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<td><strong>Author(s)</strong></td>
<td>Loh, Hazel.</td>
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<td><strong>Citation</strong></td>
<td>Loh, H. (1999). The library and online learning via GEMS. In 2nd Regional Symposium on New Media and Learning Technologies in Asia: September 8-10, 1999, Singapore. Singapore: Asian Media Information and Communication Centre.</td>
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NANYANG TECHNOLOGICAL UNIVERSITY LIBRARY

"THE LIBRARY AND ONLINE LEARNING VIA GEMS."

Mrs Hazel Loh
Head, Media Department
Nanyang Technological University Library
Nanyang Ave, Singapore 639798
E-mail: ktvo0@ntu.edu.sg
Tel: 7904892 Fax: 7920509

Abstract
This paper describes the initiatives undertaken by the Nanyang Technological University Library through the GEMS project, and the challenges faced in response to the increasing trend in online and self-paced learning on campus.

INTRODUCTION
Nanyang Technological University Library keeps abreast of new information technology, explores and adopts relevant technology where applicable to deliver information resources and services effectively to its users. Since 1981, the Library has progressed significantly in the area of automation. In 1988, the entire library operations were integrated with the purchase of a turnkey library system called ATLAS from DRA. In 1989 library notices to staff and students on campus was automated and delivered via e-mail instead of paper notices. In the early 1990s, the 3M self check system was implemented to facilitate self-borrowing of books by users followed by the introduction of the WebOPAC which enabled our catalogue to be accessed locally as well as internationally via the internet. NTU Library was also the first library in Singapore to embark on cataloguing Chinese resources. In 1996 multimedia features were integrated into the WebOPAC through digitisation of video clips and scanned images of slides which made it possible for users to have a short preview of a video and access to images via the webOPAC. In 1997 video-on-demand enabled popular or recommended videos in the library collection to be digitised and stored on the server for concurrent and 24-hr access from the lecture theatres for teaching purposes.

In 1998 the Library collaborated with the Centre for IT Services on a campus wide project in the form of GEMS. The Library envisaged the need to integrate its growing range of digital resources to be made accessible via the network and beyond the library walls as the University is moving toward the direction of online learning. The NTU21 Report also documented the University's initiatives for the 21st century. One of the initiatives mentioned was the need to build a digital library which is responsive to the changing needs of staff, students and members of the public. Collaboration and close liaison with the schools in NTU through the Schools' Library Coordinators and the Library Committee made up of the Librarian, Deans and Director of CITs also plays an important role in helping the Library keep in touch with the needs of the users and determine which direction the Library progresses.
THE ISSUES AND THE CHALLENGES

With the extensive use of multimedia and information technology in Singapore's education scene, the Library has responded by diverting a higher percentage of the budget towards acquiring more electronic & online databases, e-journals, audiovisual and coursewares. As these digital resources are expensive, the budget for print-based material has shrunk considerably. The challenge for librarians handling the acquisitions of electronic resources is balancing the budget for these resources and negotiation with vendors and publishers for the license and access rights.

With the advent of new formats for resources and delivery methods, Librarians are also challenged with the need to go through a new learning curve to equip themselves adequately to serve and educate the users in this new environment.

Another challenge is to promote the use of digital formats amongst the faculty members in their courses. This not only encompass encouraging use of digital resources in their teaching and assignments, but also in the submission of thesis, student projects or research papers electronically to be deposited with the Library.

The final challenge for the Library is not in the use of new technology but rather the soft issues, such as the copyright limitations which make it difficult to provide access to resources electronically. The difficulty is with negotiating for copyright clearance for providing access to digitised full text articles and videos for reserve or essential course material. However, with online databases, cd-rom databases and e-journals, GEMS is able to limit the access to NTU members only, either through password control or access by IP address. The GEMS software makes this process transparent to users via user authentication and bypass login method. Through networking these digital resources and working closely with the CITS on the network support, the Library is able to extend an essential part of its resources beyond the Library walls to support online teaching through GEMS.

WHAT IS GEMS?

GEMS is the acronym for Gateway to Electronic Media Services. It serves as a "portal" to a wide range of digital information resources, be it cd-roms, online databases, full text electronic journals, audiovisual, multimedia or electronic publications delivered to the
user's desktop with a personal touch. It also serves as a vehicle for e-publishing and e-commerce, and is expandable and scalable to integrate future digital resources and applications for an increasingly networked learning and teaching environment.

ROLE OF GEMS IN SUPPORTING ONLINE LEARNING.

Through GEMS, our library resources are more fully integrated to serve an increasingly networked teaching and learning environment here at NTU. To facilitate access to GEMS services beyond the Library's walls, the campus network has been expanded recently from about 6,000 network points to about 14,000 network points and also upgraded to cater for transmission of bandwidth-intensive multimedia contents. Every one of the 7,000 odd student residential rooms and staff quarters on the campus are now networked enabled. Additional network points are also added to the Library, its reading rooms and all tutorial rooms to accommodate online access. The NTU campus network is also capable of allowing staff in their office, students in the halls, all LTs and tutorial rooms to access electronic, VOD and multimedia services for their teaching and learning needs. Thus, the direction is towards making library's digital resources available outside the boundary of the Library and accessible at the users' convenience.

GEMS provides access to a variety of digital Information resources, namely, online databases, electronic journals, electronic publications, CD-ROMS, audiovisual, VOD, multimedia and internet resources via a single and friendly graphical user interface on any networked PCs in the Library or campus to staff and students. Although we already have these resources in our library collection, they were not integrated for access and delivery. With GEMS, our digital resources are now accessible via a single point and at anytime, anywhere on campus.

The main features of GEMS are as follows:

(1) Provision of a one-stop access to multimedia resources.

We have a system that enables our staff and students to access a wealth of knowledge and information services from the desktop. Services include access to:

- networkable CD-ROMs such as multimedia CDs, coursewares, or database searching,
- online databases, such as Proquest Direct, Reuters, Dow Jones, FT Profile,
- Audiovisual resources & video-on-demand,
In other words, a user will need to use only one workstation in the Library or any compatible networked PCs on the campus to access his information and learning needs. A common and friendly graphic user interface seeks to make the user find the information he requires with minimal effort. Should help be required, the user could simply interact with the Administrator in the Library. The Administrator has the ability to see the screens of those workstations in the Library environment and also take control of the search screens to show the user the correct steps. For users outside the Library, an e-mail facility will soon be available via GEMS for users to direct their enquiries.

(2) Electronic submission and management of electronic documents.

The trend is for the Library to acquire more electronic resources directly from source to support online learning. A facility is available in GEMS for staff and students to submit their publications such as final year project reports, applied research project reports, conference papers and theses electronically to the Library. The librarians would go through the documents submitted and organize them for users to access. You can say that an opportunity for us to venture into electronic scholarly publishing is now open to us.

Reserve articles that have copyright clearance could also be accessed electronically via this module. At present, NTU Library subscribes to the online database service, Proquest Direct, which has a feature called SiteBuilder to enable lecturers to link electronic full text articles from the database website to their courses on the web. Lecturers could also arrange to submit their course notes or lecture material to be accessed electronically via GEMS by their students on any networked pc.

This module also facilitates the submission of publications of NTU departments such as news, Calendars and Prospectus. A comprehensive search facility allows users to locate the resources they require, and also allow them to specify in their profile for updated information to be e-mailed to them at regular intervals.

(3) Selective dissemination of information (SDI).

A personalisation feature enables users to set conditions in their profile for relevant information to be delivered to their desktop using the push technology. This could include new title alerts, new internet resources from the Library, conference announcements, resources from other institutions or organizations.

The system also draws information from the user profile and display only the relevant information, for example, staff would receive personal information pertaining to leave matters, pay advice, training calendar, Staff Suggestions Scheme, etc. Students would be provided with relevant information such as subject registration, academic calendar, exam timetable, academic results and so on. They would also be able to surf the net and bookmark their favourite internet links as well as e-mail their contacts.
(4) Booking of resources facility.

GEMS also benefits the users in ensuring that they have a workstation at the specified time and librarians in managing their services and facilities. A web-based booking programme is available for booking of individual workstations and rooms for group use. This aims to prevent workstation resources from being monopolised and allow a fairer spread of resource usage among registered users. In addition, a system administrator station also provides the library with the flexibility to monitor the usage of GEMS workstations. The Library staff can assess the usage patterns of the various resources and services and release more workstations for services in demand.

Lecturers can also book audiovisual titles for teaching purposes at the lecture theatres. They need not take out the physical item as the requested titles would be transmitted to the lecture theatre on the requested day and time.

(5) Cross-media search

A cross media search facility allows users to locate the resources they require irrespective of the format, be it a book, journal article, e-publication, audiovisual, cd-rom, VOD or multimedia. Therefore users need not select different catalogue searches to locate the resources that they require on a particular topic. In future, other online resources such as course materials developed by the lecturers or resources from distance learning programmes, could be incorporated into this cross-media search for a single point of access.

(6) Secured interface and e-commerce

GEMS is developed with system security and e-commerce features in mind. To prevent unauthorised use of library workstations and services, users are required to log on to GEMS for authentication. They need only to insert a student matric card or a staff card into a card reader and key in their passwords. The system would then authenticate them. At the same time, it caters for charging purposes if users are accessing fee-based services, or using the printing facilities.

CONCLUSION

With GEMS as our vehicle, the Library will continue to work towards incorporating future digital resources and applications such as our locally developed resources from the TopClass online learning server. With more and more digital resources being added, the Library is planning with the CITS to add more computers in the Library for users to access these networked resources. We collaborate closely with schools and departments on campus to meet the needs of the University in the form of providing relevant, borderless and integrated online information resources via the campus network infrastructure.
REFERENCES
