identify and find information on the rating agency
- *Label options* provide information about the label, such as the date and time it was created
- A *Rating* which is a set of 'attribute pairs', giving the category of the rating and its value (e.g. category: *violence*; value: 6, where '6' is defined

¹⁶² PICS – Platform for Internet Content Selection. See <http://www.w3.org/PICS/#Introduction>

by the rating agency as 'graphic'- this example is taken from *SafeSurf's* system¹⁶³)

Each document has an associated 'label list': technically this is always the case even if the number of labels is one. Multiple labels can be used to rate different aspects e.g. sexual content, a violence rating, and so on.

There is some scope for using PICS labels to indicate accessibility, although it does not appear that this has yet been explored.

16.6. Collection Description

A particular issue in the electronic environment is to find standard ways in which collections can be described. As the number of searchable resources (library catalogues, web sites, other datasets, and so on) expands, it is no longer feasible to rely on the user selecting particular collections to search. We need ways of describing collections so that software can handle selection, at least within parameters set by the user. Collection descriptions will need to provide for subject, level, scope, geographical location, access policy and a whole range of other attributes.

In the UK work on this issue has started only recently¹⁶⁴. It will, however, be important that collections of accessible material, or more general collections containing significant accessible resources, can be accessed in this way.

16.7. Metadata content

As indicated earlier, there is a major issue over the descriptions used within metadata fields. It is noticeable that there are a variety of ways of describing accessible formats, for example. Clearly it is important that agreement is reached on metadata content schema as well as on structural elements such as which fields and tags to use.

¹⁶³ <http://wwwsafesurf.com/>

¹⁶⁴ Powell, A. (ed.) Collection description working group: work in progress. Bath: UKOLN, October 1998. <http://www.ukoln.ac.uk/metadata/cld/wg-report/intro.html/>

17. User Interfaces and Query Formulation

The interface is the means by which a user interacts with the library service. The term can usefully be applied both to human (person-to-person) and computer (person-to-machine) interaction, although the issues raised are very different. It is also helpful to expand the definition of the 'interface' to include all those features which enable or prevent successful interaction, including the design of access to the service as a whole.

17.1. Access

Much has been written concerning access to general library services for blind and visually impaired people and in this Section we provide only a summary of the most pertinent issues. We have drawn heavily on the recommendations and guidelines of experts in the field including the *Library Association*, *STV* and the *American Library Association*¹⁶⁵ and the summary in this section is largely derived from these sources.

It is generally recognised that access to a library is a vital issue to be considered by architects, designers and service providers. Visually impaired people may be discouraged from using the library altogether if too many barriers to access are perceived. A very broad understanding of access is needed: it includes public transport links and approaches to the building as well as the entrance to the building itself. Once at the building, barriers may not be obvious. For example, revolving doors are now common, but may be difficult for people with a visual impairment to negotiate and can be dangerous for guide dogs. Older library buildings may have to be adapted in order to make them more accessible but the ramp installed as an 'add-on' to provide wheelchair access can be confusing to someone who is blind. Library security systems can create problems as the blind user's stick passes under the barrier which then catches him or her unawares.

Once inside the building it should be obvious to all visitors which way to go. Simplicity of layout will help visually impaired users to navigate their way around. Bearing in mind the needs of partially sighted people, attention to colour, and especially contrasting floor and wall colours and to good lighting is vital. There are a number of recommendations on the choice of colours: just as in web page design, in physical environments the use of contrasting of colours is considered to be of much more important than the actual colours themselves. Safety issues must also be considered, and with the visually impaired person in mind this could include marking all glass areas, ensuring that furniture is easily identifiable rather than the same colour as the floor and that the floor is relatively free of obstacles.

¹⁶⁵ For example see: Machell, J. *Library and information services for visually impaired people: national guidelines*. London: Library Association, 1996.
Deines-Jones, C. and Van Fleet, C. *Preparing staff to serve patrons with disabilities: a how to do it manual*. New York: Neal-Schuman, 1995.

Signage should always be clear and follow a logical pattern. The provision of tactile maps and audio guides enable visually impaired users to find their way around relatively unaided. Audio messages in lifts are becoming common, but not all have braille interpreted floor indicators, nor do all doors bear braille signage.

Access to adaptive aids needs careful consideration and there are different trains of thought regarding this. For example, some visually impaired users may prefer to have a separate unit in which to use the adaptive library facilities, while others may want to be integrated rather than isolated. The most productive way to make informed decisions is to consult the users themselves first and try to reach an agreed consensus.

One of the REVEL team's observations (see section 7.2.1) is that there is enormous diversity of practice among higher education libraries, and other reports would suggest that the same is true of public libraries. This suggests that minimum national standards would be appropriate, perhaps with some kind of 'accessible library' kite mark. This suggestion forms part of our overall recommendations.

17.2. Staff Training

Staff training has been identified as one of the "most important elements in providing services to visually impaired people"¹⁶⁶. Many partially sighted people will rely heavily on assistance when accessing a library, particularly if they are new users. They need to feel comfortable in asking for assistance and in turn staff must feel confident in providing assistance in a positive manner. Staff need to be aware of the particular difficulties faced by visually impaired people. Misunderstandings brought about by a lack of knowledge can easily dissuade the user from asking for help again. Similarly a negative experience can harm the confidence of staff members and discourage them from offering assistance.

General staff training should include a visual impairment awareness element in all induction programmes, with a more specialised programme of follow-up training. For example advice is needed on the different levels of sight impairment and the diverse problems faced by visually impaired people. Practical skills should also be covered, such advice on how to interact with visually impaired people, including etiquette and how to guide a blind person, use of appropriate language and descriptive techniques.

Training in the use of adaptive equipment is important. Staff need to be confident when training visually impaired people in order for the users to get the best out of the session. Therefore staff not only need to be familiar with software and adaptive aids themselves but also in basic training skills in order to pass on their knowledge.

¹⁶⁶ Machell, J. 1996, *op.cit.*

Experts in the field suggest that it is never too early to embark on raising awareness of disability issues. The *TESTLAB Project* (see Section 10.2) recommended that training should begin at library school level, thus ensuring graduates entering into the workforce are fully aware of the issues of accessibility to library services for visually impaired people and the problems faced by this group of users.

17.3. The Computer Interface

As the emphasis shifts more and more towards end-user access to electronic systems, whether to retrieve information objects themselves or merely to access the metadata which describes physical objects, the interface provided for the user becomes ever more crucial.

Interface design is a highly specialist subject with an extensive literature of its own. The move from character-based to graphical user interfaces (GUIs) has had particular implications for blind and visually impaired users, since the increasing emphasis on images, together with the use of multiple, overlapping windows and the loss of linearity it implies, pose enormous problems. A number of screen readers have been developed to cope with GUIs, with greater or lesser success, and a considerable amount of research is being undertaken in this area.

Not only has there been a significant change in display technology, but devices used for user input have also changed. While the keyboard remains almost ubiquitous, manipulation of the interface is most commonly achieved by using a pointing device such as a mouse or trackerball coupled to a moving cursor. Clearly these methods are impossible for a blind user and difficult for anyone with any degree of visual impairment. Some assistance can be given by allowing for increasing the size and/or shape of the cursor and it is possible to simulate mouse movements with the keyboard (e.g. using Microsoft Windows' 'MouseKeys' accessibility option). Even so, the use of features like double-clicking, pull-down menus and 'drag and drop' make accessibility more difficult.

A recent Guide published by the UK Higher Education Funding Councils¹⁶⁷, although focussed on the development of accessible courseware, contains useful observations on the design of accessible interfaces which could equally be applied to library and information systems. It suggests that a well-designed user interface will have the following characteristics:

- Simplicity
- Consistency
- Adherence to standards
- Flexibility of input

¹⁶⁷ Higher Education Funding Council for England, Scottish Higher Education Funding Council, Higher Education Funding Council for Wales, Department of Education Northern Ireland and Disability Information Systems in Higher Education Centre *Guidelines for Accessible Courseware. op. cit.*

- Flexibility of output
- Intuitive navigation
- Help facilities

Research into accessible interfaces is continuing in a variety of centres around the world (see Chapter 4).

17.4. Query Formulation

Libraries have traditionally offered assistance to their users to enable them to formulate queries in the most appropriate way. For example, the search engines provided with different online services frequently lack consistency and some expertise is needed in order to retrieve data efficiently – or even at all.

For blind and visually impaired users, the efficient use of search tools presents particular problems, and it was noted earlier that they experienced frequent difficulties in using this function within web sites. The solution to this issue probably lies in a combination of better design of software interfaces, better understanding of how users search (see Chapter 21) and library 'help' services designed with the needs of blind and visually impaired users in mind. This area is one in which we recommend further research.

18. Discovery, Location, Request and Delivery of Resources

18.1. Introduction

The MODELS framework¹⁶⁸ identifies *resource discovery*, *resource location*, *resource request* and *resource delivery* as central to the operation of information broker services. That is, the service must provide mechanisms which allow individual information objects to be identified, a location (which could be a local library store or a server on the far side of the world) to be found, a request to be sent to the provider, and the item itself to be delivered. Because libraries operate in a global marketplace for information, it is essential that they can interoperate with all possible providers and send to their users sensible result sets – for example with duplicate entries removed. In the remainder of this section we refer briefly to a number of standards and protocols which have been developed to support these processes.

18.2. Z39.50

The main protocol used between library systems is now Z39.50 (an American NISO standard) which assumes the use of a client/server (in Z39.50 parlance an origin/target) model (see Chapter 24 below). In essence the client (e.g. the user PC or local library system) requests a service from the server (e.g. a remote library catalogue system). The server performs functions on behalf of the client, as specified in the request, and returns a result set – this may then be interpreted by the client software and turned into, for example, a display of catalogue records.

It is important to note that the client does not have to be an end-user, but can be another piece of software. Provided both client and server are Z39.50 compliant it should in theory be possible for any client to query any server and receive back an interpretable set of results. In practice it has proved difficult to achieve this, partly because of different implementations of the protocol by servers, and partly because of incompatibilities in the internal structure and content of records returned by the server. Much more work remains to be done to overcome these problems.

The importance of Z39.50 is that the client only needs to ‘understand’ the Z39.50 syntax in order to query any compliant server anywhere in the world. For distributed systems this is essential. In terms of accessibility its importance lies in the possibility of querying a range of servers for records containing, for example, ‘braille’ in a specified MARC field – once that standard has been agreed (see section 16.2 above).

¹⁶⁸ Dempsey, L., Russell, R. and Murray, R. Utopian place of criticism? Brokering Access to Network Information *op. cit.*

18.3. The ILL Protocol¹⁶⁹

The international standard inter-library loan protocol, ISO 10160/1 has been agreed as the protocol for the handling of document requests, using three sets of parameters (essentially, who is making the request [library and end-user], what is being requested, and where the item is to be sent). Although not yet widely implemented, most of the library system vendors and major inter-library lending agencies (including the British Library) are committed to supporting it, so that it is likely to become widespread. At present the major implementations are in Canada¹⁷⁰.

18.4. Electronic Data Exchange (EDI)

It seems likely that EDI will become of increasing importance to libraries as a means of structuring trading and other exchanges of data in electronic networked environments. The book sector more generally is heavily committed to the EDIFACT standard¹⁷¹ and there have been interesting experiments including the development of an EDI module within the PICA library system, which is widely implemented in the Netherlands and Germany¹⁷².

18.5. Accessibility Issues

Although the area of resource discovery, location, request and delivery is at the core of much work which is ongoing in the field of digital libraries, there are relatively few issues raised by accessibility considerations. This is because these systems are essentially the infrastructure which exists to deliver objects (in whatever format, including accessible formats) to users (who may use them as they see fit, including the use of accessibility software). While the work in this area is of supreme importance in enabling accessible networked services to be put in place, it is not fundamentally affected by this consideration.

¹⁶⁹ International Organization for Standardization Information and Documentation – Open Systems Interconnection – Interlibrary Loan Application Service Definition ISO 10160: 1997. (Amendment 1 acknowledges the National Library of Canada as the maintenance Agency)

¹⁷⁰ <http://www.nlc-bnc.ca/iso/ill/main.htm/>

¹⁷¹ <http://www.harninger.com/resource/edifact/>

¹⁷² This work has taken place within the EC funded EDItEUR project: <http://www.editeur.org/>

19. On-demand publishing and copyright clearance

A particularly interesting strand of eLib was concerned with the development of 'On-Demand Publishing', which was based on the creation of electronic anthologies of core texts which could be printed as and when users made requests for them. Such systems would offer the benefits of continuous and simultaneous electronic access, and fast, flexible delivery of core material, without requiring libraries to expend resources on first acquiring many multiple copies of conventionally published texts. Potentially there are advantages for publishers in avoiding up-front production and distribution costs.

The aim of these projects was to address a model with the following features:

- Close involvement with publishers and/or book suppliers
- Simple and effective mechanisms for copyright control and payment
- Appropriate standards for storage and delivery
- Adaptation to the UK University requirement
- Approaches to encouraging a cultural change in the way texts were used in institutions.

Although the initial projects were not particularly successful (largely because the business model and the problem of copyright control proved much bigger problems to resolve than first anticipated), the issue was of sufficient importance, and the chances of success sufficiently high, for eLib in its final phase of projects to fund a single new service development. Known as Higher Education Resources ON-demand (HERON)¹⁷³ and based at the University of Stirling and at Napier University, Edinburgh, HERON is intended to provide a national service which will take advantage of the economies of scale (and of experience in negotiating rights clearance) that can be generated.

HERON will:

- Develop a national database and resource bank of electronic texts which will widen access to course materials. The database will provide pointers to other collections as well as holdings, the latter including published book chapters and journal articles.
- Collaborate with rights-holders and representative bodies to remove blockages in copyright clearance and to determine appropriate conditions, including fees.
- Offer opportunities to universities to market their own resources.

HERON offers a possible way to manage the copyright problem for accessible materials. Two other issues need to be considered: whether changes in copyright legislation could be agreed, and whether electronic copies could be protected in

¹⁷³ <http://www.stir.ac.uk/infoserv/heron/project.htm>

such a way that publishers would have confidence that onward transmission, and thus unauthorised use, would be prevented.

As noted in Section 9.3, as far as legislation is concerned, the UK is out of step with many Western nations in providing no general right to make copies, without prior permission, in alternative formats. Although conditions attach to these rights (for example in Scandinavia the rights holders receive significant fees when their print books are transcribed into audio tape), the alternative situation where individual permissions have to be requested, as in the UK, is in practice far more restrictive. A change to UK copyright law, possibly by implementation of a European Commission directive, would therefore be a major step forward. In any case the Copyright Licensing Agency needs to be brought into discussions (which is another reason for working through HERON, which has good working relationships with the CLA).

Publishers are understandably nervous of granting rights to create copies in electronic formats, since they feel that even if such a copy is initially made available for use by a person with a visual impairment, it is difficult to stop onward transmission and use of the document by others. An enormous effort is going into the protection of electronic documents, and various solutions are being tested. As we have seen, a variety of Electronic Copyright Management Systems (ECMS) have been developed, aiming to provide authors, publishers and intermediaries such as libraries with tamper-proof mechanisms for monitoring usage and ensuring that rights holders can receive royalty fees based on use. Based on this approach and on other related work the SEDODEL Project offers a promising way forward (see Section 10.4).

20. Browsing in electronic environments: the resource access gateways

One of the major successes of eLib has been the subject gateways like EEVL¹⁷⁴ (engineering), ADAM¹⁷⁵ (art & design) and SOSIG¹⁷⁶ (social sciences). These provide quality-assured Web-based collections of electronic resource pointers in specific academic disciplines. Each resource represented has been quality-checked by an experienced professional (librarian or subject expert) and professionally catalogued. The ROADS software package, developed by UKOLN, provides the base for these services¹⁷⁷.

One of the major benefits of these gateways is that they remove the need for individual libraries to assess and catalogue the electronic resources in each subject area. Instead a national service provides an authoritative resource which can be linked from each library's own web site. In effect they are a mechanism for resource sharing at the national (and possibly, given current discussions with the US) international level.

The development of the national Resource Discovery Network Centre (RDNC) has been described in section 11.1.6.

While the eLib gateway projects were subject-based, the concept is equally applicable to other domains – and the possibility of developing a gateway which focused on accessible resources is one of the ideas suggested in the REVIEL model. This gateway would need to be designed carefully so as to work alongside subject gateways, but could act as a guide to appropriate accessibility aids and software, and might form the public focus for efforts to promote accessibility standards. The NLB for example has developed a pilot gateway to accessible reference sites¹⁷⁸, this covers a number of subjects such as computing, science, hobbies and crafts. Given the shift in focus towards collection development, the new resource discovery network hubs have many similarities with the 'Resource Databank Hub' proposed in this Report.

¹⁷⁴ <http://www.eevl.ac.uk/>

¹⁷⁵ <http://adam.ac.uk/index.shtml/>

¹⁷⁶ <http://sosig.ac.uk/>

¹⁷⁷ <http://www.ukoln.ac.uk/roads/>

¹⁷⁸ <http://www.nlbuk.org/reference/>

21. Use of Information

Use of information is the *raison d'être* of libraries and information services: if no-one uses the service then there is little point in its existence. It follows that library services need to be designed with a 'use' and 'user' focus from the start, and this is as true of electronic and hybrid services as it has been of traditional ones in the past.

Use impacts on the library in two ways. Firstly, the library provides an environment in which use can take place. One way to view this is as a 'pseudo-office', which could provide facilities ranging from a desk and chair (or their virtual equivalents), through provision of a copier, a network connection, a PC and appropriate software, to specialist facilities such as a microfilm reader – or again, their virtual equivalents. A number of specialist centres, such as the SLRU at the University of Central Lancashire, have created environments of this type specifically for blind and visually impaired users, taking into account the specific needs which those users have expressed. Because technology is changing so rapidly, there is a need for a national library co-ordinating body, such as we have recommended, to promote good practice in this area and to ensure that libraries are delivering services fully in line with the latest developments.

But supporting use also implies that the library designs its services with the mechanisms of use in mind. It is beyond the scope of this Report to discuss the general implications for the hybrid library of research into information seeking and information using behaviour, but it is clear from the work of Ellis¹⁷⁹, of Wilson and Walsh¹⁸⁰, and of others, that the user's purposes are highly significant in defining the most appropriate service delivery mechanism. Furthermore, the networked environment now provides opportunities to integrate library service use with broader developments such as networked learning environments, which carry the imperative of designing for dynamic user-defined purposes. It is also worth noting that, for the user, 'use' leads on through processes of extracting and analysing useful information to personal storage and indexing of personal files and links – the creation of personal hybrid libraries.

It is apparent that little work has been done on information use by blind and visually impaired people within networked, or hybrid, library environments. One of our recommendations is that work is needed on this issue in order that advice on service design can be based on a thorough understanding of how users actually behave. A particular issue is that blind and visually impaired people are forced to search for information in an essentially serial manner in a world in which visual

¹⁷⁹ Ellis, D. A behavioural approach to information system design *Journal of Documentation* 45(3), 1989, pp. 171-212.

¹⁸⁰ Wilson, T. and Walsh, C. *Information Behaviour: an inter-disciplinary approach* (British Library Research & Innovation Report 10) Sheffield: Department of Information Studies, University of Sheffield, 1996.
<http://www.shef.ac.uk/~is/publications/prelims.html/>

parallelism is becoming more and more dominant. It follows that, in the increasingly visual environment of the Web and other networked information, it is particularly important that the usage patterns of blind and visually impaired people are better understood.

22. Return and Release

Because most traditional material is consulted by being lent to users, libraries have developed mechanisms for the return of material, cancellation of outstanding loan records and replacement on display for selection by other users. This process remains important in the hybrid library, especially where traditional materials are being loaned to users distant from the library. The Post Office 'Articles for the Blind' Scheme has been described earlier, and provides a mechanism to enable physical library materials to be returned by blind users.

Electronic materials may not need to be returned (although this cannot be assumed – for example, CD-ROMs may be lent as if they were books, and this may become dominant with DAISY-standard audio materials). However, licensing requirements may limit the number of simultaneous users allowed to access an electronic resource, in which case software is needed to monitor the number of users and queue or refuse access when the maximum number covered by the licence is reached. Equally important, the software must ensure that when one user is finished with the material, the slot is released for use by another.

Because blind and visually impaired people may experience physical access problems it is particularly important that returns procedures are designed with them in mind.

23. Preservation

Traditional accessible materials (braille, audio tapes, etc.) pose their own preservation problems. For example, braille materials need to be stored carefully (and not stacked on top of each other) since the embossing can be pressed flat by sustained pressure. Analogue audio tape is notoriously short-lived, and although masters can be kept to avoid loss of quality by poor user equipment or practice, these too deteriorate over time.

Digital material is also subject to deterioration and loss, although the rate of loss in different media is as yet unclear. There are a number of problems which need to be addressed:

- Physical deterioration of the medium on which the data is stored. For example, there is still considerable uncertainty about the expected shelf life of CD-ROMs.
- Technological change, which makes reading equipment obsolete and thus may make archives virtually inaccessible. For example, it is highly unlikely that CD-ROM players will still be widely available in ten or twenty years time.
- Dynamic content, since digital content may change rapidly. An example would be a web site offering a range of goods for sale, where updating of each page results in the loss of earlier versions.
- Non-persistent identifiers, which mean that if a web page is moved to another site, or re-addressed within a site, it becomes effectively lost.
- Security, especially loss by fire or water damage of materials created in accessible formats but where only one master copy is held. This issue alone argues for national co-ordination of accessible materials.
- Responsibility, since it is by no means obvious that the archival functions of libraries with traditional media can be carried over into the electronic era. For example, few web sites are currently archived in any systematic way.

A number of useful experiments and projects are being carried out into how digital preservation can be achieved, including the eLib CEDARS (CURL Exemplars in Digital ARchiveS) project based at the London School of Economics¹⁸¹. However, none to date have had a specific focus on accessible materials, and one of our recommendations is that this should be addressed in the hybrid environment.

¹⁸¹ <http://www.curl.ac.uk/cedarsinfo.shtml/>

24. Library Systems

24.1. Introduction

Libraries have been using computer-based systems for many years. Until recently, however, these systems were limited largely to 'housekeeping' operations – acquisitions, cataloguing, lending and so on. This is slowly changing as networked information becomes more important, although to date most of the commercially-available systems are functionally little different from those of a decade ago, albeit with a greater degree of integration between modules. For example, integration of inter-library lending is only just starting to be achieved.

A major challenge for systems suppliers is to develop from this operational management base into systems which provide gateways into the much broader world of networked information, in which the Library's 'information population' is far wider than the resources which it acquires for its own 'stock'.

24.2. Client/server approaches

Most library systems now operate on client/server principles. In essence this means that the 'client' (for example, the user PC) runs software which enables it to undertake processing of data, display etc., and it accesses the 'server' where a database is held and queries are processed. In fact the amount of processing done at the client and server ends varies enormously. However, the importance of this approach in the networked environment is that a client built in accordance with agreed standards should be able to 'converse' with any servers which are also compliant. Since servers can also act as clients, this provides the basic mechanism under which a user can gain access to a very wide range of applications and datasets. The Z39.50 standard is dependent on the use of a client/server model (see section 18.2 above).

24.3. Middleware

It may be helpful in future to think of library systems as providing the essential 'middleware' that links together the user with the information. This takes us back to the model described in Chapter 13 above and suggests that a rather different design paradigm needs to be adopted. Instead of supporting a library defined linear process (acquisition – cataloguing – lending – return) the software needs to link together the user with an information object and dynamically resolve the acquisition (or electronic equivalent), lending (again or electronic equivalent) and other processes. It is the Search and Retrieve, rather than the cataloguing, function which becomes central.

24.4. Parallel and serial searching across disparate resource banks

If it is accepted that Search and Retrieve should be at the core of library systems, there is a major design issue concerning the management of search processes. Because of the problem of searching across hundreds of databases it is in many cases essential that software is able to take a query from a user and search a

selection of databases before returning results to the user in a sensible form (for example, removing duplicate entries). So, if a user presents a query about a particular author, for example, the software should query a series of catalogues and present the results as a single result set, perhaps displaying the database originating each result. The user does not want a scrolling display of what the software has found, line by line as results come in. For this reason, considerable effort (not least in the eLib phase 3 hybrid library and clump projects) is being expended on 'parallel' searching.

However, there are many occasions when the user in fact wants the software to perform a mix of parallel and serial searches. For example, he/she may want to query the local library catalogue first, then, if that does not produce a satisfactory result, other library catalogues in the vicinity, and only if there is still no result, a parallel search of a wide number of catalogues to try to identify a copy that might be available on inter-library loan. A similar scenario could be painted for a subject search, and an essentially similar one again for accessible materials (e.g. query NLB first, then RNIB, then my local public and university libraries, then anywhere).

The need for machine-readable collection descriptions to enable this type of searching was discussed in Section 16.6 above.

Part IV Implementation issues

In this final Part of the Report we draw attention to a number of implementation issues. For convenience we first reproduce our core recommendation, and then suggest the key agenda which requires attention. We make some suggestions about the business model for a NALS. The final set of issues are recommendations for further work.

25. Core Recommendation: The National Accessible Library Service (NALS)

There are immense opportunities to end the exclusion of people with visual impairments from full participation as users of information and literature through the development of an integrated, well-designed, national service which integrates both traditional and electronic library services. The **UK National Accessible Library Service (NALS)** would be a co-operative enterprise drawing on the strengths of all sectors to serve all citizens who have need of its services. It should not be limited to any one sector, such as higher education, nor to use for particular purposes, such as education. Its dual focus would be on encouraging all content suppliers and brokers, including libraries, to take accessibility seriously and on facilitating access to material in appropriate formats.

NALS would take its place as a part of the enabling infrastructure of the UK's Distributed National Electronic Resource (DNER), drawing on distributed resources as far as possible and making maximum use of electronic formats where these are suitable for delivery and access by blind and visually impaired people. But it would in essence be a **hybrid** service, using traditional and electronic formats as appropriate to the needs of its users.

The model proposed for the NALS is as follows:

- A National Co-ordinating Agency with responsibilities for:
 - Policy development
 - The development of an agreed minimum service standard for all agencies providing 'library' services to blind and visually impaired people
 - Co-ordination with cognate national initiatives, such as the National Grid for Learning (NGfL) and 'New Library: the People's Network'
 - Co-ordination of training, for both librarians and end users, again setting national standards
 - Agreement on metadata standards for accessible formats, within international conventions
 - Co-ordination of collection development, including with other agencies on priorities for transcription in order to build up the national accessible resource in a planned fashion
 - Promotion of accessible Web, and other, design standards
 - Operation of a 'kite-mark' scheme for accessible library services which meet the minimum standards
 - Collection of appropriate statistics on demand for, provision of and supply of accessible library services

- Representation internationally
- A Resource Databank Hub, offering services including:
 - A growing stock of materials in traditional formats (braille, Moon, etc.)
 - Delivery capability for all formats
 - A stock of, together with access to, significant electronic materials for which permission to use is available, including resource delivery capability
 - Legal deposit of alternative formats
 - A catalogue of its holdings, with Z39.50 capability
 - Co-ordination of collection descriptions
 - A specialist Web-based gateway identifying quality-assured resources, linked to the National Resource Discovery Network Centre (NRDC) services
 - Maintenance of a user authentication and user profiling system
 - Agreements with delivery agencies
 - Digitisation expertise (capability could be outsourced)
 - Access to copyright clearance expertise, including the development of blanket permission agreements with publishers (probably through an arrangement with the Higher Education Resources On-Demand (HERON) service)
- A Technical Advisory Centre with responsibility for
 - Ensuring that latest advances are disseminated (especially with regard to content accessibility)
 - Monitoring standards
 - Technical advice to Delivery Agencies, for example on transcription
 - A programme of research & development tightly focused on achieving accessibility within the hybrid (traditional + electronic) library environment
- A series of clusters of Delivery Agencies, which could be
 - Geographical, involving public, academic libraries and other centres within, for example, a metropolitan area
 - Domain, including commercial organisations, academic institutions and learned societies. Each offering services to blind and visually-impaired users which meet or exceed national standards, and some developing specific expertise to be shared across the network.

It should be noted that, apart from the Delivery Agencies, the above roles could be undertaken either by a single agency or by a number of separate agencies.

This Report makes the case for a national initiative to make this model a reality. The REVIEL Project's work on accessibility and the findings of its component phases are described in Part II as background to the design of the NALS. In Part III we describe the key issues from the wider perspective of information and

communications technology development, networked information services, and research into the concept of the 'hybrid library'. In Part IV we consider the implementation issues raised by our core recommendation, and the further areas of work which need to be explored.

26. Implementation

The implementation of an integrated, accessible library service in the UK would be a major undertaking and a number of issues can be identified as needing attention. The model on which such a service could be based is described in section 25. However, the following issues would also need to be addressed:

- Government-level support for the concept and its implementation
- The consortium of interests which would need to be brought together to create a practical service. At a minimum these include: the Library & Information Commission; the Higher Education Funding Councils; the British Library; the Royal National Institute for the Blind; the National Library for the Blind; and the Library Association.
- A 'model service' specification, which we suggest should be based on the service model described in section 13 above, amplified by the remaining Chapters of Part III of the Report.
- Development of a clear business model to which government, publishers, voluntary agencies, libraries and other stakeholders are committed.
- The establishment of an agreed plan of action, to include research and development agendas

In order to achieve this it is important that a co-ordinating sponsor is identified quickly. We argue that the NALS should be a cross-sectoral initiative, and should therefore not be a concern of only the academic or only the public library sector. It may be that the Library & Information Commission would be the most appropriate 'sponsor' in these circumstances, although a case can be made that the national library should, as in the USA and Canada, play the leading role.

27. Towards a Business Model

As has been noted above one of the problems with developing electronic library services is that the business and economic models are as yet unclear. The traditional publishing chain – author → publisher → library → end user – is reasonably well understood, even if at times libraries have felt that they are the victims of monopoly practices by some journal publishers. In the electronic environment things are far from clear. The ‘nightmare scenario’ for publishers is that a single copy, made available on a fileserver, will be able to supply all the demands for it from across the world. In effect they would then have to charge their full costs and profits to a single customer. In fact this could be viable if the customer is a third party agent who collects fees on the basis of usage, but if the situation was a free-for-all then the publisher would go out of business very quickly.

At the same time end-users are not in the habit of paying per usage. Indeed one of the roles of libraries is to act as a ‘co-operative’, buying in materials by effectively spreading the acquisition costs across a large population so that the per usage cost is minimised, and is in any case not paid at the point of use. One of the main reasons that the higher education community in the UK has been able to launch large dataset services (BIDS, EDINA, MIDAS etc.) successfully has been because they were provided free at the point of use, with costs borne by a combination of top-slicing university funding at a national level and institutional library subscriptions.

The business model for the provision of accessible formats is equally unclear within the networked environment. However, there is a need to maintain ‘free at the point of use’ as a baseline, and from there a viable model needs to be developed from a co-operative approach which involved publishers, national agencies including those in the voluntary sector, government (both national and local), and educational institutions.

Before a business model could be fully articulated it would be important to obtain better information on the sources of funding which are currently applied to accessible library resources (much of it from the voluntary sector) and on the potential sources which could be applied. Under the latter heading, questions could be asked as to whether resources should be targeted through the national library, as in the USA. Other key questions include: is it feasible for national norms or standards to be developed which would influence local authorities to prioritise this area? Could national government encourage a more proactive role by its own agencies, so that the full costs of accessibility are considered in planning? Or are we to continue with the poorly co-ordinated voluntary efforts which make resource planning in this area so difficult?

Tied in with this issue is that of accountability. Most funders of services in this area are not accountable to end users in any real sense. If the ‘business’ is

-serving the information needs of visually impaired end-users, their perspectives and views need to be brought into the equation. Again, however, too little is known of the end-users preferences and wants for this to be feasible at the present time. More understanding of the end-users' priorities is therefore vital.

A particular issue for people who are blind or visually impaired is affordability. Bearing in mind that the majority of this section of the population is elderly and the additional costs which fall on all people with a disability, it is essential that costs of using hybrid library services are minimised. This includes attention to the equipment and infrastructure costs associated with using electronic materials, as well as the costs of content and delivery. Libraries have a clear role to play in providing access to the hardware and software systems needed.

The above discussion would argue that the best business model to adopt is one in which national activity (the Co-ordinating Agency; the Resource Databank Hub and the Technical Advisory Centre) are resourced through national agencies – the Department of Culture, Media & Sport, the British Library, the Higher Education Funding Councils, the Further Education Funding Council, the Scottish, Welsh and Northern Ireland Offices, the RNIB, NLB and so on. Individual Delivery Agencies will need to be resourced, as at present, from a variety of sources but the most important issue will be the willingness of public, academic and other libraries to accept that the agenda of inclusiveness involves costs, but that the benefits make the investment worthwhile. If they can be assured that, because national frameworks exist, their investment will represent value for money, then there is no reason to believe that the necessary commitment would not be forthcoming.

28. Recommendations

Our main recommendation, the establishment of a National Accessible Library Service, is given in Part I of this Report and is repeated in Chapter 25. This recommendation includes national co-ordination, policy development, standards development, international activity, and research and development in the field.

We make the following additional recommendations:

1. Further research is needed into the ways in which blind and visually impaired people use information sources in hybrid and electronic environments, particularly where their serial method of working through an information search comes into conflict with the parallelism displayed, for example, for web-based systems which use frames.
2. Those responsibility for the training of library and information professionals, including the professional associations and the academic departments, should ensure that all entrants to the profession are made aware of the issues of inclusion and accessibility, and that they are regularly updated on advances in this field through Continuing Professional Development.
3. Consideration should be given to the development of closer links between the accessibility community and the library and information community.
4. Research should be undertaken into the commonalities between accessibility to libraries and to other 'memory institutions', such as museums, art galleries and archives.
5. A number of technical and standardisation issues need further exploration, including:
 - ◆ The use of RDF, Dublin Core, etc. and/or rating labels to describe accessibility features;
 - ◆ The networking issues associated with accessible digital audio and multimedia;
 - ◆ The use of personal profiles to control display characteristics for people with a visual impairment.

* * * * *

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Acronyms

ABWA	Association for the Blind of Western Australia
ADAM	Art, Design, Architecture & Media Information Gateway
APH	American Printing House for the Blind
ATRC	Adaptive Technology Resource Center
AUDETEL	Audio Description of Television for the visually disabled and elderly
BIDS	Bath Information and Data Services
CAPS	Communication and Access to information for Persons with Special Needs.
CAST	Center for Applied Technology
CCTV	Closed Circuit Television
CEI	Committee on Electronic Information (of JISC)
CLA	Copyright Licensing Agency
COPAC	The Consortium of University Research Libraries OPAC project
CRE	Commission for Racial Equality
CSS	Cascading Style Sheets
DAISY	Digital Audio based Information System
DDA	Disability Discrimination Act
DENI	Department of Education Northern Ireland
DISinHE	Disability Information Systems in Higher Education
DNER	Distributed National Electronic Resource
DRC	Disability Rights Commission
DSA	Disabled Students Allowance
DTB	Digital Talking Book
DTD	Document Type Definition
EASI	Equal Access to Software and Information
ECHR	European Convention on Human Rights
ECMS	Electronic Copyright Management Systems
EDINA	Edinburgh Data and Information Access
EEVIL	Edinburgh Engineering Virtual Library
eLib	Electronic Libraries Programme
EOC	Equal Opportunities Commission

EXLIB	EXpansion of LIBrary Services for the Visually Handicapped
GLADNET	Global Applied Disability Research and Information Network
GUIB	Textual and Graphical User Interfaces for Blind People
HARMONY	Horizontal Action for the Harmonisation of Accessible Structured Documents
HEFCE	Higher Education Funding Council for England
HEFCW	Higher Education Funding Council for Wales
HERON	Higher Education Resources ON-demand
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
IAU	Information Access and Use
IFLA	International Federation of Library Associations and Institutions
INCLUDE	Inclusion of Disabled and Elderly People in telematics
IPR	Intellectual Property Right
ISO	International Standards Office
JANET	Joint Academic Network
JISC	Joint Information Systems Committee (of the UK Higher Education Funding Councils)
MARC	Machine Readable Cataloguing
MIDAS	Manchester Information, Datasets and Associated Services
NALS	National Accessible Library Service
NARD	National Agency for Resource Discovery
NARIC	National Rehabilitation Information Center
NCAM	National Center for Accessible Media
NCC	Navigation Control Center
NGfL	National Grid for Learning
NLB	National Library for the Blind
NLS	Library of Congress National Library Service for the Blind & Physically Handicapped
NUCAF	National Union Catalogue for Alternative Formats
NWRLS	North West Regional Library Service
OCR	Optical Character Recognition
OPAC	Online Public Access Catalogue

PDF	Portable Document Format
PICS	Platform for Internet Content Selection
PIP	Pilot Interlending Project
RDNC	Resource Discovery Network Centre
REVIEL	REsources for Visually Impaired users of the Electronic Library
RFBD	Recording for the Blind & Dyslexic (US)
RNIB	Royal National Institute for the Blind
RTF	Rich Text Format
SATURN	Smart Card and Terminal Usability Requirements and Needs project.
SCONUL	Standing Conference of National and University Libraries
SDI	Selective Dissemination of Information
SEDODEL	Secure Document Delivery for Blind and Partially Sighted People
SGML	Standard Generalised Markup Language
SHEFCE	Scottish Higher Education Funding Council
SKILL	Skill: National Bureau for Students with Disabilities
SOSIG	Social Science Information Gateway
STV	Share the Vision
TESTLAB	TEsting Systems using Telematics for Library Access for Blind and visually handicapped readers
TIDE	Telematics for the Integration of Disabled and Elderly people
TNAUK	Talking Newspaper Association UK
UKERNA	United Kingdom Education & Research Networking Association
UKOLN	UK Office for Library and Information Networking
URL	Uniform Resource Locator
WAI	Web Accessibility Initiative
WBU	World Blind Union
W3C	World Wide Web Consortium
XML	Extensible Markup Language

APPENDIX I: 20 Golden Rules for Web Page Design

- ◆ Adhere to the official W3C HTML specifications
- ◆ Maintain a clear distinction between content and structure, such that a user is able to access content without an imposed structure. W3C refers to this as 'graceful transformation', and emphasizes the need to ensure that pages can be read on a wide variety of hardware e.g. devices without mice, or using large font sizes.
- ◆ Keep the layout of all pages as simple as possible and maintain consistency throughout the site, with particular attention paid to the order in which elements occur. Visually impaired users can then learn the layout from one page and apply it to subsequent pages. Similarly, keep the navigation structure simple, clear and consistent.
- ◆ Offer a text index or site map, so that users can navigate directly to pages.
- ◆ Fully describe all images, video clips, audio files, etc. (using the ALT tag). This is especially important where a 'clickable image' is provided for the sighted user to select an area and establish a link by a mouse click – visually impaired users should be able to access an equivalent text list.
- ◆ Provide a text alternative for all Java and JavaScript, and avoid their use for effects (like scrolling text) which can be difficult for partially-sighted users to access.
- ◆ Similarly, use event handlers (such as *OnMouseover*) with care, bearing in mind that a user with a screen reader may not generate the expected event.
- ◆ Where images are used simply for 'decorative' purposes, rather than to provide information, use a null ALT tag (ALT="") which will enable the browser to skip the image.
- ◆ Provide a description of all links (again using the ALT tag) and if possible separate links by some non-link text.
- ◆ Place links one to a line and label them clearly.
- ◆ Only use contrasting colours for text and background.
- ◆ 'Wallpaper' (i.e. a decorative background), shadowing and watermark images should be avoided as they mask content for partially-sighted readers.
- ◆ Where a font is specified, preference should be given to *sans serif* fonts such as *Arial*, which are easier for partially-sighted users to read.
- ◆ Do not use audio only for significant information content. Again, provide a descriptive text alternate.

- ◆ Avoid automatic refresh or 'splash screens' (which some designers use to send users to a new page automatically after a predetermined time). With a typical refresh time of 5 to 10 seconds, this usually happens before a screen reader has had chance to read the first page!
- ◆ Use tables with care and do not over-elaborate them. Try to avoid the use of tables to control displayed format. Where tables are used care should be taken to provide appropriate headers.
- ◆ Where pages use frames the home page should offer a no-frames alternative which is applied consistently throughout the site. It is also desirable to provide links from the home page or text index to each frame.
- ◆ Whenever a page is updated ensure that all the text-alts are updated consistently at the same time.
- ◆ Provide an email address on each page, or at least on the home page, so that users can send queries if there is something they cannot read or need explained. More generally, make the site hospitable to comments on accessibility.
- ◆ Test all pages for accessibility before they are launched, using a tool like 'Bobby'.

In summary:

Good design for accessibility is good design.