
Web Information Services at the University of South Africa Library: A Work in Progress

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ABSTRACT

THIS ARTICLE OUTLINES THE PROCESS INITIATED by the University of South Africa (Unisa) Library to develop online support to its users. Unisa has been offering distance education for more than fifty years. The library has played a prominent role in supporting learning and research through sophisticated systems based on print-on-paper information sources and postal communication. A lack of infrastructure has hindered the development of alternative electronically based service delivery. The article describes how two decisions made in 1997 cleared the way for such development and how the library responded to this opportunity by creating a Web Information Services Team. This team was composed of persons already involved in projects for electronic service delivery. The project's goal was to deliver directly to the user, via the World Wide Web, training programs, current awareness services, and texts in various formats and from various sources to support both learning and research. The team started work on the project in August 1997 and concentrated initially on research and the acquisition of the necessary hardware and software. Toward the end of the year, the first product delivery took place with the launch of the library's Web page, the first Web-based training program, the setting up of a Windows NT server for loading and networking databases, and pilot projects to make current awareness services and commercial full-text databases available to clients online on a trial basis.

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INTRODUCTION

The University of South Africa (Unisa) has a fifty year history in the provision of distance education at a tertiary level. The university originally functioned as the parent body for a number of university colleges in South Africa. As these colleges each succeeded in achieving their autonomy, Unisa defined a new role for itself as a distance education university, a role which was recognized in law in 1946. From the start, the university set high standards for teaching and examination, and the rapidly growing library prided itself not only on the size of its collection but also particularly on the quality of its services. The Unisa library now boasts the most extensive collection in South Africa.

Unisa is today by far the largest university in South Africa in terms of student numbers and ranks as one of the world's mega-universities. In 1997, there were 124,212 students registered at Unisa for programs ranging from certificates to doctorates. Most of those students are resident in South Africa and are spread throughout the country. There are also more than 4,000 students from other African countries and 2,200 scattered among the other five inhabited continents of the world. Unisa continues to deliver its teaching programs largely through the medium of print on paper and the postal system. Students of structured courses are supplied with their lectures in print form. They are generally required to complete written assignments set as part of the curriculum, and successful completion of the course is judged by means of a challenge examination written at the end of the academic year. Students must purchase their own prescribed books for use throughout the course, but the library supplies copies of recommended materials that are usually required to be consulted at specific stages during the course. The library has built up a large collection of books, known as the Study Collection, to assist in meeting this requirement. Unisa also offers research degrees at the Master's and doctoral levels. Such students are offered a comprehensive subject librarian service. A subject librarian typically searches the appropriate bibliographic sources on behalf of the research students and supplies them with a list of suitable references from which to choose their own readings. These readings are then supplied on request in print-on-paper form to the relevant student by post.

In the supply of information services to students of Unisa, the use of information technology has thus far been supplementary. The library computerized its administrative processes many years ago and has an extremely sophisticated in-house system for handling requests for information materials for clients for whom the library is remotely located. Bibliographic databases have been loaded on a local area network at the main campus in Pretoria since 1994, but use has been restricted to staff whose offices are on campus and to those students able to visit the campus. The advent of the Internet and the World Wide Web have revolutionized communication. Unisa is not immune to that revolution, and staff in various sec-

tors, including the library, has been investigating the use made of this technology in distance education and considering how best to apply it in our own situation.

The immense size of the organization and the massive investment in the existing teaching model and delivery systems has hindered Unisa's ability to grasp the potential offered by network technologies. The infrastructural and socio-economic realities of South Africa also represent significant hurdles. A breakdown of the student population of Unisa indicates that roughly 49 percent are black, 38 percent are white, 9 percent Asian, and 4 percent colored.¹ Thus 62 percent of the student population comes from traditionally disadvantaged backgrounds and may well lack all the skills that are required to benefit from an electronic environment.

According to a survey conducted in 1996, 48 percent of the student population had access to a personal computer (PC) for use in their studies and 15 percent had access to the Internet. It seems that this number is increasing, especially with the proliferation of "Internet Cafés," "Cyber Connections," and government sponsored "Telecentres" in the rural areas (the first was opened in March 1998 in the Northern Province). The postal service can be unreliable and is becoming increasingly expensive, which gives students an incentive to use alternative means of communication with the institution. E-mail is anticipated to be one such means, as there are daily inquiries from students in this regard. The Internet in general is being used as a medium of communication both by the university itself, with the development of World Wide Web sites, and by students. This paves the way for increased electronic delivery of tuition materials as well as general communication with the students.

While it is important not to further disadvantage students who lack many of the resources that would facilitate electronic materials provision and communication, multimode delivery cannot be ruled out. The students have recognized the importance of computer literacy, and many of them are making an effort to improve their skills.

THE UNISA LIBRARY'S WEB INFORMATION SERVICES TEAM

In 1997, Unisa made a significant commitment to include electronically based service as a mode of delivery for its distance education programs. The university's senate made two decisions which signaled this commitment:

1. The Students on Line (SOL) experimental project was approved as an operational system. This service gives students online computer access to materials loaded on computers at the main campus. This offers the potential to make study materials for independent learning electronically available. Through the system, students can also contact lecturers, submit assignments, and have access to the library catalog.

2. A contract with a company known as Cyber Connections was approved. This agreement will result in access to networked computers being made available to Unisa students free of charge. Facilities will be established throughout the country. These opportunities are offered in a very competitive environment as the Cyber Connections facilities will not be exclusively for Unisa students and Unisa study material. The quality and content of the Web-based services that Unisa will provide will therefore be crucial to the success of its electronic service delivery.

These developments were seen by the library as an opportunity to take a significant step forward in the sphere of electronic information service delivery to its remotely located clients. In order to make use of this window of opportunity, the library decided to establish what became known as the Web Information Services Team (WIS Team). Six staff members, who already had significant responsibilities for existing or planned Web-based electronic information projects, were appointed on a full-time basis for a period of one year to focus their attentions on those projects. In addition, three staff members, who also had responsibilities for such projects as a smaller part of their activities, were designated associate members of the team along with two persons in coordinating, support, and communications roles. Associating the staff members through this team structure proved to be extremely valuable. The Unisa library is a very large organization, consisting of 250 staff members divided into five divisions. The projects that were brought together in the WIS Team originated in four of those divisions, and persons working on the projects were not always aware of similar activities by colleagues in other divisions. The team brought together members from different parts of the library and facilitated the sharing of ideas and solutions and offered support for problem solving. When the team was constituted, attention was given to team building under the leadership of an organizational psychologist, and vision and mission statements for the group were compiled. Each member set goals for their specific project within the team.

It is important to note that the Unisa WIS Team projects were not designed as a co-ordinated approach to achieve a particular integrated goal. These are a set of projects of diverse origin that were identified as having a common relevance to the delivery of library and information services electronically using Web technology. In this way they support the library's goal of "service provision redesigned through the application of information technology" (University of South Africa, 1996, p. 4). The projects were given more prominence and linked together through the WIS Team in order to take advantage of synergies and to enable the team members to offer one another mutual support.

The following descriptions indicate the motivations behind some of

the Unisa library's WIS Team projects as well as giving some idea of the problems encountered, solutions found, and progress made.

LIBRARY SKILLS TRAINING PROGRAMS DELIVERED DIRECTLY TO THE USER VIA THE WORLD WIDE WEB

The aim of this project is described as being an opportunity for students located at a distance from the university's campuses to acquire library and information skills. This will enable them to use a library and all sources of information available to them in a library and to be information literate students and lifelong learners.

Background

Many Unisa library clients (students) come from a disadvantaged school situation where:

- libraries were almost nonexistent;
- available library material was not well used;
- library instruction was not adequate or nonexistent;
- information technology is/was minimal; and
- there is a lack of general computer literacy.

In spite of all these apparently negative factors, a large percentage of students do manage to enter tertiary institutions. Unisa accommodates thousands of these disadvantaged students because of the advantages that open and distance learning offers them.

Introducing new information technologies into tertiary education in developing countries takes more than plugging a computer into the wall. An enormous technology gap exists between the developed and developing worlds. In developed countries, students log-on at home and electronically send completed assignments to a professor's e-mail box. In rural South Africa, many students live in homes without electricity and have not even used a typewriter. In South Africa, it is likely that students will enter a library for the first time in their life during their tertiary education (Swank, Lubbe, & Heaney, 1996, p. 283).

Categories of Users

Beginner users could be:

- computer literate users with previous library experience;
- first time users with little experience and no computer literacy;
- first time users with no library experience and no computer literacy; and
- first time adult users with a great fear of appearing ignorant.

The result of this situation is that many of the users of the Unisa library are completely overwhelmed by the library and everything in it. They suffer from severe library anxiety, computer anxiety, and therefore information anxiety. Users are venturing into, and exploring, new territory

and are often not ready for the demands they must face. Finding personal pathways to understanding will help to reduce information anxiety. Access to information is often the antidote to anxiety (Wurman, 1990, pp. 41, 45). Demands that the Unisa Library faces: to cope with an electronic library environment and to understand user needs in this new electronic environment.

A user needs survey was done in 1996, and strong needs were expressed for computer-related training and for library and research skills:

- to introduce electronic library information in an educationally proper and user-friendly way in order to enable the different categories of users to make the "electronic leap";
- to reach students at a distance; and
- to acquire an electronic learning center in order to improve the electronic training situation at the library.

Although the target group for the programs under discussion is first time users, experience has shown that these are not the only attendees of the training.

Unisa Library Training Programs

The Unisa library training program consists of different courses presented for the past four years in contact sessions in the library. The development of the training program was a daunting task as no individual division has the expertise to deal with all the aspects that need to be included in a comprehensive training program. The trainers who present these sessions are all experts from different departments in the library. They are also staff members who work with clients and are therefore aware of client needs as far as library and information training is concerned. These trainers have developed manuals that are issued to students enrolled for the training so that they can keep them for future reference. The text is enhanced with graphics and practical exercises. The contact sessions have been assessed and evaluated by the Bureau for University Teaching as well as being evaluated by participating students. The recommendations and comments from these assessments and evaluations are used continuously to upgrade and adapt the course material and the manuals. The three levels of training in library and information skills are:

1. *Basic library skills.* These consist of bibliographic instruction and library orientation. The first encounter many students have with electronic media is the introduction to the library's OPAC. Immediately after that, one to four training sessions in basic search strategies on the OPAC are offered.
2. *Advanced library skills.* Students are introduced to different general sources of information—e.g., periodicals, dictionaries, encyclopedias, indexes, and so on. Orientation on the location, access, and use of

these various sources is provided. Awareness of the electronic availability of these sources is created. The use of multimedia is introduced.

3. *Elementary research skills.* The recording of information, the reading of text references, and the compilation of an elementary bibliography is covered. The use of subject-related databases and other electronic resources is included.

The momentous development of open and distance learning (ODL) internationally and the re-entry of post-apartheid South Africa into the international community has forced Unisa to enter the competitive market. Online delivery of academic course material is now becoming a priority and, with the development of the SOL program, Unisa is beginning to make its study material available online. The library as a major support service has also started developing its training material in electronic form.

Development of the Electronic Workbook for the Basic Skills Course

It was decided to use the printed text of the workbook for the contact course as a basis. The text was converted to HTML, and the graphics and layouts were adapted for electronic training purposes. Changes in language usage, writing style, and subdivisions were necessary to make the workbook more user friendly. The adapted material was sent to the compilers of the original text for final editing and approval of the content. The Bureau for University Teaching was again involved in the process.

The creating of links was an integrated process within the development of the library's Web page. Links were created to other existing information about the library on the Web page. This was done to give depth and width to the content of the training program. The pilot copy was made available on the library's home page four months after it was initiated. Uploading problems delayed accessibility for about three weeks.

Experience Gained and Needs Identified

Liaison with the Department of Computer Science and with the Bureau for University Teaching was important. Delays were reduced and standards can be set in this way. Knowledge of HTML, Web page design, programming, teaching on the Web, graphic design, basic teaching principles, and critical path analysis is needed. One staff member involved in course development has since enrolled for a British Open University Internet course on Teaching and Learning Online. Support needed for this development is the necessary software—e.g., link checker, graphics program, HTML converter, and HTML editor. Research about the assessment of study material on the Web and information on Networked Learner Support are components that will keep the development of library training programs at a high standard. No formal assessment of this product has yet been possible, but the feedback received has been favorable. An

overall observation about the program is that it could be more interactive. Work has been completed on converting the advanced library skills course manual to HTML so that it can also be mounted on the library's home page.

RESEARCH INFORMATION SKILLS

The Research Information Skills course was developed in response to a request from the Department of Chemistry to the Departments of Information Studies and Library Services to develop a course in effective information retrieval and use for the structured M.Sc. in Chemical Education. Accordingly, the overall aim of the course is for each student to develop the necessary skills for effective retrieval, evaluation, organization, and use of information for research.

The product has been introduced as an elective course for the M.Sc. (Chemical Education) and also as part of the Research Methodology course in the M.Ed. (Environmental Education). The team approach was adopted for tuition materials development as there were a number of parties involved initially. The team included a staff member from the Bureau for University Teaching. Her input as an education specialist was invaluable, and she could relate to the material as someone who was faced with it for the first time. She also provided useful commentary on the layout and on how to make the text as accessible as possible without being patronizing. There were four people from the library, all from the Research Services division, and they assisted in the information provision perspective as well as information literacy. The theoretical component was provided by a staff member from the Department of Information Studies.

The rationale was to produce efficient information users rather than full blown information scientists. Accordingly, a very practical course was developed in which the content of the tuition material is generic, but the exercises are subject specific. However, as it is a course for Master's degree students, there is a theoretical framework to the course, and there are certain concepts that the students should master. It is envisaged that, by the end of the course, the students will be able to apply the theory of information retrieval and use to their research information requirements. The course consists of eight study units:

- Study unit 1 Research and information
- Study unit 2 Information infrastructure
- Study unit 3 Computerized information retrieval
- Study unit 4 Database structure
- Study unit 5 Search strategies
- Study unit 6 Organization and maintenance of information in a personal database
- Study unit 7 Internet: Navigation and use
- Study unit 8 Publishing

There is a five day compulsory workshop where the students can put what they have learned into practice. As the researcher is best able to decide what material is relevant for his or her research, the emphasis is placed upon self assessment and evaluation. To this end, the students must compile a portfolio based on exercises included in the tuition material as well as a final project. The following definition that was developed by Paulson, Paulson, and Meyer (1991) was used as a point of departure for this course:

A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements in one or more areas. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. A portfolio . . . provides a complex and comprehensive view of student performance in context. It is a portfolio when the student is a participant in, rather than the object of assessment . . . it provides a forum that encourages students to develop the abilities needed to become independent, self-directed learners. (p. 60)

In the final project, students will be required to do a comprehensive literature search on a topic related to their research and explain all their reasoning. They must also include examples of search strategies, sources consulted, and so on. Each student will be expected to draw the references into a personal database and compile a sample reference list. Each reference list will be drawn up according to the conventions of the discipline in which the research is conducted. All the activities in the portfolio are designed to assist in the development of the skills and knowledge required for the completion of the final project. The lecturers from chemistry and education, whose students are registered for the course, will be involved in assessment of the portfolio from a subject perspective, and other members of the team from an "information" perspective. The portfolios will be externally examined.

Currently the tuition material is available only in print but, by the end of the year (1998), there will be an electronic version available for those students who have access to the Internet. It is hoped that the interactivity of the text can be enhanced in the electronic version. It is envisioned that eventually the students who are too far away from the main Unisa campus to attend the workshop will be accommodated, either through Internet-based activities or, where database access is restricted, in collaboration with a library that has the necessary facilities.

There are also two computer aided instruction (CAI) packages being developed that will provide additional material for students. These will be distributed on diskette initially and later via the Internet. The CAI packages cover search strategy formulation and database structure.

The following definition of information literacy was used as a frame of reference for the outcome of the course and, in one of the activities,

the students have to substitute the word "researcher" for "An information literate person."

Information Literacy

An information literate person:

- recognizes the need for information;
- recognizes that accurate and complete information is the basis for intelligent decision making;
- formulates questions based on information needs;
- identifies potential sources of information;
- develops successful search strategies;
- accesses print and technology-based sources of information; and
- is a competent reader.

An information literate person evaluates information:

- establishes authority;
- determines accuracy and relevance;
- recognizes point of view and opinion versus factual knowledge;
- rejects inaccurate and misleading information; and
- creates new information to replace inaccurate or missing information as needed.

An information literate person uses information:

- organizes information for practical application;
- integrates new information into an existing body of knowledge; and
- applies information in critical thinking (California Media and Library Educators Association, 1994, pp. 2-3).

This is the first year that the course is offered and, as such, the project team is aware that there will be problems and pitfalls. It is not yet known how the students will respond to the material or to the portfolio. At the time of this writing, ten students were registered for the course but registration was still open. Other academic departments have expressed an interest for next year. It is hoped to expand the course to accommodate more students, as we consider it increasingly important that, as an academic library, we accept the responsibility to teach people how to find and use information effectively. We consider it preferable to pursue this goal in collaboration with academic departments.

WORK GROUP ON INTERNET COURSE DEVELOPMENT

The Work Group on Internet Course Development (WICD) was established in order to improve the quality of existing Internet training courses offered by the Unisa library and to develop new courses that would meet the requirements of the different types of users found in a university

environment. The work group comprises people from the library who offered training in various aspects of the Internet as well as an education specialist from the Bureau for University Teaching. The point of departure is that the Internet is one of the richest sources of information available and, as information specialists, we have an obligation to teach clients about the Internet as a resource. Owing to a lack of facilities, the Internet training was first limited to Unisa staff members but, on completion of the library's electronic learning center (May 1998), the training was extended to students able to visit the campus.

There are three units that have been developed in the light of interviews conducted with people who had attended earlier presentations. The interviews revealed that many of the units were too advanced for the average attendee, and that they felt that their expectations were not being met. They indicated that they really needed a basic introductory course where they were assisted through each step. In the earlier training, units were offered according to application (WWW, mail lists, newsgroups, telnet, Gopher, ftp), and skills levels were not established prior to enrollment. The consequence of this was a vast range of competencies within groups, and the trainers were often at a loss as to how to deal with the class. A great many of the trainees were also highly frustrated. The three training units currently offered are:

- Internet for new users, which provides a limited theoretical and practical background to the Internet. It covers basic Internet concepts and terminology such as the World Wide Web, protocols, browsers, URLs, and bookmarks. Netscape is introduced in a hands-on session. The manual for the unit is available online, and there are links to sites to illustrate various aspects of the Internet.
- The second unit is an introduction to Netscape where an in-depth explanation is given on the functioning of the Netscape browser. It is recommended that trainees should have a prior knowledge of the Internet in order to benefit from the Netscape unit and an online self-test questionnaire has been designed accordingly.
- The third unit offered is an introduction to finding information on the Internet. This includes searching skills (Boolean operators), search engines, subject directories, telnet, ftp, and how to evaluate and cite Internet resources.

Eventually, all the manuals will be available online in an attempt to meet the training requirements of all clients including those located at a distance from the main campus. It is also not possible to provide classroom tuition to 120,000 students. The course material has been developed with an awareness of the backlog in the education of many of the students, which is why the units are offered piecemeal. The students should

be able to pace themselves, and there is always an opportunity to e-mail questions to the trainers.

Questionnaires have been designed to assist in the evaluation of the training offered so that the tutorial material can be upgraded and adjusted to meet the changing requirements of the users. It is envisaged that the existing units will be increased to accommodate developments on the Internet itself. Training in individual Internet applications will be offered as additional courses to the existing units.

In order to overcome the problem of the wide range of competencies in the classes, it was decided to try to screen trainees by means of questionnaires that they completed prior to registration for any particular course. Before registering for unit 1 (registration is online for all units), the trainees answer a questionnaire designed to establish their competency with regard to the Windows environment. If the trainees do not answer a certain number of questions correctly, they are given an opportunity to redo the questionnaire or they are encouraged to attend a Windows course offered by the Department of Computer Services. The trainers felt that the students who were not confident enough in the use of Windows would not easily be able to benefit fully from Internet training since Netscape (the browser that is supported by Unisa) is a Windows-based application.

A problem with Internet course development is that updated versions of the browsers are released at regular intervals, and this means that all tutorial matter has to be changed accordingly. A frustration is that adequate warning is often not given that the latest version of the browser is to be loaded on the campus-wide network, and courses have to be changed at very short notice.

The full diversity of the students' requirements for Internet training will not be met by the three existing units, although they are a foundation on which to build. Considering the nature of Unisa's student population, it will be a long time before an introductory unit is no longer required.

THE PROVISION OF A CURRENT AWARENESS SERVICE

The long-term purpose of the current awareness project is to provide a substitute for the circulation of new journals to lecturers. The circulation of journals is a valued current awareness opportunity for the academic staff, but it diminishes the availability of the journals. As the library's policy states that it has a "client-driven focus," it was felt that a service to clients should not be discontinued unless an acceptable alternative could be provided.

Various electronic current awareness products have been investigated that could partly provide what the circulation of journals has provided over the years. To be considered, products had to conform to the requirements of allowing the saving of profiles and the e-mailing of search results. They also had to be available via the Internet in order to allow for

the ultimate extension of the service to research students located at a distance from the university's main campus. Silverplatter, NISC, Ovid, Dialog, and Faxon allow the user to save profiles. As no additional financial resources have been made available for this pilot project, the bibliographic databases to which Unisa already subscribes in CD-ROM format are being used for the pilot project. These include Silverplatter products such as MLA, LLBA, Sociofile, and Art Index as well as NISC's South African Studies, Dialog's ERIC and Philosopher's Index, and Faxon's Faxon Finder which is particularly strong in the field of the humanities. Current Contents on Diskette is used to provide a service to the science faculty. Service providers like Silverplatter have announced that very advanced Web-based SDI facilities will be part of their next release.

All the subject librarians received training in the saving and reloading of profiles as well as the other details involved in providing a current awareness service and/or training of clients to use the databases themselves in the future. Each subject librarian has identified three interested "test clients" for the purpose of this exercise—i.e., lecturers on sabbatical, those writing books, or those completing their doctoral dissertations. These clients were chosen because of a greater need for a current awareness service. Reference interviews were held with these people to determine their specific research needs. They were very keen to participate and provide feedback. Search strategies were tested on the databases, and the results were discussed with the clients. The strategies were accordingly refined or expanded. The profiles are saved and re-run when the databases are updated, and the results are sent to clients via e-mail.

At the time of this writing, the pilot project had been up and running for three months, and the feedback has been mainly positive. A product to serve the needs of the law clients has not yet been identified. The strong American bias of some of the products and postage and administrative delays in receiving updated CD-ROMs have been problematic.

Tables of contents (TOCs) services are also a viable alternative to journal circulation. UnCover (<http://uncweb.carl.org:80>) and Ebsco (<http://www.epnet.com>) provide TOCs. Problems have been identified with UnCover usage such as the fact that print-outs of TOCs do not include the volume and number of the journal and results cannot be sent to the client via e-mail. Publishers such as Springer (<http://link.springer.de/alert/asub.htm>) offer Web browsing of their TOCs for a fee whereas Academic Press (<http://www.europe.idealibrary.com/>) and Elsevier (<http://www.elsevier.nl/locate/ContentsDirect>) offer free Web browsing of the TOCs of their journals. Elsevier allows the client to select relevant titles from the list available on their Web page and then new TOCs are automatically sent to him/her via e-mail.

After the pilot project is completed, the library hopes to offer current awareness products to its clients via the library home page

(<http://www.unisa.ac.za/library/index.html>). A CAI program to enable clients to use the products independently could also be made available. The role of the subject librarian will still be important with regard to the creation of search profiles and the refining of search strategies.

UNISA LIBRARY HOME PAGE

Although a Web page for the library had been planned for some time, the necessity for it became clear in the light of the university's commitment to making information available electronically to its students. Involvement in Internet training and in researching the Internet for the purpose of writing a training manual offered the opportunity to look at and examine other library home pages. Creating screens for Unisa's in-house developed Web-based OPAC meant that HTML had to be learned. These experiences built sufficient confidence to start the process of creating a home page for the library. Additional skills were acquired by attending HTML and Web page design courses.

Initially, people in the library had to be convinced of the necessity of a home page, after which staff had to be identified to serve on a drafting committee, the help of a graphic artist had to be obtained, the hardware had to be upgraded, and new software had to be acquired. An HTML editor named HotDog was downloaded from the Internet and evaluated for a period of thirty days after which approval was obtained to purchase it.

Planning

The whole project was very carefully planned. The following questions were asked :

- Why does the Unisa Library need a Web page?
- What will the benefits be to our users/clients?
- What will the benefits be to the library?
- What should go onto the Web page (the content)?
- Who will be involved in the compilation?

The first brainstorming session with the Web committee was held where the structure, layout, design, and content of the page were discussed. The content of the page turned out to be a major problem area and consensus could not be reached at first as to what information about the library should be "advertised." It was necessary to move away from traditional thinking and to focus on the electronic delivery of information to the users/clients. New ways to access library information and services had to be created. Staff had to be made aware that, with the Web technology, existing library resources and services could be presented in new ways—e.g., multiple access points to information.

It was decided that the idea of a library home page had to be sold to all the staff members, therefore each representative on the Web commit-

tee went back to their divisions and formed a committee where a regular progress report about the Web page was given, feedback was gathered from the staff within the division, and contributions for the Web page discussed. Meetings were scheduled at regular intervals where a story board of the layout and structure of the main areas of the Web site was drafted. Changes were made until a point was reached where the ideas could be converted into a Web page. The team all had a look at the page, and more changes were made. By this time the five main pages of the Web site had been decided upon and consisted of the following:

- information about the library (including general information about the library, services offered, information about the various divisions, as well as a staff search facility);
- information about what is happening in the library—e.g., training offered;
- information about available electronic resources and access to the OPAC;
- study information—e.g., links to information on the university's Web page such as the Students On-line system;
- a selection of useful Internet addresses.

Selection of Content

With the finalizing of the layout of the five main pages, it was possible to start gathering content. After the completion of the Web page, it was realized that this was the most important and the most time-consuming part of the Web site development. In selecting content, the following had to be kept in mind: not to try to include every bit of information about the library and to take the clients' needs into consideration. Content was divided into two areas: (1) local information, and (2) remote information.

In the content-gathering process, what was available in print or electronic format was first considered. Printed documentation, such as the library's services and procedures handbook, handouts, and so on proved useful. Documentation already in electronic format was a good starting point. Where documentation existed, it was in WordPerfect and had to be converted to HTML. A program called WPTHHTML was purchased for this purpose. Something that had to be taken into consideration was that these documents had to be adapted for online use. At this point the need for an editing team was realized. All documents had to be edited before they could be published on the Web page. A team of people was selected for this job.

Where no documentation existed, staff had to write new content for the project. This was a delaying factor in the whole process as people had other jobs to do and simply did not have the time to compile the necessary documentation. The second area of content examined was remote information. The resources had to be selected and evaluated before they were included.

Presentation of the Information

At this point, it was realized that much information had been gathered that would have to be organized. More story boards were done to establish exactly how all the information would be structured and linked. As the pages were completed, converted, and edited, the graphics were discussed with the graphic artist, ideas were given, and she then designed a graphic that was, in turn, presented to the Web Page Committee for approval. Demonstrations were given from time to time for the various divisions in the library where they were asked for input, and changes were made where deemed necessary.

When everything was finally ready and the page could be uploaded to the university's Web server, a major problem was encountered which had not been foreseen. Some of the file names were in upper-case and, when the page was loaded, many of the links did not work. The reason was that the upper-case file names, which did not pose a problem on the editor which was used, unfortunately were incompatible with the Unix Web server. This meant that the whole Web site had to be rechecked and all the file names changed. In this process it was discovered that not all the graphics displayed properly on PCs with VGA monitors. An alternative text version of the entire Web page had to be designed to overcome this problem. The page was then finally uploaded. Valuable experience was gained from this exercise.

Maintenance

Maintenance of the Web site is a crucial part of the whole Web site design process. A centralized maintenance procedure is used to update information on the library's Web page. This is quite a complex process. The following tasks form part of the process:

- updating local library information;
- checking hyper links;
- adding new information or deleting outdated information; and
- reorganizing or changing the design of the Web site.

Staff in the various divisions had to be made aware of the importance of ensuring that information is current, and a procedure had to be drawn up for updating information. Another problem was the checking of hypertext links. A few link checkers were downloaded from the Internet and evaluated, and it was then decided to purchase Linkbot.

To make the library's Web site accessible in the subject directories and search engines on the Web, the Web site address was submitted to several of these resources. For a long time after the initial completion of the Web page, all changes had to be e-mailed to the Computer Services Department with a lengthy description of the files that had to be changed or added, the location of these files, and so on. This great source of frus-

tration was resolved by obtaining direct access to the university's Web server so that the library is able to maintain its own Web page.

ESTABLISHING THE ELECTRONIC TEXT CENTRE FOR THE UNISA LIBRARY

The aim of the Electronic Text Centre is to become the heart of a future electronic library by providing an online scholarly text service of international standard and by encouraging a higher level of computer literacy among our client community. The goals of the proposed electronic text center were formulated as follows:

- to collect and prepare texts for an online text service;
- to provide hardware and software to enable text analysis by computer on campus or remotely via the Internet;
- to provide training and instructed support to clients in the independent and confident application of tools for the analysis and creation of scholarly electronic texts; and
- to make the service available twenty-four hours a day to any client with access to a computer and a modem.

Need Statement

The need for a service like an electronic text center came to the fore with problems experienced with the CD-ROM databases that were scattered in different departments throughout the library. They are in several different formats and require different platforms to run on. In these times of decreasing funds, it is impossible to provide hardware and software to support them all. Staff and clients need to be trained to use several different interfaces for all these resources because each package is released with its own search and display software. CD-ROMs are legally and technically difficult to network on a campus-wide scale. If the library were to continue to collect electronic resources in this way, the hardware costs would be prohibitive.

As a distance teaching university in the electronic age, the clients of Unisa library will increasingly develop needs for remote access to full-text electronic resources. In the future, increasing numbers of students will be able to use such access as services offering access to the Internet are developed.

Benefits

Unisa is the largest distance teaching university in southern Africa. Our students can benefit considerably from an Electronic Text Centre. It will encourage the development of a new generation of computer-literate clients at Unisa. The aim is that any registered Unisa student who owns a computer and a modem or has access to one should be able to access the Electronic Text Centre twenty-four hours a day at his or her convenience. Online texts are not subjected to library hours or limited to the library building. A client with access to a computer and a modem does not have

to go physically to the Electronic Text Centre to work with most of the texts that it holds because he or she can access those materials from home. The Electronic Text Centre can support many simultaneous users, and texts cannot get lost (Ream, 1993).

In the field of the humanities, there are already several full-text databases available. Although they are expensive, they are one-time investments, the information will never go out of date, the format of the text is compatible on all platforms, and the data will outlive the current hardware. In the field of science and technology, the electronic text center will provide the infrastructure to support distance teaching, the invisible college, scholarly communication, distribution of research results, and electronic publishing.

Electronic text allows more flexible use. Hypotheses can be tested quickly over massive amounts of data—e.g., to count and read in context the occurrences of a term, or search for the earliest recorded use of a specific word in the English language, and so on (Seaman, 1994). Having one software package will have the advantage that users will only have to learn one interface in order to acquire the skill to search all the databases (Seaman, 1994). In the long term it will be cost saving because full-text databases will be loaded on one machine instead of numerous workstations that will eventually have to be set up to accommodate all the different CD-ROMs (Ream, 1993).

An Electronic Text Centre will help Unisa to provide a service of international standard to its clients that would enable it to compete with other institutions on an international level. Electronic hardware and software items purchased by Unisa will be evaluated in terms of standards set by the Electronic Text Centre to ensure compatibility and quality. This will ensure the accessibility of all full-text resources purchased in the future.

Functions

The Electronic Text Centre will provide a physical facility (in the library) that is convenient for clients to visit for training and instructed support as well as a place where full-text databases that cannot be networked (e.g., CD-ROMs) could be consulted. The center should provide hardware and software that enables computerized text analysis and also training and guidance in the use of these tools. By this means, networked electronic books may become a mainstream part of teaching and research resources at the university and would strongly support distance teaching (Seaman, 1994).

The Collection and Preparation of Texts

The Electronic Text Centre will collect electronic texts needed for study and research at Unisa. There are several options for collecting on-line texts of which the following are the most important:

- *Purchasing:* The Electronic Text Centre will formulate a collection de-

velopment policy to control the selection of full-text databases. Texts should preferably be in SGML. The literature databases of Chadwyck-Healey and the Oxford English Dictionary would be great assets. Statistics during a one month trial indicated that frequent access was made.

- *Publishing*: Researchers could, in the future, use the electronic text center to publish their articles, research reports, and even dissertations. The periodicals published by Unisa could be put in the electronic text center. It would also be possible to produce tutorial letters and other study materials and distribute them via the electronic text center's search and display software. Creation of texts will be encouraged by the availability of an electronic text center, because graduate students, lecturing staff, and researchers who are subject experts would publish articles and papers. Archival materials in the Unisa Library Special Collections that are potentially very useful for study and research, but relatively inaccessible, could be made remotely available by means of the Electronic Text Centre.
- *Scanning*: Texts which are not subject to copyright, such as texts published before 1900, could be scanned and encoded to be included in the Electronic Text Centre. The Electronic Text Centre will provide hardware and software to scan documents in various formats for clients who would like to create their own texts. Standards will be formulated regarding issues such as file formats to ensure compatibility and exchangeability.
- *Text Encoding (SGML and TEI)*: Texts should be encoded in a nonproprietary manner. All the electronic text centers which were studied are committed to SGML (Standard Generalized Markup Language) and the *TEI Guidelines*. SGML is an international standard for data interchange irrespective of the software or platform. Because this will also be the standard for the proposed electronic text center, it would be no problem to transfer the data to a more up-to-date system should the current system become outdated. SGML markup could be done with a text editor, word processor, or SGML editor—e.g., SoftQuad Author/Editor.

The Text Encoding Initiative (TEI) has published the *TEI Guidelines*, a two-volume reference source of 1,300 pages that can also be accessed via a search or browse interface at various Internet sites. It provides a full set of tags, a methodology, and a set of Document Type Descriptions (DTDs) that allow the detailed description of the spatial, intellectual, structural, and typographic form of a work (Seaman, 1994). The DTD can be used by a program to parse or validate the tags in a text (Hockey, 1996).

Bibliographic records that refer to the electronic file where the full-text documents are stored should be created so that they can also be retrieved via the library catalog. The SGML tags of the TEI header could be

converted to USMARC and imported into the library catalog instead of creating new records manually.

- *Training:* The electronic text center will provide training in scholarly tools for text analysis and encoding (SGML and HTML) to enable lecturers and researchers to create their own texts.

Pilot Project

- *Web Page:* A Web site has been set up for the Electronic Text Centre pilot project. It contains information about the project and links to related remote sites. It is also used to announce news like free trial access periods. The Electronic Text Centre has 12.5 gigabytes on a Silicon Graphics machine to host the Web page and full-text databases.
- *Slotow Collection:* The Slotow Collection contains documents from the Anglo Boer War and is housed in the Unisa Library Archives. It has been selected for the pilot project because 1999 is the centenary of the Anglo Boer War. Selected texts and images are scanned to be presented in electronic form via the Internet as an example of what the Electronic Text Centre will offer in terms of locally created texts. A flatbed grey scale scanner is used for scanning text with Optical Character Recognition (OCR). For the purposes of the pilot project, these texts, which are initially saved in ASCII format, are converted to HTML. Images are scanned with a flatbed color scanner and stored in jpeg format. They will be linked to the texts which will be delivered in HTML for the pilot project. SGML markup will not be done for the pilot project because of its complexity and because there is no search and display software in place yet. In the meantime, expertise and skills are being gathered to allow ultimately for the creation of quality SGML texts for Unisa's Electronic Text Centre.

Evaluation of a Search Engine

At present, various search and display software packages are being evaluated. Opentext Livelink Search, Verity's Search97, and Site Search are the products on the short list. Each product will be evaluated against the following criteria:

- it should support SGML;
- it should run on a Silicon Graphics machine;
- it should be powerful enough to handle large volumes of texts; and
- it should be flexible enough to be customized according to the clients' needs.

Problems

Although the Electronic Text Centre project has been approved by the university as one of the major fundraising projects of the Jubilee Fundraising initiative, no funds for the project have been raised to date. Commercial full-text databases and search and display software are ex-

pensive. Transcription and markup of texts are painstaking and labor intensive activities requiring highly skilled staff. There is a great demand for technical expertise and much training and marketing still needs to be done. Copyright restrictions prevent the creation of electronic versions of the study materials most heavily in demand. The relatively narrow bandwidth of the South African Internet is another barrier in the way of delivering full-text materials over the Internet.

Conclusion

The model and standards proposed for the Unisa Library Electronic Text Centre are based on worldwide leading electronic text initiatives. It could provide the infrastructure for building a full-text collection which could be exchanged on an international level and outlive the current technology.

COMMERCIAL DATABASES

Together with books, information located in journals forms the most important source for study and research at a university. Off-campus Unisa students currently have very limited access for searching for themselves in any of the bibliographic or full-text databases to which the library subscribes, as these databases are networked only on the main campus in Pretoria owing to licensing and network restrictions.

To meet the information needs of mainly postgraduate clients, the library provides an extensive subject reference service whereby commercial bibliographic databases, together with any other applicable information source, are searched on request by subject librarians. With the improvement of Internet access for Unisa students in South Africa and the growing number of Unisa academics with Internet access at home, it is imperative for the library to make as many commercial databases as possible available to the remote client to allow for faster access to relevant information. Providing direct access to the bibliographic or full-text databases through the Internet will not only speed up the process of obtaining journal articles but will also place the important task of identifying and evaluating relevant articles directly in the hands of the researcher. The Unisa Library is a founding member of the Gauteng and Environs Library Consortium (GAELIC), and this has made resource sharing in the area of shared subscriptions to bibliographic databases possible. The library is taking an active part in investigating shared or joint acquisitions in specific subject areas.

A project has been launched within the Unisa Library with the following aims:

- to investigate, plan, and implement the replacement and upgrading of the existing bibliographic database network infrastructure to provide

for local and remote access via the Internet to the bibliographic commercial databases held by the library for all client groups;

- to evaluate the subscription to, and placement of, bibliographic and full-text databases on the network according to specific criteria as part of the collection development process to ensure the optimum utilization of the database budget.

Existing Database Network

At the beginning of 1997, the University's Department of Computer Services (DCS) judged the hardware of the library's existing CD-ROM network obsolete and in need of replacement and advised the library to investigate migration to a new CD-ROM network platform. The library's forty-three CD-ROM databases are networked on a system consisting of three 486-DX PCs, seven CD-ROM towers containing forty-two double-speed drives, four 1.7 Gb hard drives using Novell NetWare and SCSI Express, EISA bus architecture, and Ornetix CD-Vision 4.0 as the network management software. Databases are networked only on the main campus in Pretoria.

After consultation with network experts at the university, it was decided to start the migration to a new platform with the purchase of a Windows NT server with 20 Gb hard drive. This server can also be configured to serve as an Internet server for the library. This will enable the library not only to investigate what additional hardware and network management software is needed to replace the existing network, but also to evaluate and test various bibliographic databases on the Internet to build up the necessary experience for providing remote access.

Investigating Various Options

The hardware investigation will comprise the following:

- to analyze the current network environment at the university and to meet with various network administrators at the university to identify possible problem areas and open communication channels to discuss them;
- to identify possible database network management software. The library should investigate whether Ornetix CD-Vision still meets the necessary criteria for managing a database network;
- to identify programs to launch bibliographic databases via the Internet. Some bibliographic databases have Internet search software such as WebSpirs from Silverplatter. However, there are other important databases that still run on DOS or Windows software that need a launch program to enable searching. Programs such as Citrix Winframe or W3Launch will be tested; and
- to compile criteria by which these systems and programs can be evaluated.

The server was delivered in November 1997, and the configuration was done during December 1997. During this time, demonstration or trial versions of the network products to be evaluated were obtained, mainly by downloading from the Internet.

Network Content Investigation

Providing the technical infrastructure for remote access on the Internet is only one part of the project; investigating what databases should be made available (i.e., the content of the database network) forms the other major part of the project as that will determine whether the library can provide the information resources to meet the information needs of its clients.

Existing Database Subscriptions. The Unisa Library subscribed to its first databases on CD-ROM in 1988. Generous increases in the budget for electronic resources during the first few years allowed the library to add to those subscriptions, and the library currently subscribes to a total of sixty-five databases of which forty-three are networked. Databases were originally placed on the CD-ROM network based on the cost of networking, subject coverage, potential use of the database, and space available on CD-ROM towers. No major revision of the network databases was done in the past three years. Decisions to subscribe to new databases were taken by an ad hoc committee that was convened irregularly.

Electronic Collection Development. As no increase was received for the electronic resources budget for the past two years, yearly increases in the subscription prices put pressure on the library to continue with the same database subscriptions. No new databases could be added to the network without canceling existing databases. As no formal collection development policy for electronic information resources exists in the library, it was decided that the time had arrived for the establishment of a more formal structure to manage the electronic resources budget. In order to do this, the following should be done as part of the groundwork:

- compile a list of criteria according to which existing subscriptions to databases should be evaluated. This will identify databases for cancellation in order to make money available for new subscriptions or placement of databases on the network;
- use the above exercise to finalize a list of criteria according to which all database subscriptions should be evaluated in the future. That will ensure the optimum utilization of the database budget; and
- identify those criteria according to which the placement of databases on the network can be evaluated.

These criteria will be discussed for approval at an Electronic Database Workshop to be held in April 1998 and will be attended by all subject librarians and other stakeholders. During this workshop, a decision will

also be made on the structure and procedures of the committee that should decide on database subscriptions.

Joint subscriptions to bibliographic or full-text databases as part of the GAELIC consortium also necessitate a more formal way to decide about subscriptions to databases, and it is hoped that implementing the above will provide clearer guidelines for decision making and stimulate a healthy debate on joint acquisitions with other libraries.

Trial Databases

After the installation of the Windows NT server, it was decided to start with trial access to existing network databases using WebSpirs from Silverplatter. After loading and configuration of the software and obtaining the necessary licenses from Silverplatter, the first eight databases were made available, initially only internally in the library, but later also to all Unisa staff on the main campus. Trial access to remote students will be made available from April onward.

As part of the Gaelic Joint Acquisitions Workgroup investigation, trial access to the ABI/Inform Full-Text database from Ovid was made available to all Unisa staff and students. Access to the database was advertised on the university's campus-wide e-mail communication system and under the heading Trial Databases on the library's Web page. Enquiries from Unisa students as far away as the United States, Switzerland, and Israel were received. During this trial period the following will be monitored:

- configuration of the server and the speed of data transfer to users;
- data transfer on the university's network and the identification of possible problem areas; and
- ease of access to an Internet database located outside South Africa.

Marketing

Reaching the thousands of remote Unisa students with the news of the new information service could prove to be a challenge, and all available channels of communication should be utilized to reach as many students as possible. The major marketing tools are Unisa's student newspaper *Unisa News*, the staff bulletin *Unisa Bulletin*, and the library's staff bulletin *Bibliovaria*. Flyers, brochures, or bookmarks detailing how to gain access to the database, basic searching techniques, and contact information will be compiled for the various databases. These will be distributed at the library's information desk, at group discussion classes by lecturers, in the branch libraries, or added to any letters sent to students by the library such as introductory letters to postgraduate students.

Training

Although one can assume that students with Internet access at home have the necessary level of computer or Internet literacy to use these databases on the Internet, thousands of Unisa students from disadvantaged

backgrounds will now have the opportunity to search databases previously not available to them. Providing the necessary training for remote users in computer and Internet literacy, as well as database selection, searching techniques, and basic information retrieval skills poses a significant challenge for those involved in user education.

Access Control and User Authentication

The most urgent problem to solve is the system of user authentication and authorization to be used. As Unisa students are spread across the world, it is very important to ensure that acceptable security is in place to enable the library to comply with restrictions set out in the database license agreements. The three main methods of access restriction, user-ids and passwords, IP-address restriction, or the use of proxies will be investigated. It is generally felt that the administration involved in a system of user-ids and passwords for the number of Unisa clients is not a workable model, and that the use of a proxy server, together with IP filtering, will be a better system of access control.

Other Problems Identified

Apart from the problems mentioned that will need to be investigated, various other aspects will also need attention such as:

- support for the remote user by setting up a help desk or an electronic help facility where questions and problems can be submitted;
- design of the Web page that will provide access to the Internet databases;
- setting up an acceptable system of statistical measurement and reporting using a spreadsheet; and
- setting up a formalized system of communication about database news with client groups such as a regular news column in university publications, a news section on the Web page, or maybe a listserv to which registered users can belong.

The Unisa library will, by creating an infrastructure to enable remote access for all its clients to bibliographic databases, provide its clients, for the first time, with the opportunity to satisfy their own information needs and to become experienced searchers for information. The successful completion of this project will enable the library to place access to information in the hands of all its clients.

CONCLUSION

In the report *Business Process Reengineering Project Interim Report* by the Unisa library (1998), strong emphasis was placed on the perceived paradigm shift from the traditional library as a physical depository of information sources with high levels of mediation for the clients to an entity lacking boundaries (existing partially in cyberspace) where clients are

empowered to a high level of self-sufficiency in information use. In this paradigm, the client can access the information network from multiple entry points (University of South Africa, 1998, pp. 21, 22).

Although the WIS Team projects are only now beginning to bear fruit, they will in time make a strong contribution toward realizing that paradigm shift. This process will be particularly meaningful for the remote users of the library and will, for the first time, enable them to enjoy some of the same benefits which have long been available to on-campus students.

NOTE

¹ These racial classifications are used only to point to the various levels of privileges each group had under the previous South African government.

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