Application of ICT in the College Libraries of Assam

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ABSTRACT: College education plays an important role in developing the knowledge power of any individual in a society. The College libraries are able to fulfill the needs of the students, teachers and researchers by providing different kind of printed or digital resources. Better and effective library services can be ensured by the application of information and communication technology (ICT) with skilled and qualified library manpower. The purpose of the study was to investigate the application of ICT in the college libraries of Assam. Random sampling method has been used to select the colleges and collect the data from the respondents. The questionnaires were distributed personally or by e-mail to the college librarians and the same were received personally or through E-mail. Findings of the study indicated that ICT infrastructure in the college libraries really influenced on the ICT based library Services. The use of ICT has substantially improved the management of library activities with the availability of ICT based facilities. The ICT infrastructure and networking facilities in the college libraries should be regularly upgraded to improve the additional features while delivering library services.

I. INTRODUCTION

College education is an important part of higher education which is usually identified with the education in colleges, universities, technologies and which deals mostly with adults and is a higher level of knowledge in terms of its complexity and understanding. The modern library services can be ensured by the application of information and communication technology (ICT) with skilled and qualified library manpower. After independence, government of India has given importance to education sector for achieving the development goals. Various committees and commissions were set up by the government of India to look into the problems of educational reforms. These reforms have great impact in the development of higher education in Assam in the post independence period. At present, there have been 298 general degree colleges affiliated to different universities in Assam where 295 provincialised and 3 government degree colleges [15]. In total 189 colleges were provincialised before 2012 [16]. The study covers the 3 government and 189 provincialised degree colleges in Assam. The total number of colleges covered under the study is 192.

In recent ICT era, different agencies such as RUSA, UGC, INFLIBNET, the concerned state government and the local enterprises have been taking great initiatives to modernize the educational institution specially the academic institute. Hence, the application of ICT in the academic libraries of Assam has been gradually improving day by day due to the financial assistance of different agencies. This paper will identify the library services performed by ICT devices, ICT infrastructure and extent of use in the college libraries including status of library automation and institutional repository in the college libraries and the problems that have faced to implement the ICTs in the college libraries of Assam.

II. LITERATURE REVIEW

Atonring in 2015 has conducted a study on information and communication technology infrastructure in the university libraries of Tamil Nadu. The study mainly focuses on how far the university libraries have adopted the modern techniques for library management and availability of ICT infrastructure among arts and science university libraries in Tamil Nadu [1].

Egoeze *et al.,* (2014) conducts a descriptive survey study on ICT infrastructure and application in Nigeria Universities. The study found that ICT infrastructure is lacking in Nigeria universities and the utilization is low. The main ICT infrastructure and services utilized in Nigeria universities were identified to include the computer, the internet, E-mail services, the World Wide Web, website, and telephone [2].

Ajaegbu *et al.,* (2014) made a case study on awareness and utilization of ICT based library services on Nigerian Private University. The study focused on factors necessary for the sustainability of ICT based library services in Nigerian Private University, the level of awareness of the ICT based services to post graduate students, level of value placed to ICT based services by post graduate students and the level of satisfaction in using the ICT based services as being rendered by the institution to the post graduate students. The ICT based services are internet services, OPAC, electronic data, e-journal, fax machine, document delivery, scanner, printing facilities, CD-ROM, desktop and laptops. Findings of the study showed that the highest level of awareness as ICT based service is internet service. Internet services is being given priority in terms of value when compared with other ICT based library services

while fax machine is the least valued factor as indicated by the respondents [3].

Mondal and Bandyopadhyay (2014) study on availability of ICT infrastructure in the university libraries of West Bengal has defined that the ICT infrastructure in the university libraries of West Bengal is still at different stages of development. Most of the university libraries of West Bengal have minimum infrastructure for the implementation of ICT [4].

Chhatwal and Mahajan (2014) conducted a study on availability of ICT infrastructure facilities to access e-resources among the University libraries of Punjab and Chandigarh. The study has made to examine and compare the ICT infrastructure facilities such as hardware, software, campus LAN and internet facilities available in the university libraries of Punjab and Chandigarh. Finding shows that some of the participating libraries lack computer hardware, antivirus software, digital library software, research data analysis software, extended campus LAN and internet facilities with necessary bandwidth [5].

Patil *et al.,* (2014) conducted a study on ICT applications in Agriculture University libraries of western India with the objectives to find the automation status, ICT infrastructure, library services through ICT, training need by library staff with problem faced in adopting ICT etc. The study has conducted eight agriculture universities of western part of India. It is found that 02(two) university libraries have achieved 100 percent library automation, 04(four) university libraries achieved 75 percent automation and remaining 02(two) university libraries have achieved 50 percent library automation. Regarding the availability of ICT infrastructure, the SDAU library having the maximum to the some extend and the BSKKV library have the minimum infrastructure. All the universities feel lack of ICT facilities to meet the demands of the users. They found that 88(eighty eight) percent libraries have initiated to create or development digital library with the funds from ICAR [6].

Saleem *et al.,* (2013) on their paper application and uses of information and communication technology on academic libraries has found that the application of ICT tools are increasing in academic libraries specially in engineering college and arts and science colleges due to the development of technologies. Most of the academic libraries have found that the usage of internet has less due to proper LAN connection [7].

Sivakumaren *et al.,* (2014) have studies on ICT facilities in University libraries to identify the ICT infrastructure facilities, ICT based software and types of electronics resources available in the university libraries. The study has covered 10 government and deemed university libraries. It is found that no libraries have implemented digital library [8].

III. OBJECTIVES

The key objectives of the present study are:
1. To identify the ICT based Services performed by ICT devices in the College Libraries of Assam;
2. To identify the ICT infrastructure and extent of use in the college libraries of Assam; and
3. To identify the barriers in the implementation of the ICTs in the college libraries of Assam.

IV. HYPOTHESIS

1. There is a significant relationship between ICT infrastructure and the ICT based library services.
2. Use of ICT has substantially improved the management of library activities with the availability of ICT based facilities.

V. SCOPE AND LIMITATION

The study covers the degree colleges which have been imparting general education in Assam. There are 298 provincialised and 3 government degree colleges imparting general education in Assam, out of which 189 colleges have been provincialised before 2012. The study have covers the 189 provincialised and 3 government degree colleges. The total number of colleges covered under the study is 192.Colleges imparting Technical, Medical, Management, Law and special subject or other colleges related to professional courses are excluded in the present study.

VI. RESEARCH METHODOLOGY

Research methodology of the study includes the use of questionnaire, interview and observation method for collection of primary data from the respondents. Random sampling method has been used to select the colleges and collect the data from the librarians. The questionnaires were distributed personally or by e-mail to the college librarians and the same were received personally or through E-mail. Certain primary data were collected through telephonic interview. In the same way, certain data have been collected by personal observation during the visit to the libraries. Well known statistical package SPSS has been used to find out the frequency, mean and standard deviation of the research objectives.

VII. RESULT AND DISCUSSION

A. Response rate of the study
The questionnaires were distributed to 192 colleges out of which 118 colleges have responded and filled up the questionnaire. The percentage of response rate is 61.5%.

B. Library Services Performed By ICT Devices
Table 1 defines that at the highest 96.0% libraries provides photocopy services followed by 92.9% libraries facilitates internet service, 87.3% libraries offer desktop facility whereas 84.9% libraries provide OPAC services; 81.7% libraries, printing facility; 72.2% libraries, scanning facility; 71.4% libraries, lending services; 70.6% libraries, CD-ROM facility; 63.5% libraries, electronic database services; 58.7% libraries, online database services; 41.3% libraries, institutional repository services and the least 22.2% libraries, document delivery services.

C. Hardware Infrastructure Facilities
Table 2 shows that at the highest 99.2% of the libraries responded that they have desktop computer facilities and followed by 96.0% of the libraries have the photocopy machine. Subsequently data in gradation are 93.7% college libraries possessed server machine; 92.9% libraries, CCTV facility; 84.9% libraries, scanner for general purposes; 75.4% libraries, barcode scanner; 74.6% libraries, barcode printer; 62.7% libraries, backup device; 44.4% libraries, scanner for digitization; 29.4% libraries, projector; 20.6% libraries, identity card printer and the least 19.8% libraries, laptop facility.

D. Software Infrastructure Facilities
Table 3 shows that the highest 96.8% of the college libraries have library management Software packages followed by 88.1% of the libraries that have anti-virus software. It is also present that 51.6% of the college libraries have institutional repository software.

E. Availability of ICT based Technologies
Table 4 shows that at the highest 95.2% of the college libraries have internet technology in their college

libraries followed by 73.0% of the college libraries have adopted barcode technology. Very few 8.7% of the libraries have video conference technology and 3.2% college libraries have RFID technology which is regarded as least response.

Table 1: Library services performed by ICT devices.

Description	Responses (N=126)	Mean	Rank	Std. Dv
Online Database Services	74(58.7%)	.5873	10	.49428
Electronic Database	80(63.5%)	.6349	9	.48337
Institutional repository	52(41.3%)	.4127	11	.49428
Document Delivery service	28(22.2%)	.2222	12	.41740
Internet Service	117(92.9%)	.9286	2	.25857
OPAC	107(84.9%)	.8492	4	.35928
Lending Services	90(71.4%)	.7143	7	.45356
CD-ROM	89(70.6%)	.7063	8	.45725
Scanning facility	91(72.2%)	.7222	6	.44969
Printing facility	103(81.7%)	.8175	5	.38783
Photocopy service	121(96.0%)	.9603	1	.19599
Desktop facility	110(87.3%)	.8730	3	.33428

Table 2: Hardware facility in the library.

Description	Responses (N=126)	Mean	Rank	Std. Dv
Server	118(93.7%)	.9365	3	.24482
Desktop	125(99.2%)	.9921	1	.08909
Laptop	25(19.8%)	.1984	13	.40040
Printer	118(93.7%)	.9365	3	.24482
Scanner for general purposes	107(84.9%)	.8492	5	.35928
Scanner for digitization	56(44.4%)	.4444	10	.49889
Barcode scanner	95(75.4%)	.7540	6	.43242
Barcode Printer	94(74.6%)	.7460	7	.43702
Backup devices	79(62.7%)	.6270	9	.48554
Projector	37(29.4%)	.2937	11	.45725
Identity card printer	26(20.6%)	.2063	12	.40630
CCTV	117(92.9%)	.9286	4	.25857
Photocopy machine	121(96.0%)	.9603	2	.19599
Telephone	83(65.9%)	.6587	8	.47603

Table 3: Software facility in the library.

Description	Responses (N=126)	Mean	Rank	Std. Dv
Library Management Software	122(96.8%)	.9683	1	.17602
Institutional repository software	65(51.6%)	.5159	3	.50174
Anti-virus	111(88.1%)	.8810	2	.32514

Table 4: Availability of ICT based technologies.

Description	Responses (N=126)	Mean	Rank	Std. Dv
Barcode	92(73.0%)	.7302	2	.44565
RFID	04(3.2%)	.0317	4	.17602
Video Conference	11(8.7%)	.0873	3	.28340
Internet	120(95.2%)	.9524	1	.21381

F. Extend of use of ICT in the College Libraries
Status of Library Automation: Fig. 1 shows that out of 126 respondents, the highest 53.2% libraries are partially automated while 43.7% libraries are fully automated. The least 3.1% libraries are found not automated.
Level of automation achieved by the libraries: Table 5 depicts level of automation achieved by the college libraries in Assam. It shows the mean value of the acquisition, cataloguing, circulation, serial control and OPAC is 1.08, 4.27, 3.59, 1.28 and 4.11 respectively.
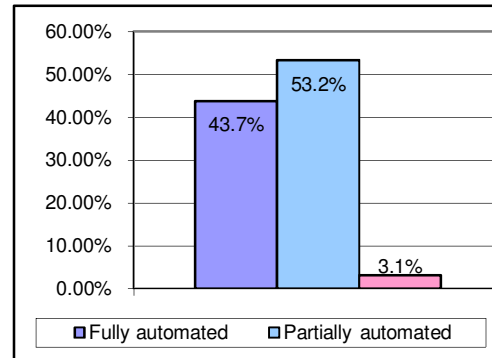

Fig. 1. Status of library automation.

Table 5: Level of automation achieved.

Automation Modules	0%	Below 25%	25%	50%	75%	100%	Mean	Std. Dv
Acquisition	59 (46.8%)	44 (34.9%)	4 (3.2%)	4 (3.2%)	3 (2.4%)	12 (9.5%)	1.08	1.542
Cataloguing	6 (4.8%)	0	0	12 (9.5%)	38 (30.2%)	70 (55.6%)	4.27	1.162
Circulation	22 (17.5%)	14 (11.1%)	1(.8%)	1 (.8%)	7 (5.6%)	81(64.3%)	3.59	2.083
Serial control	52 (41.3%)	46 (36.5%)	7 (5.6%)	2 (1.6%)	0	19 (15.1%)	1.28	1.700
OPAC	14 (11.1%)	8 (6.3%)	2 (1.6%)	0	4 (3.2%)	98 (77.8%)	4.11	1.790

Status of Institutional repositories. Fig. 2 depicts that out of 126 colleges, 40.5% libraries have availed institutional repositories while 20.6% libraries are still in process and 38.9% libraries do not have institutional repository.
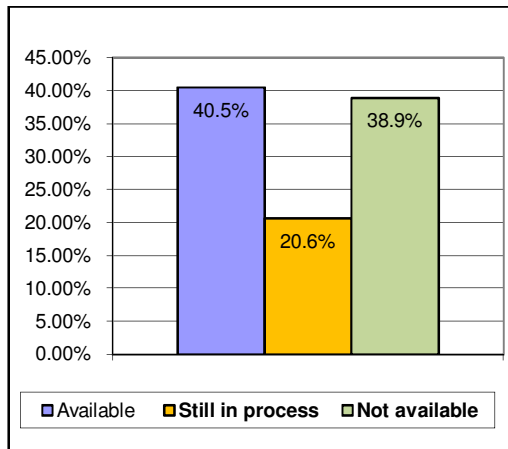

Fig. 2. Status of institutional repository.

G. Constraints in Implementation of ICT.
Table 6 depicts the constraints in the implementation of ICT in the college libraries of Assam. It shows that at the highest 81.7% libraries have faced problem due to lack of IT skilled manpower. Subsequently, 66.7% libraries faced problem caused by inadequate training in ICT applications whereas 56.3% libraries, lack of IT infrastructure and network facility; 49.2% libraries, work overload; 47.6% of each libraries, lack of budget for ICT and erratic Power supply; 35.7% libraries, lack of upgrading ICT strategy; 33.3% libraries, non availability of consultation services; 32.5% libraries, lack of support from authorities; 18.3% libraries, lack of interest for learning ICT application and 14.3% libraries, lack of co-ordination among library staff.

H. Statistical Analysis
Hypothesis 1: There is a significant relationship between ICT infrastructure and the ICT based library services.
Result: From the Table 7 & Table 8, it shows the relationship between facilities available in the libraries and the services provided. The relationship is positively correlated and to be found significant at 1%.

Table 6: Constraints in the implementation of ICT.

Description	Responses (N=126)	Mean	Rank	Std. Dv
Inadequate training in ICT applications	84(33.3%)	2	.6667	.47329
Lack of IT infrastructure and network facility	71(43.7%)	3	.5635	.49793
Lack of support from authorities	41(67.5%)	8	.3254	.47039
Lack of budget for ICT	60(52.4%)	5	.4762	.50143
Lack of Co-ordination among library Staff	18(85.7%)	10	.1429	.35132
Non availability of consultation services	42(66.7%)	7	.3333	.47329
Lack of upgrading ICT strategy	45(64.3%)	6	.3571	.48107
Lack of interest for learning ICT application	23(81.7%)	9	.1825	.38783
Overload of work	62(50.8%)	4	.4921	.50193
Erratic Power supply	60(52.4%)	5	.4762	.50143
Lack of IT skilled manpower	103(18.3%)	1	.8175	.38783

Table 7: Descriptive Statistics of ICT infrastructure and the ICT based library services.

	Mean	Std. Deviation	N
Overall services	8.43	2.522	126
Hardware facilities	9.53	2.507	126
Software facilities	2.37	.711	126
ICT based technologies	1.77	.609	126
Overall facilities	13.67	3.466	126

Table 8: Correlation between ICT based services and facilities available in the library.

Facilities		Service
Hardware	Pearson Correlation	.700**
	Sig. (2-tailed)	.000
	N	126
Software	Pearson Correlation	.581**
	Sig. (2-tailed)	.000
	N	126
ICT based technologies	Pearson Correlation	.617**
	Sig. (2-tailed)	.000
	N	126
Overall facility	Pearson Correlation	.734**
	Sig. (2-tailed)	.000
	N	126

**. Correlation is significant at the 0.01 level (2-tailed).

Hypothesis 2: Use of ICT has substantially improved the management of library activities with the availability of ICT based facilities.

Result: The Pearson correlations have applied to obtain the relationship between two factors of ICT infrastructure facility and library management activity. The main factor availability of ICT facilities in the

sample libraries correlated with management of library activities.

In the Table 8 facilities available in the sample library have four particular dimensions, i.e. ICT based library service, Hardware facility, Software facility and ICT based technologies. The means scores obtained from 12 number of ICT base library services has drawn and found 8.43. Out of 14 hardware facilities available in mean score 9.53, out of 3 categories of library software facilities available in mean score 2.37, ICT base technologies containing 4 types of facilities and the mean score is 1.77. The overall facilities mean score is 22.10 out of 33 facilities available in the surveyed libraries. Management of Library activities have classified into five categories and overall views of library automation depicted the attitude on the activities.

Table 9: Descriptive Statistics of ICT Facilities and Management of Library activities

		Mean	Std. Deviation	N
Facilities available	ICT Base Library services	8.43	2.522	126
	Hardware services	9.53	2.507	126
	Software services	2.37	.711	126
	ICT based technologies	1.77	.609	126
	Overall facilities available	22.10	5.586	126
Management of library activities	Views of library automation	1.40	.554	126
	Level Acquisition	1.08	1.542	126
	Level Catalog	4.27	1.162	126
	Level Circulation	3.59	2.083	126
	Level Serial Control	1.28	1.700	126
	Level OPAC	4.11	1.790	126

Table 10: Pearson Correlation between facilities available and management of library activities.

Facilities available		Management of Library activities					
		Views of library automation	Level of acquisition	Level of Cataloguing	Level of circulation	Level of serial control	Level of OPAC
ICT Base services	Pearson Correlation	.596**	.238**	.473**	.634**	.332**	.612**
	Sig. (2-tailed)	.000	.007	.000	.000	.000	.000
Hardware	Pearson Correlation	.524**	.217*	.425**	.525**	.294**	.527**
	Sig. (2-tailed)	.000	.015	.000	.000	.001	.000
Software	Pearson Correlation	.536**	.141	.364**	.356**	.253**	.402**
	Sig. (2-tailed)	.000	.115	.000	.000	.004	.000
ICT based technologies	Pearson Correlation	.445**	.105	.349**	.505**	.279**	.435**
	Sig. (2-tailed)	.000	.243	.000	.000	.002	.000
Overall facilities	Pearson Correlation	.621**	.234**	.489**	.622**	.344**	.611**
	Sig. (2-tailed)	.000	.008	.000	.000	.000	.000

**Significant at 1% level, *Significant at 5% level

Mean scores of the level of acquisition, cataloguing, circulation, serial control and OPAC are 1.08, 4.27, 3.59, 1.28 and 4.11 respectively defined the percentage from lowest to highest (0%, below 25%, 25%, 50%, 75% and 100%).

From the Table 9 it can be depict that the overall facilities available in the surveyed libraries correlated with the management of library activities. Level of acquisition (r=.234) Level of Cataloguing (r=.489),

level of Circulation (r=.622), Level of Serial Control (r=.344) and Level of OPAC (r=.611) have positive correlation with overall facilities available in the sample libraries. All the relationships are found significant at 1% level. It concluded that the facilities increase in a library, management of library activities increasing positively. Thus the hypothesis can be accepted.

VIII. FINDINGS

- The highest number of libraries has availed desktop computer facilities followed by photocopy machine, server machine, and CCTV facility. Very few libraries have laptop facility.
- The highest number of colleges have availed library management software followed by anti-virus software and more than half libraries digital library software.
- The highest number of libraries has internet technology followed by barcode technology. Very few have video conference technology and RFID technology.
- More than half of the libraries are partially automated while less than half of the libraries are fully automated. The few libraries are found not automated.
- The less than half of the have availed institutional repositories while few libraries are still in process and very few libraries do not have institutional repository.

- It is found that the highest number of libraries have provided photocopy services followed by internet service, offered desktop facility, OPAC services, and printing facility while few libraries have provided document delivery services.
- The highest number of libraries have faced problem due to lack of IT skilled manpower followed by inadequate training in ICT applications, lack of IT infrastructure and network facility, work overload, lack of budget for ICT and erratic power supply, lack of upgrading ICT strategy, non availability of consultation services, lack of support from authorities, lack of interest for learning ICT application and very few libraries have lack of co-ordination among library staff.

IX. SUGGESTIONS

- Lack of library staff is the main problems for the college libraries. Library staff should be recruited as per the UGC norms.
- The Library automation and institutional repository should be setup with branded IT equipment.
- The hardware and software facility in the library should be regularly upgraded so as to improve the additional features while delivering library services.
- The library should be equipped have high speed internet with Wi-Fi facility so that the users can access online data base services.
- The library should equipped projector and identity card printers for providing better library services in ICT environment.
- The library should provide video conference facilities which enables the users to maximize the usage of ICT based library activities and services.
- Browsing section is more important for the library users for consulting ICT based library services and the section should be well equipped with enough number of computers.
- The librarians should participate ICT based training on library management software and digital library software organized by different agencies to cope up the latest technologies.

X. CONCLUSIONS

From analysis of the study, the highest 53.2% libraries are partially automated while 43.7% libraries are fully automated. The least 3.1% libraries are found not automated. The 40.5% libraries have availed institutional repositories while 20.6% libraries are still in process and 38.9% libraries do not have institutional repository. The highest 81.7% libraries have faced problem due to lack of IT skilled manpower followed by 66.7% libraries faced problem caused by inadequate training in ICT applications. From the statistical analysis, it has found the ICT based library services in the college libraries are depends on the availability of ICT infrastructure. The use of ICT in the college libraries has substantially improved the management of library activities with the availability of ICT based facilities. The Library automation and Digital library or institutional repository should be setup with branded IT equipment. The respondents replied that 40.5% libraries have availed institutional repositories while 20.6% libraries are still in process and 38.9% libraries do not have institutional

repository. Hence, the authority should take necessary steps to facilitate institutional repository section in their libraries. The hardware and software facility in the library should be regularly upgraded so as to improve the additional features while delivering library services.

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