

## **The "electronic MBL": providing South African business students with remote access to information**

Lorraine Grobler; University of South Africa; groblm@alpha.unisa.ac.za  
Marieta Snyman; University of South Africa; snymamj@alpha.unisa.ac.za

### **Summary**

Developments in electronic delivery systems and the availability of remote access provide distance learning institutions with many applications to overcome geographical boundaries and bring the world of library and information to the desktop of the remote student. The Unisa Graduate School of Business Leadership (SBL), in conjunction with Athabasca University, Alberta, Canada, have initiated a pilot project to deliver the MBL programme electronically via Lotus Notes. An electronic delivery system (EDS) has been developed for document delivery to students. This paper discusses the background investigation, operation of the system and consequences of the "electronic MBL" to the library for the redesign of existing information and document delivery procedures.

### **1. BACKGROUND**

Distance and off-campus education is an important medium in acquiring postgraduate business qualifications, such as the MBA and business related programmes and courses. The flexibility which distance teaching affords students employed full-time, together with reduced travel requirements makes it an attractive option.

The University of South Africa (Unisa) currently dominates the local distance tertiary education scene in Africa. Its Graduate School of Business Leadership (referred to as the SBL), situated at Midrand, is South Africa's largest business school.

The SBL offers two postgraduate courses, namely the Master of Business Leadership (MBL) and the Doctor of Business Leadership (DBL). Both these courses are similar to the MBA and DBA degree courses offered by other tertiary institutions. In addition to the degree courses, the SBL offers a variety of shorter, non-graduate programmes aimed at the South African business sector.

At the beginning of 1997, the SBL launched an electronic distribution of courseware system for the MBL 1 and MBL 2 programmes. This system is based on a concept designed and implemented at Athabasca University in Alberta, Canada. The system includes of a virtual **T**eaching and **L**earning **E**nvironment, referred to as TALE, as well as facilities to either request or download additional course material, including library material. The entire system is known as the Electronic Delivery System, referred to as the EDS. The term "electronic MBL" is a more descriptive term used by the students enrolled for the course.

### **2. NEED FOR GOING THE ELECTRONIC ROUTE**

Reinhardt (1995) points out that the changing nature of companies and their nature of work, especially with large-scale downsizing and the shift to an information-based economy, is requiring workers and employees to be more flexible and better trained, especially in the use of technology. Business now requires schools to turn out students with a different set of skills than those emphasised in early-twentieth-century education. Employers themselves are using new technologies to educate workers. Technologies that are making the biggest difference in education and training and increasing information

access fall into three main categories, namely, networking, multimedia and mobility. Networking includes LANs, WANs, and on-line services (especially the Internet), as well as applications enabled by networks, such as audio conferencing, videoconferencing, E-mail, collaborative software and instructional management.

Michalski (1995) points out that at Athabasca University, the advantage of their electronic MBA programme has been the exposure of future managers and business leaders to the modern, fast changing world of computers. In today's business world to be computer illiterate is equivalent to the inability to read or write.

Benefits to the SBL in going the electronic route include:

- widening access to the MBL programme, making it truly international;
- teaching students more about business in conjunction with the latest computer technology, i.e. students acquire knowledge about technology and how to utilise it in different business fields, thus gaining competitive advantage after graduation;
- enriching the teaching and learning environment (TALE) with additional activities, e.g. multimedia, CBI, CAI, Worldcom databases, etc;
- reducing turn-around time of assignments and exams. Students can upload their work and deliver it to lecturers almost instantaneously, thereby completely eliminating the post office system;
- eliminating the print phase of the course production process, speeding up course development significantly with a substantial reduction in printing costs;
- absence of geographical limitations.

### **3. THE SBL'S ELECTRONIC DELIVERY SYSTEM (EDS)**

#### **3.1 Overview**

The most important aim of the system is to improve and facilitate communication between the SBL and its distance or off-campus student corps. The general aims of this system are to cut down on the overall production cost per student, to diminish the need of a postal system and to achieve the basic principles that are the trademarks of distance learning institutions. Auxiliary aims of the EDS are to provide students with an opportunity to increase their computer literacy skills and to familiarise themselves with remote or dial-up connections to a server.

The EDS makes extensive use of the Lotus Notes software package. A Lotus Notes server, situated at the SBL campus at Midrand, is used as a central distributing facility. By means of the replication process on Lotus Notes, most of the processing, such as composing mail or planning an assignment, is done on the students personal workstation/computer without the need of being connected to a server. With the replication process, changes are sent from a student's computer to the Notes server at the SBL. Any changes that have taken place on the server before the student has accessed it are sent to the student. The Lotus work space consists of specially designed, menu-driven interfaces, referred to as databases. These databases are flat databases and are normally populated with records known as documents. During replication, Lotus Notes checks whether or not documents have been added or modified and only the modifications or additions are transferred to the specific databases. This allows the students to use the full potential of a personal computer without being limited to the SBL server's processing capabilities. This process decreases the connection time to the server and thus reduces a student's telephone costs.

### 3.2 Basic operation of the electronic MBL

Presume a student has to submit an assignment and also needs to send a message to a fellow MBL student who also has access to the Lotus server. The student will start by designing and planning the requested assignment by using the application software on his or her workstation which could be in Cape Town, Harare or London. After finalising the assignment, the student will use a database to submit the assignment. The student will also use another database to compose a mail message to the fellow student. The student will then access the Notes server at the SBL and replicate. Since only two documents have been added, only the relevant databases will be replicated. Any changes that have taken place before the student replicated, such as messages that have been sent to the student, will also be sent to the student's workstation. The student will be able to read the changes, such as mail messages, by using Lotus Notes **without** being connected to the server. This has a cost-saving benefit for the student. The estimated time for the replication process to be completed is about ten minutes (19200bps) in which about 1MB of data can be transferred.

Presently the SBL offers 16 courses and has 120 functional databases. There are about 1000 users registered on the server. The average growth of new users, that is, students that access the Notes server for the first time is about 80 students per week.

### 3.3 Available databases on the SBL's EDS

There are various databases that are distributed for each course. These include:

- **Courseware** which consists of electronically delivered courseware, placed in electronic format with hypertext links to different parts of the course and other electronic activities on the system.
- **Electronic Mail** which is part of the Lotus Notes software package with a connection to the WorldCom company which allows students to send and receive e-mail messages via the Internet.
- **Group Discussions** which enhances and may possibly eventually replace the physical weekly student group discussions.
- **Help** which is a self-help activity allowing students to post questions regarding the course and permitting other fellow-students to respond to them. For proper responses and to ensure the integrity of any information posted, this activity could be monitored by the lecturer for the course concerned.
- **Individual assignments** which would allow students the opportunity to electronically post assignments to the course tutors or markers.
- **Group Assignments** which would allow a group of students to electronically post assignments to the course tutors or markers
- **Subject Groups - open discussion** which would allow all students to participate in discussions on topics related to the course.
- **Case discussion** which is developed for those courses having several cases and for the lecturers who want to have discussions related to each case study.
- **Course evaluation -TQM** which enables students to do an evaluation of the course on the course evaluation questionnaire available on the system.
- **News** which posts all recent and relevant information pertaining to the course.

- **Personal profile - Alumni** which is designed for students to voluntarily post their personal information in order to network.
- **Library** which enables students to forward requests for books and articles to the Unisa Library. This aspect is discussed in full in section 4 of this paper.

### 3.4 Cost to the student

The cost per student is very difficult to determine and depends to a large extent on the availability of, or access to a computer by the potential student. A random sample of 32 MBL 1 students indicated that 100% have access to a computer either at home or in the workplace.

For the purpose of this paper, both a worst case and a most likely scenario is presented:

- **Worst case scenario - R9 000.00** (all equipment has to be purchased by the student)
  - Computer R5 500.00
  - Printer R1 500.00
  - Modem R1 300.00
  - Software R 800.00
  - Telephone charges

per month R 50.00

- **Most likely scenario - R2 000.00**
  - Modem R1 300.00
  - Software R 800.00
  - Telephone charges

per month R 50.00

### 3.5 Requirements to run Lotus Notes

Lotus Notes runs on different platforms and supports Windows, Presentation Manager (OS/2) and Macintosh.

#### 3.5.1 Configurations

**Table 1: Minimum Configuration**

Peripherals	IBM	MAC	Comments
Computers	486, Pentium, IBM compatible PC	Mac II, SE30, LC, Performa, Quadra, PowerBook (except PowerBook 100), Centris.	Hard disk with 40 MB of free space is recommended for data storage for duration of programme.
Monitors	Windows - all Microsoft supported displays (EGA, VGA, SVGA, XGA, IBM 8514)	All Macintosh compatible monitors	
	Windows - all Microsoft windows	All Macintosh supported printers	Choice of printer is up to

Printers	supported printers; OS/2 - all OS/2 supported printers		the student and is bases on print quality desired. It is recommended to have a higher quality printer.
Memory	Windows - minimum 4 MB RAM, recommended 8 MB: OS/2-OS/2 version 1.3 or higher with Presentation Manager, with 8 MB of RAM or more.	5 MB RAM recommended or more.	Required to enhance responsiveness and speed of system.
Operating system	Windows-MS-DOS or PC-DOS version 3.1 or higher with Presentation Manager	System 6.0.4 and higher, 7.0 recommended.	
Modems	14400 baud modems, Hayes V-series Ultra and Optima Smart modem 14.4, Practical Peripherals PM 14400 FXSA v.32bis, US Robotics Sportster 14400 v.32/v.42bis.		Speed recommended to reduce on- line charges.

(Michalski,1995)

### **Recommended configuration**

- **Windows**

- 486 DX 33 or higher
- 200 MB or more of hard disk (based on IDE or SCSI controller)
- 8 MB or higher RAM
- 1 MB SVGA video (local bus or VL-bus video)
- 14" SVGA monitor

- **Macintosh**

- LC IV or Power PC
- 160 MB or more of hard disk
- 8 MB or higher RAM
- A colour monitor. (Michalski, 1995)

## **4. THE LIBRARY DATABASE**

### **4.1. Integration of the EDS within the present library IT infrastructure**

Software from different companies are not easily integrated into one system. One would therefore expect problems to arise when Lotus Notes is integrated in the present library IT infrastructure. Lotus Notes is not used elsewhere in the University. Integration was done within the boundaries of the present environment, but future trends were kept in mind when procedures (often tedious) were established. Quick-fix solutions by introducing additional new software that might be compatible with overall IT strategy of the library were avoided.

### **4.2 Integration within the Document Delivery Division**

The Unisa library on the main campus handles all book and periodical requests. Articles are scanned in at the main library by the Periodicals Subdivision, and then mailed electronically using Lotus Notes to the students. Book requests are received electronically and the actual books are posted to the students in the conventional way.

#### **4.2.1 Integration within the Periodicals Subdivision**

Lotus Notes has been installed on two workstations in the library, namely, in the Periodicals Subdivision where periodical requests are received and processed and in the Inter- Library Loans Subdivision on the Ariel workstation. Two dedicated telephone lines have been installed for remote access. A laser printer is connected to the workstation in the Periodicals Subdivision to print requests received.

The workstation in this subdivision is used for receiving periodical and book requests and the electronic delivery of articles. Any messages to students regarding the unavailability of articles which have been referred to the Inter-Library Loans Subdivision are transmitted electronically to the students.

#### **4.2.2 Integration within the Inter-Library Loans Subdivision**

This subdivision currently uses Ariel which is a document transmission system from the Research Libraries Group. It provides fast, inexpensive, high-quality document delivery over the Internet, integrating scanning, sending, receiving, and printing into a single, easy-to-use system.

Articles requested and received via Ariel for MBL students need to be transmitted electronically through the Lotus Notes e-mail facility. In order to facilitate this, Lotus Notes was loaded on the Ariel workstation in the Inter-Library Loans Subdivision. Problems arose as Ariel is incompatible with Lotus Notes with regard to the format. An Ariel file is a standard multi-page

.TIF file compressed to the Group IV fax standard and preceded by a Group on Electronic Document Interchange (GEDI) header. In order to view it, one would require a programme that is capable of reading or removing the GEDI header and handle multi-page .TIF files. There may be viewers available to meet these requirements, but this option still needs to be investigated.

The ideal solution would have been to attach the received article from Ariel to Lotus Notes and send it electronically to the students. If students have access to a MIME (Multipurpose Internet Mail extensions)- compliant e-mail client Ariel mail can be retrieved. This is not possible yet, and these articles requested and received through Ariel need to be printed and then scanned in for delivery through the Lotus Notes system. Messages to students on articles or books not available through ILL are sent electronically to the students.

### **4.2.3 Maintaining a database**

Articles for MBL students are scanned in by request and there is no need to store these articles permanently as they are once-off requests. Image files use large amounts of computer storage and for this reason documents should be removed as soon as they are no longer required in order to accommodate new documents. No database is envisaged for MBL students using the EDS at this stage.

### **4.2.4 Scanning**

The current flat bed scanner used in electronic delivery for the EDS through Lotus Notes has certain limitations. The images produced are not always up to standard and cannot be edited. This necessitates scanning parts of the articles again until the image is of an acceptable standard. Bound periodicals are too bulky to scan.

The scanner software scans only one image per file, which means that an article of ten pages is put into ten files. This creates large files, and in order to decrease the size, the files could be compressed using PKZIP, creating only one file. This compressed file is attached to an e-mail message and then mailed to the student with the necessary instructions to decompress the attached file. The student will have to detach it, decompress it and then import each file separately into a .TIF viewer to be able to read the article. This could be a very cumbersome process. This system was not introduced, and the Adobe Acrobat 3.0 is being used instead..

### **4.3 Staffing**

A library staff member in the Periodicals Subdivision signs on to the EDS system in the mornings between 8:00 and 10:00 and makes a print-out of all the completed request forms received. This is the only time that the laser printer is available. Book requests go to the section responsible and periodical requests go to the Periodicals Subdivision. The staff locate the periodicals on the shelves. Requests from periodicals which are not available or held by the library are sent to inter-library loans. A staff member in the Periodicals Subdivision is responsible for the scanning of articles requested and staff in the Inter-Library Loans Subdivision are responsible for processing the transmission of the articles received through inter-library loan.

### **4.4 Staff training**

Two library staff members were trained by the SBL in the use of Lotus Notes as regards filling specific requests for articles in periodicals and book requests. Further training will be required as further library facilities are added and staff assigned to operate the system.

### **4.5 Present Status**

An experimental library request module for the Lotus Notes EDS system was implemented in February 1997 in the library's Document Delivery Division and will be operating as a pilot project for the remainder of the year. The phasing- in of the system involves only first and second year MBL students. It is envisaged that the project will be fully implemented by 1999.

#### **4.5.1 Lotus Notes Library Database**

A Library database was developed on Lotus Notes. This database consists of forms for article and book requests as well as general library inquiries. The students need to fill in these forms and send their requests electronically via Lotus Notes e-mail facility.

#### **4.5.2 Adobe Acrobat**

Adobe Acrobat 3.0 was acquired as it was considered as being the most suitable solution at present for viewing articles sent via the Lotus Notes e-mail facility. Adobe Acrobat allows users to create a document in any application and share it across platforms without any loss to its original style . It creates .PDF (Portable Document Format) files via a scanner from any printed page. The free Acrobat reader can be downloaded from Adobe's Website. It is possible for any MBL student who has e-mail facility to receive an article in .PDF format and view it with the Adobe Acrobat reader. The Adobe Acrobat Capture makes it possible to assemble many images that belong to a single document into a single file. This means that the students can browse the pages as a document using the Adobe Acrobat reader and print them all at the same time.

To date only a few requests have been received by the library through the Lotus Notes EDS system. There could be different reasons for the lack of usage. Among the reasons are lack of knowledge of the system, computer literacy, or students reluctant to start using the new system, preferring the conventional print-based and manual postage system. This is an area that requires further investigation by the SBL.

## **5. THE FUTURE OF THE EDS SYSTEM**

### **5.1 Integration of the EDS with the library's electronic reserve system**

The Document Delivery Division did a feasibility study on the possibility of replacing the present manual system used for storing recommended articles supplied to undergraduate and honours students with a suitable electronic reserve type of system. With this system, articles are scanned into a database and stored on a file server. Software for searching and processing of requests would be networked so that students visiting the library can select and print articles themselves. Searching and processing of requests from remote stations directly by end-users must be possible. The system must make provision for transmitting documents electronically by e-mail to the end-user.

The scanner planned for the electronic reserve system is more advanced because of its face-up scanning method, improved quality, and faster scanning. The scanner software allows for the scanning of a batch of images and the distribution of documents via e-mail, fax or on-demand print immediately. Since the scanning would be done in one central location by staff trained for this purpose, the mailing of the requests to students will be done by different staff members trained in the use of the EDS. Staff members presently handling the requests on the Lotus EDS system are also involved with the scanning process. This has proved cumbersome and is receiving attention.

## **6. LOTUS NOTES AND THE INTERNET**

Lotus Notes and the Internet are two completely different approaches to electronic delivery and connection time to the server. As pointed out in section 3.1, Lotus Notes is based on the extreme off-line and replication method which minimises the connection time and saves costs to the student. The Internet is a very attractive option which allows users to explore a wide range of information resources available around the world. However, connection time to the system is longer and can be costly.

The following table compares connection time between Lotus Notes and the Internet based on a required 15 hours of study time per week per MBL student.

**Table 2 : Comparative connection time**

	<b>Minutes</b>	<b>Times per week</b>	<b>Speed</b>	<b>Minutes per week</b>	<b>At 2400</b>
<b>Lotus</b>	2	3	9600	6	24

<b>Notes</b>					
<b>Internet</b>	180	5	2400	900	900

(Michalski, 1995)

The Lotus Notes connection time is the minimum possible and the Internet connection time is the maximum. The above calculations are based on the assumption that everything is located on the server connected to the Internet all of the time which is the extreme case scenario.

As shown in the following table, the number of concurrent users utilising the system and browsing through various Internet resources and the long connection times places high demands on the server and its communications lines.

**Table 3: Off-line and on-line connections**

	<b>Connection time per day per one user in minutes</b>	<b>Number of connections possible to make per day per one port</b>
Off-line (Lotus Notes)	5	288
On-line (The Internet)	180	8

(Michalski, 1995)

The Athabasca University experience has shown that with Lotus Notes, 8-10 ports (telephone lines with modems) can easily handle 500 students. If this is compared to the required infrastructure using the extreme connection time for the Internet, the number of modems is close to 50 (or more if one calculates peak hours).

Lotus Notes Release 4.1 has a built-in browser that allows a user to connect to any Web site by entering a URL. Notes databases can also be made available to any Web user via Lotus's Domino, the free Notes server add-in process takes any Notes database and converts documents to HTML.

The MBL students work in study groups with a group leader. A requirement is that at least one member of the group has access to the Lotus Notes EDS system. As more students are getting Internet access it will be necessary to create a Lotus Notes mail box for requests and mailing of articles. Course material could also be made available through the WEB.

Presently, the extreme off-line and replication method is more cost effective for the student. Future releases of Lotus Notes such as Lotus Notes Releases 4.1 will make the Internet more viable.

## **7. THE EDS: "A LOTUS GARDEN, NOT A ROSE GARDEN"**

Berkman (1995, 206) comments that Lotus Notes is not a "rose garden", but a "lotus garden" as all of the "kinks" have not been worked out. This became very evident with the integration of the EDS within the present Unisa library IT infrastructure.

In addition, as Notes allows students to create his or her own mini databases, ensuring data integrity becomes a major problem. Furthermore, students using the system have

commented that they have to deal with increasing information overload. The overflowing postal in-tray is being replaced by overflowing e-mail messages, icons, online news clips and other electronic items that appear whenever the students switch on their PCS. Neither has the physical postbox crammed with paper exactly disappeared. Further course material not yet on the EDS system is posted to the student in the conventional way and is print-based. Add to this the busy work schedules of most business students, phone mail messages, fax transmissions, domestic commitments, etc, it is clear that the biggest challenge to the student is managing information.

This is a major opportunity for the Unisa Library to further refine traditional library training to include the management of information. The SBL subject librarians are presently collaborating with the SBL lecturers in this regard. The current changes in the use and distribution of information at distance tertiary institutions, provides a critical role for librarians as team players and essential partners with faculty in the overall learning process.

The African environment poses many challenges for us in finding means of bringing technology closer to our business students. We are not there yet... we are not even close, but the inevitable movement in that direction with the electronic MBL is most exciting, with substantial benefits for our distance business students.

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**Biography - Lorraine Grobler** has a B. Bibl(Hons) from the University of South Africa. Her library career started at the Bloemfontein Public Library in 1971 and since then she has worked in the field of corporate and academic librarianship. She is presently co-ordinator of the SBL Subject Librarian team and Head of the SBL Reference & Information Centre at Midrand. She is currently serving as a member on the Program Advisory Board for Off-Campus Library Services, which is affiliated to Central Michigan University Libraries and the CMU College of Extended Learning in the USA. Dept of Library Services, University of South Africa, P O Box 392, Pretoria, 0001 South Africa; E-mail: groblm@alpha.unisa.ac.za

**Biography - Marieta Snyman** completed the B.BIBL degree at the Rand Afrikaans University in 1980. She started working in the Unisa Library in 1987 in the Cataloguing Division. Since 1996 she has been working in the Information Technology Support Services Subdivision that forms part of the Library Management Service Division. She is responsible for IT Project Management and IT Project support in the library. Dept of Library Services, University of South Africa, P O Box 392, Pretoria, 0001 South Africa; E-mail: snymamj@alpha.unisa.ac.za