South African Journal of Information Management
[DoE accredited]
Peer Reviewed Article
Vol.6(3) September 2004

Streamlining the integration between INNOPAC's electronic course reserves and WebCT

C. Rensleigh
Department of Information Studies, Rand Afrikaans University
cr@rau.ac.za

C. de Beer
Web Manager, Rand Afrikaans University
cdeb@rau.ac.za

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Key words: Online academic environment , electronic course reserves (ECR), integration, WebCT, INNOPAC

1 Introduction

This article is a discussion of how electronic information resources can be used inside the online academic environment and in particular how the electronic course reserves (ECR) module of INNOPAC can be integrated with the WebCT environment.

In the online academic environment, the trend is for information sources to be integrated and made available via a single point of entry. Such information sources mainly consist of copyrighted material that is effectively managed by ECR systems. These systems administer and control access to the copyrighted material, that is ECR documents.

This article consists of two parts. The first focuses on the online academic environment and the role of the Internet. It continues with a brief discussion of the online academic information sources and virtual libraries. The latter part of the article focuses on the Rand Afrikaans University's online academic environment and a practical method of integrating an

ECR system with this online environment.

1.1 Research problem

The research problem is formulated as follows:

How can a more effective online learning environment be created for Rand Afrikaans University students with regard to authentication and the accessing of ECR documents when integrated with the WebCT environment?

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2 Online academic environment

Fundamentally, a university is a community holding conversations about knowledge (Scott 2003). It is an institution in the tertiary education sector where people work together to educate, do research and other scientific activities as well as to prepare people for their future careers (Pauw 1975:13).

A more formal definition according to the Oxford English Dictionary (Oxford 1987:3518) is:

'The whole body of teachers and scholars engaged, at a particular place, in giving and receiving instruction in the higher branches of learning; such persons associated together as a society or corporate body, with a definite organisation and acknowledged powers and privileges (esp. that of conferring degrees), and forming an institution for the promotion of education in the higher or more important branches of learning; also, the colleges, buildings, etc., belonging to such a body.'

The latter part of the above definition refers to physical buildings and therefore to the more traditional type of university. The educational world has been changing rapidly and in order to expand the student base; the use of the Internet and information and communications technologies (ICT) is becoming an important and integral part of the learning and teaching strategies of many universities world-wide. In fact, it is becoming a major trend in higher education. One such area in higher education where the use of ICT is flourishing is distance learning.

2.1 Defining the concept 'distance learning'

Distance learning can be defined in many ways. Some define it as the use of print or electronic communications media to deliver instruction when teachers and learners are separated in place and/or time. Another definition of distance learning is (Mullins 2004):

'The process of extending learning, or delivering instructional resource-sharing opportunities, to locations away from a classroom, building or site, to another classroom, building or site by using video, audio, computer, multimedia communications, or some combination of these with other traditional delivery methods'.

There is indeed a variety of definitions for 'distance learning' but all have the following components:

- teacher(s) and student(s)
- separation by time and/or space (geographic distance)
- communication mediated by technology.

What distance learning really means is that *instruction can be moved to the people*, rather than *moving the people to the instruction*. In the context of this article distance learning can be seen as an extension of the traditional university (face-to-face contact) in order to reach a wider student base.

2.2 Internet-based online learning

Distance learning via the Internet can be facilitated through any number of the following (Wulf 1996:51):

- electronic mail (delivery of course materials to students, sending in assignments to lecturers, getting and giving feedback, etc.)
- bulletin boards/newsgroups (used for the discussion of special topics)
- downloading of course materials or tutorials via FTP
- interactive tutorials on the Web
- real-time, interactive conferencing using multi-user object oriented (MOO) systems or Internet relay chat (IRC)
- intranets for the distribution of training for employees
- the use of online databases, library catalogues and search engines and Web sites to acquire information and pursue research related to studies.

Any and all of the above, and in any combination, can be used to facilitate online learning via the Internet. The variety of options available makes it possible to facilitate different student needs.

Based on the above, higher educational institutions can market their services according to the following (Ryan, Scott, Freeman and Patel 2000:134):

- A regional focus;
- concentrating on attracting students from a more narrowly defined geographical location and making extensive use of their ICT on the university campus;
- a global focus; and
- competing in a global market with like-minded institutions. The Web as a technology is making this potential market a reality. The globalization of teaching and learning in higher education has been stimulated by among other things the following two major innovations:
- the first is the growth in ICT that allows fast, cheap and user friendly means of communication
- the second is the growth of English as the *de facto* global language (Sperling 1999:110).

2.3 Advantages of using the Internet for online learning

Online learning can be facilitated via many different mediums. The following are some of the advantages of using the Internet (Bates 1995:203; Kerka 2004; Sandelands 1998:75):

- time and place flexibility
- potential to reach a global audience
- no concern about compatibility of computer equipment and operating systems
- quick development time, compared to videos and CD-ROMs
- quick and easy communication via e-mail
- easy updating of content, as well as archival capabilities
- lower development and operating costs, compared to satellite broadcasting
- access to essentially unlimited sources of information

- allows for the creation of unusually rich course materials.

Carefully designed Internet courses can enhance interactivity between lecturers and students and among students themselves. With the use of Internet technologies, one can reach a more widely dispersed audience with the same (or less) effort than if one had to travel to many sites to give the same presentation. In addition one would also be able to incorporate a variety of media into the learning presentations.

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3 Online academic information sources

Today's virtual higher education environments, using ICT in teaching, learning and research, have created new challenges and opportunities for tertiary institutions, in particular information sources that can be used for academic purposes. It must also be said that students and lecturers still have a need and use for information that is in a traditional (printed) as well as electronic (digital) formats.

A variety of electronic information sources can be used inside the online academic environment. These include electronic journals, e-books, e-databases, online public access catalogues (OPACs) and Web sites (Rensleigh 2003b). Even non-electronic materials can be made available electronically when digitized.

Digitizing printed material to make it available in an electronic format offers the potential for greater remote access by large numbers of users in a local and remote environment, and for increasing the value of the material by adding keyword searching facilities and hyperlinks to related information sources. Most electronic information sources are moving towards the Internet as a medium for access and distribution.

3.1 Virtual libraries

While brick-and-mortar libraries have done their best to stretch their traditional resources, they still need to confront the changing nature of demand for online services (Stern and Connaway 1999:298). In an era of digital information and the growing popularity of the Web, it is clear that the field of electronic libraries is rife with possibilities, and holds tremendous advantages for publishers.

The features of traditional libraries are common to virtual libraries. However, virtual libraries add to these the use of the Internet as service delivery mechanism (Moore 2000:422). The dexterity of the Internet allows for a significant increase in the efficiency and effectiveness of traditional library services. The virtual library is not bound to normal working hours as it is accessible 24 hours a day, seven days a week and 52 weeks a year (Hooper 2001:72). Traditional academic libraries are predominantly located as close to the students as possible, whereas virtual libraries are not bound to a specific demographic location because their users can be anywhere in the world. Distance is no longer a critical factor as the Internet makes every Web site throughout the world only a click away.

Standing between the traditional library and the virtual library is the hybrid libraries, a combination of the two. Changes in teaching methods have placed additional strains on traditional library resources encouraging the transformation (Dugdale 1999b:150). A successful hybrid library would offer users seamless access to integrated print, electronic, local and remote resources.

3.2 Electronic course reserves

One of the information resource systems typically included in virtual libraries is electronic course reserves (ECR). This system makes copyrighted material, such as journal articles, book extracts, newspaper cuttings, etc. and non-copyrighted material, like lecture notes and study guides, available to the traditional student as well as to the distance/non-traditional student.

It offers a solution to the problem of increased demand for scarce resources resulting from today's pressures of a changing student population and new pedagogic trends (Dugdale 1999a:17). An electronic equivalent of printed material is placed in the electronic reserves where it is convenient and accessible for researchers, students and other users.

ECR have multiple advantages over hardcopy material as students (Brigham, Ronallo and Sneff 2001:56, Dugdale 1999:17; Konicek,Hyzny and Allegra 2003:102):

- can access reserve material from any place at any time regardless of library hours;
- can access the same article simultaneously;
- are not affected by copies not being returned; and
- are not influenced by theft and defacement of articles or missing pages.

3.3 Copyright

Copyright licensing has developed throughout the world as the main solution to problems caused by photocopying. Under most copyright legislation, the permission of the copyright owner is required before copies may be taken beyond the limits set out by the law (Davies 1999:60). As far as photocopying is concerned, considerable progress has been made over the past 20 years and the next great challenge is in electronic copying (Davies 1999:62).

Ang (2001:384) points out that although copyright has always been about protecting the non-material expression in a work (as opposed to the vehicle in which the expression is embodied), the digitization of the medium in which the expression is captured has interesting consequences on the effectiveness of copyright:

- Equally good copies can be made available at very low costs; and it may be worked on and transformed and even distributed worldwide. This weakens the practical effectiveness of copyright.
- The use of the content in this medium involves an electronic copy of the content. This means that, to the extent that copyright law can and does extend control over such electronic uses, copyright becomes more important and valuable to the owner.
- The digitization of content means that it is more subject to technological control and manipulation.
- As the electronic digital medium becomes increasingly the primary mode in which the content is published, stored and circulated, it also becomes increasingly the medium in which libraries will deal with content.

Traditionally copyright laws have been seen as the protector of the rights of the copyright owner. The arrival of the Internet has given rise to global dissemination possibilities that have the potential to undermine the traditional model of publishing and copyright (McKnight 1996:30). The Internet and digital technologies have increased the potential for copyright infringement one hundred-fold (Oddie 1999:239).

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4 Online academic environment at the Rand Afrikaans University (RAU)

The RAU has adopted a multi-modal flexible education model to serve distance as well as residential students. This approach makes course content available in three forms:

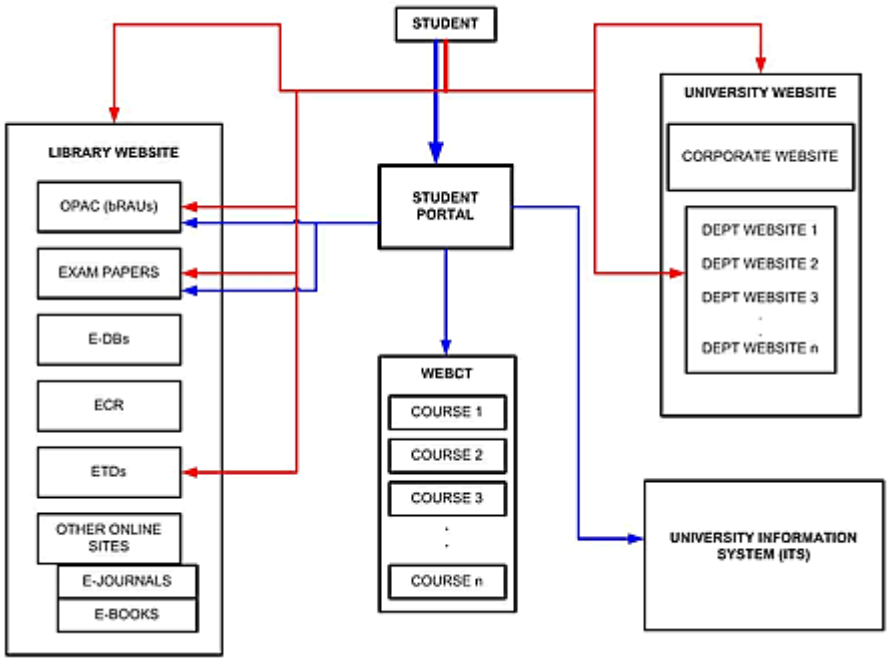
- All content printed in the form of a course pack
- Course content made available in an electronic format on a CD-ROM
- Course content made available online via the Web.

Contact sessions between lecturers and students vary from full contact (residential) to limited contact (distance). To facilitate the online academic environment, RAU has opted for the WebCT platform which was dubbed *Edulink*. Students log on to a central Web environment called the *Student Web*. Once logged onto this Web site, access to various information systems is available as illustrated in Figure 1 (Rensleigh 2003a).

Included in these are the following academic information resources as provided by the University Library and Information Centre (LIC) at RAU (Rensleigh and De Beer 2004):

- Online public access catalogue (OPAC)
- Electronic academic information databases (E-DBs)
- Past examination papers
- Electronic theses and dissertations (ETDs)
- Electronic course reserves (ECR).

Figure 1 Visual layout of information sources available in the student online environment



4.1 The RAU electronic course reserves

The university library and information centre is powered by an INNOPAC platform. As with any modern-day information system, it has been designed to be modular. As part of this system is an electronic course reserve module. During 2003 a sample of students tested the viability of this system (Rensleigh and Van der Westhuizen 2003). The results were very favourable.

The RAU ECR process works as follows:

- The lecturer decides on the documentation to circulate to students. If copyright is applicable, a copyright application is made with the Dramatic, Artistic and Literary Rights Organisation (DALRO). The University Library and Information Centre (LIC) strictly adheres to copyright guidelines and pays for copyright clearance for any article placed on reserve that exceeds fair use guidelines.
- The lecturer supplies the copyright tariff and original documentation to the LIC.
- LIC administration creates a record in the system.
- The original document, if not in an electronic format (PDF), is scanned and loaded into the system.
- Students use the system.
- The total copyright fee is paid annually by the university to DALRO. These charges are absorbed by the university and are not passed on to students.

Access to the electronic course reserves via the OPAC is gained as follows: Students:

- access the university OPAC
- select the course reserves option
- specify the lecturer and course (Figure 2)
- select the electronically available document
- supply user surname and number (Figure 3)
- gain access to the document.

Figure 2 shows the course reserves available for the specific lecturer. In this instance, three printed copies are available in the LIC for photocopying. In the centre of the screen is a link to an electronic version of the same content.

Figure 2 Example of the ECR system after the lecturer surname has been specified

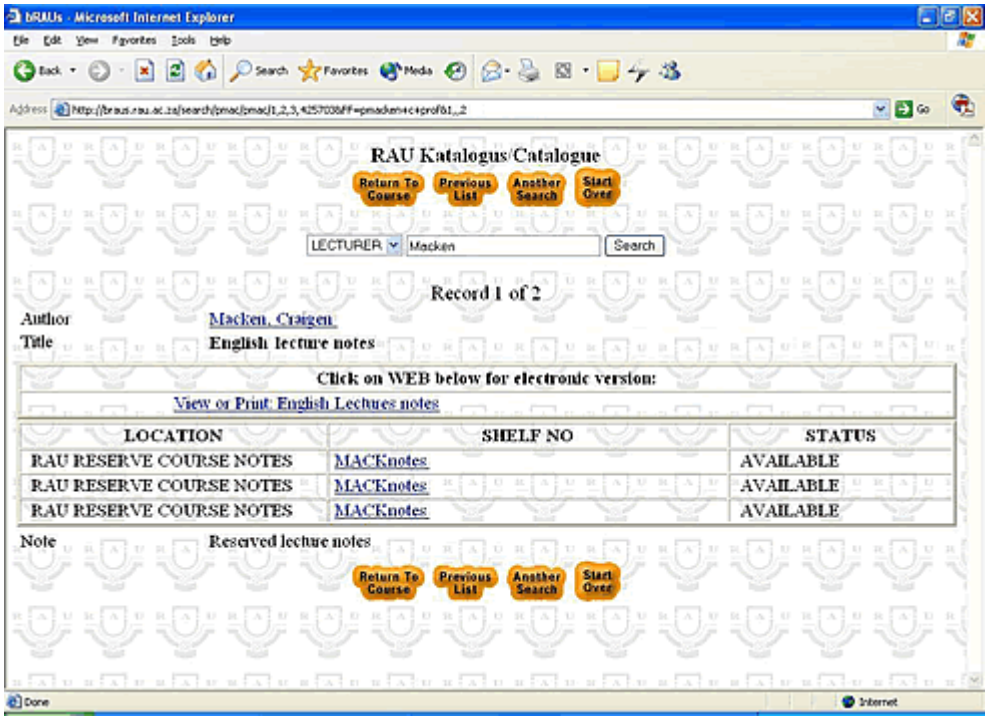


Figure 3 depicts the screenshot before the user surname and number is supplied. Only RAU registered students and staff members will have access to this system. Take note of the copyright warning visible at the bottom of the screen. Additional information visible for this electronic document is that it is 16 pages long and in a portable document format (PDF). There is no fee to be paid with regard to copyright for this specific document. After the user

has been authenticated, the content of the document will be made available (Figure 4).

Figure 3 Example of the ECR system waiting for the user name and number to be specified

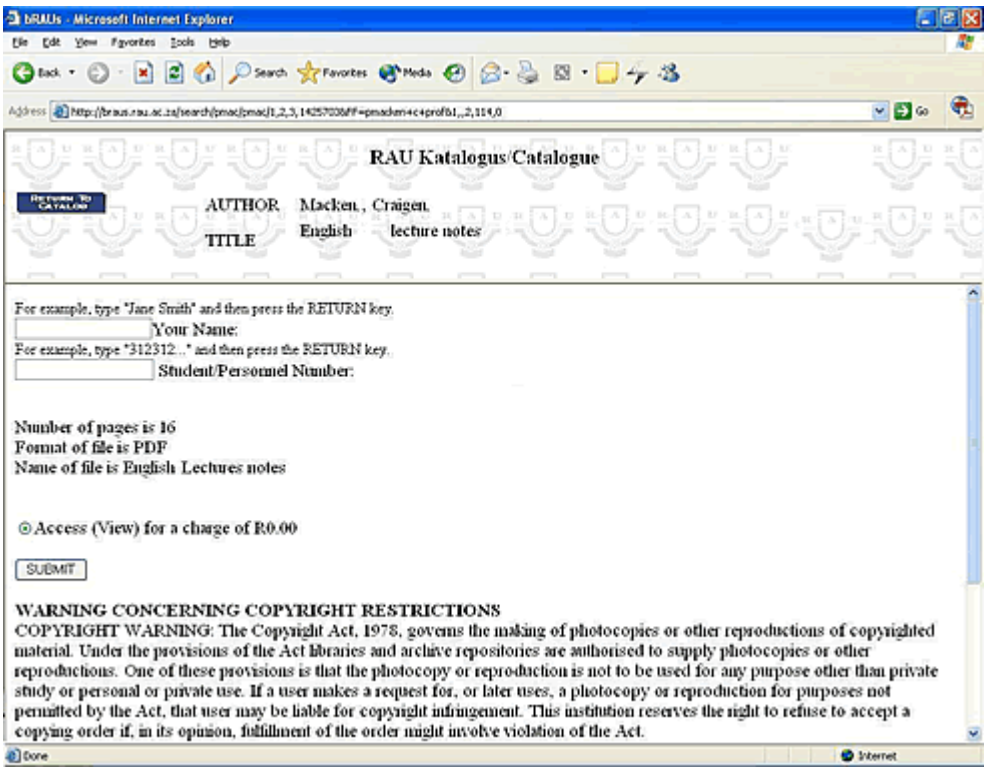
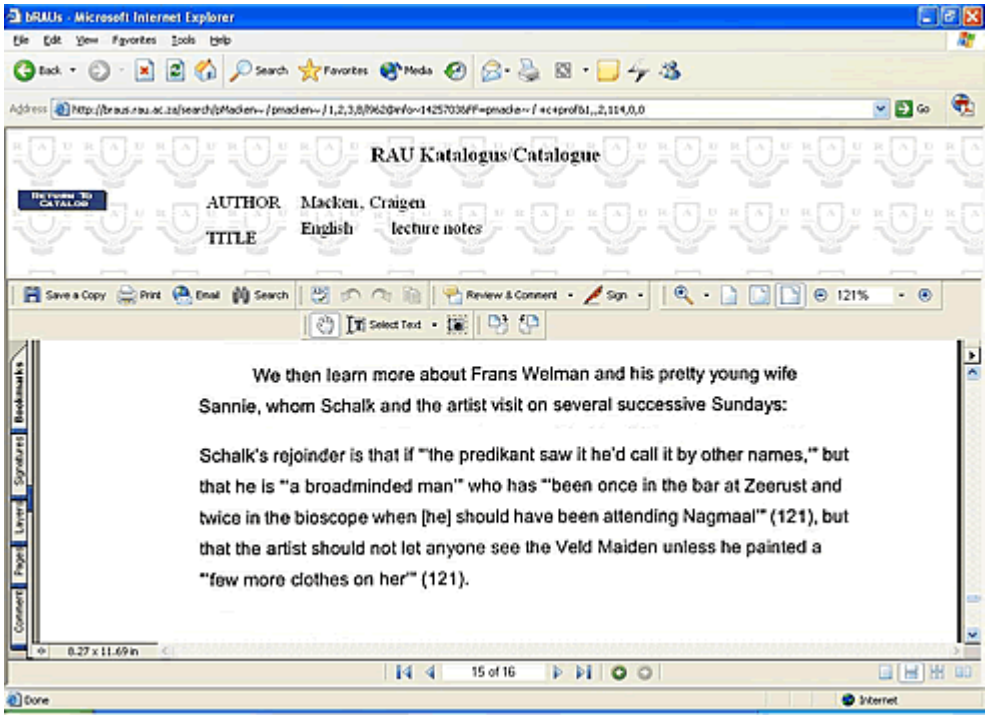


Figure 4 Example of the ECR system after the user has been authenticated



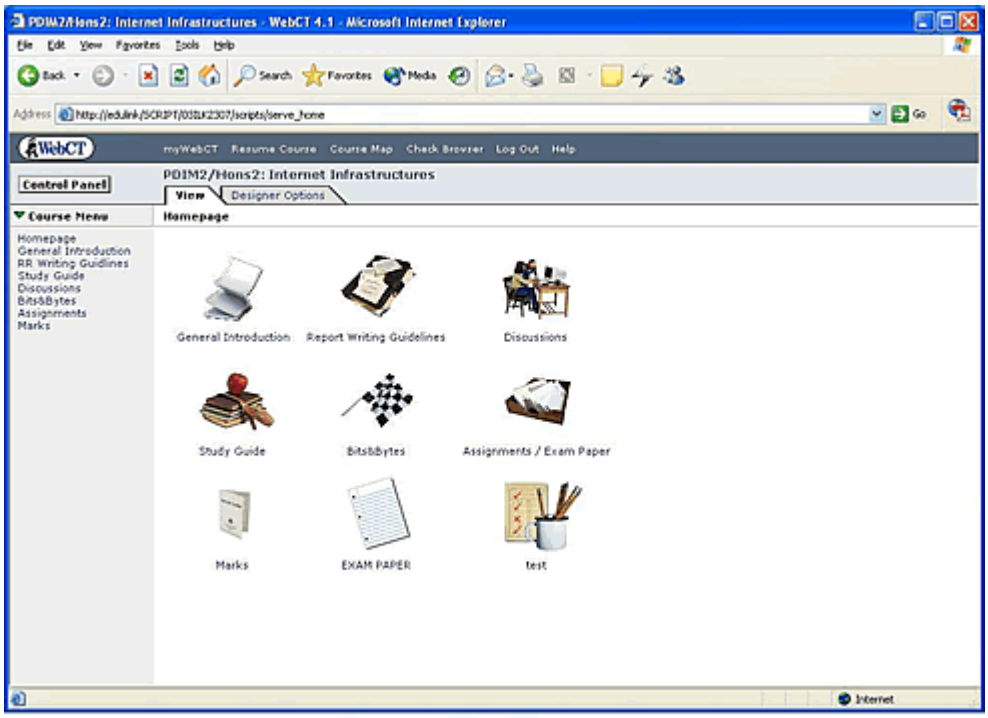
4.2 Integrating the electronic course reserves into the Edulink environment (WebCT)

The university online academic environment, Edulink, is a very powerful and versatile environment. There are many facilities that can be utilized, for example, a discussion forum,

assignments uploading, bulletin board and glossary. The main advantage is that it is inside the Web environment. Figure 5 shows the different components of an example of an online course built in the WebCT environment.

Hyperlinks to relevant internal (lecture notes, handouts, assignment details, etc.) and external (past examination papers, journal articles, etc.) course content can be created very easily. A very helpful application of this functionality is that lecturers do not need to copy and distribute documents as these documents can be accessed by students who have lost or failed to collect copies (Dugdale 1999a:18).

Figure 5 Example of the components of an online course build on a WebCT platform

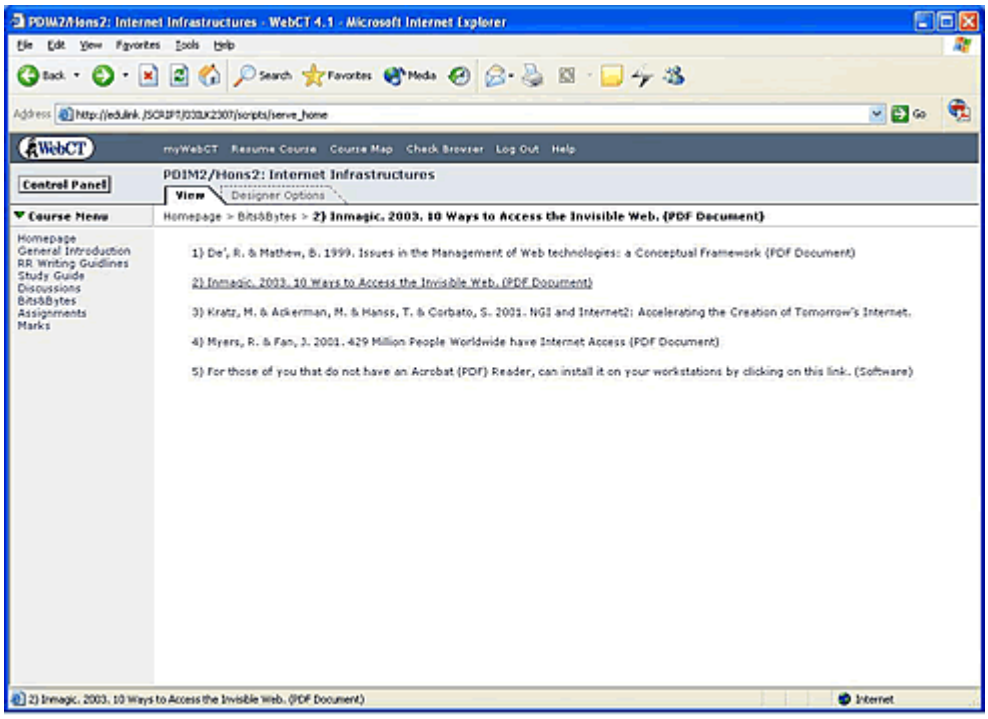


The content under the ‘Bits&Bytes’ section in Figure 5 is value-adding reading material that was not available when the original content was uploaded at the beginning of the course. Figure 6 is an example of hyperlinks to such content.

Most of the time content of this nature is copyrighted. Owing to the necessity to obtain copyright clearance, items made available on an electronic reserve system usually take a significant amount of time. Most online academic environments make it very easy to share an electronic document, such as a journal article, with registered students. With this in mind, the temptation is always there to refrain from not obtaining the required copyright clearance.

This brings us to the essence of an electronic reserve system which has the purpose of efficiently managing the flow of information to the maximum number of students at any given time in the most user-friendly and effective way as possible (Dugdale 1999a:19).

Figure 6 Example of the hyperlinks to electronic (PDF) documents



- For a RAU student to get access to these ECR documents, he or she needs to exit the WebCT environment and logon to the ECR system and follow the authentication procedure as described in section 6.1 of this article.
- A better alternative is to use a hyperlink from the WebCT environment to the ECR system homepage and from there follow the authentication procedure.
- A third alternative is to use a hyperlink from the WebCT environment to the specific ECR document, which is stored inside the ECR system. To do this an authentication script needs to be activated once the hyperlink is used.

Access to the ECR via the WebCT authentication script is gained in the following way:

- The student activates the hyperlink to the ECR document
- The copyright warning is displayed and waits for acknowledgement
- The student clicks on ‘continue’
- The required authentication parameters are passed to the ECR system
- The required ECR document is displayed.

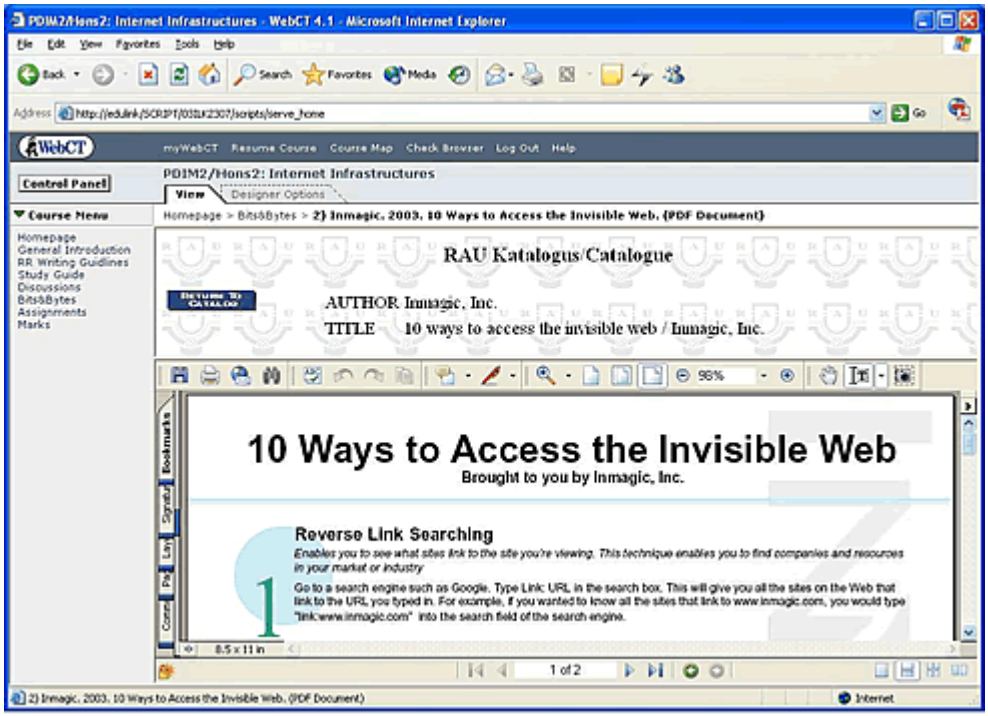
Table 1 compares the two methods discussed in this article to get access to copyrighted documents in an ECR system. The number of steps required to get access to the ECR documents are considerably less for the WebCT authentication script. One of the major advantages of using the authentication script is that the document is opened inside the WebCT environment (Figure 7) and the utilization of the document is managed from within the ECR System. In other words, the ECR system registers a valid use of the document. From the students’ point of view it appears as if it is one system, the user-interface is the same as well as the look and feel.

Table 1 Comparing two methods to access ECR documents

Steps	**Access via the ECR system**	**Access via the WebCT authentication script**
1	Students access the university OPAC	

2	Select the course reserves option	
3	Specify the lecturer and course	
4	Select electronic available document	Select the hyperlink to the ECR document
5	Copyright warning display	Copyright warning display
6	Supply user surname and number	
7	Click OK	Click OK
8	Access the document	Access the document

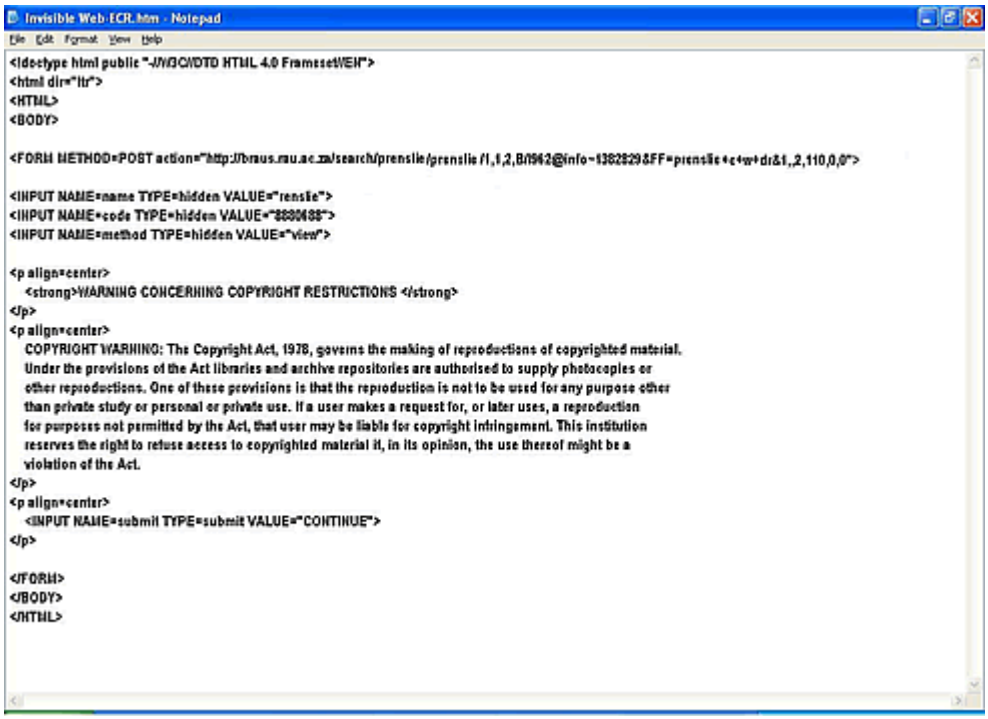
Figure 7 Example of an ECR document opened inside a WebCT environment



4.2.1. The HTML-based authentication script

Each of the documents in the ECR can be accessed from within the WebCT environment by using a unique HTML-based authentication script. The script in itself is very straightforward. In the context of the RAU's ECR system, where the copyright fee is paid by the university and not the individual students, authentication can be done by passing the lecturer's credential as form values to the ECR module of INNOPAC as depicted in Figure 8.

Figure 8 Example of the HTML code of the WebCT ECR authentication script



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5 Conclusion and future work

This article set out to propose a method by which a simplified and more effective online learning environment could be created for RAU students. As demonstrated, this can be achieved by utilizing an HTML-based script that automates the ECR authentication processes when integrated with the WebCT environment.

Owing to the merger between the Rand Afrikaans University and the Technikon Witwatersrand in January 2005, the current policy regarding copyright fees, where the RAU carries the total cost, may be revised. In the event that the policy changes in that students are required to pay copyright fees, the authentication script, as discussed in this article, would need to be developed further using Perl and Oracle single sign-on (SS) to allow for each student's credentials to be passed to the ECR system as opposed to the lecturers' credentials. Furthermore, this implies augmented integration between on-campus systems such as Oracle, WebCT and INNOPAC with other online academic information sources.

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ISSN 1560-683X

Published by InterWord Communications for the Centre for Research in Web-based Applications, Rand Afrikaans University