ICT infrastructure in university libraries of Karnataka

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Survey of the status of ICT infrastructure in six selected university libraries of Karnataka revealed that the libraries greatly vary from one to another as far as the ICT infrastructure is concerned. Most of the libraries lack sufficient hardware and software facilities and do not have adequate internet nodes and bandwidth. The campus LANs of the universities are not fully extended to exploit the benefits of digital information environment.

Introduction

Information and Communication Technology (ICT) comprises a diverse set of technological tools to identify, collect, organize, create and disseminate data and information. The ICT encompasses a wide range of technologies including telecommunication technologies, such as telephony, cable, satellite, TV and radio, computer-mediated conferencing and video-conferencing, as well as digital technologies, such as computers, information networks (internet, world wide web and intranet) and software application. In other words, ICT has emerged as a result of the digital convergence of computer technologies, telecommunication technologies and other media communication technologies.

ICT has altered the ways in which the academic activities – teaching, learning, research and extension activities – are carried out at higher education level. ICT has helped to overcome the barriers of time and space and reduced the time-lag between the generation of information and its consumption by the end user. University library, as a sub-system of higher education, should act as a trend-setter in adopting ICT in its activities.

Ever dynamic ICT has challenged the traditional process of library activities and this situation stresses the necessity for the university libraries to be part of the ICT based information world. ICT offers ample opportunities for libraries to automate the traditional activities, implement efficient and effective library cooperation and resource sharing networks, develop institutional repositories, provide value-added information services and initiate capacity building programmes for library staff and library users. The present study is an attempt to assess and report the ways in which the university libraries in Karnataka have responded to changing information environment and developed infrastructure to use ICT.

Literature review

The ICT infrastructure is as important as the older essential technological infrastructure such as electricity and transportation. The ICT has become ubiquitous and ushered into a whole new era of teaching, learning and research. Similarly, the ICT has influenced the field of library and information services. The main components of the ICT are computers, network and internet, display screen technologies and peripherals, and software and information systems. Rubrics (set of categories that define and describe the important components of the areas being assessed) have been proposed for assessing ICT infrastructure.

Nyamboga and Kemparaju revealed the status of ICT infrastructure such as availability of computers and network facilities in six Karnataka State University Libraries. They concluded that the university libraries in Karnataka that they studied were lagging behind in the application of ICT. Naik examined the communication
media available in eight university libraries in Karnataka State and confirmed that these libraries were at different stages of development and majority of them lack ICT infrastructure. Venkataramana and Chandrasekhar Rao conducted a survey to evaluate the hardware, software, network facilities and status of library automation in central university libraries in India. The study concluded that IT has been deeply embedded in these libraries and the trend will continue in future. Mahapatra and Padhi reported the state-of-the-art of ICT infrastructure and problems in application of modern technologies in libraries in Orissa. They confirmed that inadequate finance and lack of trained staff were the major stumbling blocks in application of ICT in these libraries. The survey conducted by Haneefa found that the special libraries in Kerala have fairly well developed ICT infrastructure but library staff need proper training for making optimal use of the resources. Borang and Sarma reported status of ICT infrastructure and ICT-based services in libraries of academic institutions in Arunachal Pradesh. The libraries under the study were providing access to Internet, e-resources under consortium activities and OPAC of their own libraries.

The university libraries in India are still struggling to build the required ICT infrastructure on one hand and recruit the required human resources to handle them on the other. The earlier studies carried out by Nyamboga and Kemparaju in the year 2002 and Naik in the year 2003 assessed the application of information technology components for library and information services in the selected university libraries of Karnataka during a period IT was making its inroads to the university libraries particularly with the support of INFLIBNET Centre. The UGC-Infonet Digital Library Consortium was introduced in the year 2004 and this is bound to have had a bearing on the ICT application in university library system in Karnataka. The present study attempts to re-audit the progress made by the university libraries with regard to the ICT infrastructure in light of this background here.

Objective of the study
The main objective of the study is to find out the status of hardware, software and other ICT infrastructure available in university libraries of Karnataka.

Methodology
The study is based on the primary data collected from the libraries of those universities which have been established under the Karnataka State Universities Act, 2000. The university libraries included in the present study are: Bangalore University Library (BUL) at Bangalore, Gulbarga University Library (GUL) at Gulbarga, Karnatak University Library (KaUL) at Dharwad, Kuvempu University Library (KUL) at Shankaraghatta near Shivamogga, Mangalore University Library (MaUL) at Konaj near Mangalore, and Mysore University Library (MUL) at Mysore.

A structured questionnaire was designed to obtain the data from the university librarians. The data hence received was reduced to the statistical tables and simple table analysis done to draw conclusions.

Analysis
Hardware infrastructure
The Mysore University Library has maximum number of server systems (6) followed by Gulbarga University Library with 5, Bangalore University Library and Kuvempu University Library with 3 each, and Karnatak University Library and Mangalore University Library with one server systems each. The number of desktop computers available in the six university libraries varies from 12 in Mangalore University Library to 140 in Gulbarga University Library. Except Gulbarga University Library and Mysore University Library, other university libraries do not have scanner. The Bangalore University Library, Gulbarga University Library, Kuvempu University Library and Mysore University Library have one barcode printer each. The Gulbarga University Library has 2 barcode printers, and Gulbarga University Library, Kuvempu University Library and Mysore University Library have one barcode printer each. The Gulbarga University Library has maximum of 15 back-up devices followed by Karnatak University Library with 2 and Mysore University Library with 1 back-up device. The Gulbarga University Library has 2 LCD projectors whereas Bangalore University Library, Kuvempu University Library and Mysore University Library have one each. The Bangalore University Library, Gulbarga University Library, Mangalore University Library and Mysore University Library have one fax machine each. Only Gulbarga University Library and Kuvempu University Library have web camera facility. The Kuvempu University Library has one identity card printer (Table 1).

It is apparent from the analysis that the Gulbarga University Library, Bangalore University Library and Kuvempu University Library have better hardware infrastructure compared to the rest.
Table 2 shows the software facilities available in university libraries under study. In order to automate the house-keeping operations such as acquisition, technical processing, circulation, and serials control, Gulbarga University Library and Mangalore University Library are using LIBSYS. The Karnatak University Library is using SOUL and Kuvempu University Library is using SOUL along with CDS/ISIS. The Bangalore University Library is using NewGenLib, and Mysore University Library is using SLIM++ for automation of house-keeping operations. For the purpose of digital library activities, Bangalore University Library and Kuvempu University Library are using E-Prints, Gulbarga University Library is using DSpace, and Mysore University Library is using NewGenLib. The Karnataka University Library and Mangalore University Library are not using any digital library software. Except Gulbarga University Library, no other library under the study is using CD-Net management software. Four university libraries are using Norton anti-virus software. The Gulbarga University...
Library is using McAfee and Kuvempu University Library is using Trendmicro anti-virus software. The Bangalore University Library, Gulbarga University Library and Mysore University Library are using SPSS for research data analysis. Half of the university libraries do not have software facility for research data analysis.

**Campus LAN**

The Local Area Network (LAN) of a university system is essential to provide access to the information sources and services electronically to end-users at their points. The users can be alerted of the information resources such as books and journals procured and / or licensed to have access in the university library over campus LAN. The users can recommend, request for loan or reserve the information resources through campus LAN. The users can also search OPAC of their university library from their desktop and also browse the internet. The status of campus LAN in the universities under the study has been presented in Table 3.

All the six universities are found to have established their campus LANs. The Kuvempu University has set up an extensively spread-out campus LAN which reaches out from library to all the academic departments, administrative sections, hostels, guest house and selected residences of the officers and academic staff. The campus LANs of Bangalore University, Gulbarga University and Mangalore University are spread out over the library, university computer centre, academic departments and administrative sections of their respective universities. The campus LANs of Karnataka University Library and Mysore University Library are restricted

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Campus LAN</th>
<th>BU</th>
<th>GU</th>
<th>KaU</th>
<th>KU</th>
<th>MaU</th>
<th>MU</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Established campus LAN</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Levels of Extension:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a)</td>
<td>Library Computer Centre, university</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>b)</td>
<td>Computer Centre, and all Academic Departments</td>
<td>Library Computer Centre</td>
<td>Yes</td>
<td>Yes</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
</tr>
<tr>
<td>c)</td>
<td>Centre, University Computer Centre, Academic Departments, And Administrative Sections</td>
<td>Library Computer Centre, Academic Departments, Administrative Sections and Residences</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Yes</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Maintenance of campus LAN</td>
<td>University Library</td>
<td>University Computer Centre</td>
<td>Exam Section</td>
<td>University Library</td>
<td>University Computer Centre</td>
<td>Dept. of Physics</td>
</tr>
<tr>
<td>4</td>
<td>Physical Medium of Transmission used for LAN</td>
<td>UTP Cable, OFC</td>
<td>UTP Cable, OFC</td>
<td>OFC</td>
<td>UTP Cable, OFC, Wireless</td>
<td>UTP Cable, OFC</td>
<td>OFC</td>
</tr>
</tbody>
</table>

*Note: BUL: Bangalore University Library, GUL: Gulbarga University Library, KaUL: Karnataka University Library, KUL: Kuvempu University Library, MaUL: Mangalore University Library; MUL: Mysore University Library*
The Bangalore University Library and Kuvempu University Library have shouldered the responsibility of their campus LAN maintenance. At Gulbarga University and Mangalore University the responsibility rests with the university computer centres. The physical media of transmission used for LAN are UTP cable and OFC in Bangalore University, Gulbarga University, and Mangalore University. Kuvempu University has used wireless connectivity apart from UTP cable and OFC. Karnataka University and Mysore University libraries have used only OFC for the purpose.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Internet facilities</th>
<th>BUL</th>
<th>GUL</th>
<th>KaUL</th>
<th>KUL</th>
<th>MaUL</th>
<th>MUL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of connection</td>
<td>V-SAT, Leased Line</td>
<td>V-SAT</td>
<td>V-SAT, Leased Line</td>
<td>Leased Line</td>
<td>V-SAT, Leased Line</td>
<td>Leased Line</td>
</tr>
<tr>
<td>2</td>
<td>Service provider</td>
<td>BSNL, ERNET India</td>
<td>ERNET India</td>
<td>BSNL, ERNET India</td>
<td>BSNL, ERNET India</td>
<td>BSNL, ERNET India</td>
<td>BSNL</td>
</tr>
<tr>
<td>3</td>
<td>Bandwidth</td>
<td>512 kbps, 2 Mbps</td>
<td>2 Mbps</td>
<td>512 kbps</td>
<td>2 Mbps</td>
<td>512 kbps, 2 Mbps</td>
<td>2 Mbps</td>
</tr>
<tr>
<td>4</td>
<td>No. of internet nodes</td>
<td>75</td>
<td>140</td>
<td>25</td>
<td>45</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>Browsing section</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Separate browsing section for academic staff</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>No. of internet nodes for academic staff</td>
<td>18</td>
<td>40</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>02</td>
</tr>
<tr>
<td>8</td>
<td>Personnel supervising internet section</td>
<td>Library Staff with IT skills</td>
<td>Library Staff with IT skills</td>
<td>Library Staff with IT skills</td>
<td>IT trained staff</td>
<td>-</td>
<td>Library staff</td>
</tr>
<tr>
<td>9</td>
<td>Department chamber</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Levels of provision</td>
<td>All Academic Staff</td>
<td>All Academic Staff</td>
<td>Chairpersons of Departments</td>
<td>All Academic Staff</td>
<td>Chairpersons and Professors, Readers</td>
<td>All Academic Staff</td>
</tr>
<tr>
<td>11</td>
<td>Plans to update network infrastructure</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Note: BUL: Bangalore University Library, GUL: Gulbarga University Library, KaUL: Karnataka University Library, KUL: Kuvempu University Library, MaUL: Mangalore University Library; MUL: Mysore University Library
Internet facilities

Internet as a computer network of networks offers access to a wide range of e-resources such as full-text journals, books, reports, standards, newspapers, and abstracts and bibliographic databases of research articles. In short, it serves as a window to the world of knowledge. The e-mail, bulletin boards, newsgroups, electronic commerce, etc., are other services of the Internet. The Internet can be used to support library activities such as acquisition, technical processing, and serials control. It is an effective channel for marketing of library and information products and services at global level. The Internet facilities made available in the universities with a special emphasis on their respective university libraries is as shown in Table 4.

The universities under the study have either leased line or V-SAT or both for Internet connection either from BSNL or ERNET India, or both of them. The Internet bandwidth varies from 512 kbps to 4 mbps. The Internet nodes created in the libraries vary from 140 in Gulbarga University Library to only 12 in Mangalore University Library. Except Mangalore University Library, all other university libraries have Internet browsing sections. Four university libraries have separate Internet browsing sections for academic staff. The Internet nodes created for academic staff in the libraries varies from 40 in Gulbarga University Library to 2 in Mysore University Library. The Bangalore University Library, Gulbarga University Library and Karnataka University Library have appointed the library staff with IT skills for supervising the Internet sections. The Kuvempu University Library has assigned such responsibility to IT trained staff and Mysore University Library with library staff (not IT trained).

Conclusion

ICT infrastructure in the university libraries of Karnataka is at different stages of development. Insufficient computer hardware and suitable software and lack of Internet facilities with required bandwidth indicate that university libraries of Karnataka are yet to establish extensive facilities required for efficient information access. Hence, there is an urgent need on the part of the university libraries in Karnataka to plan, implement and develop ICT infrastructure to be fit in facing the challenges ahead of them.

References