Use of RFID Technology in College Libraries of Assam: A Case Study

Anupam Chanda
PhD Research Scholar
Dept. of Library and Information Science,
Assam University Silchar
PIN: 788011
Email: anupamchnd1988@gmail.com
Mobile No: **7002039631**

&

Professor Manoj Kumar Sinha
Professor and Head of the Department
Dept. of Library and Information Science,
(Swami Vivekananda School of Library Sciences)
Assam University Silchar, PIN: 788011
Email: mksinha1965@gmail.com
Mobile No: **09435231672**

ABSTRACT

Assam lies in the center between mainland India and North-East Region, and the state is surrounded by the other north eastern states. It has got the highest number of educational institutions in North-Easter Region, imparting of quality education is lagging behind, due to lack of value in the higher education system, insufficient number of faculty members who can impart good quality education to the college and university students and scholars which results in development of higher education system in the states of North East India.

Assam has lots of educational institutes having the very high-tech library system, some of the institutions have implemented RFID technology for smooth running the library services. Many libraries have automated their library systems, some libraries are still using the manual mode, but

slowly these libraries are converting their manual system into the automated library housekeeping operations. In Assam, altogether ten number of college and university libraries have implemented RFID technology till to date. Out of these, there are six number college libraries where RFID technology has been implemented.

The present paper deals with the theoretical perspectives, usefulness and implementation status of RFID technology in college libraries of Assam.

Besides this , the authors also tried to highlight some pertinent points like the cost of RFID equipment, RFID goals in libraries, RFID components that are using the libraries, etc. which should be taken into consideration while implementing the RFID in the college and university libraries or any library of higher learning institutions.

KEYWORDS: *RFID Technology, College Libraries –Assam , Higher Education- Assam , North-Eastern Region.*

1. 0   INTRODUCTION

Assam enjoyed the unique position of attaining education in both pre-independence and post-independence period. The existence of mass education in general and higher education in particular in North-East region was started by five agencies. The modern age of education history began with the annexation of Assam with the British Empire by the treaty of "Yangdabu" in 1926. According to the report of late W. Robinson, who was first appointed Inspector of Schools in 1840 for the Brahmaputra Valley, a deplorable condition of the indigenous educational institutions prevailed in the region. In 1841 initiatives were taken to open new schools through the efforts of the government and other agencies. By 1875, the number of educational institutions for general education rose to 1,293 with an enrolment of 31,462. (Source: http://dheassam.gov.in/history.asp). During the pre-independence period, there was no infrastructure development for North-East India. The Christian missionaries introduced basic formal education to communicate between the people, for secretarial, administrative work and to convert numerous distinctive religions into Christianity.

Table 1: Colleges of Assam during Pre-Independence period-1947

Sl. No.	Name of the Colleges	District/Capital	Establishment
1	Cotton College	Guwahati	27th May 1901
2	Jagannath Barooah College	Jorhat	19th August 1930
3	Gurucharan College	Silchar	15th July 1934
4	Madhab Choudhury College	Barpeta	14th July 1939
5	Nowgong College	Nagaon	7th August 1944
6	Darrang College	Tezpur	26th July 1945
7	Kanoi College	Dibrugarh	15th June 1945
8	Karimganj College	Karimganj	1946

Source: NAAC (2004) & Vanlalchhawna (2006).

Assam lies in the center between mainland India and North-East Region, and the state is surrounded by the other north eastern states. Educationally, Assam has attained the top level among the states of North-East Region. Assam state is having most wide-ranging network of higher educational institutions in the whole of North East. Guwahati, the capital of Assam, is one of the leading hubs for higher learning in the region. Economically, Assam has the most significant economy, and it has relatively well developed in educational institutions and infrastructure compared with the other states in the region. Assam has the advantages of social-economic development, and it has politically gained high status, ever since independence period because the state is the primary transit point to pass through the other seven states in the region. Besides, Assam is the nearest neighbor to the mainland states of the country. The state is known for its abundant resources like oil, tea, etc. before independence, Assam had many schools, higher secondary schools as well as eight colleges. The colleges of importance like Agricultural University, Indian Institute of Technology (IIT), National Institute of Technology (NIT), Ventral Institute of Technology, etc. were established in various districts and capital of Assam. Presently, Assam has got the highest total number of universities; two Central Universities, two State Universities, and many Private Universities. There are three Government technical institutes; Indian Institute of Technology (Guwahati), National Institute of Technology (Silchar) and Central Institute of Technology (Kokrajhar). Moreover, there are 301+ nos. of Govt./ Provincialised Colleges and 300+ Private Colleges. The data as mentioned above depicts that Assam is somehow better developed in higher education during pre-independence and post-independence period comparing with the other North-Eastern States.

Although, Assam has got the highest number of educational institutions in North-Easter Region, imparting of quality education is lagging behind, due to lack of value in the higher education system, insufficient of faculty who can enhance and impart significance superior modern style of education. Moreover, the lack of infrastructures demeans the importance of higher education.

(Source: http://shodhganga.inflibnet.ac.in/bitstream/10603/68265/14/14_chapter%205.pdf)

1.1 About RFID Technology

RFID stands for Radio-Frequency Identification. RFID is a technology that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency (RF) portion of the electromagnetic spectrum to uniquely identify an object, animal, or person. RFID consist of a

small chip and an antenna. RF transmission lines are used to convey a radio frequency signal with minimum attenuation and distortion.

They are two main types, balanced and unbalanced. The chip typically is capable of carrying 2,000 bytes of data or less. RFID is coming into increasing use in industry as an alternative to the barcode. RFID technology has advantages that it does not require direct contact as well as line-of-sight scanning. An RFID system consists of three components: an antenna and transceiver (often combined into one reader) and a transponder (the tag).

The antenna uses radio frequency waves to transmit/pass a signal that activates the transponder, the tag transmits data back to the antenna, and the data is used to notify a programmable logic controller that an action is going to occur. RFID systems containing low-frequency from 30 KHz to 500 KHz have short transmission ranges (generally less than 6 feet). High-frequency RFID technology from 850 MHz to 950 MHz and 2.4 GHz to 2.5 GHz offer longer transmission ranges (more than 90 feet).

In general, the higher the frequency, the more expensive the system is. Libraries have used RFID to replace the barcodes on library items. The tag may contain identifying information or may just be a key into a database. RFID technology may replace or supplement barcodes and can offer other methods of inventory management and self-service checkout by the patrons. It can also act as a security device, taking the place of the more traditional electromagnetic security strip (Source:http://internetofthingsagenda.techtarget.com/definition/RFID-radio-frequency-identification).

1.2   Academic Libraries of Assam

An academic library is the strength of any educational institute, most importantly without proper libraries, there can be no real progress in the education sector. A library is a fountainhead from which knowledge flows. Education comprises of two essential elements, which are teachers and books. Library gives valuable support to education by providing books and other study materials. At the same time, a sound educational system is dependent on systematic libraries. Any form of scholarly work without libraries may become meaningless. Libraries which are attached to any educational institution are known as academic libraries. The primary characteristics of a good academic library are to make a complete identification with its institution. Of course, a library with a collection of documents only can't achieve the goal of the institutions. Proper management

of the library is necessary to provide the optimum benefit of the library to its parent institutions as well as its users. The quality of the resources and services of the library depends upon how these are managed by the library staffs.

Information is considered as essential commodities for development of a nation. Therefore libraries and information centers are getting much importance. UGC, Govt. is giving more and more funds for the development of academic libraries. But still, it is seen that university and college libraries are being less used than their capacity and users claim that libraries are not adequate to satisfy their needs. Therefore, library professional should think a strategic plan and some alternatives to utilize the existing resources and services to secure maximum utilization of the resources acquired by the libraries.

Assam has lots of educational institutes having the very high-tech library system, some of the institutions have implemented RFID technology for smooth running the library services. Many libraries have automated their library systems, some libraries are still using the manual mode, but slowly these libraries are converting their manual system into the automation system. In Assam, Ten academic libraries have implemented RFID technology to date. Out of these, six are college libraries.

1.3   Statement of the Problem

The study entitled as "*Use of RFID Technology in College Libraries of Assam: A Case Study*." There were no studies conducted on the use of RFID technology in college libraries of Assam. The status of RFID technology in college libraries is not known. So, the topic has been undertaken to study the status of use of RFID technology and its impact on library services.

1.4 Objectives of the Study

The following are the primary objectives of the study:

- ➢ to trace the development of the RFID technology in college libraries;
- ➢ to examine the application of RFID in libraries;
- ➢ to know the level of acceptance of RFID among library professionals;
- ➢ to study the present problems faced by the RFID implemented libraries.

2.0   REVIEW OF LITERATURE

Nisha (2018) in her study mentioned that Radio Frequency Identification (RFID) as a tool is being used for the better governance and management of libraries RFID technology was implemented in Defence Science Library, Defence Scientific Information & Documentation Centre (DESIDOC), Delhi, in 2013. The study describes the process of implementation of RFID system in the Defence Science Library, at DESIDOC. It provides an overview of the work to implement the RFID system including the philosophy or the background or thought process that had gone into deciding in its implementation, the various features, technical specification of the library automation software and the system itself. The constraints faced during the data migration and the visible advantages from the users' perspective vis-à-vis manual operation are also covered. The study concludes that implementation of RFID technology has brought a bouquet of benefits to librarians, the staff and scientists or user of the Library.

Nagalakshmi and Trivedi (2014) in their study have mentioned that Radio frequency identification (RFID) is one of the new AIDC (Automatic Identification and Data Capture) technologies. The technology acts as a base for automated data collection, identification and analysis systems worldwide. They have discussed in their paper how the RFID Technology successes in Indian academic libraries, components of RFID for library management, RFID Vs. Barcode, RFID benefits and issues and the vendors at Indian market for RFID technology.

Bhavanishankar and Galagali (2013) have highlighted in their study "**RFID: An overview"** This paper discusses major standards and components of RFID systems which introduces the sense of cost effectiveness, safety and security. RFID system became most essential carriers' technology for the library that best fit under the umbrella of automatic identification, management of material flow and streamlines various other library options.

Ahuja and Potti (2010) on their paper **"An introduction to RFID technology"** mentioned that the technology has emerged some time back and was not used that much because of lack of standardization and high costs. This paper describes RFID technology and its applications in today's world.

Dhanalakshmi and Mamatha (2009) have mentioned on their paper "**RFID based library management system"** that RFID based Library Management system (LMS) would allow fast transaction flow for the library and will prove immediate and long-term benefits to the library in traceability and security. This paper presents the experiments conducted to set up RFID based LMS.

Sumi and Kumar (2007) have mentioned in their paper **"Application of RFID Technology in libraries"** which gives a brief idea about the RFID, its importance in the library system, how it works and describes different components of the RFID technology. It also briefs about the tentative budget to establish RFID technology in the library and finally its future in Indian libraries.

Hong (2006) in his article **"The application of RFID smart label technology in modern libraries"** stated that RFID is an untouched automatic identification technology; it will replace the barcode technology commonly used in the library at present. This article presents the application of this technology in the library.

Mengxin (2006) on his paper **"Research on the Feasibility of RFID's Application in the Libraries"** analyses the feasibility of RFID's application in libraries from the perspectives of the library's strategic planning, financial and technology issues as well as the safety and humanism issues and then it discusses the case of San Francisco Public Library. The paper suggests that libraries should consider the conditions and social circumstance individually before making up the decision to introduce the RFID system.

3. RESEARCH METHODOLOGY

By the objectives, problems, and limitations of the study, an effort is made to evolve the suitable methodology for the research. Survey method has been used to collect the data. A well-designed questionnaire, interview, and observation techniques have been adopted for data collection as a data collection tools. The questionnaire has been distributed amongst librarians, and the researcher tried to get 100% response from them. For this study, the researcher has also collected data by gone through to the library records, annual reports, and by visiting the library/institutional websites, etc.

3.1 Designing the Questionnaire

Keeping in the view of set objectives a questionnaire has been designed in structural form. The questionnaire comprised of questions covering different facets of the problems. To facilitate quantification and analysis, mainly close-ended questions have been designed to use along with rating scales. To capture response and have fewer missing responses, responses such as ―no

opinion‖ and ―don't know was included. Few open-ended questions were also included by the researcher so that respondents can express their views freely.

3.2 Sampling Design

For the present study, the purposive sampling technique has been used by the researcher.

The present study has included overall 6 (Six) College Libraries, of Assam.

Table 2: RFID implemented colleges of Assam

Sl. No.	Name of the College	Name of the Library
1	Morigaon College, Morigaon	Gurucharan Medhi Library
2	Science College, Kokrajhar	Kamal Kumar Brahma Central Library
3	Diphu Govt. College, Diphu, KarbiAnglong	Diphu Govt. College Central Library
4	Mazbat College, Mazbat, Udalguri	Central Library
5	Bengtol College, Bengtol, Chirang	Dr. A.P.J. Abdul Kalam Central Library
6	Fakiragram College, Fakiragram, Kokrajhar	Fakiragram College Library

3.3 Data Analysis Techniques

By the received filled up questionnaire the data has been analyzed and tabulated. All the results have been presented in the form of tables and graphs. For the data analysis standards, statistical techniques have been used.

4. 0   RFID TECHNOLOGY IN COLLEGE LIBRARIES

RFID is the latest fast-growing technology to be used in the library for minimizing the theft of documents and as an access control systems. RFID technology provides for "sightless" or no line of sight identification of items. It includes the ability to facilitate circulation, re-shelving, and theft detection, and it has several other significant advantages.

Most of the colleges are now a day's using RFID technology in their libraries as it helps to provide better library services to the users. In colleges the numbers of staffs are decidedly less in libraries in compare to university libraries, in an average five or six staffs are there in college

libraries, in that case, RFID helps the staffs to do their work quickly. In circulation counter it helps most, and also RFID helps in case of theft detection purpose as well as stock verification.

4.1 How RFID Works in Libraries

The Process of RFID Library Management System

- As a part of technology implementation, RFID tag is implanted in every book and all other reading materials of the library, and complete book/reading materials information is entered into the software installed in server or workstation.
- Now whenever a library member brings the book for issue/return purpose, the RFID reader from the tag reads the information about that book and transmits the data into the software and books is smoothly issued in a few seconds with a minimum of manual intervention.
- As the member takes the book outside the library, the antenna placed at the exit gate automatically read the information contained on the RFID tag to verify whether the book is issued correctly or not.
- In case the book is not issued to the member as per library norms, or it is being stolen from the library the antenna sense it and give an instant alert. Thus the technology resulted from successful theft reduction of books.

Each RFID tag has a non-powered radio antenna which can be communicated to by a powered antenna belonging to a tag reader on a scanner or security gate. Although it is not necessary that the two antennas "see" each other as is needed with a traditional barcode, it is necessary that they be relatively close to one another since the wattage used by the powered antenna is very low for health and safety reasons.

The RFID reader sends out electromagnetic waves, and the tag antenna is enabled to receive these waves. "When the tag antenna enters the RF (Radio Frequency) field, the tag's microchip circuits are powered by signals from this RF field created by the reader. The chip then modulates the waves, and the tag sends them back to the reader. The reader converts the signals received from the tag into digital data and sent it to a computer."

There are various types of tags available for library kind of environment like:

- Standard tags for books;
- CD-DVD tags;
- Magazine tags. etc.

4.2 Services provided by RFID Technology in Libraries

➢ Self-return
➢ Combined issue/return
➢ Fine/charge payment
➢ Automatic sorting
➢ Security
➢ Stock management
➢ Accessioning

4.3 Advantages and Disadvantages of RFID Technology

Following are the advantages and disadvantages / limitations of applying RFID Technology in libraries which are given in Table-3: :

Table 3: Following are the advantages and disadvantages of RFID technology

Advantages	Disadvantages

Best tracking system for library theft control;	High cost;
Easy to find the misplaced books;	Frequency block;
Fast and exact stock verification can be done using RFID;	Chances of removal of exposed tags exit gate sensor problems;
Self-check-in / out can be done using RFID by the users;	Reader collision; Tag collision;
Library staff can be used for other works instead of circulation.	Interoperability.

4.4 Data Analysis and Interpretation

Table 4: Size of collection in the libraries (N=6)

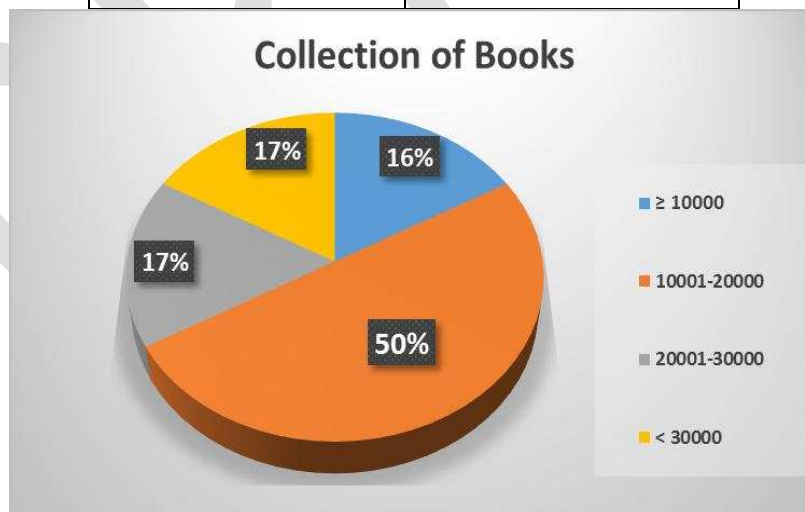| Range (No. of books)	No. of college libraries
≥ 10000	1
10001-20000	3
20001-30000	1
< 30000	1

Fig 1: Collection of books in the libraries.

From the above figure, it is clear that most of the college libraries have a good number of the collection which is between 10001-20000 books. Only one library has a collection of more than 30000 books.

Table 5: Per day Circulation in the College Library (N=6)

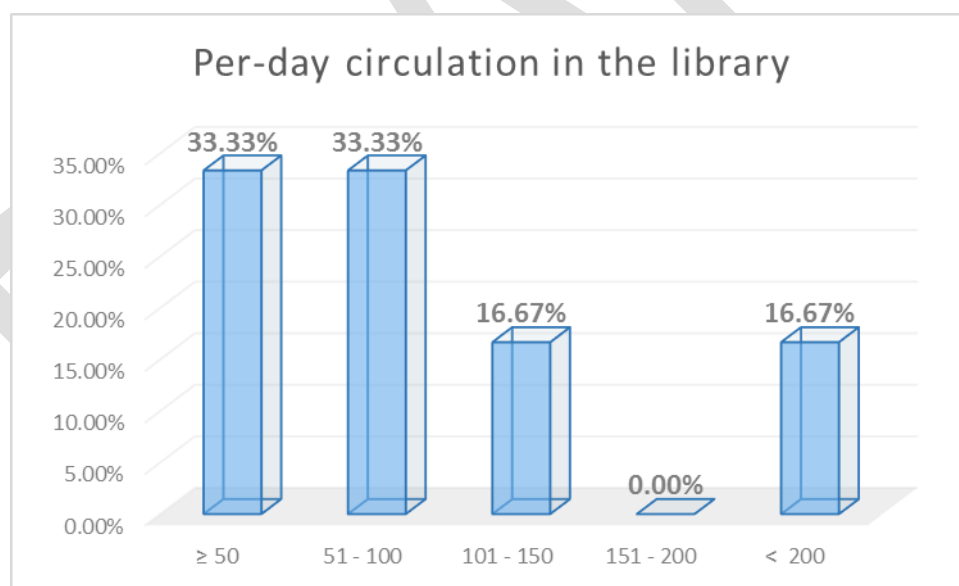| Range (No. of books)	No. of college libraries
≥ 50	2
51-100	2
101-150	1
151-200	0
< 200	1

Fig 2: Per-day Circulation in College Libraries

Most of the college libraries circulation is below 100 books/day on average. From the above table, it is clear that only one library is doing circulation of more than 200 books/day.

Table 6: Use of LMS by the College Libraries (N=6)

Name of the LMS	No. of college libraries
Koha	4
SOUL 2.0	2
LibSys	NIL
e-Granthalaya	NIL
TLSS	NIL

Out of 6 (Six) college libraries 4 (Four) libraries are using Koha and remaining 2 (Two) libraries are using SOUL 2.0, so it is clear that Koha is the most popular software among the college librarians.

Table 7: RFID Installed in College Libraries (N=6)

RFID installation year	No. of college libraries
Before 2014	NIL
During 2014	NIL
During 2015	2
During 2016	NIL
During 2017	4

Most of the college libraries have installed RFID technology during the year 2017 (4 nos. of college libraries), and remaining 2 (Two) libraries have installed in during the year 2015. So it is clear that in the year 2017 RFID revaluation has come to college libraries of Assam.

Table 8: Objectives of Using RFID in Libraries (N=6)

Objectives / Name of the college	Morigaon College	Science College	Diphu Govt. College	Mazbat College	Bengtol College	Fakiragram College
Self Check-in/out	√	√	√	√	√	√
Return items to shelf more	√	**X**	**X**	**X**	√	√

quickly						
Increase security	√	√	√	**X**	√	√
Reduce theft	√	√	√	√	√	√
Increased equipment reliability	√	**X**	**X**	**X**	√	**X**
Better inventory control	√	**X**	√	√	√	√
Faster processing of new materials	√	**X**	√	**X**	√	√
Track materials more accurately	√	**X**	**X**	**X**	√	√

Table 9: College Libraries having RFID Components (N=6)

Objectives ⟋ Name of the College	Morigaon College	Science College	Diphu Govt. College	Mazbat College	Bengtol College	Fakiragram College
RFID tags	√	√	√	√	√	√
Self-check-in/out station	√	√	√	√	√	√
Staff check-in/out station	√	**X**	√	√	√	√
RFID smart card	√	√	√	√	√	√
UPS for power backup	√	**X**	√	√	√	√
RFID handled reader	**X**	**X**	**X**	**X**	√	**X**
Antenna	√	√	√	√	√	√
Server	√	√	√	√	√	√
RFID label printer	**X**	**X**	**X**	√	√	√
Security gate	√	√	√	√	√	√

Table 10: Total Cost of Implementing RFID in College Libraries (N=6)

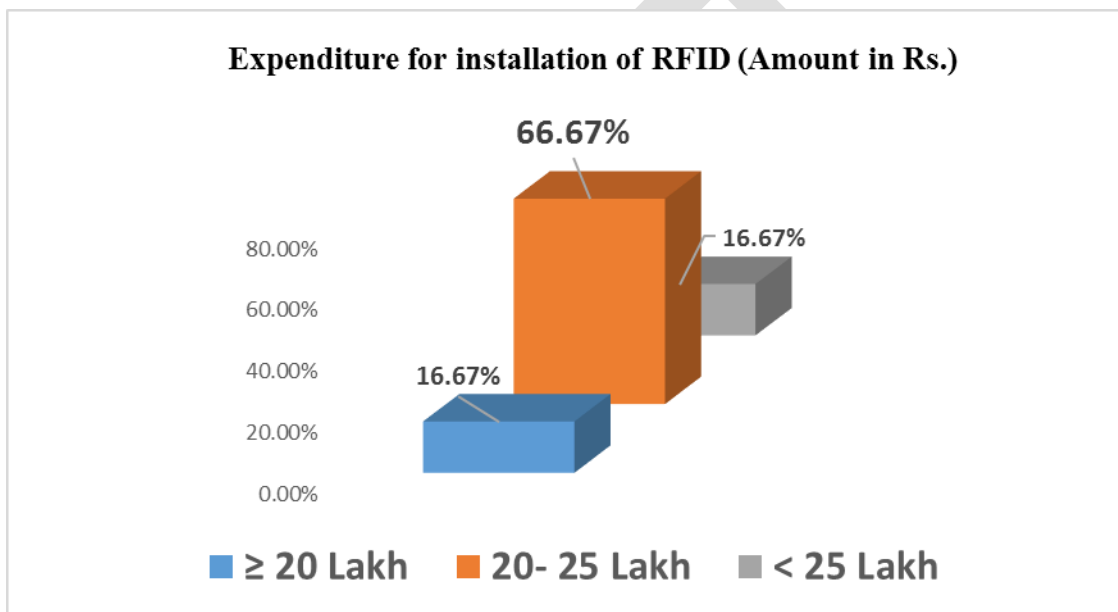| Range (Amount in Rs.)	No. of college libraries
≥ 20 Lakh	1
20-25 Lakh	4
≤ 25 Lakh	1

Fig 3: Installation cost of RFID technology in College Libraries

From the above figure, it is clear that most of the college libraries have spent Rs. 20-25 Lakh to install the RFID technology in their libraries. But again the cost depends on the collection of the library study materials if the study materials are more automatically the price will high as the number of tags depend on how many study materials are available.

Table 11: Days require Installing RFID in College Libraries (N=6)

Range (No. of days)	No. of college libraries
≥ 30 Days	3
30-60 Days	0
60-120 Days	2
≤ 120 Days	1

Most of the colleges (Three) replied that they installed RFID technology in their libraries in less than 30 days by using outsourcing agencies. 2 (Two) nos. of colleges replied that they required 60-120 days to installed the system and only 1 (One) library has mentioned that it needs more than 120 days to install the system. Again the reason is that installation of RFID technology depends on the number of collection in the library.

Table 12: RFID trained staffs in the College Library (N=6)

Name of the College	No. of RFID trained staffs
Morigaon College, Morigaon	2
Science College, Kokrajhar	1
Diphu Govt. College, Diphu, KarbiAnglong	1
Mazbat College, Mazbat, Udalguri	1
Bengtol College, Bengtol, Chirang	2
Fakiragram College, Fakiragram, Kokrajhar	4

Very few staffs in these college libraries are trained on RFID technology. Only one college has 4 (Four) number of trained staffs. Most of the staffs in the college libraries are Non-IT background, so it is difficult to train them on RFID technology, as RFID is a hi-tech system and its needs minimum IT knowledge.

5.0   MAJOR FINDINGS AND CONCLUSION

5.1 Major Findings

From the study the researcher has found out some major points which are as follows:

- Most of the colleges are having a collation of **10000-20000** books in their libraries, which seems to be a good number in case of college libraries;

- Circulation of books in most of the college libraries is up-to **100** books/day in an average;

- Most of the college libraries are using Koha LMS for their library automation; Koha is the most popular software amongst the college librarians;

- The maximum number of RFID installation has been conducted in the year **2017**;

- Cost of implementation of RFID technology is between Rs. **20-25** Lakh according to the response given by most of the college librarians;

- Minimum **30** days require installing RFID technology in the libraries; again it depends on the size of the collection of the study materials;

- Due to lack of RFID trained staffs, the college libraries are facing problem using RFID technology; sometimes they have to call the vendor for a minor problem;

- Though RFID saves the time in the circulation of items while doing shelf check-in/out students are facing problems, and in some libraries, they have shutdown shelf check-in/out counter due to wrongly used by the students.

5.2 Conclusion

College libraries are now a day's adopting technologies, college libraries in Assam have started automated their library long back ago, and recently they have started installing RFID technology in their libraries for smooth conduction of library day to day operation, it can save the time of the staffs as well as users. The RFID technology has become an innate part of all modern libraries and has proved that it is efficient, effective, user-friendly, and expedient. It is much better and improved technology over conventional barcodes system. The RFID technology extensively

benefited the staffers and the readers of college libraries both regarding the provision and availing services.

The lack of trained and skilled manpower was some of the factors which should tack care of by the libraries. RFID offers quicker and faster circulation of books, including check-in, checkout and renewal without wasting user's time. Staffs can be deployed for other library works. Record keeping and shelving of the books has become easier for the library staffs. Major changes brought by RFID technology in the libraries are theft detection, security, reduce time, etc. For a small size library, the return-on-investment does not make much of economic sense to them. However, as the interest in RFID as a solution to optimize further the automation and tracking of documents are gathering momentum at an increasing pace with more libraries joining the trails, it is expected that cost will soon be affordable and make good economic wisdom both for large and small libraries.

REFERENCES

Ahuja, S., & Potti, P. (2010). An Introduction to RFID Technology. Communications and Network, 02(03), 183- 186. doi:10.4236/cn.2010.23026 (Retrieved on 01/02/2017: http://file.scirp.org/pdf/CN20100300005_47213461.pdf)

B, Bhavanishankar, & Galagali, R. M. (2013). RFID: An Overview. *Indian Journal of Information, Library & Society, 26, N3-4,* Pp.173-178.

Dhanalakshmi, M., & Mamatha, U. (2009). RFID based library management system. *Proceedings of ASCNT–2009, CDAC, Noida, India*, Pp.227-234.

Hong, W. (2006). The application of RFID smart label technology in modern libraries [J]. *Researches in Library Science*, *8*, 004. (Retrieved on 21/07/2017: http://en.cnki.com.cn/Article_en/CJFDTOTAL-TSSS200608004.htm)

Mengxin, C. (2006). Research on the Feasibility of RFID's Application in the Libraries [J]. *Journal of Academic Libraries*, *4*, 024. (Retrieved on 21/07/2017: http://en.cnki.com.cn/Article_en/CJFDTOTAL-DXTS200604024.htm)

Nagalakshmi, L. Radha Alias. & Trivedi, M. (2014). Success of RFID Technology in Indian academic libraries - A study. *The International Journal's Research Journal of Science & IT Management.* 3(8), Pp.51-58.

Nisha, F. (2018). Implementation of RFID Technology at Defence Science Library, DESIDOC : A Case Study. *DESIDOC Journal of Library & Information Technology, 38(1),* 27-33. doi:10.14429/djlit.38.1.12351

Sumi, S. & Kumar, J. (2007). Application of RFID Technology in Libraries. In 5th International CALIBER -2007,Panjab University ,Chandigarh,08-10 February,2007, INFLIBNET Centre, Ahmadabad, Pp.459-467. (Retrieved on 18/02/2017: http://ir.inflibnet.ac.in/bitstream/1944/575/1/459-467(cal%2007).pdf).

Website visited:

http://www.dheassam.gov.in/colleges_1.asp

http://shodhganga.inflibnet.ac.in/

About the Authors

Anupam Chanda received his MLISc degree in the year 2013 from Assam University, Silchar. After completion of Master degree he has joined Assam University Central Library as Data Entry operator where he worked for 3 months after that he has joined National Institute of Electronics and Information Technology (NIELIT), Guwahati as Assistant Librarian where he worked for 1 yr and 9 months. Presently he is working as Librarian in Assam Don Bosco University, Azara Campus, Azara, Guwahati, Assam-781017. He is pursuing his PhD from Dept. of Library and Information Science, Assam University, Silchar. His topic of PhD is ***"Implementation of RFID Technology in Libraries of Higher Educational Institutions of North-East India: A Study"*** *He has published 2 research papers in journals, 1 research paper in edited book, 1 research paper in conference proceedings and 1 book. He has attended 3 (Three) International Conference and presented papers in all the conferences. His areas of interest are: Digital Library, e-resources, institutional repository, RFID technology, Green Library, Big data, IT application in libraries, Artificial intelligence in libraries. His contribution in the study is conception of the idea, collection of related literature, writing and compiling the entire manuscript.*

Dr. Manoj Kumar Sinha, Professor & Head, DLISc, Assam University, Silchar

Dr. Manoj Kumar Sinha (b.1965) did Graduation, Post –Graduation and Ph.D. Degree in Zoology, Library and Information Science from T.M. Bhagalpur University, Bhagalpur. Besides this, he has acquired B. Ed. Degree from Annamalai University in 1995 and also did Post-Graduate Diploma in Higher Education from IGNOU, New Delhi in 2002. At present he has been working as Professor and Head of the Department of Library and Information Science, Assam University, Silchar and he has been appointed as the Head of the Department w. e. f December 11, 2009. Prior to this he served the Assam University, Silchar as Assistant University Librarian from January 30, 1997 to January 30, 2003 and Assistant University Librarian (Sr. Scale) from January 31, 2003 to November 18, 2009 and as Reader, Department of Library and Information Science from November 19, 2009 to November 18, 2012, Assoicate Professor from 19-11-2012 to 19-11-2015. Recently he has been appointed as Professor in the same Dept. since 19, November 2015 under CAS.

*Before joining Assam University, Silchar, he served as Librarian in Jawahar Navodaya Vidyalaya, Gorakhpur (Navodaya Vidyalaya Samiti, Lucknow Region, Dept. of Education, and Ministry of HRD, Govt. of India) from February 15, 1993 to January 28, 1997. Before coming to library profession, he worked as JRF and SRF in Life Sciences under the CSIR Sponsored Research Project entitled "**Ecology and Phytochemistry of Biocidal Plants of Santhal Parganas, Bihar**" at University Department of Botany, T.M. Bhagalpur University, Bhagalpur.*

He has published about 285 research papers and articles in the areas of Library & Information Sciences , Botany, Zoology and Environmental Sciences, His areas of interest are Traditional Librarianship, Academic Library System, Public Library System, HRD issues, Users Study and Users Education, User Empowerment through ICT, Quality Management, Knowledge Management, Library Automation and Networking, Digital Library, e-learning, Indigenous Knowledge System etc.

He is life member of ILA, IASLIC, UPLA, SIS, MANLIBNET, JILA, Assam Library Association, FBAI, and actively associated with research and academic work. He is Member of Board of Post-Graduate Studies in Library and Information Science, Member , School Board of School of Information Sciences; Member , Swami Vivekananda School of Library Sciences (Feb 2011) ; Member of Academic Council; Assam University Court since December 2009. His biography has been included in many Biographical Directory of National and International importance. He has been associated with few journals as a Member of Editorial Board. He served as reviewer for few Indian and foreign journals. He has been awarded Excellence Award in August -2016

and Achievers Award for Best Paper from Modern Rohini Education Society, New Delhi in January-2017.

He has guided eight M. Phil. Students and 42 Masters of Library and Information Science students and also nominated as a Subject Expert in sister departments of Assam University. Since 2013 IPP Course Work programme has been introduced in the department and now he has been supervising 08 Ph.D. and 04 M. Phil. research scholars. 05 Ph.D. Scholars have been awarded Ph.D. degree and two have submitted their Ph.D. theses for evaluation. Seven M. Phil Scholars have been awarded M Phil Degree. Currently two M Phil. and five Ph.D. research scholars are working under his supervision. He has also been associated with many universities of India and served as Subject Expert for evaluation of M. Phil/ and Ph.D. Theses, also conducted P G Practical Examinations, and acted as a Paper Setter etc. He has been regularly invited by the NERO, UGC Guwahati for evaluating Minor Research Proposals (MRP) and Seminar Proposals.

He has wide experience in organizing events like Book Fair and Exhibition and also organized PLANNER-2005, Seminar on Digital Library Management (2008), Librarians Day and Organizing Orientation Programme for Fresher' regularly since 1997 on behalf of Assam University Library. Recently he has successfully organized National Seminar on Collection Development (NSCD-2011) in collaboration with Central Reference Library, Kolkata (Ministry of Culture, Govt. of India. He also organized Four Day National Training Programme on Application of Open Source Software for Library and Information Services. He has been actively participating contributing and presenting Invited / Contributed Research Papers in National and International Seminar/ Conferences, attended several Training Programmes and Workshops pertaining to ICT Application in Library and Information Services. Besides this he has honour of Chairing Technical Sessions in many Seminars and also acted as Rapporteurs, Rapporteur General in SIS -2012 and PLANNER-2016 and Chaired technical session in many Seminars and Conferences. He has been invited as Resource Person for Invited talk on diverse topics in Seminar, Workshops, Conferences and Refresher Courses from many Universities located in North Eastern Region

He may be contacted at mksinha1965@gmail.com, dr_mk_sinha@yahoo.com,

Mobile: 09435231672