

Periodic Research

Assessment of ICT Infrastructure at Government First Grade College Libraries Affiliated to Kuvempu University : A Study



B. Shankarappa

Research Scholar,
Deptt.of Library and Information
Science,
Kuvempu University,
Shankaraghatta, Shivamogga,
Karnataka



K.C. Ramakrishnegowda

Retired University Librarian,
Deptt.of Library Science,
Kuvempu University,
Shankaraghatta, Shivamogga,
Karnataka

Abstract

Information and communication technology (ICT) infrastructure facilitate libraries any where and any time provision of pin-pointed and exhaustive information for their users. Application of ICT to provide advanced library and information services to the college academic community has become a basic necessity. The present study attempts to assess the ICT infrastructure in the libraries of Government First Grade Colleges affiliated to Kuvempu University. The study has used questionnaire for collection of data. The study found that the college libraries have made efforts to develop hardware, software and networking facilities. However, the effects made to develop ICT infrastructure in the college libraries found to be insufficient. Also, the personnel looking after the ICT based services need to update their knowledge on and often, To improve the situation and provide relevant informative environment to the users, the state government, college administration and librarians have to play their role effectively.

Keywords: Information and communication technology, ICT, Library Automation, Government First Grade Colleges, Shivamogga District, Chikkamagalur Dist. Kuvempu University.

Introduction

Information technology and communication technology are the two faces of the same coin. One cannot have meaning without the other. In today's world there is no single activity which is not affected by information and communication technology (ICT).

ICT has altered the ways in which the academic activities – teaching, learning, research and extension activities – are carried out at higher education level. Education system is one among many other systems involved ICT application to a maximum extent. As a result of fast developments in ICT the new pedagogy in the education system has taken a new dimension in the process of transformation of knowledge. Especially in higher education system the government is insisting and encouraging to adopt ICT for acquisition, processing, maintenance and effective dissemination of information.

Now a days the first grade colleges are playing multiple roles i.e., in addition to Under-Graduate courses they are also offering Post-Graduate courses and research programmes in the colleges. The MHRD has facilitated e-resources such as e-books, e-journals and e-databases through N-LIST programme along with required internet facility under NMEICT programme to colleges. For extending all these facilities to their users adopting ICT is inevitable for college libraries. Hence, the present study intends to assess the status of ICT infrastructure and ICT based services in the Govt. First Grade College libraries affiliated to Kuvempu University.

Review of Literature

Walmiki and Ramakrishnegowda (2009) studied the status of ICT infrastructure in the university libraries and reported that the libraries are facing many problems in equipping and adopting ICT infrastructure due to lack of adequate hardware, software and manpower with IT knowledge. Sampath Kumar and Biradar (2010) studied and reported the status of the ICT adoption in the selected first grade colleges along with many problems in adopting the same appropriately and strongly recommended to provide basic ICT infrastructure along with necessary library automation software

E: ISSN No. 2349-9435

and training to the librarians. Naveen and Nagesh (2016) studied and reported the status and problems of library automation in Govt. First Grade Colleges of Hassan District, Karnataka and they have also recommended for providing basic ICT infrastructure, sufficient funds, manpower with IT knowledge. Sakarkar and Kuralkar (2013) studied the college librarians attitude towards adoption of ICT and their involvement in the process of computerizing the libraries. Lakshmi Sankari and Chinnaswamy (2014) studied and highlighted the ICT skills possessed by the engineering college librarians in Salem and Namakkal Districts of Tamilnadu. Konwar and Sinha (2014) reported in their study about status of ICT infrastructure and development along with library networking in the major college libraries of Barak Valley, Southern Assam College and pointed out lack of ICT infrastructure, partial automation, improper internet connectivity, improper policy matters, etc. Jaspal (2012) surveyed the degree college libraries, Chandigarh in relation to the current status of ICT infrastructure, various applications of ICT attained and problems faced by the librarians in automating the libraries. Recommended to update with newer technologies to provide value added information services to their clientele. Umesh Kumar (2013) studied the automation and networking status of aided minority degree college libraries in Urban Bengalure. Al-Ansari (2011) in his study pointed out that most libraries have inherent weakness in automated operations and services. Shivakumaren and et al(2011) studied about the ICT infrastructure facilities and ICT based technologies along with availability of e-resources in the selected Government and deemed universities I Chennai, Tamil Nadu.

Objectives of the Study

The objectives of the study:

1. To assess the ICT infrastructure equipped by the Government First Grade College libraries;
2. To assess the status of the automation of the Government First Grade College libraries;
3. To know the ICT based services at the Government First Grade College libraries;
4. To assess the ICT skills and competencies among the library professionals of the Government First Grade College libraries;
5. To know the opinion of the librarians about the factors which influencing the librarians to introduce ICT infrastructure at the Government First Grade College libraries. and
6. To assess the problems faced by the librarians in equipping ICT infrastructure at the Government First Grade College libraries.

Scope of the Study

This study is limited only to the 27 Government First Grade colleges established before 2015 and affiliated to Kuvempu University in the jurisdiction of of Shivamogga and Chikkamagalur districts.

Methodology

A structured questionnaire was designed to collect the related primary data by personal visits and interview with the library professionals of the respective colleges. The questionnaire consisted of

Periodic Research

both open and closed ended questions based on the requirement of the investigation by covering many characteristics i.e., Year of establishment, library collection, ICT infrastructure, ICT skills, status of library automation, the problems in attaining or equipping ICT infrastructure, in the college libraries etc.

Data Analysis

The Questionnaire was distributed among the librarians of 27 Government First Grade College libraries which were established during the period 1965 -2014. Among these colleges 2(7.41%) colleges have been established during 1965-1974, followed by 6(22.22%) colleges in 1975-1984, 6(22.22%) colleges in 1985-1994 and 13(48.15%) colleges in 2005-2014. Further, 13(48.15%) colleges have 2(f) status and only 14 (51.85%) colleges have both 2(f) & 12(B) status. Only 17(62.96%) colleges have undergone NAAC accreditation. In addition to Under-Graduate courses 10 (37.04%) colleges are offering Post-Graduate Courses in different disciplines and only 1(3.70%) college is offering research programme.

Staff Status in the College Libraries

Table 6.1

Sl.No.	Staff Status	Number of Colleges	Percentage
01	Professional Staff	25	92.59%
02	Semi-Professional Staff	02	7.41%
03	IT-Professional Staff	01	3.7%
04	Non-Professional Staff	14	51.85%

The data in table 6.1 shows that among 27 college libraries 25(92.59%) libraries have qualified professional staff, 2(7.41%) libraries have semi-professional staff, only 1(3.70%) library has an IT-professional staff and 14(51.85%) libraries have non-professional supporting staff.

Educational (Academic and Professional) Qualifications of Library Professionals

Table 6.2

N=25

Sl. No.	Education Qualification	Numbers	Percentage
01	BA/BSc/BCom/BSW	25	(100%)
02	MA/MSc/MCom/MSW	09	(36%)
03	B.L.I.Sc	02	(08%)
04	M.L.I.Sc	25	(100%)
05	MPhil	19	(76%)
06	Ph.D	02	(08%)
07	PGDLAN	03	(12%)
08	SET/NET	03	(12%)

The data in table 6.2 shows that only 03 (12%) librarians are having PGDLAN qualification in addition to the basic professional qualification.

Periodic Research

22(81.48%) libraries subscribing 11-20 and 4(14.31%) libraries subscribing more than 20 newspapers and magazines.

Among 27 colleges 15(55.56%) libraries having 1-100 CDs and DVDs, 7(25.93%) libraries have 101-200 CDs and DVDs, 3(11.11%) libraries have 201-300 CDs and DVDs, and 2(7.40%) libraries have more than 300 CD and DVDs.

ICT Infrastructure Facility in the College Libraries

ICT infrastructure is the basic and important key factor in the process of any automation activity. This ICT infrastructure involves hardware, software, and network accessories and UPS systems.

Hardware Accessories

The data presented in table 6.4.1 shows that 26(96.30%) libraries are having desktop computers. 22(81.48%) libraries are having Laser jet printers, 18(66.67%) libraries are having barcode printers and barcode scanners, 17(62.96%) libraries are having server computers, 07(25.93%) libraries are having LCD Projector/Smart Board facility, 04(14.81%) libraries are having Laptop computers, 03(11.11%) libraries are having Audio/Visual Equipments, 12(44.44%) libraries are having CCTV/Surveillance Camera, 02(7.41%) libraries are having Dot-Matrix Printers and ID-Card Printers. But 1(3.70%) library don't have any ICT Hardware Infrastructure facility.

Among 27 libraries only 15(55.55%) libraries have LAN network comprises network racks 10 (37.03%), 16 port switches 02(7.41%), 24 port switches 02(7.41%) equipments.

Further, among these 27 libraries 23 (85.19%) libraries are equipped with Un-Interrupted Power Supply (UPS) system with different capacities offline and online UPS systems.

Table 6.3

N=27			
SI.No.	Collection Status	Number of Colleges	Percentage
Books	5000-10000	05	18.52%
	10001-20000	11	40.74%
	>20000	11	40.74%
Journals	5-10	10	37.03%
	11-20	09	33.33%
	>20	08	29.62%
Newspaper & Magazines	5-10	01	03.70%
	11-20	22	81.48%
	21-30	04	14.31%
CD & DVD's	1-100	15	55.56%
	101-200	07	25.93%
	201-300	03	11.11%
	>300	02	07.40%

The data in table 6.3 shows that the collection development i.e., books, Journals, newspapers & magazines and CDs and DVDs in the college libraries.

Among 27 colleges 5(18.52%) libraries have 5000-10000 books, 11 (4.74%) libraries have 10001-20000 books and 11 (40.74%) libraries have more than 20000 books.

Among 27 colleges 10 (37.03%) libraries are subscribing 5-10 journals, 9 (33.33%) libraries are subscribing 11-20 journals and 8(29.62%) libraries are subscribing more than 20 journals.

Among 27 colleges 1(3.70%) library subscribing 5-10 newspapers and magazines,

Table – 6.4.1

N=27			
SI.No.	ICT Infrastructure	Numbers	Percentage
A. Hardware Accessories			
01	Server Computers	14	51.85%
02	Desktop Computers	26	96.30%
03	Laptop Computers	04	14.81%
04	CD Server	0	0%
05	Dot-matrix Printers	02	7.41%
06	Laser jet Printers	22	81.48%
07	Inkjet Printers	0	0%
08	Barcode Printers	18	66.67%
09	ID Card Printers	02	7.41%
10	Scanners	17	62.96%
11	Barcode Scanners	18	66.67%
12	LCD Projector /Smart Board	07	25.93%
13	Data Backup Devices	11	40.74%
14	Audio/Visual Equipments	03	11.11%
15	CC TV/Surveillance Camera	12	44.44%
B. Network Accessories			
01	Network Rack	10	37.03%
02	16 Port switch	13	48.15%
03	24 Port Switch	02	7.41%
04	L2/L3 Switch	00	0%
05	Router	04	14.81%
06	Firewall	00	0%

C. LAN Network		15	55.56%
D. UPS Systems			
01	Offline UPS system (1/2 Hour Backup)	04	14.81%
02	1 KVA Online UPS System	05	18.52%
03	2 KVA Online UPS System	06	22.22%
04	3 KVA Online UPS System	03	11-11%
05	5 KVA Online UPS System	05	18.52%

Software Accessories

Table – 6.4.2

N=27			
Sl.No.	Software Accessories	Numbers	Percentage
01	MS-DOS	26	96.30%
02	Windows-XP	26	96.30%
03	Windows Server 2000	02	7.41%
04	Windows 2008	13	48.15%
05	Windows Vista	0	0%
06	LINUX	0	0%
07	MS-SQL	03	11-11%
08	MS-Office Tools	26	96.30%
09	Anti-Virus Software	25	92.60%
10	Library Automation Software	21	77.78%

The data in table 6.4.2 shows that 26(96.30%) libraries are having MSDOS, Windows XP, and MS-Office tools. 25(92.60%) libraries are having Anti-Virus Software, 21(77.78%) libraries are having library automation software, 13(48.15%) are

Library Automation Software

having Windows 2008 software, 2(7.41%) libraries are having Windows Server 2000, and 03(11.11%) libraries are having MS-SQL Server software. But 1(3.70%) library do not have any software infrastructure facility.

Table 6.4.3

N=27				
Sl.No.	Automation Software	Number	Percentage	Total
01	e-Granthalaya	13	48.15%	21 (77.78%)
02	e-Lib	05	18.52%	
03	easylib	02	07.41%	
04	New Genlib	01	03.70%	
05	None	06	22.22%	
				06 (22.22%)

The data in table 6.4.3 shows that 21(77.78%) libraries have library automation software and among them 13(48.15%) libraries are using National Informatics Centre(NIC)-Gol developed e-Granthalaya Open Source Software, 05 (18.52%) libraries are using e-Lib commercial software, 02 (7.41%) libraries are using Easylib commercial software and 01(3.70%) library has New-Genlib commercial software.

It is clear from the analysis that the college libraries are using different automation software which hinders resource sharing (library cooperation) due to non-compatibility of ICT infrastructure.

ICT Skills – Hardware Accessories

Questions were raised to know the skills and knowledge of ICT among library professionals working in the First Grade Colleges and the data has been presented in Table 6.5.

Table 6.5 : ICT Skills and Knowledge in using Hardware Accessories

N=25				
Sl.No.	Computer Hardware Accessories	Good	Poor	Don't Know
01	Mobile Phone	25(100%)	0(0%)	0(0%)
02	Pen Drive/Flash Drive & USB	24(96%)	0(0%)	1(4%)
03	Scanners	22(88%)	2(8%)	1(4%)
04	CD/DVD Writings	21(84%)	4(16%)	0(0%)
05	Computer Hardware	19(76%)	6(24%)	0(0%)
06	Dot Matrix/ Laser/ Inkjet Printer	19(76%)	6(24%)	0(0%)
07	Digital Camera	16(64%)	5(20%)	4(16%)
08	LCD/ Multimedia Projector	15(60%)	5(20%)	5(20%)
09	Barcode Printer / Barcode Scanner	14(56%)	6(24%)	5(20%)
10	Webcam	14(56%)	6(24%)	5(20%)
11	Ipad/Notepad/MP4 Player	13(52%)	9(36%)	3(12%)

The data in table 6.5 shows the level of ICT skills and knowledge in using computer hardware accessories by college librarians. 25(100%)

librarians are having 'good' skills to operate mobile phone, followed by Pen Drive/Flash Drive & USB(96%), scanners(88%), CD/DVD Writings(84%),

Table 6.6

		N=25		
Sl. No.	Computer Software Accessories	Good	Poor	Don't Know
01	Operating Systems (MS-DOS, Windows & Linux)	24 (96%)	1 (4%)	0 (0%)
02	MS-Office Tools (MS-Word, Excel, Powerpoint etc)	24 (96%)	1 (4%)	0 (0%)
03	Database Management Softwares(MS-Access, SQL)	5 (20%)	10 (40%)	10 (40%)
04	PDF Reader and Convertor (Adobe Acrobat)	19 (76%)	3 (12%)	3 (12%)
05	Internet Browsers (IE, Mozilla, Chrome etc)	24 (96%)	1 (4%)	0 (0%)
06	Anti-Virus Softwares (AVG, McAfee, Norton etc.)	20 (80%)	3 (12%)	2 (8%)
07	Data Managing Software Tools (Winzip, Winrar)	11 (44%)	8 (32%)	6 (24%)

The data presented in table 6.6 shows the skills among the library professionals in using different ICT based Software Utilities & Tools which are essential in library automation and ICT related activities. All the 25 (100%) librarians are having skills in using Operating Systems, MS-Office Tools,

PDF Reader and Convertor (Adobe Acrobat), Internet Browsers and Anti-Virus Softwares. Only 17 (68%) librarians and 22 (88%) librarians are having skills in using Database Management Softwares and Data Managing Software Tools (Winzip, Winrar) respectively.

Status of Automation of College Libraries

Table 6.7

		N = 27	
Sl. No.	Automation Status	Numbers	Percentage
01	Fully Automated	07	25.93%
02	Partially automated	07	25.93%
03	Initial	05	18.52%
04	Not Automated	08	29.62%

The data in table 6.7 shows the status of the automation task carried out at the selected college libraries. Among 27 libraries 05 (18.52%) libraries have initiated the work in developing databases of collections and of users required for automation. 07

(25.93%) libraries are partially completed some of the activities of the automation. And 07 (25.93%) libraries have fully automated. But 08 (29.62%) libraries are not yet initiated the automation task.

ICT Based Library Services

Table 6.8

		N = 27	
Sl.No.	ICT based Services	Numbers	Percentage
01	Lending Services	10	37.04%
02	Reference Services	10	37.04%
03	OPAC	10	37.04%
04	WEB OPAC	0	0%
05	Indexing & Abstracting	0	0%
06	CD-ROM Search	03	11.11%
07	Internet Browsing Facility	16	59.26%
08	Printing Services	15	55.56%
09	NLIST Service	14	51.85%
10	EDUSAT Services	26	96.30%

The data in table 6.8 shows that 10 (37.04%) libraries offering automated Lending Services, Reference Services and OPAC services, 03(11.11%) libraries offering CD-ROM search services, 16(59.26%) libraries offering Internet browsing services, and 15(55.56%) libraries are offering printing services. 14(51.85%) libraries have subscribed N-LIST e-resources services. 26(96.30%) Libraries are offering EDUSAT services to their users. But, none of the libraries offering WEB OPAC and Indexing & Abstracting services in their libraries.

Librarians' Opinion about the factors that influence for the introduction of ICT infrastructure in the colleges libraries

Some of the factors which have influenced the librarians to introduce ICT infrastructure in their college libraries are presented in Table-6.9. The data in the Table 6.9 shows that the librarians expressed their opinion the ICT enable to quick access to the current data, improve the quality in library services, increases the status of the library professionals, speed up the library services to meet the user requirement, improve the importance of the library were most positive factors. The factors with which the college librarians agreed are the government/ management insists or support, availability of grants and users demand for library computerized services.

Table 6.9

N = 27

Sl.No.	Factors	1	2	3	4
01	ICT facilitates quick access to current data of the library	26 (96.30%)	01 (3.70%)	00	00
02	ICT improve the quality of library services	26 (96.30%)	01 (33.70%)	00	00
03	ICT enhance knowledge and skills of library professionals	24 (88.88%)	03 (11.12%)	00	00
04	ICT increases the job satisfaction of Library professional	19 (70.37%)	08 (29.63%)	00	00
05	ICT increases the status of the Library professional	17 (62.96%)	10 (37.03%)	00	00
06	ICT improve the importance of the library	17 (62.96%)	09 (33.33%)	01 (3.70%)	00
07	ICT reduce workload of library professional	14 (51.85%)	13 (48.15%)	00	00
08	ICT enhanced the resource sharing activities among the colleges	14 (51.85%)	13 (48.15%)	00	00
09	ICT speeds up the library services to meet the user requirement	19 (70.37%)	08 (29.63%)	00	00
10	Government/Management insists to adopt ICT	12 (44.44%)	15 (55.56%)	00	00
11	Availability of Grants from Government/ Management	08 (29.63%)	15 (55.56%)	04 (14.81%)	00
12	Users demand for library computerized services	07 (25.93%)	11 (40.74%)	08 (29.63%)	01 (3.70%)

(Rating Scale: 1= Strongly Agree, 2= Agree, 3= Disagree, 4= Can't Say)

Barriers in Implementation of ICT Infrastructure at College Libraries

The data in the table 6.8 (6.4.1-6.4.3) shows that the majority of the libraries are not fully equipped with ICT infrastructure. There are many factors which make them lagging behind, The librarians opinions are presented in Table 6.10.

Table 6.10

N=27

Sl. No.	Barriers	Agree	Disagree
01	Lack of building infrastructure	21(77.78%)	06 (22.22%)
02	Lack of budget	22 (81.48%)	05 (18.52%)
03	Lack of adequate qualified staff in the library	26 (96.30%)	01 (03.70%)
04	Lack of IT professionals	21 (77.78%)	06 (22.22%)
05	Lack of support from management/ administration	16 (59.26%)	11 (40.74%)
06	Lack of Uninterrupted Power Supply	18 (66.67%)	09 (33.33%)
07	Lack of proper guidelines for ICT implementation	18 (66.67%)	09 (33.33%)
08	Lack of co-ordination between library and management	11 (40.74%)	16 (59.26%)
09	Lack of users demand for ICT based library services	12 (44.44%)	15 (55.56%)
10	Lack of appropriate government policy and guidelines for adoption of ICT	20 (74.07%)	07 (25.93%)

The data in table 6.10 shows that many factors which are in one or other way make the libraries lagging behind to equip ICT infrastructure and automation activities to a full extent. These factors are building infrastructure (77.78%), budget (81.48%), qualified staff(96.30%), IT professionals (77.78%), management/ administration support (59.26%), Uninterrupted Power Supply (66.67%), proper guidelines for ICT implementation(66.67%) , co-ordination between library and management (40.74%),users demand for ICT based library services(44.44%), and finally appropriate government policy and guidelines for adoption of ICT in the college libraries(74.07%).

Findings

The major findings of the present study are as follows:

1. 25 (92.59%) college libraries are having professionally qualified fulltime librarians.
2. 26 (96.30%) libraries are having basic ICT infrastructure i.e., desktop computers, windows operating system, and MS Office software. 14(51.15%) libraries are having Server computers.
3. Only 21 (77.78%) libraries are having library automation software but there is no uniformity or standard in choosing and using the automation software.
4. Only 07(25.93%) libraries have achieved the automation task to a full extent, 07(25.93%) libraries are partially automated, 05(18.52%)

E: ISSN No. 2349-9435

- libraries have initiated but remaining 8(29.62%) libraries have not started the automation task.
- 16(59.26%) libraries are offering internet browsing facility in the libraries
 - 14(51.85%) libraries have subscribed to NLIST services of Inlibnet Centre.
 - 26 (96.30%) libraries are providing EDUSAT facility.
 - 22(88%) libraries have LCD/Multimedia projector.
 - All the 25 (100%) librarians possess the required skills for using computer hardware and software accessories.
 - Majority 13(48.15%) of the libraries are using NIC developed e-Granthalaya open source library management software.
 - Only 10(37.04%) libraries are offering ICT based library services like lending, reference, and OPAC services.
 - A majority of the libraries are facing space/building infrastructure problem, lack of IT professionals, insufficient budget, lack of proper policy/guidelines from government/administration and lack of UPS systems, etc., which are hindering the library automation activities to a large extent.

Suggestions

This study leads us to give a few suggestions for successful implementation of the ICT infrastructure and automation activities in libraries of all the Government First Grade Colleges studied here,

1. The Government has to provide clear and the appropriate guidelines for adopting ICT in the college libraries.
2. The Government has to appoint one qualified fulltime IT professional staff to all the colleges for effective implementation of ICT in the colleges in general and in libraries in particular.
3. The college management/administration has to avail expert opinion by forming a committee for planning, effective implementation and monitoring all the ICT activities in the library.
4. There is a need for uniformity and consistency among the libraries in using library automation software and standards.
5. The college administration/ management has to provide sufficient ICT infrastructure to the libraries with appropriate trained manpower to handle ICT applications and ample training opportunities for the librarians to upgrade skills.
6. College libraries must equipped with high speed Internet connectivity along with internet browsing centre for effective use of resources and services available in and outside the library.
7. The government has to make subscription to N-LIST e-resources mandatory by providing financial assistance to all the colleges for the specific purpose.
8. The college administration/ management has to provide required space or independent building with infrastructure for libraries for effective implementation of ICT applications.
9. The college administration/ management has to earmark funds for the continuous upgradation

Periodic Research

and maintenance of ICT infrastructure in the college libraries.

Conclusion

In the process of effective use of ICT based resources and services ICT infrastructure is inevitable. Because advancement and continuous developments in the ICT applications as well as explosion of information. These GFGC libraries have not fallen back behind in equipping and utilizing ICT infrastructure, but, failed in achieving cent percent automation of library activities and developing ICT based services. Majority of the libraries are using NIC developed e-Granthalaya library management open source software followed by commercially developed e-lib, easylib and New Genlib softwares. This shows that there is a serious lapses, in adopting specific standards and policies in opting library automation software at government colleges. A small number of colleges are subscribed consortia based N-LIST programme. Many factors have affecting the present situation of the libraries which are the major hindrances in achieving automation activities to a full extent. The findings of this study have provided some useful insights for GFGC libraries to take some appropriate and necessary measures to adopt and improve the ICT infrastructure, also to develop ICT based resources and services to a full extent. Out of many issues full pledged ICT infrastructure and continuous ICT based training/awareness programs for librarians are very much required.

References

1. Al-Ansari Husain. (2011), *Application of information and communication technologies in special libraries in Kuwait, The Electronic Library*, 29 (4). 457- 469.
2. Barik Prasanna Kumar, Das K C and Ramesh D B, (2011). *Assessment of application of information and communication technology(ICT) and it's problems in the private engineering and management colleges of Orissa, PEARL-A, Journal of Library and Information Science*, 5 (1). 1-13.
3. Jaspal Kaur, (2012). *Availability and use of information technology in degree college libraries in Chandigarh. Gyankosh, The Journal of Lib. & Info.Management*, 3(2). 24-34.
4. Konwar Uday Krishna1 and Sinha M.K, (2014). *Status of ICT infrastructure and development of college library network among the major colleges of Barak Valley, Southern Assam: A case study, In Proceedings of paper at the 9th Convention Planner-2014, Dibrugarh University, Assam, 25-27 September 2014 p.156-164.*
5. Lakshmi Sankari R and Chinnasamy K, (2014) . *ICT skills among librarians in engineering colleges in Salem and Namakkal districts: A study*, 3 (12). 9-17.
6. Mondal Arup Kumar and Bandyopadhyay Amit Kumar, (2010). *Application of ICT and related manpower problems in the college libraries of Burdwan, DESIDOC Journal of Library & Information Technology*, 30 (4). 44-52.
7. Naveen C L and Nagesh R, (2016) . *Status and problems of library automation in Govt. First*

E: ISSN No. 2349-9435

- Grade colleges of Hassan Dist, Karnataka: a study, International Journal of Library and Information Science (IJLIS), 5(1) 25-35.*
8. Nimai Chand Saha Sain, Chitta Ranjan and De, Mrittunjoy, (2008). Present state of ICT application in the college libraries of Bankura subdivision W.B.: A study, In the Proceedings of the Sixth International Convention for Automation of Libraries in Education and Research (CALIBER 2008), University of Allahabad, Allahabad, 28th February to 1st March 2008, p.127-143.
 9. Ramasesh C P and Jerry Arokyamary. (2015). ICT skills and competencies of engineering college LIS professionals in Karnataka: A perspective, SRELS Journal of Information Management, 50 (2) . 209-218.
 10. Sakarkar Sachin D and Kuralkar Rushikumar R, (2013). Librarians attitude towards information communication technology in colleges affiliated to Sant Gadge Baba Amaravathi University: A study, In Proceedings of 9th International Convention for Automation of Libraries in Education and Research (CALIBER-2013), INFLIBNET Centre, Gandhinagar, Gujarat, p.12-17.
 11. Sampath Kumar B T and Biradar B S, (2010). Use of ICT in college libraries in Karnataka, India: A survey. Electronic Library and Information Systems, 44 (3). 271-282.
 12. Sivakumaren K S, V Geetha and Jayaprakash B, (2008). ICT facilities in university libraries: A study". In the Proceedings of the Sixth International Convention for Automation of Libraries in Education and Research (CALIBER 2008), University of Allahabad, Allahabad, 28th February to 1st March 2008, p.28-34.
 13. Umesh Kumar Y, (2013). Automation and networking status of aided minority degree college libraries in Urban Bengaluru: A study. International Journal of Information Dissemination and Technology, 3(4). 279-282.
 14. Veenapani Salam Chanu and Singh Th.Khomdon, (2011). Automation of libraries in Manipur: A survey. Gyankosh, The Journal of Lib. & Info.Management, 2 (2) 80-85.
 15. Walmiki R.H and Ramakrishnegowda K C, (2009). ICT infrastructure in university libraries in Karnataka. Annals of Library and Information Studies, 56. 36-241.