International Federation of Library Associations and Institutions
IFLA Professional Reports, No. 90

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Designing and Building Integrated Digital Library Systems - Guidelines

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Acknowledgements

This publication, commissioned by IFLA Libraries for the Blind Section, was prepared by:

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Barbara Freeze,	The Canadian National Institute for the Blind Library, Canada
Rebecca Herrington,	National Information and Library Service (NILS), Australia
Birgitta Irvall,	Swedish Library of Talking Books and Braille
Rosemary Kavanagh,	The Canadian National Institute for the Blind Library, Canada
Katariina Kiiliainen,	Celia Library for the Visually Impaired, Finland
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Designing and Building Integrated Digital Library Systems – Guidelines / By Bente Dahl Rathje, Margaret McGrory, Carol Pollitt, Paivi Voutilainen under the auspices of the IFLA Libraries for the Blind Section
The Hague, IFLA Headquarters, 2005. – 67p. 30 cm. – (IFLA Professional Reports : 90)

ISBN 9077897054
ISSN 0168-1931

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1 Preface

1.1 Introduction

Libraries have always been a community's 'portal' to information, knowledge and leisure. Beyond their shelves, libraries are a community's gateway to information from many sources nationally and internationally. Libraries provide professionals trained to distinguish and verify content, build collections and provide a reference and information service. Today more libraries rely on electronic sources for collecting, organizing and distributing information.

The information age has created unprecedented opportunities to acquire electronic content from many sources including existing digital content in many different types of libraries. The concept of a "world library for the blind" rests on the ability of digital libraries to share and coordinate collection-building resources and to use digital technology to share content. It requires designing these systems and services with interoperability in mind and using common standards. It begins with a shared understanding that technology does not fundamentally change library service, but rather the way in which it is organized and delivered. Therefore, guidelines for the development of the digital library must begin with the assumption that the library remains a collection of organized content reflecting works of imagination and information necessary to facilitate life long learning, career development and an informed citizenry. Its digitization is a means of ensuring that its collections are preserved and accessible to all regardless of disability.

Major work has been done through the Digital Accessible Information System (DAISY) Consortium and with NISO to establish standards for the recording of navigable digital audio books. For many libraries for the blind, the focus of the past five years has been on the implementation of these standards and the conversion of their analogue collections to digital audio. Others are building collection resources through the Internet and accessing remote sources for the content they distribute to their users. The Internet is both a source of content and a means for distribution. It has profoundly changed information services for users and libraries. Publishers of content, trade books and magazines, electronic journals and electronic databases offer new opportunities for acquiring, managing and distributing content that is accessible.

The increasing complexity of the environment, the many sources of information, the variety of electronic and other formats such as digital audio books and materials, braille and large print, which must be managed and integrated into a seamless service have forced libraries for the blind to seek more sophisticated technological solutions designed for their community of users. Consequently, in designing and building of integrated digital library systems, the "front-end," or user-facing services, must be considered along with the "back-end" supporting technologies, systems, and underlying architecture.

1.2 The Purpose of these Guidelines

The purpose is to provide libraries for the blind and those who work in them with a broad overview of matters to be considered in planning and implementing an integrated digital library system.

The guidelines are not intended to provide technical solutions. Given the pace of technological change, solutions can only be developed with intensive review of marketplace developments specific to each situation.

1.3 Who Would Benefit from these Guidelines

Libraries and other organizations providing a service to populations experiencing vision loss, those who because of a disability cannot read conventional print or experience a perceptual difficulty in comprehending print. These libraries may include public libraries, national libraries or other libraries serving those who are print disabled. However, it is worth noting that apart from content dealing with "accessibility" and "copyright and related legal matters" which are particularly relevant to libraries serving print-disabled populations, the Guidelines can be used by *any* library seeking information about what to consider when implementing an integrated digital library system.

2 What is an Integrated Digital Library System?

The term "Integrated Digital Library System" (IDLS) means different things to different people. Examples of what constitutes an IDLS vary from one organization to another (see 8.3 Appendix 3 Case Studies).

2.1 Definition of the components of an IDLS

The components that comprise an IDLS may include the following functions:

Acquisition: The collecting of library assets and material through purchase, exchange, or license. As part of this function, the system should facilitate the acquisition or permissioning of the digital rights of an asset, as well as the enforcing of those rights with regard to the use of the asset.

Cataloguing and indexing: The proper and consistent description of assets which enables users to search for and retrieve those assets using cataloguing standards such as MARC format and Dublin Core metadata.

Storage of digital books and other content: The management, naming conventions, and tracking of digital assets, and the ability to retrieve them easily for production or reading. Functions include:

- The management of the creation (production) of digital assets -- the tasks or workflows, production resources, human resources, and the management of them, and the digital "works-in-progress".

- The archiving of assets -- the “preservationist” role of the library and the policies and processes on retention, refresh and asset lifecycles.
- The management of data storage -- the authorization of users to check data files in and out of the system according to specific rules and version controls. The control of the offsite copies used in the event of disaster recovery**.**

Circulation and distribution: The management of digital assets as achieved through the functionality of a traditional integrated library system. The ability to record items issued and returned, items overdue, and items requested. Also included is the recording of user data, reading and service preferences, and automatic selection of material for them.

Delivery channels: The interfaces to the IDLS for staff and users. The system should have several access and delivery channels, all of which must be usable through adaptive technology. The World Wide Web is the most popular delivery channel right now.

Factors that may influence the nature and degree of integration of an organization’s IDLS include available budget, amount and location of digital content and services offered, legislation, and staffing levels and skills, together with the culture and long-term objectives of the organization.

2.2 Designing an IDLS for users who are print-disabled

An IDLS for persons who are unable to read print must give special consideration to the accessibility and usability of its user interfaces (delivery channels) and how it defines and describes the various formats of material that are available (detail of cataloguing information, e.g. contracted or un-contracted braille). In many cases, print-disabled users will not visit their library service provider in person and will receive their material through the postal service or online, so it is essential that the IDLS interface supports this type of remote service delivery.

2.3 Concepts to address prior to designing an IDLS

Before designing an IDLS the library should consider the following:

- The benefits the library wants to achieve, e.g. financial savings, improved quality, more products and services;
- The investment the library is prepared to commit, e.g. financial expenditure, staff time and expertise, re-prioritization of objectives, changes to working procedures and conditions;
- The “bigger picture,” e.g. what are other organizations doing, what is happening worldwide and where the library fits into the picture;
- The possibility of working with other organizations, e.g. joint collection development, joint system development;
- The needs of users both now and in the future;
- The different delivery systems available, e.g. traditional hard copy circulation, online direct access to digital content; file downloads via internet or other digital communication methods.
- The desired degree of integration among the system components.

3 Planning an IDLS Project

3.1 Defining the Scope of an IDLS Project

Defining the scope of an IDLS project is complex from the point of view of all participants, and for this reason the library is encouraged to establish a project team with representation from areas of the organization affected by the IDLS e.g. library management, finance, IT.

Although there are many methodologies that address a project's lifecycle, the following four phases are generally accepted as standard: Envisioning, Planning, Developing, and Deploying or Stabilizing. In this section we will focus specifically on the Envisioning and initial Planning phases. (See Chapter Seven 'Developing the IDLS Project Plan' for more information about the planning, developing and deploying phases).

3.1.1 The Envisioning Phase

Envisioning:

- Determine primary business goals
- Functional requirements
- Develop project scope.
- Establish project budget estimate
- Timelines for implementation
- Compile vision document

In the Envisioning Phase, the library, in consultation with the technology sector, determines the primary business goals that the technology must meet and develops consensus amongst its stakeholders about what is to be done. A project budget is established along with rough timelines for implementation. Work performed in this phase is considered "high level" in that many of the details still have to be worked out.

The next step is to develop the project scope, defining the project variables in greater and greater depth. From the library's perspective, the scope of the project is not a methodology but rather a definitive statement as to what the IDLS is intended to do – what services it will offer to its users and what functions it and/or its users will perform. As much as standardization is desirable, particularly of business requirements, when designing a system, each library entering into an IDLS project usually answers these questions or some subset of them uniquely. The answer depends on the positioning and role of the library within its community and the kinds of services it provides or intends to provide in the future.

The library's project team defines the business requirements that the system must satisfy to meet the goals of the project. This iterative process results in a vision document, which

outlines the rationale for the project, the expected outcome(s), the project's feasibility, goals and constraints, opportunities and risks, and the structure of the project. At the end of this process, all major project stakeholders agree with the vision of the project as outlined in the document.

Performing this work takes time, effort and dedicated resources. It is never an easy task. Throughout the Envisioning Phase, the project team visits and re-visits the project documents, constantly updating and refining them with new information, thereby achieving greater clarity over time. This phase is usually very creative, starting from a simple notion or vision statement and building up to a detailed, shared, and fully articulated concept of what is to be accomplished. The consensus of what is to be done is as important as the documentation that defines the end product.

3.1.2 The Initial Planning Phase

In the initial planning phase three main documents are produced. The Project Charter defines what work will be accomplished, how much it will cost, and when the deliverables are to be produced. The Requirements document defines the goals and business requirements of the IDLS in depth. Finally, there is the initial Technical Architecture document outlining the basic technological solution to be used. The architecture of the solution is the responsibility of the technology teams that will develop the solution and ultimately support it. The choice of architectures, platforms, databases, and development languages are all critical issues to be determined by technical leads on the IDLS project team in consultation with the library. It cannot be emphasized too much that security issues need to be foremost in the minds of technical staff throughout the design and development of an IDLS.

Initial planning:

- The Project Charter
- The Requirements Document
- The Initial Technical Architecture Document

3.2 Elements to consider

3.2.1 Buy versus Build

Deploying and integrating commercial "off-the-shelf" applications, or at least standard development toolkits, can address most requirements of an IDLS. Envisioning and planning teams need to pay special attention to the opportunities offered by commercial software. As a rule, unless the Library has an in-house programming department, well-supported commercial systems will be simpler to implement as well as being more cost-effective to operate, even if customization is required.

Customization of commercial systems generally should be avoided or limited as much as possible. Customization can add significant costs to any technology project. The costs of customization can be double the initial price of software.

Another issue to consider carefully is multiple languages. Many enterprise-level applications are now available with interfaces in several languages. The cost of adding another language to an application, however, can be high. The general rule is that the translation and programming costs are 30% of the initial price of software for each new language.

3.2.2 Outsourcing

Whether or not to outsource all or some of its IDLS is a decision that will be specific to each library. If a library or its parent organization has a mature systems operations department that can manage the large infrastructure, support, and operational requirements of a fully functional IDLS, then outsourcing need only be considered in the financial context. However, if a library does not have an existing information technology department to support the deployed system, then outsourcing may be an option worth investigation.

3.3 Developing the Business Case for an IDLS

A business case will be an integral part of a project on the scale of an IDLS to present the justification for its implementation and operation.

Developing the business case:

- Assess current situation
- Present options or alternatives
- Cost benefit analysis
- Recommended solution

Building an IDLS is a significant undertaking for most libraries. Many libraries may not have experience with the level of technology required in an IDLS, nor with the complexities of managing a project on such a scale. An important part of the library's planning and investigation will be a business case to evaluate the many aspects of such a project.

The business case should place the project within the business strategy of the organization and demonstrate how the project will contribute to the success of the strategy. The business case will present and assess the current situation and state the problem or opportunity that exists for the library. It should then present the options that are currently available to the library, including the "base case" option of continuing with the current service offering. This section will also include an analysis of the different options, and the recommendation of a course of action.

One of the key sections of a business case is a detailed analysis of the costs and benefits of the recommended option. A number of factors must be considered in the cost/benefit analysis, including:

3.3.1 Business Process Reengineering (BPR)

This is the analysis of the library's current workflows and processes, and how these will be changed as a result of the implementation of an IDLS. New processes will likely be required to ensure maximum operational benefits from the IDLS implementation.

3.3.2 Costs and Financial Implications

Consider both the initial costs and the ongoing, long-term financial impact, including:

- Project costs (project staffing, tools);
- Setup costs (hardware, software, design, customization and other professional services, implementation, training);
- Maintenance costs (licensing, support, future upgrades).

3.3.3 Service Benefits

Include any potential benefits to users, such as:

- Improvement of existing services;
- Opportunities for new services.

3.3.4 Operational Benefits

Consider ways in which the library is likely to benefit, for example:

- Cost reductions (e.g., eliminating marginal services, staff reductions, less expensive production methods);
- Cost avoidance (e.g., improved productivity);
- New revenue opportunities.

The business case should also discuss the project implementation strategy by identifying the project's critical success factors, stakeholders, related projects that may affect it, and the impact of the project on the organization (e.g. staffing). The strategy should present an outline of the major areas of work in the project and the related milestones, resourcing for the project, and the project management framework, including the project governance model and the change management plan.

Finally, the business case should include a preliminary risk plan for identifying, analyzing, and mitigating risks, and a communications plan that details the primary stakeholder groups, the different documentation created by and for each group, and what communications each group will receive. Additionally, the business case should include a glossary of terms unique to the project and appendices with supporting documentation (e.g. high level risk plan and communications plan).

4 Content Building for Digital Libraries

4.1 Concept of Digital Collections

One of the major considerations in planning a digital library is whether access will be provided to only the library's local collection or whether the library will become a gateway or portal to multiple sources of digital content. If the library elects the portal approach, the degree of integration must be considered in order to provide seamless access for the user regardless of format or location.

4.1.1 Sources of Digital Content

Collections may include material from:

- Local digital collections
- Local hard copy collections
- Remote library collections
- Web-based commercial collection services e.g. audible.com

4.2 Building Digital Collections

4.2.1 Organizing Content

In designing and building an IDLS, the organization of content is a significant consideration. Traditional methods of cataloguing and classification have been the primary tools in organizing content. The library's own national cataloguing and classification rules or codes and international standards should be used. Cataloguers should keep up-to-date with current cataloguing discussions at the international level, for example, the IFLA Meeting of Experts on an International Cataloguing Code (see also Papers, Statement of International Cataloguing Principles 19 December 2003 www.ddb.de/news/ifla_conf_papers.htm).

Today, the cataloguing environment is global. In digital libraries, the focus of cataloguing is no longer exclusively print books. Content from a variety of information sources and formats must be organized, most of them digital. Nevertheless, all bibliographic resources regardless of format should only be catalogued once.

The OPAC should be constructed according to IFLA´s Guidelines for OPAC Displays. (see http://www.ifla.org/VII/s13/guide/opacguide03.pdf) It should be accessible (see W3C Web Content Accessibility Guidelines www.w3.org/WAI) and its usability should be tested with users who are visually impaired or print disabled and use assistive technology.

Cataloguing rules and codes are constantly analyzed and revised. FRBR (Functional Requirements for Bibliographic Records) is the new bibliographic standard for organizing

content. It has evolved since its conception in the 1990s and offers a framework, which harmonizes different cataloguing, codes and which promotes interoperability.

FRBR-based cataloguing exploits features of the Internet. For example, bibliographic records always contain links to other versions, author information, or Web-based information resources. In addition, a bibliographic record needs to serve multiple functions -- identification, information retrieval, selection, and access.

In FRBR, all elements of a bibliographic record are analyzed to provide functionality for a variety of users and user needs. Some libraries (especially in Scandinavia, Italy, and Australia) have begun to develop databases relying on the FRBR model. IDLS should support the FRBR model. (See: Appendix 4: Glossary of Terms for more on FRBR)

4.2.2 Archiving and Storage media for accessible Digital Content

There are two main types of collections of digital content, or "master copies:" Archive Masters and Distribution Masters, following the DAISY terminology. Ideally, the library should give serious consideration to having both.

Archive Master

The **Archive Master** serves two main purposes.

The Archive Master is the library's assurance that as technologies change over time the library's digital assets remain valid. The archival master must be the original form of the data, prior to any modifications made to the data for distribution to users. If the library has transcribed the content to an accessible digital format, such as DAISY or electronic braille, the master should be the original, editable format, such as WAV for audio files. This ensures that it may be migrated to future technologies and delivered in future formats.

The second main purpose of the Archive Master is preservation for disaster recovery purposes. In case of disaster, the entire library collection can be re-created from the library's Archive Masters. Many technological solutions exist for the physical preservation of digital assets. Most options involve a combination of online and offline storage. Content might be placed on arrays of hard disks, on tape backup systems, on optical storage technologies (e.g., compact disc), or all in different combinations. It is critical to ensure that the storage requirements are sized to accommodate collection growth and the additional data required to manage the storage itself (similar in some ways to records management rules) and that the network can support the transmission of a large amount of data.

Distribution Master

The Distribution Master is the electronic master from which copies are made for distribution to users. The crucial difference between the Distribution and Archive Masters is that Archive Masters are never made available to users. Archive Masters are kept

separate from a distribution version of the content either physically (e.g., offline tape) or logically (e.g., on a separate storage area network). Distribution Masters may be made available to users in client-facing distribution services, such as electronic delivery. As such, the Archive Masters are more secure.

Distribution Masters may be a simple copy of the Archive Master, like an electronic braille file made available to users in hard copy or in electronic format. In the case of electronic distribution, the Distribution Master may be a modified version of the Archive Master, such as a copy with digital rights technologies applied to it. Finally, the Distribution Master may be a different format from the Archive master. An example of this would be a DAISY book in MP3 format. Formats like MP3 are smaller than the original WAV formats, so are easier for users to listen to online or download; however, the intellectual content of MP3 files cannot be edited by end users, unlike WAV. Libraries may have different policies regarding this type of Distribution Master, such as the preferred format (e.g., DAISY/NISO, MP3 or MPEG4) or how the format is created (e.g., 32kbps or 48kbps). Ideally, such policies will be made according to best practice and published standards. It is important for all libraries, however, that Distribution Masters satisfy the performance and quality requirements of their users.

Storage

It is important to stay current with trends in storage technology. This technology is continually evolving and libraries must make their decisions in the context of their technology infrastructure and architecture. The project's technology team should ensure that the library follows best practices for storage.

4.3 Linking to other Digital Collections

Libraries are increasingly relying on other sources to augment their digital collections. To do so, the library must ensure that the appropriate permissions and licensing agreements are in place with the other sources and the relevant copyright legislation is adhered to. The responsibility of the librarian in validating the accuracy, authenticity, and accessibility of the source data, particularly from websites, is becoming even more important.

The library will need to determine the appropriate interfaces and standards required to use remote collections. For example, libraries may wish to create "virtual" collections, in which many collections can be searched at the same time. Alternatively, it may provide a simple link to the websites of those collections. The library should check the accessibility of remote collections and websites to which it offers links. Before establishing those links the library should ensure that it has the resources and software tools necessary to monitor and maintain the validity of the links.

Appropriate authentication of users must be established in order to allow a user of one library to have access to the collections of partner libraries without infringing copyright legislation (see section 4.6).

The capability of the system to enable the user to directly download a book or place a hold on a remote collection, either directly or through interlibrary loan, must also be determined.

4.4 Integrating on-site Hard Copy Collections and Online Collections

Many organizations have been supplying hard copy material, such as braille books and talking books on cassette, for many years. Although they are moving to digital content, many will continue with their hard copy services. It is therefore important to consider the extent to which it is possible to integrate the different collections within the IDLS. The hard copy master production files may be created or acquired, stored and archived, tracked and catalogued in the same way as digital content files. Ideally, the information about all books should be searchable by the user through the same user interface. However, the channels of distribution may be completely different.

4.5 Cooperative Collection Development

In planning their digital collection development, libraries for the blind around the world should take into consideration the production plans of other libraries with whom they have cooperative agreements. In order to facilitate access to one another's digital collections, at a minimum, standard format specification such as DAISY and/or XML should be used. In addition, library-specific messages on the digital file, for example to clients, should be located outside the book in order that the library acquiring the file can easily remove them. Ideally, libraries for the blind should adopt common structure standards for different types of material such as fiction and non-fiction in order to normalize the reading experience for users of partner libraries. (See section 4.6.3 for more details about exchanging digital content between libraries).

4.6 Copyright and Related Legal Matters

4.6.1 Understanding Copyright in the Digital Environment

IFLA has provided the groundwork on this issue. *The IFLA Position on Copyright in the Digital Environment* articulates the premise that "digital is not different" and that existing exceptions and limitations can be carried forward. It also states that license agreements should not override exceptions or limitations embodied in the law.

4.6.2 Importance and Potential of International Agreements

The Berne Convention, the Trade Related Intellectual Property Rights (TRIPS) Treaty, and the WIPO Copyright Treaty allow states to include in their intellectual property laws exceptions or limitations to copyright which do not conflict with the legitimate interests of rights holders.

Most accessible material is created by specialist agencies operating on government funding, charitable funds, or social subsidies. In practice, only a small proportion of the

material published currently becomes available in accessible formats. In many countries it is estimated that only around 5% of published titles ever become available in accessible formats, and some accessible versions are not available until months or years after the original is published.

If no exceptions or limitations exist in national legislation for the benefit of people who are blind or visually impaired, producers of accessible formats need to seek explicit permission for every title and every format. This causes delay and is sometimes met with refusal, denying blind and visually impaired people vital access to a text they urgently require. It also places a huge administrative burden on organizations producing accessible material.

Ideally, all countries should have exceptions or limitations in law, for the benefit of people who are blind and visually impaired.

The exceptions should have the following features:

a) Achieve general acceptance and recognition that creation of alternative format versions from lawfully acquired originals on a non-profit basis with controlled distribution does not constitute an infringement of copyright and therefore requires no permission.

b) Enshrine rights rather than merely improving procedures for permission.

c) Avoid restriction to particular formats or technologies.

d) Assure access to the world stock of accessible materials without geographical or territorial limitations caused by legislative divergence.

4.6.3 Exchanging Digital Content between Libraries for the Blind

Exchanging digital content necessitates the creation of international agreements to allow unhindered transfer of accessible material among different countries. Bi-lateral or multi-lateral agreements may be the first step. The ultimate goal is an international accord backed by WIPO and all its members.

IFLA Libraries for the Blind Section (LBS) will work with its constituent members and with WIPO, IPA, the library community, and other relevant organizations to create a trusted environment to provide IPA and WIPO the assurance that LBS members will adhere strictly to all copyright requirements.

Together with other relevant organizations, a mechanism will be developed to share files and books among member libraries, ensuring adherence to copyright requirements.

Libraries should create a trusted environment in which circulation among people who are print–disabled can and will be controlled, fair use is guaranteed, and the protection of intellectual property (IP) is assured.

5 Archiving, Storage and Managing Digital Assets

5.1 Digital Handling Systems

As documents have evolved from paper to electronic formats, new systems have been developed to handle the large quantities of data associated with business functions.

Document management systems have emerged primarily to handle text-based documents. Banks, insurance companies, and law firms are primary users of these systems, which manage the considerable documentation generated concerning users, services, and products. Such systems commonly include records management and workflow functionality.

Similarly, rich media (audio, images, and video) have also evolved into electronic formats. Specialized digital asset management systems are designed to manage these storage-intensive resources. Examples include image banks of photography studios or the video archives of large news organizations.

In recent years, the technologies of document management and digital asset management have converged rapidly as organizations combine traditional written documents with rich media. A number of companies now integrate both functionalities in their products, either through the acquisition and integration of other products or through the development of their own applications. This movement is of considerable benefit to libraries, and especially libraries for the blind, which require the management both of documents (e.g., text, braille) as well as rich media (e.g. digital talking books).

5.2 The Digital Repository

The term “database” is frequently misunderstood. To some, it means the actual data being stored, while to others, it refers to the database management system that actually controls the access to the data. Both definitions may be correct depending upon the circumstances. The term “digital repository” engenders similar confusion. In this discussion we will be referring to the “digital asset management” system or the “document management” system as the digital repository.

5.2.1 Managing the Production and Preservation of Digital Assets, and Digital Rights Held for these Assets

A digital repository may be best described by defining each of the functional activities and the people who perform those activities. The “people” may be staff members or upstream[1] end users, or downstream[2] applications.

[1] **Upstream**: a transmission from an end user to a server.

Functions associated with managing a digital repository:

- Adding new content to the repository;
- Checking-out and checking-in with version control;
- Downloading to the delivery media e.g. web portal.

Parallel to these core activities are a series of underlying functions including:

- Audit trail: The logging of every activity in the digital repository such as who is working on the digital asset, who last updated it.
- User rights administration: Creating, modifying and deleting users or partner applications from the lists that control access to digital assets.
- Security management: Controlling access to assets through a matrix of permissions and rights pertaining to user roles and groups as well as by asset grouping or by individual asset.
- Metadata management: The metadata of an asset may include digital rights. In this scenario, the digital repository must perform the management of those digital rights as defined for each asset.

In addition, there are optional functionalities that can serve to enhance the digital repository depending on the positioning of the repository within the library. The most significant is the "workflow engine." A workflow engine is the system that manages the movement of an asset through a library process.

The workflow engine can fulfill several roles. If a library has a separate mandate for the preservation of digital assets, a workflow could be created to generate copies of the asset in a separate format or location strictly for that purpose.

5.2.2 Data Architecture

The data structure or data architecture is a major decision in the design and implementation of a data repository. There are several options to consider. One option is to allow the purchased application to manage all of the data. In most cases, commercial digital repository applications manage the directory/file structure by using unique folder names and storing assets under unique system generated names so as to optimize the search and retrieve function of the operating platform.

Another option is to have the digital repository create a folder for each asset and either attach the metadata to the folder or embed some of the metadata in the folder name (title plus a unique identifier).

A final option is to have the digital repository create a folder at the custodial item level. This level is characterized by the bibliographic data (i.e. catalogue record) of the

[2] **Downstream**: a transmission from a server to an end user.

originating source being identified as the highest level of metadata. Within this folder reside sub-folders that contain the metadata elements common to all formats or versions of the custodial item, e.g. Braille, digital talking book in MP3, digital talking book in DAISY, publishers source files.

Each of these options has significant “pros and cons” that needs to be investigated within the design and implementation phases of any digital repository project, once the platform has been determined.

6 The E-Delivery System

6.1 Users in the Digital Environment

6.1.1 Defining the User in the Digital Environment

The use of digital technologies to produce and deliver access to content provides blind and visually impaired library users with a high degree of choice and independence in exercising that choice. Users in the digital environment are confident that the optimal use of digital technologies will result in optimal service delivery and, in addition, that their individual needs will be met. They have varying degrees of computer knowledge and competency, from the expert computer user to the beginner. Some users have personal computers and use the Internet to access information directly within the digital environment. Others use offline playback devices to access content created in the digital environment.

Whether a user chooses to access materials with or without a computer, the expectation is that ”going digital” means improved sound quality of audio books, a more durable and easy to use format, and more books available more quickly. The reason for this is based on the assumption that new technologies vastly improve the end product and the production time. For users of computers or digital playback devices, “going digital” allows them to access more information, faster, either by accessing e-books online or by placing holds on hard copy items using an online digital library service or portal.

The typical computer user chooses to manage his/her own service on-line and expects to be able to customize many online features such as search preferences and screen displays to build his/her own personal library experience. Those who use computers to access information also expect a fully accessible library experience designed for people who are blind or visually impaired. A fully integrated digital library system is designed to ensure that users can employ their preferred access technology (for example, a screen reading program that employs synthetic speech, a screen magnification program, or a refreshable braille keyboard). They also expect their privacy and personal information to be protected, and for children, a safe and entertaining learning environment.

Those utilizing playback devices to access books and information expect an easy-to-use machine that is adaptable to their individual needs. Some playback device users take advantage of the sophisticated navigation features built into the machine and the digital

content. For example, they use the “go to page” feature to access information contained within the table of contents or the index of a digital book. Others choose to use a playback device in the same way they used an analogue player to perform basic functions such as “play,” “rewind,” etc. Some users in the digital environment prefer the combination of a computer and a playback device to order books online, and then take advantage of the navigation features and portability offered by the playback device.

In short, blind or visually impaired users in the digital environment expect the same access to information as their sighted peers.

Moving to a digital production platform enables libraries to produce multiple formats from a single source file, it provides the opportunity for greater global resource sharing to secure more books for users, and it improves the quality of books users receive.

6.1.2 Training Users and Staff to Access Content in the Digital Environment

The training and support of users and staff are both crucial to the successful deployment of an Integrated Digital Library System. Emphasis should be placed on the development of a comprehensive but easy-to-use manual and the development of a training project management plan (PMP). The PMP should clearly outline the scope of training to be carried out. (See Appendix 1 for an example of the aims of a typical user/staff training and support plan).

6.1.3 Privacy Issues and Confidentiality

Privacy and confidentiality:

- Password protected
- Terms of use
- Privacy statement

It is important to emphasize the need for a secure and password-protected system. A matrix defining user/staff roles and security levels should be created by libraries to clearly identify and strictly justify who has permission to access private and confidential information. Under no circumstances can private and confidential information be made available to users/staff, except to those staff needing access for work purposes. Libraries must adhere to local privacy and confidentially legislation.

A “terms of use” statement and privacy statement should be created in consultation with legal counsel. Users of the digital library service must agree to the terms of use and privacy statements for the site before being granted permission to login. User passwords should not be kept on record by the library, to ensure privacy. Instead, a “reset password” option can be built into the digital library service to enable a user to reset and/or create their own unique password if either they choose to create a more familiar phrase or in case they forget their original password.

Security features should be built into the digital library service such as an automatic logout for a defined inactivity time span so that users who forget to logout do not have their session left open indefinitely. Login failures should also have a defined limit to ensure that system "hackers" are prevented from entering the system, and to alert library staff should such an attack take place. These precautions are necessary to protect the privacy of users.

6.1.4 User Interaction

Users access the features offered within the digital library that are of interest to them and which meet their information needs. For some, emphasis is placed on accessing online materials immediately. Some use the digital library service to stay informed about national and local current news events, or to read about library news and announcements. For others, emphasis is placed on using the online library catalogue to search for and place holds on physical items, such as braille books. (See Appendix 2 for examples of typical user interaction. Typical user profiles provided by NILS - National Information and Library Service, Australia listed in Appendix 5)

6.2 Handling Delivery of both Physical and Electronic Formats

An IDLS provides immediate delivery of electronic formats to users who are logged onto the site, in the form of online books, newspapers, and other online information available through external information databases. The delivery of physical formats such as braille or books on compact disc is aided by an IDLS in that it enables the user to search for and place holds on library books independently.

6.3 Portals and the WWW

A Web portal may be defined as a Web site or service that offers a broad array of resources and services. Many traditional Web portals have provided users with online search and communication tools such as search engines and access to e-mail accounts. Portals are an ideal gateway for providing library users access to various types of online information such as online books, news, magazines, encyclopedias, dictionaries, library catalogues, etc. and for libraries to customize information and services for different groups, for example, seniors or teens. They also provide a way to make different types of information accessible to users.

6.4 Distribution Model versus Circulation

The use of digital technologies to produce hard copy books affords many new options for offering services to users.

For many decades, libraries for the blind have circulated hard copy books on a variety of physical media, such as different audio tape formats (4-track, 6-track, etc.), vinyl records, and flexible disk, as well as hard copy braille, using the national postal system as the delivery vehicle. Users would return the books to the library after they had read them. This service model often evolved from the personalized selection of books by staff from a

limited collection to automated selection on behalf of users from a collection of tens of thousands of titles and hundreds of thousands of copies. This entailed the progressive development of large-scale production infrastructures, customized cataloguing and production systems, and staff handling large volumes of material manually.

The use of digital media presents an opportunity to libraries for the blind to review their service models. If libraries plan on maintaining hard copy service to users on physical media (e.g., compact disc, flash memory), they may consider the possibility of phasing out the circulation of the media and move to distributing it to users without expectation of return.

Although distributing hard copy books without expectation of return initially seems to be an expensive proposition, many libraries will find that it is actually less expensive than circulating them. In addition, the automation required for duplication opens new opportunities for user service and for streamlining library operations e.g. CD on demand and braille on demand. It is certainly worth the effort to conduct a cost/benefit analysis to determine if a library can reduce its operating costs in this way. Be aware of any legal restrictions prohibiting the use of one-way distribution.

A number of factors make the one-time distribution of, for example, digital audio books an attractive proposition:

6.4.1 Costs

Digital production methods are generally less expensive than most analogue production methods:

- Lower material cost;
- Most digital media (e.g., CDs) can hold much more audio per unit than same unit of analogue media:
    - Example: CDs can hold 2-3 average-size audio books at 32kbps;
    - Cost per book is much lower under distribution model;
- Lower Human Resources costs:
    - Greater automation (duplication centers require minimal human supervision);
    - No need to receive material back;
- Lower facility costs:
    - Reduced space in circulation department;
    - Digital duplication equipment has smaller footprint than analogue, that is, it requires less floor space.

6.4.2 On Demand Production

If production is oriented towards an on-demand model, minimal inventory will need to be kept on hand. Libraries may manage their production pro-actively to produce extra copies of popular resources, or they may keep only the raw material required for known production schedules on hand.

6.4.3 Service Selection

Users can easily select their own reading material and have physical copies duplicated and shipped within 24 hours. Others who prefer can still have books selected for them.

6.4.4 Customization

Customization may be required for these systems under certain circumstances. The amount of customization will depend on the systems selected for asset management, production management, and duplication. Customization may be needed to implement new functionalities in the system, or only to create interfaces among different systems.

6.5 Access Technologies

People who are blind or visually impaired today typically use computers and the Internet using access technologies. Unfortunately, not all Web sites are set up to work well with access technology. This is a definite barrier to information access for people who are blind or visually impaired.

6.5.1 Options in the Future

A conceptual view of access technology can be divided into four distinct categories as follows:

- Via a delivery channel;
- The physical media;
- End user devices;
- End user enabler technologies.

The delivery channels in use or being currently investigated are quite varied. The traditional delivery of physical items either in person or through the postal system is still a valid method. The telephone is everywhere as a method to deliver the spoken word as is radio, and soon digital radio and television will be the same. The Internet has enhanced this capability and includes satellite, digital cable, and other forms of high-speed access.

Access possibilities for physical media, although dependent on a delivery channel, continue to expand in scope. Braille paper will continue to be used for some time. The traditional analogue tape is being superseded by CD or DVD technology, which is in turn, becoming commonplace. Books on memory sticks or other flash media appear to have great potential, as do other possibilities such as electronic paper, light-weight refreshable braille, as well as audio books created from synthetic voice. New formats allowing for greater compression and higher quality are always in development.

End user devices are dependant on physical media. However, they are becoming increasingly feature-rich and offer a variety of options. The home computer can be configured to handle CD's as well as DVD's. Memory card readers are readily available for personal computers, sometimes replacing the conventional 3½-inch floppy diskette.

End user enabler technologies are either specialty computing devices such as speech or braille PDAs (Personal Digital Assistants), software or accessible mobile telephones that enable the user to access library content in new ways.

6.6 Defining Security Requirements

6.6.1 Firewalls and anti-virus protection

It is important to ensure that the library's systems are protected from attack such as viruses and hackers. This protection can be provided by an external supplier (often connected to an organization's Internet access) or software can be purchased and installed on the library's own systems. The appropriate solution may vary according to whether the system is hosted on servers within the organization or hosted by an external service provider.

Whatever the situation, it is imperative to keep security software and services up-to-date as new attacks are becoming more prevalent and aggressive.

6.6.2 Policies and procedures

It is important to establish policies for acceptable use of information technology within an organization, such as rules governing staff use of the Internet, downloading software, appropriate use of e-mails and opening file attachments.

6.6.3 Backing up data

The investment in creating digital assets is significant. Therefore it is crucial to develop strong back-up procedures to protect this investment. Consider the impact of the loss of different types of data when determining the frequency and formats of back-ups.

Back-up systems should allow for growth in the amount of data the library can back-up. They must be regularly monitored to ensure their ability to effectively restore data as required.

7 Developing the IDLS Project Plan

7.1 Selecting the IDLS Project Team

Once a library has made a formal decision to embark on an IDLS project, it is important to articulate the goals of the project and, having done so, assemble a project team, including a project leader.

The project leader should have a good overview of how the library works; the print disabled groups it serves, the goals of the project, and information technology in the field. Although it is not necessary for the project leader to be an information technology expert,

it is essential that they have previous experience in managing complex library projects from a planning and financial perspective.

The project leader's first responsibility is to assemble the project team. If possible, the core members of the team should be dedicated to the project and all or some of their regular workload be assigned to other staff for the duration of the project. It is important, as well, that the membership of the project team include staff expertise from those library departments that will be impacted by the new system, as well as representation from the organization (internal or external) that will manage the library's information technology. Working groups reporting to the project team can be established to focus on specific project goals, such as requirements development, archive design, technical infrastructure, accessibility, and the user interface. Including representatives from all departments also means that everybody is involved in planning and communicating the library's transformation.

One of the primary functions of the project team is to develop and deploy a communication plan to the organization as a whole. In this way, staff and stakeholders can be kept informed as to the progress of the project.

Consultation with the library's users and stakeholders should take place prior to commencing the project. However, if the library needs to review system requirements, or test accessibility or functionality as the system is developed, consideration could be given to establishing a reference user group or focus group. This group should include users from all print-disabled groups that the library serves. Collectively, they should represent a range of computer literacy levels, from the beginner to the expert user. During the testing phase persons unaccustomed to using computers should be included.

7.2 Role of Consultants

Consultants may be used to help with both determining the requirements for the digital library system and for evaluating the various computer systems available in the marketplace.

A qualified experienced consultant can be costly. It is important to find a consultant who is a good match for the organization and the project team. It is also important to define the scope of work the consultant will perform. For example, will the consultant advise the project team on available systems, or function in a technical capacity and manage the computer infrastructure aspects of the project?

It is also important to find a consultant who will ensure that his/her knowledge and expertise is passed on to library and/or IT staff to ensure continuity of in-house expertise for ongoing system support. A contract and statement of work is required to ensure that the work that is done by the consultant meets the library's specifications.

7.3 Developing a Requirements Document

Prior to developing a Request for Proposal (RFP) for the systems solution, a statement of requirements must be documented which ultimately will form the basis of the RFP. It is important that this document is exhaustive and comprehensive in terms of requirements for all the functionality to be included in the system. The articulation of requirements is usually a lengthy and iterative process; however, the success of the RFP and the system that is ultimately selected and deployed rests largely upon the strength of the requirements document.

7.4 Seeking Marketplace Solutions

The library may want to start the system acquisitions process by surveying the vendors. It is also useful to visit other organizations and libraries that have implemented an IDLS or that are further along in their development plans. (See section 8.3 Appendix 3 for case studies showing IDLS development in a number of libraries for the blind).

7.4.1 Request for Proposals

When preparing an RFP, in addition to the functional requirements, it is important to provide detailed information on the library, its users and its plan for serving these users in the future, and any existing technology infrastructure on which the IDLS will reside. If the library has already implemented some components of an IDLS, it is particularly important to inform the vendor(s) how the library expects the vendor's solution to functionally integrate with these existing components.

It is important to emphasize in the RFP the features that are essential to a library serving a print disabled population, such as accessibility and perhaps**,** circulation by profile. If a vendor is given a comprehensive view of the library's activities, users, and system requirements, it will be better equipped to develop a solution that is appropriate and responsive to the library's needs.

7.4.2 Vendor Selection

Choosing the best solution and the right vendor is a complex decision. Vendor proposals can be very different. First, it is critical to compare vendor responses to each and every requirement. It is important to know what proportion of the requirements is met by each solution, the proportion that cannot be met, and the extent of customization and integration required.

The proposals should provide information on the financial stability of each vendor and the market share they command relative to their competitors. The comparative cost of each solution is important as well. These costs should not be compared in isolation, however. That is to say, one vendor's costs may be low but so might be the degree to which that vendor's solution meets the library's requirements. There are a number of variables that must be considered: the completeness of the response in terms of the requirements, software and hardware costs, the cost and extent of customization, the implementation

plan, and ongoing support and maintenance agreements. Consult with other libraries where the system has already been installed and other companies with systems like the ones proposed. Ask for references and interview them on the solution, their implementation experience, and their ongoing relationship with the vendor. Finally, it is important to determine the extent to which the vendor can support the library and its new requirements over time.

7.4.3 Seeking Partnerships with other libraries

Partnerships and consortia of libraries serving similar communities can be beneficial in developing an IDLS particularly in helping to share the cost burden and ongoing upgrades and customizations.

One option is to co-develop the requirements and have a joint project team. Vendors will be more interested in working with two or more libraries wanting the same solution.

Another option is to purchase a functioning system from another library. In this context it is important to know the purchase options; for example, can the system be purchased outright, including the source code so that it can be locally supported, or will the library supplying it provide support and upgrade for their software in years to come.

Alternatively, study another library's vendor-developed solution and buy the same from the vendor. This solution will be less costly than if the library assumes the initial cost of development and customizing on its own. Partner libraries using the same systems can work together in user groups to plan for changes they will need in years to come.

7.5 Project Deployment

A variety of tasks must be accomplished prior to commencing the implementation of the IDLS:

7.5.1 Contracts with Vendors and System Developers

It is important to have contracts with all vendors involved in providing the solution and to ensure that the expectations of the parties are clearly articulated. The involvement of legal counsel with knowledge and experience of IT systems would be prudent in ensuring that the library's interests are protected ongoing. Alternatively, partner libraries that have experience in IT implementations may have a contract template that can be modified.

The contract should specify exactly what the vendor is providing in terms of the IDLS software, hardware (if it is included), customizations and the cost of professional services to develop them, a project plan with timelines, a clearly articulated change process, and the support and maintenance for the product. The contract may also include, at a high-level, the acceptance criteria, which will be further defined during the project's implementation phase. Take time to ensure a clear and all-inclusive contract; the project budget should include legal fees for these negotiations.

7.5.2 Developing the Project Plan

In conjunction with the vendor(s), the library must develop a project plan with a precise timetable, identifiable project milestones and targeted resources for the project. The project team will work with the vendor(s) project team to develop a plan that is comprehensive and reasonable. The two teams need to learn how to work effectively together.

It is preferable to develop the project plan using software that is designed for this purpose, such as Microsoft Project. Most vendors use project management software. Ensure that sufficient time is budgeted to develop the project plan and continue to update it throughout the project as circumstances change – the project plan is a living document.

As well, ensure project team availability for the duration of the project. This may mean re-negotiating vacation time as well as other library events to ensure that resources are available to complete the project on time and on budget.

7.5.3 Executing the Project Plan

Follow the plan and modify it if necessary. Have regular prescheduled weekly meetings with the project team, which now is comprised of library staff, IT personnel and vendor representatives to review the project plan.

A professional project manager, that is, someone who has project management certification, should be considered to manage the project from beginning to end. Professional project managers are trained and experienced in keeping a project on track and ensuring that it stays on budget, on schedule, and on scope.

7.5.4 Identifying Milestones and Sign-Off Points

A major project task is to identify milestones at which the vendor and the library will complete their various work packages, which will be tested by the project team and signed off upon acceptance by the library. The library should ensure a separate systems environment is set up to be able to test vendor software and modifications prior to live implementation. This is often referred to as a “quality assurance,” or QA, environment.

It is important that the library project team develop a formal testing strategy, with test plans to test all aspects of the new system. Problems should be logged and reported on a regular basis to the vendor and the “fixes” retested and only accepted and signed off upon successful performance.

7.5.5 System Delivery

Before the system(s) goes “live,” or “into production,” it should be tested under as normal as possible conditions. The project team should be the primary testers, as they understand the requirements to be fulfilled by the software and whatever customizations

have been developed. User acceptance testing will follow this, during which the actual users of the software put it through its paces.

7.5.6 Identifying Human Resources and Appropriate Skills

A fully implemented IDLS will render many of a library's traditional processes and tasks obsolete. Consequently, it is important to make sure that staff have the appropriate training and skills to work effectively in the new service model. For example, if the library chooses to make copies on demand, staff need to be trained to burn CDs instead of picking copies from shelves in stacks.

7.5.6.1 Training or Replacement

Library staff working in the IDLS will require basic computer competency. Print-disabled employees must be able to learn how to access computers with adaptive technology. For example, the production of DAISY-books, braille books, and e-texts is highly computerized and a new production control system will follow new production workflows, which will be computer-based.

It is important to develop a training plan and budget to ensure that employees are given the training they require for working effectively in the IDLS and the related production technologies used in a digital environment. Vendors provide training both for library and IT staff who will be responsible for support after implementation.

7.5.7 Impact on facilities

The library will physically change after implementing an IDLS. Staff including blind and visually impaired employees will work primarily with computers. To be able to use all programs properly, appropriate computer capacity needs to be available to staff. If the library opts for the "distribution model" and distributes copies on demand, there will be less need for stacks for hard copy books.

If the library plans to manage its own technology operations, as opposed to outsourcing, the systems infrastructure and archive will require physical space with special environmental and power requirements and specific requirements for networking, backup and restore, etc. IT staff will need the training and skill sets to support this very complex infrastructure.

7.5.8 Data Validation

When the library moves data from one or more systems to the new IDLS, it is important to consider whether all of the data elements are to be migrated or only a subset is required. Also, once the data is resident in the IDLS, the library should have a test plan in place to confirm that all the data came across and the accuracy of that data. Prior to testing the testers need to ensure that the system is correctly configured and working to appropriately display expected results as per the test plan.

7.6 "Go live" Implementation

How the library implements the IDLS depends on the library structure, employees and the vendors with whom the library has partnered. If the library decides to close for a period of time, the impact on users must be well-understood and alternative arrangements made. With a good plan that users know in advance, the library may be able to start with a "big bang" approach.

7.6.1 Phased-in versus Big Bang Approach

If the library plans to implement a digital archive, production tracking and library system as part of its IDLS, each component should be implemented separately in a phased manner. The digital archive or repository can be started, tested and implemented independent of an existing library system and thus without affecting service for users. Services such as the streaming and downloading of audio books can then be tested by the project team and perhaps piloted with a group of library users before being fully deployed.

The production tracking system is an internal system, which manages "works in progress" (WIPs) and can be phased in with new production workflows while the old system, manual or computerized, is still in use. The transition can take 6 months or so using two systems but the impact of change will be minimized.

When implementing a new library system it is necessary to ensure that all bibliographic, transaction, and user data are migrated prior to going "live." Once the data is converted and migrated, the new library system has to start with a "big bang," as it is not feasible to run two circulation systems at the same time. If the library is moving from a manual system it is best to avoid parallel operations.

7.6.2 Developing the Implementation Plan

The project team and library departments must work closely together in developing the "go live" implementation plan. Staff acceptance is essential for the success of this major change. An effective plan allows staff the opportunity for input to its development and to its change management strategy.

The implementation plan describes what has to be done, when and by whom and the dependencies between tasks.

Implementation plan elements:

- Timetable
- Financial management plan
- Resources
- Vendor negotiations
- Hardware and software purchase agreements
- Site preparation
- Systems installation and configuration
- Systems testing
- Training plan
- Communications plan
- Risk management
- Change control
- Problem management
- Quality assurance plan
- Acceptance and sign-off plans

The library should expect that the implementation of an IDLS will take considerable investment of time and resources. It would not be unusual for a project to take one to two years, depending on the size and complexity of the implementation and the resources available.

7.6.3 User Testing and Feedback

The library should select a group of interested and computer literate users to test the system. Train them thoroughly in all aspects of the new service and note their feedback carefully. It is important to correct problems that they identify. If possible, try to phase in the users – first test with a small group, then a larger group, and then the entire community.

7.7 Marketing and Communication

7.7.1 Informing Users

It is important to let the users know about the service benefits. These could include ease of use and handling, better audio quality, faster service delivery, self service options, user customization and so on. Use a variety of communication tools to get the news of the new services to library users for example, face-to-face user group meetings, newsletters, online messaging, the library's own website, exhibitions etc.

7.7.2 User Support and Help Desk

It is advisable to have extra staff on hand ready to ease the transition and additional phone-lines to provide sufficient user support during the first months. A Help Desk is useful for prioritizing and tracking calls. The library will have a vendor support agreement in place to address problems beyond that of staff expertise.

7.7.3 Informing other Stakeholders

It is important to keep supporters of the library informed about the progress of and opportunities afforded by the IDLS implementation. These would include the library's board and management, government agencies, donors, other organizations with which the library is partnered such as mainstream libraries, other organizations serving print-disabled people, suppliers and publishers.

7.8 Evaluating Achievement of Project Goals

7.8.1 Determining if Project Goals are met

After the system has been in use for several months the library should measure the extent to which the pre-defined goals of the project have been met. This can be done by interviewing staff and/or surveying a selected group of users. A Post Implementation Review provides a record of lessons learned for guidance in future projects. The review might include:

- Assessment of initial user feedback
- Extent to which project was on schedule and on budget
- Assessment of staff feedback
- Assessment by project participants of what worked and what didn't and what they would do differently

7.8.2 Confirming Achievement of Benefits

The library's board and management will want to know that the benefits of the new IDLS as proposed in the business case were achieved. An IDLS is an enormous investment of time and resources. However, it will have demonstrated its value if the library can show a return on its investment over a number of years.

8 Appendices

8.1 Appendix 1 – Training and Support Plan

The Training and Support Plan aims to:

- Establish a plan and timeline for training of users, staff and volunteer trainers
- Develop a marketing plan to promote the benefits of the digital library to users
- Identify existing training materials and the need for further development of training materials
- Create a stand-alone interactive digital library tutorial that can be used by instructors working with users, or by users independently
- Provide live demonstrations with a hands-on component to key staff. These staff will be trained to be able to provide training and support to users and other staff.
- Equip staff with how-to training kits, for the purpose of setting up user training sessions within their local communities.
- Identify computer-training programs already in existence and coordinate the inclusion of a demonstration of the digital library service.
- Contract with access technology experts to provide support on how to use the digital library with various access technologies and/or create support materials specific to accessing the digital library using various access technologies. (Examples of access technologies include screen reading software such as JAWS, screen magnification software such as ZoomText and refreshable braille display equipment).
- Provide on-site and remote group training sessions to users and or family/friends of users
- Invite guest speakers, such as access technology experts, vendors of digital playback devices and software vendors to speak about how users can utilize access technology in conjunction with digital library services
- Provide one-on-one demonstrations to users who make an appointment to visit the library.

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8.2 Appendix 2 – The User Experience

Users access the features offered within the digital library service that are of interest to them and which meet their information needs. Examples of typical user interaction are provided below:

Instant access to books and information Users listen to online digital audio books, read electronic text and braille books, and browse online newspapers and magazines.

Online research Users access the various online information databases subscribed to by the library such as online encyclopedias or online dictionaries to conduct personal research.

Library news Users visit the library's "News and Events" section to read about new services and programs.

Ordering multiple books at once When searching the catalogue, each time a user finds a book they would like to read, they can add it to their "shopping basket". Once finished they select their shopping basket and have the option of submitting all requests at once. Users can also specify on which books they would like to place a "priority" hold.

Advanced searching With thousands of items to choose from in a wide variety of formats, it is important to provide the option to create specific types of searches. Users will utilize the "Advanced Search" option to limit a search to a specific format (such as braille), an age level, and even "date added to the collection", among other search options.

Personal profile Using their own personal profile and preferences page, users select time savers such as limiting the formats they would like to search, page layout preferences, such as placing the navigation bar at the bottom of each page, and a "saving your searches" feature.

Profile customization Users may customize their digital library profile by choosing a particular language display, selecting colour contrasts for viewing accessibility, and by editing their own password and e-mail address.

Recommended reading Users may consult a system-generated recommended reading list based on their reading history. Also included can be a section containing books recommended by library staff members.

Games Users have stated that it can be challenging to find online games that are accessible - these games are specifically designed to be accessible and can have built in audio so that screen readers are not required.

A Children's Area Young users can take part in an accessible and safely moderated Chat area for children, interactive features such as online polls, or information about events for younger users.

Online Help Users independently access help pages offered for every section within the digital library service, or they may use the various "Contact Us" links to send messages to library staff.

8.3 Appendix 3 – Case Studies

A questionnaire was sent to all the libraries on the IFLA LBS smartgroups mailing list and seven responses were received from the following organizations:

Brazil – Service to Blind Central Library Universidad Federal of the Paraiba (UFPB)
Canada – Canadian National Institute for the Blind Library (CNIB)
Finland – Celia Library for the Visually Impaired (Celia)
Netherlands - FNB Netherlands (FNB)
South Africa - South African Library for the Blind (SALB)
Sweden – Swedish Library of Talking Books and Braille (TPB)
United Kingdom – National Library for the Blind (NLB)

Other than Brazil that is in the planning stages all of the other respondents are at various stages of IDLS implementation. The results indicate that all organizations at this time are continuing to offer traditional non-digital formats and to maintain hard copy circulation systems. In the digital context all organizations have indicated a commitment to offering DAISY. Delivery methods include CD off the shelf and CD on demand, e-mail delivery, online digital audio, file download.

All respondents developed a specification of requirements document and all but FNB issued a request for proposal.

All respondents have multiple suppliers of their IDLS components or, as with FNB, a combination of a single supplier and in-house development.

All respondents have purchased off the shelf systems with added customization. All have developed an accessible user web interface jointly with their supplier and offer their users an integrated search of all available formats. None of the organizations developed their IDLS in partnership with another.

Three of the seven respondents (Celia, CNIB, and NLB) offer their users the ability to search the collections of other libraries through their IDLS. Two of the respondents CNIB and NLB indicated both on-site and off-site storage of files.

The following chart summarizes the libraries' responses, grouped by the categories used in the questionnaire.

Responses to questionnaire

Information about the organizations

Organization	Country	Contact	Web site	No. of employees	No. of employees using the IDLS	No. of users of IDLS	Location of users	Components of your IDLS
NLB	UK	Carol Pollitt	www.nlb-online.org	75	3 cataloguers, 6 customer services, 12 production, 6 others	500 users registered for online services	worldwide	- Circulation (Automated circulation processing) - Catalogue - OPAC - File management
CNIB	Canada	Margaret McGrory	www.cnib.ca	800	-	2000 clients registered for digital service	Canada	Digital asset management Workflow Storage Electronic delivery
Celia	Finland	Paivi Voutilainen	www.celialib.fi	60	50	450	Finland, Sweden, Estonia, Australia, Spain	- Digital archive (in planning) - Client service systems (circ and distribution, address admin, lending history) - Cataloguing and indexing - Net services (OPAC and Celianet)
TPB	Sweden	Birgitta Irvall	www.tpb.se	79	6 cataloguers, 15 lending service, 35 users of production system	3000 loans through catalogue in August 2004.	Sweden and Scandinavia	- Library system (Mikromarc) - Production system (Axapta) - Digital archive (at Swedich University network-

								SUNET)
FNB	Netherlands	Theo van der Greft/Maarten Verboom	www.fnb.nl	275	4 cataloguers, 40 customer services	No figures	worldwide	- customer database - catalogue of books, newspapers, magazines - automatic lending system for non-study books - orders for the reproduction and distribution processes (including status)
SALB	S. Africa	-	-	-	-	-	-	-

Information about services offered

	Type of formats offered:	Delivery methods of materials:	End user access to other organizations' collections through your IDLS:

NLB	- Braille
	- Audio:
	  o DAISY (pilot 2004)
	- E-books:
	  o DAISY (pilot 2004)
	  o Text file
	- Tactile
	- Large print
	- Moon
		- Hard copy circulation
		- E-mail delivery - magazine
		- Online reference resources
			- Yes, to search for material

CNIB	- Braille
	- Audio:
	  o DAISY / NISO
	  o MP3
	  o Audio cassette
	- E-books:
	  o Text file
	  o Braille file
	- Tactile
	- Other
		- Hard copy circulation
		- CD on demand university students
		- Online digital audio / download
			- Yes – to search for material, to place a hold / request, to download directly

Celia	- Braille
	- Audio:
	  o DAISY / NISO
	  o Audio cassette
	- E-books:
	  o Text file
	- Tactile
		- Hard copy circulation
		- Other – E-books downloaded, password protected access to server
			- Yes – to search for material

TPB	- Braille
	- Audio:
	  o DAISY / NISO
	  o Audio cassette
	- E-books:
	  o DAISY
	  o Text file (special format e-text "textview")
	- Tactile
		- Hard copy circulation
		- CD on demand university students
		- Online digital audio / download (university libraries can download)
			-

FNB	- Braille
	- Audio:
	  o DAISY 2.02
	  o Audio CD
	- E-books:
	  o DAISY 3.0 (from 2005)
	  o XML (FNB format)
	  o Text file (WP, Word)
	- Tactile
	- Large print
	- Enlargements
		- CD on demand
		- Braille on demand
		- E-mail delivery
		- online digital text / download
		- print on demand (large print, tactile)
			- No

SALB	- Braille
	- Audio:
	  o DAISY coming soon
	  o Audio cassettes
	- E-books:
	  o DAISY
		- Hard copy circulation
		- CD on demand
			-

Information about file management and archiving

	Have / plan to have	**Software package**	**Workflow processing**	**Full text searching**	**Metadata standard**	**Cat standard**	**Archive**
NLB	Partially implemented	E-works	Yes	No	Based on Dublin Core	MARC 21	Both on and off site
CNIB	Yes - Have	Software package	Yes	Yes	Dublin Core	MARC 21	Both on and off site
Celia	Plan to have 2005	Project in planning	Yes	No, not yet	Dublin Core	Finmarc, FRBR	On site
TPB	Yes - Have	In-house development	Yes, to a certain degree	No	No	MARC 21	Off site
FNB	Yes, It will be renewed in 2005	Cache database system. In house development	Yes	No	PICA 3	Geac	On-site
SALB	Plan to have	Aurora LMS	Yes	-	-	-	On-site

Delivery mechanisms and user interface

	Web customer interface	Users see all formats in one search	Functions users can perform	Accessibility development
NLB	Yes	Yes	Search, bookmark titles, e-mail request to library. Coming soon: view own records, order title directly on web.	Jointly with supplier
CNIB	Yes	Yes	Search, place hold, order, download	Jointly with supplier
Celia	Yes	Yes	Search for titles in OPAC Borrow titles independently Reserve books Browse own records Browse and change personal information e.g. address	Jointly with supplier and tests with users
TPB	Yes	Yes	Search for titles, place holds, see loans and reservations, download DAISY books, send messages to us, change their e-mail address.	Jointly with supplier
FNB	Yes	Yes		Jointly with supplier
SALB	In planning	-	-	Jointly with supplier

Partnerships

	Did you partner with other libraries to develop your IDLS?
NLB	No
CNIB	No
Celia	No
TPB	No
FNB	No
SALB	No

Information about your IDLS project

	Stage of implementation	Sources of info	Spec of requirements	RFP / ITT	Suppliers	IDLS solution:	Name(s) of your supplier(s) / product(s):
NLB	In process	CNIB, text books, suppliers, other libraries	Yes	Yes	Multiple	Off the shelf with customization	Geac Advance Library Management System. E-works file management and workflow.
CNIB	Complete	-	Yes	Yes	Multiple	Off the shelf with customization	-
Celia	Some parts complete, some in process	IFLA / SLB and DAISY meetings Suppliers and vendors Earlier experiences	Yes	Yes	Multiple	Off the shelf with customization	Library systems and Celianet from PallasPro / TietoEnator. Archive supplier still open.
TPB	Complete – all parts are functional but corrections and changes are made.	Firms selling library systems and business systems	Yes	Yes	Multiple	Off the shelf with customization	Mikromarc Library System by Bibliotekcentrum I Sverige. Microsoft Axapta business system. Digital archive at SUNET.
FNB	In process	Current systems	Yes	No	Single supplier	Off the shelf with customization	Geac Vubis Smart.
SALB	In process	-	Yes	Yes	Multiple suppliers	Off the shelf with customization	Aurora Information Technology. Any Consulting CC.

Key criteria in system selection (in order of priority)

	Cost	Functionality / service benefits	vendor	Technical compatibility	Local support	other
NLB	3	1	6	5	4	2 (proven developments for other library f/t blind)
CNIB	2	1				
Celia	3	1	5	6	2	4 (future development possibility)
TPB	2	1	3	-	4	-

FNB	1	2	-	-	3	-
SALB	3	1	-	-	2	-

Future developments

NLB	Improve user functions on web catalogue, extend e-book services, direct file download
CNIB	
Celia	Production workflow, on-demand delivery and online distribution
TPB	All DAISY titles in digital archive will be validated by fall 2005. Then project where all masters for all media should be in XML format.
FNB	Integration of the IDLS with the production system planned in 2005
SALB	Implementing the IDLS

Useful sources of further information and other comments from respondents

Don't expect your system to be completed within one year or to be perfect at first sight. All systems need customizing, modifying and amending after the initial installation.

Involve your users in your implementation, test the functionality of your system and get feedback.
Talk to other libraries about their systems and implementation processes.
Ask other libraries for the blind for their specifications and RFPs, they may be willing to let you base your documents on theirs, saving you time.
Contact DAISY Consortium and IFLA Libraries for the Blind Section, visit their web sites:
http://www.daisy.org
http://www.ifla.org/VII/s31/

8.4 Appendix 4 – Glossary of Terms

BPR (Business Process Re-engineering) – The analysis of an organization's current work processes with a view to re-designing and optimizing them to accommodate new business strategies, priorities, or technologies.

Brailler – A mechanical device used to emboss braille characters onto flexible media, usually paper or plastic; may be manual or computerized.

CD (compact disc) – Optical storage technology used for digital data or music; maximum capacity is 650MB.

DAISY (Digital Audio Information SYstem) – A technology developed by an international consortium of libraries for the blind (DAISY Consortium http://www.daisy.org) to record and play digital talking books (DTB); the DAISY standard permits navigation among the structural elements of a DTB and the synchronization between the text of a book and its narrated form.

DTB – Digital talking book

Dublin Core – A metadata standard created to describe electronic hypertext resources (specifically, web-based resources).

DVD (digital versatile disc) – Optical storage technology used for video, audio, and data; the capacity of a single-sided, single-layer DVD is 4.4GB; double-sided, double-layered DVDs offer a capacity of 14.9GB.

FRBR (Functional Requirements For Bibliographic Records) – A study undertaken from 1992 through 1997 by a group of experts and consultants as a consequence of one of the 9 resolutions adopted in 1990 at the Stockholm Seminar on Bibliographic Records. That study's aim "was to produce a *framework* that would provide a clear, precisely stated, and *commonly shared understanding* of what it is that the bibliographic record *aims to provide information about,* and what it is that we expect the record to achieve in terms of *answering user needs."* Approved by the Standing Committee of the IFLA Section on Cataloguing (now called Cataloguing Section) in 1997 (Patrick Le Boeuf — Bibliothèque nationale de France, Chair of the IFLA Working Group on FRBR).

FRBR is a conceptual model, not a data model, represented as entities, their attributes and relationships. FRBR has three groups of entities: works, expressions, manifestations and items.

FRBR advantages for libraries: Collocation, better organized, easier to catalogue, reduces cataloguing workload – a work is catalogued once for all expressions beneath it, an expression is catalogued once for all manifestations under it, and cataloguing of a single item remains the same.

FRBR offers an easier way to organize multiple formats, which is of particular advantage to libraries for the blind.

Advantages to users: Easier to find information, single search retrieves all related materials, easier to see the different expressions of a single work, better global picture, easier to find all manifestations, improved navigation and indexing, sorting and display in OPAC, ability to place holds at "work" or "expression" level rather than only at "manifestation" level, and easier to understand relationships between resources.

Disadvantage: Lack of library systems supporting FRBR.

Some Links: Functional Requirements for Bibliographic Records: Why is the model useful? What is FRBR and why is it important? Chris Oliver, McGill University/ Canadian Cataloguing Committee. http://www.collectionscanada.ca/metaforum/n11-228-e.html

Report of the Joint Meeting, June 17, 2002, Atlanta GA
FRBR and MARC 21
Sally H. McCallum, Network Development & MARC Standards Office, Library of Congress
http://www.libraries.psu.edu/tas/jca/ccda/ccda-marbi-206.html

FRBR: hype or cure-all? Patrick Le Boeuf, archiviste-paleofraphe
http://www.catalogingandclassificationquarterly.com/ccq39nr3-4.html

BiblioTech Review; Virtua 4.2 with FRBR released
http://www.biblio-tech.com/btr11/S_PD.cfm?DO+A&ArticleID=496&Xsection=BTR_Business&issueno=26

Hold – A request by a Library client or staff member to a library system for a library resource.

IFLA –The International Federation of Library Associations and Institutions is the leading international body representing the interests of library and information services and their users. It is the global voice of the library and information profession.
http://www.ifla.org/index.htm

IPA – The International Publishers Association (IPA) was established in Paris in 1896. It is a Non Governmental Organisation with consultative relations with the United Nations. Its constituency is of book and journal publishers world-wide, assembled into 78 publishers associations at national, regional and specialised level. http://www.ipa-uie.org/

LBS – IFLA Libraries for the Blind Section concerns itself with library services for the blind and other print handicapped readers. The main purposes of the Section are to promote national and international cooperation in this field, and to encourage research and development in all aspects of this area, thus improving the access of information for the blind and other print handicapped persons. http://www.ifla.org/VII/s31/

MARC – MAchine Readable Cataloguing – A standard describing the presentation of bibliographic data in electronic form; commonly used in libraries.

Metadata – Descriptive information about a resource, usually digital; data about data

MP3 – A format used for the distribution of audio content; MP3 is a "lossy" format i.e. data is removed to compress the size of the original file. It is used to decrease the size of the audio files, which are often created from .wav files; the content encoded in MP3 files cannot be edited.

MPEG4 – A graphics and video lossy compression algorithm standard that is based on MPEG-1 and MPEG-2 and Apple QuickTime technology. Wavelet-based MPEG-4 files are smaller than JPEG or QuickTime files, so they are designed to transmit video and images over a narrower bandwidth and can mix video with text, graphics and 2-D and 3-D animation layers. Wavelet technology can compress color images at rates of 20:1 up to 300:1 and grayscale images at 20:1 to 50:1. MPEG-4 was standardized in October 1998 in the ISO/IEC document 14496. (From Webopedia)

NISO – National Information Standards Organization is a non-profit association accredited by the American National Standards Institute (ANSI), identifies, develops, maintains, and publishes technical standards to manage information in our changing and ever-more digital environment. NISO standards apply both traditional and new technologies to the full range of information-related needs, including retrieval, re-purposing, storage, metadata, and preservation. http://www.niso.org/index.html

OPAC – Online Public Access Catalogue

PDA – Personal Digital Assistant, a handheld computer device.

PMP – Project Management Professional

QA – Quality Assurance

RFP – Request for Proposal – Document sent by an organization to a vendor, describing the organization's requirements in detail and inviting the vendor to submit a proposal to present a solution to these needs.

TRIPS – Trade Related Intellectual Property Rights. The TRIPS Agreement, which came into effect on 1 January 1995, is to date the most comprehensive multilateral agreement on intellectual property. http://www.wto.org/english/tratop_e/trips_e/trips_e.htm

W3C – World Wide Web Consortium – The World Wide Web Consortium (W3C) develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication, and collective understanding. http://www.w3c.org

WAI – Web Accessibility Initiative – The World Wide Web Consortium's (W3C) commitment to lead the Web to its full potential includes promoting a high degree of usability for people with disabilities. WAI, in coordination with organizations around the world, pursues accessibility of the Web through five primary areas of work: technology, guidelines, tools, education and outreach, and research and development. http://www.w3c.org/WAI/

WAV (pr. "wave") – A digital format for recording and playing audio data; wav files are fully editable.

Web portal – A web site designed to act as a gateway to other Internet resources

WIPO – World Intellectual Property Organization -- WIPO is one of the 16 specialized agencies of the United Nations system of organizations. It administers 23 international treaties dealing with different aspects of intellectual property protection. http://www.wipo.int/

XML – eXtensible Modeling Language – A format for structuring data for transfer and exchange independent of its presentation

8.5 Appendix 5 - Typical User Profiles

Profiles provided by the National Information and Library Service (NILS), a joint venture partnership of the Royal Blind Society, Royal Victorian Institute for the Blind and Vision Australia Foundation. These profiles were developed by NILS in the context of planning its Digital Service Delivery Model (DSDM)

Bill

Age: 55

Summary Descriptors:

Educated, affluent, successful, coming-to-terms with his eyesight degeneration

Occupation: Manager (semi-retired)

Bill works for an engineering company. He is a recognized expert in his field, and works part-time as a consultant and manager for his employer. Bill used to be a full-time employee for the company and worked at a senior position, but a few years ago he negotiated to cut down on his hours. Bill had decided he wanted more time to pursue his interests without retiring completely. Whilst Bill would never have recognized it, his gradually failing eyesight was just one of the things making life harder for him at work, and the pressures of full-time employment were becoming a chore.

Technical Competence: Medium

Bill uses a computer as part of his daily work. Whilst he would not consider himself an expert, Bill gets by using the basic features of MS office programs. Whenever he gets stuck, he can normally call on one of the other staff to help him out. Whilst Bill is not an expert in the latest technology, he maintains an interest, buys quality products, and is always keen to see the new gadgets that the other staff sometimes talk about.

Issue: Deteriorating eyesight

As Bill is getting older, he is finding that his eyesight is deteriorating. Whilst for several years, Bill has managed without any formal support he has gradually found himself doing more and more things as a result. First it was just his need to use reading glasses, then he took to using a magnifying glass that he now carries around everywhere. He has gradually found using his computer harder and over time has resorted to using a bigger screen with larger resolutions, but even so he can't spend more than 10 - 15 minutes using his computer comfortably now.

Domestic Context: Married

At home, Bill still lives with his wife. Bill's wife still has good eyesight, and often helps Bill out when he needs it.

Print Needs: Fiction, Non-fiction

Bill is a casual reader of fiction, but also likes to read his daily broadsheet newspaper. Bill is also a keen car enthusiast, and regularly buys magazines about classic cars. Golf is Bill's other passion, and he enjoys meeting his friends for a couple of rounds a week.

History:

About a year ago, Bill was in his local bookstore shopping for the latest bestseller. Whilst Bill was browsing for a book, he found one that had a font size so small that he couldn't read it, even with his reading glasses. Bill was shocked and went to ask the assistant if there was a different version with larger print. The assistant had pointed out that the local library had special books printed in larger print. Bill decided to have a look.

Since then, Bill has been a regular user of the local library's large print books. He has also borrowed a few of the audio books, but he doesn't really like using them. The fact that there are often 10 or 12 cassettes for each book means that he doesn't get around to listening to them. Instead he just uses the large print books.

Whilst Bill is reasonably pleased with the range of fiction available, he gets frustrated at the unavailability of the latest best sellers in large print. Bill has tried buying some of the books for himself, but the lack of distributors and the expensive cost makes it hard. Bill begrudges spending 2 – 3 times for a large print book.

Bill also finds the range of non-fictional resources annoying. He would like to be able to get his golf and car magazines in large print for example. Even his daily newspaper is difficult to read, and yet he cannot easily obtain it in large print.

Bill finds the lack of support at the local library irritating. He can't search the catalogue for material for people with visual impairment. He can't even find a magnifying glass to read the newspaper when he wants.

Bill and the DSDM

At this time, Bill may turn to NILS as a last resort He is likely to be attracted to the DSDM because of his technical expertise and its capacity to provide him with relevant searching and articles in e-Text format (which he can read on screen using Zoom-Text).

He would also be comfortable with, or at least tolerate, synthetic voice for articles. He could afford to pay to download audio books if he had to. Generally he would like to read deeper material, listen to lighter material.

Bill would be reasonably independent in his access to the system, moving quickly to deeper level screens rather than requiring assistance at the interface, after his first introduction to the capabilities of the system.

Giuseppe

Age: 77

Summary Descriptors:

Immigrant to Australia after WWII. Italian speaker with very minimal English.

Occupation: Retired Shop-owner

Giuseppe began life working in the market gardens. After his children were grown, his son opened a small veg shop in their town for Giuseppe to work in out of the fields along with daughter in law at the front serving customers.

Technical Competence: Very low

Giuseppe is not technically literate. He loves listening to the Italian radio and SBS-TV news in Italian. When he had his sight, he subscribed to the Italian language newspaper.

Issue: Macular degeneration and Glaucoma, now fully blind

Giuseppe has lost his sight totally at this stage. He is very inactive because he is essentially house-bound now. His overall health is deteriorating. He has diabetes and high blood pressure.

Domestic Context: Lives alone

Giuseppe lives alone since the death of his wife four years earlier. His son has closed the shop and moved his family to the city for more opportunities for his children. The neighborhood has become less Italian over the years making him feel less engaged with the local community. He still attends mass with the lady next door every Sunday.
He would like to be able to connect with other Italian speaking people.

Print Needs: Italian language news; Soccer information; social service information

Giuseppe is passionate about soccer, and likes to keep update with news about the Italian community. He gets most of it from radio and television audio. He has tried to get Italian books and newspapers in a form he can access, but has yet to find any collection of any size.

History:

Giuseppe had been a very independent man and head of his family. He started his grocery business and was quite proud of the quality of his vegetables, winning prizes every year at the local show. When he started losing his sight he was assured that he could go on living a normal life, but that has not been the case. He feels very cut off from family and friends. When the batteries run out on his portable radio, he can no longer sit in the back garden and listen to the Italian station. He is sad, depressed, and questioning the value of life in general.

Giuseppe and the DSDM:

Guiseppe would not be likely to interact with the online DSDM, but could benefit from an Italian speaking person on the customer service desk. The collection would need to include items in Italian that relate to his interests of soccer and community news.

Jim

Age: 23

Summary Descriptors:

Unemployed following a recent car accident

Occupation: Formerly Employed

Before his accident, Jim was a regular policeman. He has been counselled to consider retraining, but he is concerned that he won't be able to read the training manuals.

Technical Competence: Medium

Before the crash, Jim was a moderate user of technology. Whilst he did not have a computer at home, he used one at work for his job, and regularly used the Internet and email. Because of the many expenses associated with his condition, Jim has not been able to afford any computer technology at home.

Issue: Sudden blindness - accident

Jim has lost his eyesight following a severe car crash two years ago.

Domestic Context: Engaged – living with partner

Jim's girlfriend lives with him, and has done her best to help with Jim's recovery. Once Jim came out of hospital following the accident, a live in carer was provided for a few months to help them both adjust. Both Jim and his fiancé are still learning. He is finding himself very lonely and is worried that he condition may drive away his fiancé.

Print Needs: Fiction, Non-fiction

Since the accident, Jim has sought out information regarding blindness in order to learn as much as possible about blindness and to help with re-organising his life moving forward. He particularly looks for biographies of other people with print impairments, in audio books. His fiancé found none at his local library, but his carer referred him to NILS where he has been able to get some. He also thinks he might like reading crime fiction, since he understands the world of crime.

Jim would like direct contact with others who have experienced his situation. He tries to keep abreast of current affairs, and listens to RPH some times.

History:

Before the accident, Jim had never considered the idea that one day he may be blind. The shock of the accident as well as the discovery that he would be blind for life hit both Jim and his fiancé hard. He has been despairing and angry. He is expecting to get a guide dog shortly to help him improve his independence.

Jim and the DSDM:

Jim would very much like access to the DSDM. However, without computer facilities at home, he will rely on the telephone and physical delivery. Sometimes his fiancé will be able to take him to the local library, or eventually he may be able to get there himself, to use their facilities. He will depend on voice for all forms of interaction. He has high expectations of service quality, and will not be able to pay for any premium service. He has a high quality hi-fi system in his home that includes a CD player.

Joan

Age: 42

Summary Descriptors:

Busy mother, caring, social inclusion very important.

Occupation: Homemaker

Joan stays at home where she looks after the needs of her family.

Technical Competence: Low

Joan isn't technically competent herself, although she is determined to learn. Now that the kids are a bit older, she has decided that she will learn how to use the computer – after all, the rest of her family use it. She is prepared to try different information formats, but is a bit under-confident.

Issue: Blind through diabetes

Joan is blind through diabetes. She officially became blind about 3 years ago, although her eyesight was deteriorating for a while before that.

Domestic Context: Living with family

Joan lives with her husband and three children. Her oldest child is 14 and the youngest is 8. Initially her family have struggled to come to terms with Joan's blindness, but gradually their way of life is stabilising. Joan has also struggled with looking after the children – particularly the youngest – but has learnt new skills to cope with her blindness. Joan has always valued reading and used to always put an effort into reading with her children. She misses being able to do that in the same way now.

Print Needs: Fiction, Non-fiction

Joan likes a good read, and can't put a good book down. For several years Joan has made use of the local library's resources for print impaired people, using both the large print books and more recently the cassette tapes. Joan used to like keeping up with the celebrity gossip, reading Hello magazine, until it became too hard for her to read. Now she relies on her eldest daughter to update her. She would also welcome the chance to obtain new recipes so she can cook some new treats for the family.

History:

Whilst Joan always knew she was at a high risk of blindness, she lived very much in denial. With all her family growing up, Joan didn't have time to contemplate her diminishing eyesight, so eventually when it became a critical problem it still came a little unexpected. However, over the last 3 years, Joan has tried to educate herself to be an expert in diabetes and blindness. In fact she is currently contemplating trying to set-up a support group to help others in a similar position to herself.

Joan and the DSDM:

Joan will access the DSDM from home in a fairly rudimentary way to start with until she masters using her computer. Initially, she will rely on voice (appreciating the DAISY technology), and will require a lot of help, particularly when she starts using her computer. She realises she has lost the capability to browse for material; so would like recommendations on a good read. She is very interested in the virtual book club idea, both for its recommendations and the social experience it provides.

Mary

Age: 16

Summary Descriptors:

Determined, intelligent

Occupation: Student

Mary is a student at a local special needs school.

Technical Competence: Low

Mary uses a communication device to help her speak.

Issue: Cerebral Palsy

Mary has severe cerebral palsy and as a result she has difficulty controlling her movements. Whilst technically her eyesight is good (although she has a squint that requires glasses), Mary finds it difficult to gauge distances which compounds her physical challenges. She cannot walk and uses a motorised wheelchair.

Domestic Context: Living with parents

Mary lives with her parents who care for her when she is at home. During the day, Mary attends a special needs school. Mary also has a carer that helps her with her additional caring needs.

Print Needs: Fiction, Non-fiction

Mary is fiercely independent, so even though she often has to resort to her carer, she always tries tasks for herself first.

Mary likes to read, and uses the audio books from the library. Mary sometimes gets frustrated with the limited range that is available for her needs, and would like to see more information available for her. She would like to be able to read teen magazines like Dolly and is almost ready for Cleo. She hears her friends talking about them and would like to be able to participate in the fun. Like any teenager, she is infatuated with David Beckham and her favourite pop-singer is Justin Timberlake.

Mary and the DSDM

As it stands, Mary views NILS as an “old people’s library”, with a limited collection for her. She has tried computers in her school, so is willing to work with someone to try online so she can be independent in her information activities.

She lacks the money for new adaptive devices, iPod etc., so would rely on school equipment. She has a tape player that has been part of the family stereo.

Peter

Age: 66

Summary Descriptors:

Retired professional, engaged in community volunteer activities

Occupation: Retired Professional

Peter was a professional all his working life, working as a human resources manager at a major manufacturing company. Even now he is involved in volunteer activities in his community. He is past president of the Rotary Club and still chairs the annual fund raiser for the student exchange program.

Technical Competence: High

Peter is quite comfortable with all forms of Braille output and creation. He is able to note take on a portable Brailler fast. He needs notes from previous meetings, so is quite organised with his materials.
Peter has a computer at home adapted for Braille.

Issue: Blind from birth – Braille reader/writer

Peter relies on Braille information and prefers embossed materials because they have been proofread for accuracy. He will use other forms of Braille output if it is expedient to do so. He needs portability because of his community work. He is impatient with audio tapes, preferring Braille text that he can review easily.

Domestic Context: Married, 'empty nester'

Mrs. Peter is sighted. She maintains the household, but is quite comfortable with Peter's ability to look after himself.

Print Needs: Non-fiction, Current Affairs, Special interest magazines and newspapers

Peter is interested in current affairs in his local community as well as state, national and international events. His hobbies include cricket and running, so he wants to keep up on the latest tests and athletic events, as well as tracking the statistics for his local cricket side. He gets his Rotarian each month, delayed after its conversion to Braille.

Peter plays the flute and wants Braille music.

History:

Peter has always been an advocate for Braille services and equity for people with a visual impairment or any other disability. He is well known to policy makers in Canberra and in his state, serving on several committees for equal opportunity services.

Peter and the DSDM:

Peter would like to interact with the DSDM using his keyboard or voice recognition for input, but receive instructions and information back in an audio format. For the print resources that he requires, for speed he will often be happy to receive e-text that he can print on his Braille printer - although on some occasions he would prefer to receive embossed materials that have been proofread . He wants the DSDM to point to accessible current events websites that he can read on his own.

Phyllis

Age: 72

Summary Descriptors:

Contented

Occupation: Volunteer

Phyllis spends much of her time volunteering for a local charity.

Technical Competence: Low

Phyllis is not technically competent. Whilst she had a computer that her son gave her, and tried to teach her, she never really learnt how to use it - and whenever she tried she always got into trouble.

Issue: Degenerating Eyesight

Phyllis has deteriorating eyesight that has been caused by glaucoma.

Domestic Context: Married, living in retirement village

Phyllis has been happily married for 50 years, although about 5 years ago her husband suffered a heart attack and since then Phyllis and her husband have lived in a retirement village. Whilst initially, they were both a little reluctant to move, the fact that their family were not close and the pleasant environment that it provided persuaded them to give it a go. Phyllis enjoys living there as she feels safe, enjoys the companionship of the other residents, and likes the support she gets with both her own care as well as the provision of care for her husband.

Print Needs: Fiction

Phyllis' print needs are mainly fiction. She also enjoys reading biographies.

Phyllis also plays the piano, and likes to learn new tunes.

History:

After 50 years of marriage, Phyllis and her husband still love each other as much as they did when they first married. They both have their respective physical challenges, but they try to support each other as much as possible and still enjoy simple pleasures together. Phyllis' husband will often read to her, or help her to choose an audiocassette book from the library. In return, Phyllis will play the piano for her husband.

Phyllis and the DSDM:

Phyllis wants a simple form of audio book. She is not seeking social interaction.

Thomas

Age: 21

Summary Descriptors:

Intelligent, independent, ambitious

Occupation: Student

Thomas is a student in his second year of a Bachelor's degree in physics. Thomas is studying at a local university and lives at home with his parents.

Technical Competence: High

Thomas is a highly competent user of technology. Just like most of his fellow students, Thomas embraces technology to support both his academic studies as well as their lifestyles. However, over and above his peers, Thomas recognises the additional benefits that technology provides him to support a better quality of life. Thomas uses a computer, and regularly uses screen readers to translate textual information on his screen into speech. However, for some things, Thomas prefers more traditional tools, such as his Braille typewriter for making lecture notes.

Issue: Born Blind

Thomas was born blind with a condition called coloboma – where his eyes did not develop properly. As such he is completely blind.

Domestic Context: Single, living at home

Thomas is living at home with his parents and his younger brother. As with many people his age, he is looking forward to getting a good job when he leaves University and getting a place of his own. Given that Thomas has been blind since birth, his family have adapted to his disability and these days rarely even give thought to his disability within their home.

Print Needs: Academic

Given Thomas' current studies, the bulk of his needs relates to the availability of academic information for his coursework. Thomas is also provided with support from the University and has access to university staff that can help him with any particular needs related to his work. Thomas tries not to use them much except for some specific

challenges he has with interpreting diagrams and complex formulae, and manages most of his work without support. Thomas doesn't have much time to read other literature as he is too busy enjoying the social side of his studies. Though on occasions when he has a quiet moment, Thomas likes to indulge in his hobby – astronomy. Since a boy, Thomas has always had a passion for astronomy.

History:

Thomas has always been blind. Whilst he initially struggled at school, Thomas persevered and succeeded in getting good qualifications to allow him to study at university. Thomas has a good sense of humour, and sometimes laughs at the attitudes people can have of him and the assumptions they have. "...as an example" he says "people sometimes wonder how I know which bus to catch home but it's simple – I just ask!" If Thomas could have one wish, it would be to see the stars that he has imagined - he has always been fascinated by the universe.

Thomas and the DSDM:

Thomas might use the production aspect of the DSDM for study materials, seeking transformation through his Disability Liaison Officer if there is time. He will accept lower quality in order to get necessary material. He can use etext, Braille, and prefers them over audio.

He might use NILS's web pages because of their accessibility. He needs DAISY with the text files, not DAISY and audio, so that he can cut/paste info into his assignments such as quotations and bibliographic information in proper format. He also is interested in the electronic journals available from NILS.

Virginia

Age: 78

Summary Descriptors:

Kind grandmother, family focused, widowed, lives in rural area.

Occupation: Retired

Virginia has not worked for many years. In her youth Virginia worked as a shop assistant in a haberdashery store and still keeps in touch with some of the friends she made whilst working there.

Technical Competence: Low

Virginia is not technically competent at all. She does not use a computer.

Issue: Macular degeneration and Arthritis

Virginia has lost nearly all her sight and is suffering from arthritis in her hands, which has gradually worsened over the years. Her condition makes it difficult to do anything with her hands. She thinks Macular Degeneration is worse than getting cancer because of its effect on her sight which reduces her ability to get to the village.

Domestic Context: Widowed, living alone

Virginia lost her husband 15 years ago. Some of her family live nearby, and regularly come to visit or pick her up for Sunday lunch when they can.

Print Needs: Fiction, Non-fiction

Virginia's main information needs are for fictional books and local information (which she gets through a talking newspaper). There is no in situ local library, the area being serviced by a mobile library with limited audio stocks. She would like to read the monthly garden magazine from the ABC.

Virginia orders audio books (4 track) from NILS, but is frustrated by the time it takes Australia Post to deliver, and the fact that she has to go and pick things up if she is not there when they come... She has difficulties with the buttons on the Talking Book

Machine. If it breaks, she has to send it back to NILS for repair, requiring another trip to the Post Office and another break in listening to books.

History:

Virginia is a kind and worldly lady, who tries to do her bit for the world around her despite her failing health. She is a regular churchgoer and is always first in line to offer to bake a cake for the village fete. In the past, Virginia liked to do embroidery, but these days she finds that the arthritis in her fingers gives her too much pain, so she has given up. She still likes to cook though, and much to the delight of her friends, tries to bake at least one cake a week. She also still likes to admire other people's handywork.

She knows the service people at NILS by heart from her frequent telephone contacts. She sends them Christmas cards.

Virginia and the DSDM:

Virginia will have issues with call costs to the DSDM support desk. She doesn't want to give up her Talking Book Machine and is nervous about changing to CDs or other formats. She has heard the word 'digital' but doesn't know what it means.