

# *Delivering Electronic Resources at a Caribbean Academic Library*

FRANK SOODEEN, JR

The University of the West Indies, St. Augustine Campus, Trinidad and Tobago

---

This article examines the options being employed at an academic library in the Caribbean, namely the University of the West Indies, St. Augustine Campus, Trinidad and Tobago, to deliver, and enhance access to, electronic resources via the Internet. Specifically, the focus is on some of the issues related to establishing the appropriate infrastructure for providing these services and the provision of details on the actual interface design. The methodology used for the study phase included a review of relevant documentation, and interviews with participants in collection development

and access provision activities as well as subject specialist librarians. Evaluation of the end user Web interface was also undertaken. Using a combination of middleware scripts in Cold Fusion, a backend database built on MySQL, this library has been able to provide a user interface for easily identifying and accessing the electronic resources relevant to the research needs of its clientele. Despite working with limited resources, this developing country academic library is moving in the right direction as far as managing its digital resources is concerned.

---

## *Introduction*

This article describes a project at The University of the West Indies (UWI) Campus Libraries in St. Augustine, Trinidad and Tobago that was aimed at providing library users with a Web interface to access those electronic information resources that have been selected, created or collected by the libraries on their behalf. Specifically, the paper looks at some of the issues that were under consideration in the discussions leading up to the establishment of the technical infrastructure. Some details on the Web interface design that evolved during the course of the project are also provided. The methodology used for the study phase included a review of relevant documentation, and interviews with participants in collection development and access provision activities, as well as subject specialist librarians, at the Campus Libraries.

### *The campus libraries at UWI, Trinidad and Tobago*

The St. Augustine Campus of The UWI is based in Trinidad and Tobago, the twin island republic

in the southernmost region of the Caribbean. At this campus the primary repository and gateway to digital and print information in support of learning, research and intellectual stimulation, has for many years been the Campus Libraries. The St. Augustine Campus Libraries comprise five libraries – the Main Library, the Medical Sciences Library, the School of Education Library, the Institute of International Relations Library, and the Seismic Research Unit Library. Together these libraries serve 12,000 students and approximately 1,000 staff members of the university. The focus of this paper will, however, be primarily on the Main Library (ML), and the effort that is being made at this library to satisfy the growing need of the user population for access to an expanding information resource base that is becoming increasingly electronic in format.

### *Establishing a framework for the management of electronic resources at the main library*

Undoubtedly, over the past five years, the ML has been constantly challenged to embrace new ways of optimizing access to electronic resources and to

Frank Soodeen, Jr. is Librarian III (Systems) at the Main Library of the University of the West Indies, St. Augustine Campus, Trinidad and Tobago. Ph: (868) 662 2002 Ext 2215. Email: fsoodeen@library.uwi.tt

explore ways to fit new technologies and innovations into traditional library structures and practices. Like other universities, the ML has sought to develop the wherewithal to provide Web access to commercial "electronica", i.e. abstracting/indexing databases, full text journals, catalogues and websites. At the same time the ML has always been cognizant of the fact that the ultimate value of digital resources to the user will depend upon the quality of the content, the organization and the data management systems that it can bring to bear. Beyond the purchased electronic resources, the ML has begun to digitize the unique holdings and primary sources held in its West Indiana and Special Collections Division, and it is envisaged that access to these visual images and multimedia will become increasingly crucial to comprehensive research in all domains at the UWI.

Whatever the origin of these electronic resources, a mandate of the ML is to ensure that they are effectively organized and made available to the library users through a system that is not cumbersome to search and use. Closely coupled with providing the infrastructure for facilitating this type of access, is the need to ensure that the users are trained to retrieve and manipulate these resources. The ML has therefore in parallel concentrated on delivering "new" information literacy and library instruction programmes designed to furnish the clients with this kind of grounding. The Library administration is well aware that it must provide the tools and skills to ensure that the users can navigate to and through the electronic resources as effectively as possible and become e-literate in the bargain.

As a natural corollary to these developments, the library has invested in the design and establishment of the physical spaces and infrastructure for enhancing access to electronic resources within the Library. One of the earlier incarnations of a facility to provide access to electronic resources at the ML was The Information Centre (TIC), a computing services laboratory comprising eight workstations with access to the Internet and the Library's OPAC. This was opened in 2000 and was followed on by expansion to a full service information commons (comprising two facilities, i.e. the St. Augustine Research and Reference Services and the User Education Centre) by September 2002. Static Web pages were created, listing and providing hotlinks to the few academic and

research databases that the Library subscribed to at the time. A user study conducted just prior to the launch of TIC, however, indicated that few users knew of the existence of these databases in the first instance. As additional electronic resources were procured as per the dictates of the collection development policy, an upshot was that there now had to be a way for alerting users to the existence of individual electronic journal titles and aggregated services to ensure that best and optimal use was being made of the subscriptions. This was certainly one of the factors that spelt the need for a stronger and specifically focused information literacy effort from the ML. The transition from a mainly print-based resource scenario to a mix of print and electronic-based collections also created a forum for the librarians at the ML to engage in useful dialogue about the associated issues.

Among the librarians at the ML, there continues to be differing opinions on how the electronic resources should be inventoried and organized. Some librarians are convinced that the ML should not actually catalogue individual electronic items, the perception being that it is too time consuming, costly and unnecessary to do. The point has been made that the provision of a catalogue entry to remote electronic resources is not part of the catalogue's scope or function. Traditionally, the catalogue has provided bibliographic surrogates for whole items that the library owns. Other bibliographic tools such as indexes and bibliographies provided access to articles and parts of items, and to remote documents, which the library has further facilitated through document delivery services. Still, other members of the ML, albeit in the minority, believe that the OPAC should be a catchall for all resources, with cataloguers adding websites, e-journals and indexes to the catalogue as part of their workflow and remit.

For the most part then, the latter course seems to be the one that is more resisted by the professional body in the ML. The librarians prefer to envisage that the OPAC will link to a search engine that is specific to e-resources, or that a mechanism for searching the catalogue and e-resources listings through one federated search system can be implemented. Kovacs (2000) too assumes that the electronic collection will be built on a Web page separate from the library's catalogue, and, while this concept is not necessarily a detriment to the information available in his book, it does to some

extent perpetuate the notion that online resources are not worthy of cataloguing.

It is difficult to say where the ML will go with this over the longer term. The option of adopting a tool to perform federated searching across the catalogue and databases of other resources is certainly in the mix, and a current project to replace the library's current integrated library system (ILS) may possibly engender such a capacity in the not too distant future. The idea of a number of information sources "talking" to each other is probably the best compromise for a library such as the ML. Given the range of types of e-resources as well as their distributed location, it is probably more useful to aim for a system that promotes interoperability between the OPAC and the other catalogues, than for a centralized node. The continued use of Z39.50 as an intermediary between databases and the increasing importance of Dublin Core and OAI (Open Archives Initiative) standards do provide significant support for this approach.

With respect to providing users access to the electronic resources acquired by the ML, the library has for some time previously gone in the direction of the creation of separate static Web lists rather than an entry in the catalogue. These page listings became a fixture on the Library's website, but a consequence of this approach is that the users must then be made aware that they need to look at the Web lists as well as the local catalogue to obtain a more complete view of the library's collections. This has not been always apparent to the broad base of the ML's users and the design of any Web interface for e-resources would therefore have to consider how this "two-step" information gathering process could be as seamless or, at the very least, as intuitive as possible.

### *The need for a finding aid for electronic resources*

A review of the literature and academic library websites indicates that many libraries maintain electronic finding aids that consist of lists of electronic databases and e-journals on their websites apart from the main online catalogue. For example, the experience at Durham University Library indicated that traditional static pages were becoming increasingly unmanageable and that the institution had to find a way to create a dynamic data-

base-driven website with Web pages that would allow the user to locate the electronic resources they needed (Brabban and Kobasa 2001). These e-journal locaters work as good navigational tools for researchers who want a quick way to get to an e-journal without having to go to the online catalogue. As the number of resources grows exponentially, these lists of e-journals are often generated by database-driven applications that also offer significant information about each e-journal, including the dates of coverage and description of the types of material available, in addition to the title and URL. Like the online catalogue, however, this approach takes the researcher to the entire e-journal itself, and not to the individual article which would be perhaps the most ideal situation for the researcher. This approach also takes away from the concept of a single point of access for users (a long term goal of the libraries stated in the strategic plan to 2007) to locate all resources that a library has to offer, but at the same time allows for a compromise that distributes the effort of maintaining the growing collections while also improving access.

By the start of the academic year 2004-2005, the Web development team at the Main Library became aware of the fact that it was becoming impossible to maintain efficiently the thousands of Web pages and files that were then characteristic of the library's static website. At the same time the team was also aware that the library website was becoming an important portal to the users for accessing electronic resources such as the past exam papers, and the limited number of academic and research databases that the library subscribed to on an annual basis. The library had also begun to acquire e-journals in increasing numbers, and the earlier static html lists were becoming much too long to maintain on an ongoing basis. Additionally, as pointed out by Breeding (2004), as a library strives to increase its investment in electronic information, it remains vital that the institution provides "convenient ways for users to find the information they need within those resources." At the Main Library in St. Augustine, the subject divisional or liaison librarians felt that it was important for them to identify and make easily available to their clients key Internet resources that would assist tremendously in the areas of research and scholarship on the campus. It became immediately apparent that a solution that

categorized e-resources for the clients and which could be dynamically delivered to them on the basis of their research needs and subject discipline, required development. The results of numerous surveys indicating that students generally use the Web more than traditional library sources to find information (Huggard 2004) gave the necessary momentum to the Main Library to find an appropriate application.

It was decided therefore that a new resource, the E-Resources Finder, would be developed on the basis of three main categories, those being "Indexes and Databases", "E-Journals", and "Selected Internet Resources". The Library's website would be used to serve up this E-Resources Finder, which would be run on the basis of a back-end database with an application server executing middleware scripts and delivering search results to the clients.

### *Selection of the technology*

There are many choices available now to libraries wishing to create Web-accessible databases. For the Campus Libraries, factors such as resident skills of staff and budgetary constraints had to be balanced with finding a solution that was also robust, scalable, reliable and relatively fast.

As stated before, earlier delivery of e-resources comprised mainly static Web pages coded in html and later there were some attempts to introduce dynamic content using JavaScript and DHTML. For the E-Resources Finder, it was decided that there was need for a backend database interacting with the client through a middleware package. The primary components of the computing and application platform selected at the ML for deploying the E-Resources Finder were Windows 2000 with Internet Information Server, Dreamweaver, Cold Fusion Server, Cold Fusion Studio and MS Access. The library purchased Cold Fusion as the application server because of its low learning curve. Cold Fusion tags are similar to HTML tags, the code can be integrated into an HTML page and, as a security plus, the code is executed on the server side, delivering plain HTML to the browser. Using Cold Fusion, the process of providing database access on the Web is fairly straightforward and can be accomplished simply with SQL statements and without the need for an excessively complicated script.

From an architectural point of view, the important part is the role that Cold Fusion plays in enabling access from the client workstation to the server reference database. The Cold Fusion server processes database requests through the use of templates. The templates are similar to an HTML file with a ".cfm" extension and special CF (cold fusion) tags which the server recognizes while ignoring the regular HTML statements. Using these tags and the SQL query language, one is able quite easily to design Web pages that will create database records or alternatively query the database to retrieve information based on a user request. As a result of a database query, output is passed back to the Web server from the Cold Fusion server in order to create a dynamic Web page.

Initial ideas of using Access as the database were soon quelled. It was felt that despite the comparatively low number of resources, the database should be planned to take care of projected increases and to allow for multiple connections. The exorbitant cost of most robust proprietary database software packages was the main reason that the choice was made to look at open source solutions to provide for the backend database. Having already developed a prototype past exams papers database in MySQL, the Web team felt that this was the way to go for the e-resources backend as well.

It is important to note that the library manages its own Web server in house and that it has its own registered domain, <http://www.mainlib.uwi.tt>. In some instances attempts are being made to use Active Server Pages (ASP) and dot.net technology to run some of the other online applications that the Campus Libraries are developing. Examples of such applications are the ones being developed to deliver past exam papers and e-reserves to the student population. In exploring and experimenting with these various options, the library staff is developing a useful skills set and this augers well for the further integration of ICT in the ML.

### *Interface design*

Three basic Web-enabled functions are available: 1) create/modify the reference database, 2) search/browse the reference database, and 3) retrieve/download the digital document when available (e.g. scanned text document, image).

Figure 1: Home page of the Academic and Research Databases (<http://www.mainlib.uwi.tt/eresearchtools/onlinedatabaseupload/onlineindexes.htm>) [May 2007]



### Search/browse

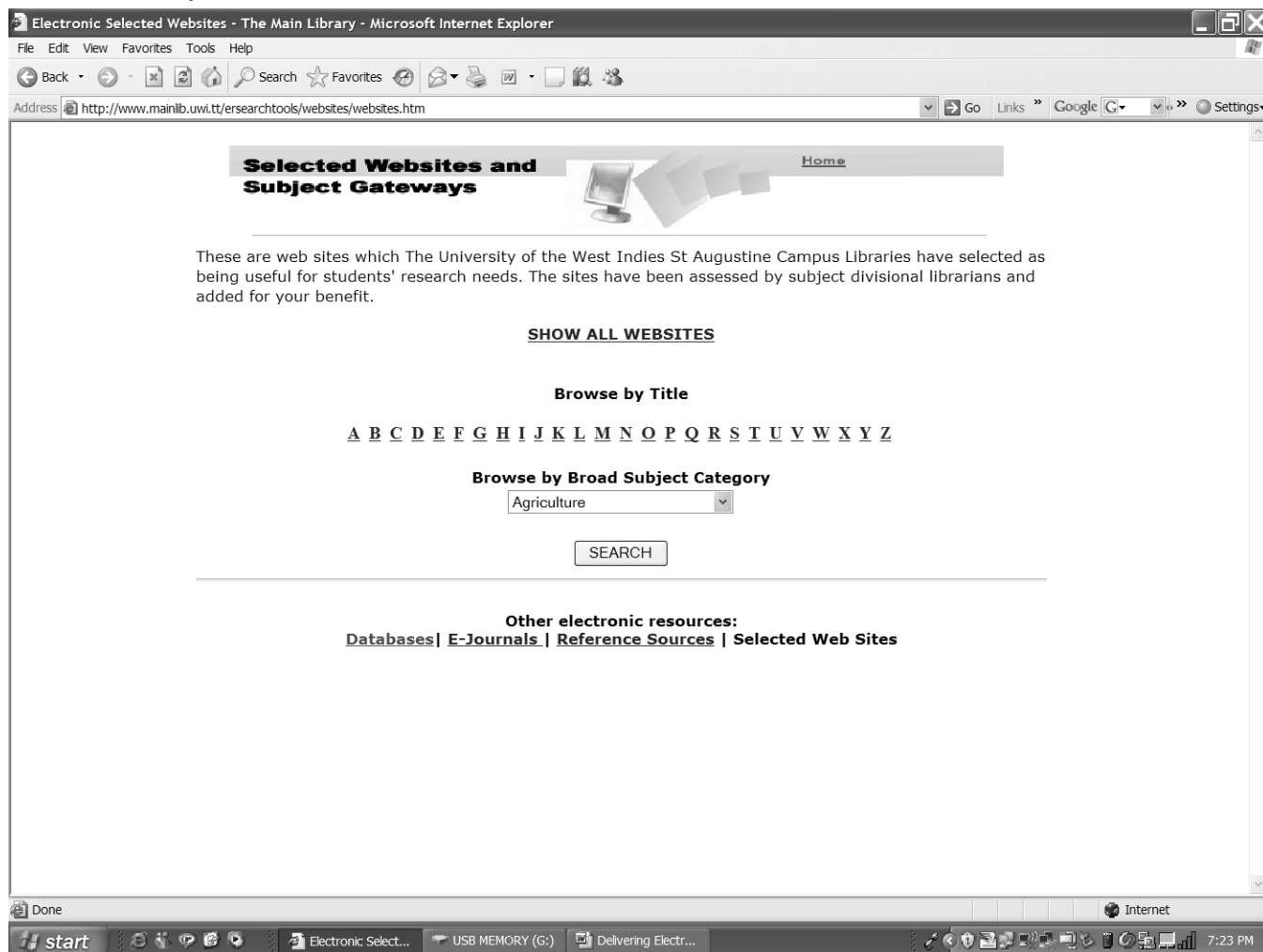
When the user selects the e-resources Finder link on the library's home page, the action brings up an HTML page listing the broad categories of resources. Presently the categories of resources covered by the database are: "Academic and Research Databases" (see Figure 1), "E-journals", "Reference Works" and "Selected Web Sites" (see Figure 2). Each item on this list is a hotlink to a form page where the user selects either to browse an alphabetical title listing of the particular resource or to perform a search according to the broad subject disciplines taught on the campus. Once the user makes his/her choice, the form's search button sets up the execution of a Cold Fusion script that pulls the associated records for that category from the table in the database. The Cold Fusion script

returns either an alphabetical listing that can be scrolled through, or a listing of resources in the category for a particular subject. Each item on the result lists is hyperlinked to the actual resource, allowing the users immediate access once they have been authenticated.

### Create/modify the reference database

It was agreed from the onset of the E-Resources Finder project that there would be a data entry module built into the system for staff to make additions and modifications to the database. The decision was taken to make the data entry Web-based, and once again Cold Fusion scripts were employed to drive the interface. Now data entry staff can modify the databases through the secure

Figure 2: Home page of the Selected Websites and Subject Gateways (<http://www.mainlib.uwi.tt/eresearchtools/websites/websites.htm>) [May 2007]



access of specific tables for which they have been authenticated.

### *Retrieving digital documents*

The users generally require a simple, user-friendly interface to search and retrieve electronic resources. The problem is that this simplicity is not easily gained when one considers the challenge of providing access to a range of electronic resources from multiple sources. Gaining access to databases and e-journals often means that the library signs varied agreements and protocols from a range of content providers. Some licenses require password protection, while others are IP-protected. On-campus or onsite access is fairly

straightforward since most of the databases and aggregator subscriptions licenses are IP-protected. However, problems mainly related to inconvenience still exist for the users who wish to switch between IP-protected resources and those that are password protected.

Until the middle of 2006, access to the e-resources categories of databases and e-journals was campus or onsite based. Remote access to the IP-protected e-resources was not available to the campus community until the Campus Information Technology Services (CITS) department in collaboration with the Library's systems staff embarked on developing a proxy-based solution. The license agreements for most of the Library's electronic resources allowed for remote (off-campus) access only to members of the UWI, that is

primarily to currently enrolled UWI students, faculty and staff. Therefore to use these restricted on-line resources when away from campus, members of the UWI community had to be authenticated on the campus network through a proxy utility. After first attempting to develop an in-house solution, the UWI turned to EZproxy as the way to provide remote access, a decision proven successful to date. Now the library can essentially extend its services beyond the confines of the campus, saving its users travel time and providing the convenience of access to the licensed electronic resources from anywhere that they may have an Internet connection.

### *Critical success factors and future plans*

Any institution embarking on delivering electronic resources collections must consider what would be the critical success factors for such a programme. At the Main Library the recipe for success must revolve around effective planning, a commitment to allocate adequate resources, and to maintain and upgrade the technical infrastructure. Perhaps most importantly though, the sustainability of any interface designed to provide resources to library users is closely tied to the level of effectiveness generated by the initiatives driving the marketing, training and support aspects of the programme.

It is obvious that if nobody knows about the service, the expensive cost of this type of investment will far outweigh its use. To date there have been some attempts to prepare leaflets and brochures outlining the various resources on offer, but the numbers of users using the databases and other electronic resources remain relatively low, a fact indicated by website access logs.

It might be a good idea now for the ML to consider appointing an outreach librarian who could dedicate time to promoting the resources as well as training users to use them effectively. As the library strives to promote use of its resources among the distance students in the other islands of the Caribbean such an appointee can serve the institution well in terms of onsite training of these remote users. A useful and timely training intervention in recent times at the ML has been the development of Web-based tutorials that are designed to help the users search the bibliographic

databases. Still what is required is a more structured approach to training in the area of electronic resources, including perhaps the mechanisms for conducting regular training audits.

In terms of support for users experiencing difficulties accessing electronic resources, the library has implemented a system where they will be directed in the first instance to a librarian either by an email attached to an "Ask the Librarian" button, or by filling in a Web form. Additionally, an open source helpdesk solution has been implemented and is currently being tested.

For the future, the Main Library will explore the available options for providing its users with an efficient portal that will provide access to its disparate information resources such as the catalogue, reference databases, subject gateways and e-journals through a federated search interface. In fact, the library's strategic plan for the year 2007 indicates such an objective and a commitment of resources to ensure a single point of search for all resources whether they are print or electronic, on-site or remote.

Providing greater resource coverage while at the same time retaining quality in resource selection and description is a crucial key to sustainability. Achieving a good balance between respectable finding tool "reach" (typical of the larger Web search engines) and metadata quality (typical of the academic VLS) is a challenge involving technological as well as labour and other economic concerns (Mason et al. 2000).

### *Conclusion*

The Library should be commended for its work thus far in the creation of a Web-based portal for providing services to its client base, as this represents a significant change in the modus operandi of the library, a challenge that the staff has risen to well. There clearly has been a willingness to move in the direction that libraries globally have been adopting, that is, the shift from largely paper-based operations to the transmission of information and knowledge electronically.

The ML acknowledges the shifting nature of the electronic resources environment and that success is really a moving target. However, there is still quite a lot that can be done with respect to the provision of the e-resources facility over the short and

medium term and the ML will continue to work to drive some of these initiatives forward. Some of these projects include:

- The integration of a link checking utility for the e-resources database
- The provision of a federated search across the e-resources database and the library's catalogue
- The implementation of a portal application with the database allowing for the dynamic delivery of e-resources based on a stored user profile. (a "MyLibrary" application)
- The furtherance of Web-based publishing of indigenous materials and the organization of heritage archives at the ML through the West Indian and Special Collections Division (WISC)
- The provision of extended support for distance education initiatives in the Caribbean
- The development of online tutorials on the effective use of the e-resources for research and teaching

Very little research within the Campus Libraries has been undertaken to date on the impact of electronic resources on library collections and services although some case studies are beginning to emerge. It is becoming increasingly important to gain a more in depth understanding of both the impact of electronic resources on library operations and user behaviour in accessing these resources. Research efforts in this vein would significantly contribute to the Libraries capacity for optimizing access to electronic resources and the purposeful fit of new technologies and innovations into traditional library practices and structure.

### References

Brabban, P.J. and P. Kobasa. 2001. Forget 'static' – get 'dynamic'! Using Active Server Pages to manage electronic resources. *VINE* 31(3): 27–35

Breeding, M.. 2004. The many facets of managing electronic resources. *Computers in Libraries* 24(1) [http://](http://www.infotoday.com/cilmag/jan04/breeding.shtml)

[www.infotoday.com/cilmag/jan04/breeding.shtml](http://www.infotoday.com/cilmag/jan04/breeding.shtml) [accessed May 6, 2005]

Farb, S.E. and A. Riggio. 2004. Medium or message? A new look at standards, structures, and schemata for managing electronic resources. *Library Hi Tech* 22(2): 144–152

Hon Ho, C. 2004. Managing the e-library in a global environment: experiences at Monash University, Australia. *Program: electronic library and information systems* 38 (3): 168–175.

Huggard, S.. The Management of electronic resources within a digital library. URL: <http://www.personal.monash.edu.au/~simonh/ICDL2004/huggardpaper.pdf> [viewed December 21, 2004]

Kovacs, D. 2000. *Building Electronic Library Collections: The Essential Guide to Selection Criteria and Core Subject Collections*. New York, NY: Neal-Schuman.

Law, D. 2004. Simplifying access to electronic resources: the changing model of information provision, *British Computer Society Review*. URL: <http://www.bcs.org/review04/articles/itsecurity/law.htm> [viewed July 27, 2004].

Mason, J. et al. 2000. INFOMINE: Promising Directions in Virtual Library Development, *First Monday*, 5 (6). URL: [http://www.firstmonday.dk/issues/issue5\\_6/mason/index.html](http://www.firstmonday.dk/issues/issue5_6/mason/index.html). [viewed October 20, 2005]

Mutshewa, A. and K.N. Rao. 2000. Enhancing access through electronic resources: the University of Botswana Library experience. *Library Hi Tech* 18(4): 315–320

Qin Zhu. 2004. Understanding OpenURL standard and electronic resources: effective use of available resources *Program: electronic library and information systems* 38(4): 251–256

Schneider, K.G. 1997. Cataloging Internet resources: Concerns and caveats. *American Libraries* 28(3): 77

Todd, C.. 2003. Metadata mayhem: cataloguing electronic resources in the National Library of New Zealand. *The Electronic Library* 21(3): 214–222

Vellucci, S. 1997. Options for organizing electronic resources: The coexistence of metadata. *Bulletin of the American Society for Information Science* 24(1): 14–17.

Weber, M.B. 1999. Factors to be considered in the selection and cataloging of Internet resources. *Library Hi Tech* 17(3): 298–303.

*Editorial history:*

*Received 8 June 2006;*

*Revised version received 23 March 2007;*

*Accepted 2 April 2007.*