Sharing The Nation’s Knowledge And Cultural Heritage Through PERDANA (National Digital Library System): Issues And Challenges

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Abstract
This paper is reproduced with slight amendments to a paper presented at the International Conference on Changes and Challenges of Public Library Services to Bridge the Digital Divide held in The Gurney, Penang from 23-25 June 2003. It describes how Information and Communication Technology (ICT) provides libraries the opportunity to improve collection management and public access to these collections through digital projects. The term ‘digital libraries’ is described as those aspects of existing library services that have a significant digital component which has also been adopted by the Malaysian Digital Library System (PERDANA). With the advent of a new information management and delivery system, there is a need to build systems to organise and manage vast amount of information, ensure survivability of the infrastructure and manage intellectual property rights. Librarians are expected to understand the digital project cycle, know how to plan digital products and organise information as well as knowing how to deliver information and materials effectively. All digital projects must address challenges ranging from improvement of data access methods, reliability and bandwidth, better audio and video streaming to scalable software support and high performance computing.

1. Introduction

Information technology is one of the key factors driving progress in the 21st century. It changes the way we live, learn, work and play. Advances in computing and communications technology has and will continue to create new infrastructure for business, scientific research, and social interaction. This expanding infrastructure provides new tools not only for communication but also for acquiring knowledge and insight from information. Digital projects provide new and exciting opportunities for libraries to make their collections more accessible to researchers and to engage the public more directly and more compellingly with the documentary heritage of their communities and state. The Information and Communication Technology (ICT) provides an exceptional tool for libraries in improving collection management and public access to these collections. Currently, some materials are in great demand, but, because of their value and condition, are endangered by unrestricted use. Many more remain inaccessible to public because of their inadequate description or absence of bibliographic finding aids due to the difficulties in cataloguing and classifying these materials. The most effective way to describe such documents is to show them physically. This often results in irreplaceable material deteriorates, sizable sections of library materials under utilized and potent historical information sits inaccessible to scholars, educators, community leaders and the general public at large.

2. Application: A National Digital Library

Generally speaking, a digital library would integrate all electronic knowledge sources, including books, journals, music, films, and informal “documents”. Harrod 1 in his glossary defines “Digital Libraries” as an umbrella term “… for conceptual models of libraries of the future that focus on the provision of services associated almost totally with digital content” or “…used to describe those aspects of existing library services that have a significant digital component. Also referred to as electronic library.”

The Malaysian National Digital Library System or PERDANA is a collaborative project among libraries in Malaysia to create a critical mass of digitally held documents (texts, still images, moving images, sound and any combination of these) which is made available on demand, within an organized and structured framework to a user anywhere and at any time. PERDANA is a cooperative project developed by the National Library of Malaysia, academic libraries, State Public Library Corporations, special libraries, Telekom Malaysia and the Multimedia Development Corporation (MDC). This initiative first started in 1999 with the establishment of a Main Committee and a Working Committee comprising of representations from the National Library of Malaysia, major academic libraries in the country and MDC. Since the official launching of its pilot portal by the Rt. Honourable Dato' Seri Abdullah Ahmad Badawi, the Deputy Prime Minister on 27 Jun 2000, the first phase of the implementation of PERDANA has kicked off on a modest scale.

3. Objectives Of Perdana
PERDANA was initiated with the following objectives, namely:

(i) To provide access to information to all Malaysians for the purpose of life long learning.
(ii) To realize the Information for All Programme.
(iii) To facilitate e-learning and the acculturation of knowledge.
(iv) To enrich local content in digital format for community and global access.
(v) To build capacities and expertise in the creation and generation of digital information sources.

4. Implementation Strategies
Since the inception of PERDANA, various strategies had been identified for its implementation between the periods 1999 - 2020. Among others, the strategies include:

- Establishment of a Main Committee and a Working Committee
- A continuous effort in local content development
- Feasibility studies on search engine development
- Continuous Human Resource Development
- Application of smart cards
- Subscription to selected commercial electronic databases
- Evaluation and Research
- Application for funds

A number of these strategies have been started at varying degree of development. This includes strongly the local content development and subscription to selected commercial electronic databases on a consortium basis. One consortia is among university libraries for the subscription of ProQuest Education Complete; EbscoHost Business Source Premier, and Science Direct and the other which is coordinated by the National Library of Malaysia involving about 72 libraries from the special libraries; state public libraries and academic libraries under the Ministry of Education. The commercial database includes ProQuest Learning and Information Services; Ebsco Information Services and CLJ Network.

5. The Way Forward
In mid 2002, the management of the PERDANA project was handed over to the National Library of Malaysia by MDC. A special approval was obtained from the relevant central agencies for an appointment of a local consultant company in preparing a Blueprint for the second phase for the implementation of PERDANA. Based on the Consultancy Contract, the scope of work by the consultant covers the following:

(i) Conduct current situation assessment of human resources and organization, technology, digital content development, critical processes and legal framework;
(ii) Revisit and review the existing strategies and recommend revised strategic direction; and recommend improvements to the current situation;
(iii) Develop an overall Implementation Plan for the implementation of PERDANA.

At the time of writing this article, the Strategic Recommendations and Implementation Plan for PERDANA has been completed and
submitted to the National Library of Malaysia. In the report, a broad implementation plan based on 18 months period was recommended. The main stages for the implementation of PERDANA consists of Project Initiation; Requirement Analysis; and development. These main stages of implementation shall be managed and supported by a structured and well-planned Programme Management activities. Change Management and Marketing shall be the soft elements that will provide support throughout the whole development and deployment of PERDANA, whilst, the maintenance of system and content shall be a continuous activity after the deployment.

6. Building And Sharing The Nation's Knowledge And Cultural Heritage Through PERDANA- The Challenges

Traditionally, libraries have been linked to their role in connecting people with information as well as to archive all sorts of information and resources. This task has been fulfilled diligently in its traditional physical way of information delivery. However, affirmative action as outlined in The Third Outline Perspective Plan 2001 – 2010 requires that local development be given a strong push. The need to preserve Malaysia’s history and heritage and to exploit the local knowledge embedded in communities will be duly recognised. Incentives will be provided to institutions of learning to produce local content in local languages. Given this scenario, PERDANA can be the platform towards realising the aspirations of the Government. While the importance of information technology to the future of the economy and nation is very clear, it is not feasible for libraries (more so the National Library of Malaysia as the driver for PERDANA) to assume responsibility associated with the full fledged implementation of PERDANA. Although there is a considerable degree of success in some of the digital initiatives that have been implemented either independently or collaboratively with other libraries/institutions, the government must expand its role in leading long-term funding. Libraries cannot rely on collaborations with private sector to fund the needed research and development because they will necessarily focus, in view of economic realities, on short-term projects. The private sector cannot and will not invest in solving problems of importance to society as a whole unless investments make sense from a business perspective.

Advances in information technology have the potential to significantly enhance the flow of information, and thus strengthen institutions of our society. This flow of information must, however, not only be ‘free’ but ‘fair’. Therefore, we must understand the potential pitfalls, and the safeguards we must put in place to achieve both a free and fair flow of information. The information revolution puts a premium on basic knowledge, not just information technology literacy, but basic skills in reading, writing, communications, and teamwork. Life long learning is becoming the pursuit for our workforce and the general public. Therefore, the nation must ensure that access to the benefits of the information infrastructure are available to everyone in the country: to those living in poor inner town neighbourhoods and ethnic group reservations, as well as in well-to-do suburbs and those marginalised groups facing daily challenges from disabilities. PERDANA can be used to bridge these gaps in our society. With this new definition in information delivery, information management services require that we build systems to organize and manage vast amounts of information. Broadly speaking, the technologies that must be considered include those for:

- Managing large data and thousands of requests for information each day.
- Managing text, semi-structured information, relational data, multimedia data, and active data.
- Translating between information representations.
- Discovering and monitoring resources.
- Analysing, summarising, integrating, and fusing information from diverse heterogeneous sources.
- Presenting data in meaningful ways.
- Tracking the lineage or provenance of information, so users can know the sources of original data and how information was derived.
- Tracking and controlling access to information, protecting privacy, and charging for information where appropriate.
Apart from the above considerations, it is equally crucial to ensure the survivability of the infrastructure in the face of malicious attacks or viruses, equipment or software failures, and overload. Survivability means that services will be available when needed and information will be delivered in a timely fashion. Thus, services must operate correctly and the information delivered of high quality. Survivability technologies include:

- Authentication and security mechanisms for a large, heterogeneous, and evolving infrastructure.
- Mechanisms for detecting system intrusion, and information and software corruption.
- Mechanisms for detecting, mitigating, responding to, and recovering from, or preventing, human error in the creation and use of infrastructure.
- Mechanisms for assuring information quality.
- Scalable information and service replication strategies.
- Mechanisms for monitoring services.
- Repositories for guaranteed long-term preservation of information.

Other challenges to be addressed in digital library development such as PERDANA include:

- Mechanisms for protecting and managing intellectual property rights.
- Strategies for managing the data that describe the library’s holdings and mechanisms for translating document formats.
- Technologies for multi-lingual interoperability, allowing the users to access information in different languages.
- Interfaces that let users visualize and understand the wealth of available information.
- Digital journals with on-line collaborative authoring, submission, reviews publishing, and reader annotation.
- Technologies for organizing large bodies of diverse knowledge (for example, clustering, summarization, and classification).
- Technologies for efficiently digitizing paper documents.

7. The Librarian’s Essential Role

Having been at the forefront of computer-based information management, librarians should be well equipped to implement this expanding graphic capability of digital technology. Digital technology promises to facilitate the entire spectrum of their tasks, administrative, cataloguing, presentation and public service. Ideally, every library under PERDANA, large or small, should develop a plan for digital projects and get started by establishing a line for digital projects in its annual budget, no matter how modest. Technical and funding support should also be solicited and partnership forged for collaboration. Librarians have the responsibility to:

I. Understand The Digital Project Cycle

Essentially, a digital project converts printed, manuscripts, and pictorial information into electronic images for use in computer-based applications. This contributes to the content development for a National Digital Library Project as pursued by PERDANA. However, before embarking on a digital project, decisions have to be made by librarians on the following issues:

(i) Creating computer facsimiles or images of materials

The conversion into electronic images can be done in several ways and with varying levels of precision. The most basic device is the scanner, preferably of high resolution, which creates an electronic image of a document or picture in much the same way as a photocopier machine does, but instead, the copy image is viewable on a computer monitor. There are also digital cameras that record images as computer records. Digital cameras create high-resolution images than scanners, and are more desirable for pictorial materials. Apart from this, a document can also be re-typed or re-keyed to create a computer text-file.

(ii) Organizing materials and providing finding aids.

Pictures, documents or collection of materials that are digitized, must be described by a finding aid or metadata.
Like a conventional library catalogue entry, metadata provides both administrative control functions for the library and finding aids for users. And like a bibliography, the metadata can both provide users with a listing on materials relevant to a search, as well as retrieve digital images from that listing. The greatest advantage of re-keying or encoding the texts of especially historic documents and manuscripts is that keyword searches can link users to actual content within, rather than just refer them to a title, subject heading, or finding aid.

(iii) Designing the presentation
Information on digitized and catalogued collection needs to be presented in a coherent and meaningful fashion so as users can navigate and retrieve information efficiently and effectively. The design of most search and retrieval software is based on that of conventional finding aids, such as indexes and catalogues. However, the graphic capabilities of current computer software support the creation of navigational tools, exhibits, and interactive educational modules.

(iv) Delivering a product
Goals of the delivery of materials, whether on the web or on the work stations on-site, should be established. The digital product could provide an extensive catalogue of a collection and include many images and encoded texts, or it could present a selective exhibit of the treasures within a collection to entice researchers to libraries for more services. Spin-off products such as on a CD-ROM can also be done for promotion and marketing.

II. Know How To Plan Digital Projects

Briefly, a digital project is undertaken with following purposes:

- To provide stimulating, innovative environment for users.
- To link local information to global systems.

However, it is very important that librarians have proper planning before embarking on digital projects. In selecting or assembling materials for a digital project, the following considerations are suggested:

(i) Survey and evaluate the intellectual or interpretive value of collections.
In conducting a survey and evaluation of one's library collections, it is necessary to take a complete and concentrated look at all the collections and determine what kinds of information are represented in each of them. Evaluating intellectual content means having to look in terms of its applicability to electronic applications. The descriptions and prioritisations will be very helpful in the selection process. Selecting collections and materials can be approached in two ways, namely:

- Entire collection where funds are available and staff allocated to undertake the project
- Planned to conform to a limited budget

Whatever the approach may be, it is necessary to find out if other institutions have already digitized, or planning to digitize the same or similar materials to avoid duplication and wastage of resources.

(ii) Quantify the size of collections.
The size of the collections and their components plays a crucial role in planning digital projects because the fundamental integrity of any cataloguing project relies on the confidence that the material included represents a complete set of information at some definable level (which ranges from somewhere between all that you have to all that there is). Since there is always be funding and time constraints on digital projects, the scope of a project should always be planned around how much digitization the budget allows for. The physical size of materials is also an important piece of information in planning digital projects because of the variety of sizes that different scanning tools can accommodate. The size of the...
original material determines the quality of the digital image, particularly if there is a need for intermediate reductive copies, which reduce the sharpness and fidelity of the original. A distinction needs to be made between materials conforming to standard scanner or camera formats and those that are oversized and will require special treatment. It is only logical that the more complex the process and the more sophisticated the needed technology, the more costly the digital project becomes.

(iii) **Assess the suitability of materials for digitization.**
Some materials lend itself to digitization and online access, and others do not. In view of this, some initial choices need to be made that will prioritize some material types, subject areas, and collections. Inevitably the best and most desirable collections or well-known will be selected. This is why it is important to have a survey of the collections prior to planning the digital project. It is important too, to assess and determine the extent to which an object or its information value will be represented through digitization. Some practical advantage needs to be identified such as:

- Does it provide access to fragile documents that cannot be viewed in any other way? (as long as they are readable both in reality and in facsimile)?
- Does it allow for searching important texts in a way not available before?
- Does it assemble texts or views from a number of libraries in a single source?
- Does it create a digital archive that will contribute images and data for other research and educational applications?

(iv) **Consider the physical condition of the materials.**
The physical condition of materials is a very important consideration when planning a digital project. One needs to evaluate how much damage will be caused through the handling required to digitize these materials, and whether it is worth the risk. Digitization should not be considered an alternative to responsible collection care; that is, a digital image is not an appropriate replacement for a deteriorating original.

III. **Know How To Organize Information And Deliver Materials Effectively**

Digital projects are about organizing information in systematic and hierarchical ways. While the organization of digitized materials follows standard database format, it also operates in an information system customized for the particular intellectual content it contains and the unique uses to which it will be applied. Once pictorial and text materials are digitized, these graphic displays are linked to the catalogue to associate each image to the larger collection of materials and to link users with the additional thematic and contextual data.

As has been mentioned earlier, the delivery of materials whether on the web or at computer workstations on-site, should be established earlier. Digitized projects bring together specialized collections and research tools for a diverse audience, and they should be responsive to the needs of individuals, communities, and institutions. As the digitized collections mature, web presentation should be able to create an online research environment that will support both novice and expert users, enable users to tailor collections to their own needs and interests, and support collaboration with colleagues.

The functionality of the final product like keyword searching, field searching, browsing, selecting, and annotating, should support the overall goals and be reflected in the project’s digitization and the bibliographic components. For instance, text must be encoded in SGML to be searchable, individual images must be accompanied by some descriptive data if they are to be easily identified and all materials must be related to broad subject categories if the collections are to be browse able.

**Conclusion**

The Information and Communication Technology is transforming the way we communicate and deal with information. The many challenges ranging from improving data access methods, reliability and bandwidth, better audio and video streaming to scalable software support and high-performance computing must be addressed. Like any other
National Digital Library Projects, these are the challenges for PERDANA. If the results are to be available when needed, the Government and librarians must act now to invigorate the long-term investment. The computer and ICT infrastructure in all libraries throughout the country, which are falling behind the state of the art must be addressed and vitalized. The synergy and enthusiasm of the library professionals in up-keeping their interest and commitment to spur development of the library services in the country can be put to good use in pushing PERDANA forward.

References:


List Of Websites

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  http://lcweb2.loc.gov/ammem
  (American Memory Digital Project)

- Washington Research Library Consortium
  http://www.wrlc.org
  (Digital Library System ALADIN)

- Museum of Fine Arts Boston
  http://www.mfa.org/cameo
  (A free information resource for art-related professions)

- Columbia University Libraries.
  http://www.columbia.edu/cu/libraries/digital/criteria.htm
  (Outlines the collection development, use, and value issues Columbia uses in assessing and developing digital projects)

- OCLC. Dublin Core Metadata
  http://purl.oclc.org.metadata/dublin