# INTEGRATION AND EXECUTION OF RFID TECHNOLOGY IN ACADEMIC LIBRARIES: A STUDY

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*Abstract:* This research reports on majorly the development, challenges, services, change in usage on time to time as key components in an engineering college library which is located in MVGR College of Engineering(A), Vizianagaram, Andhra Pradesh, to examine future implications for continuous library development activities, and make predictions about wider implementation of services through ICT. In this research all the parts includes about Advantages, services, after integration of RFID technology in this libraries; User oriented activities, changes occurred after RFID technology adaption, and suggestions to peer institutions.


*Key Words: Academic Libraries, Integration, RFID Technology, User orientation.*

## I. INTRODUCTION:

Academic libraries heavily rely on automation. Automation is very important in engineering college libraries for helping users achieve their missions, visions, goals, and objectives on both the front and back ends. New demands will emerge for adding persons, tools, and arrangements as well as creating connections between material resources and users as automation and technology advances throughout university libraries. To advance our skill sets as library professionals in the academic libraries of tomorrow, we must carefully analyses statistical reports, promote library services, engage in strategic planning, keep up with technological advancements, and use behavioral science.


### 1.1 Library Automation:

Automation is the advancement of employing machinery for basic tasks and saving time and labor. Library automation is the process of computerizing manual library processes, such as switching from a catalogue card to an online partial catalogue (OPAC) or from manual library circulation cards to an integrated library system.

Figure: 1

## 1.2 RFID Technology: An Overview

Auto Identification and Data Collection (AIDC) technology's next phase, RFID, helps systematise transactions in open spaces while providing security. Without the involvement of any humanoids, this computerization can provide accurate and sensible information. Accepting such information where one can uniquely identify each of the marked objects only helps to illuminate your advancements and also to produce intelligent results. Currently, many LIS softwares, including KOHA, SOUL, D-Space, Green Stone, etc., have adopted RFID technology and are using a variety of techniques.

**Components:**

♦ Chip Cards/Tags

♦ Readers

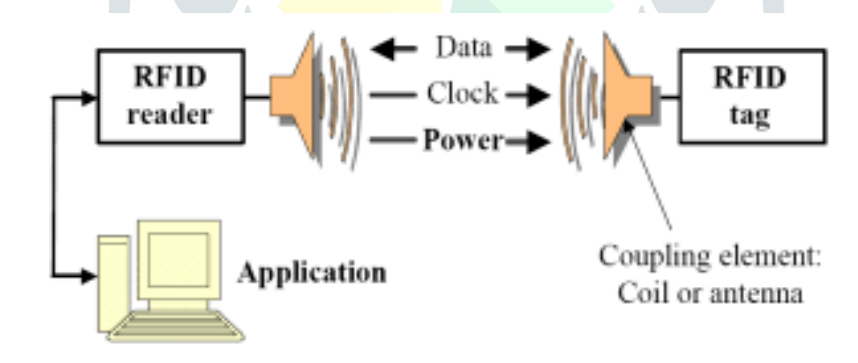♦ Middleware

♦ Host Computer

♦ Application Software



Figure: 2

## 1.3 RFID in Libraries:

As demonstrated in the instance of the computer and later in the case of bar-codes, librarians are consistently recognised as early adopters of technology. Library automation software has been evolving over the past few years as the next step in library automation, which has been observed by librarians. Currently, patrons can use the online public access library catalogue to visit the catalogue whenever they want. As a result of those efforts, user amenities have improved today. Library communities have consistently demonstrated their eagerness to try new technology. In the subject of library and information science, RFID technology will represent the next generation of automation. In order to sort every task from user to user more precisely, RFID is crucial in libraries.

RFID is a key component of library operations since it makes it easier for staff and users to complete each task. RFID provides a platform to automate the majority of the tasks performed by library employees, including check-in/check-out, categorization, stock management/verification, and inventory. Staff at the library, whose primary responsibility is to assist patrons

in making the most use of its resources, is constantly occupied with book supervision. RFID helps automate this and gives them the chance to spend more of their time serving people.



Figure: 3 RFID Work Flow Image

## 1.4 Advantages of RFID Technology in Libraries:

➢ The wasteful, simplest, and most effective way to arrange, locate, and manage library materials.

➢ Effective and efficient management of the circulation of materials (books, CDs, journals, etc.).

➢ Automated check-in and check-out.

➢ Verification of the library's inventory takes minutes rather than hours.

➢ A number of books can be read at once.

➢ The RFID tag or chip card's unique ID prohibits duplication.

➢ Automated material handling with sorting and conveyor systems.

➢ Facilitate borrowing between libraries and within libraries.

## 1.4.1 Benefits to Libraries Stock management:

➢ It will be possible to improve user services through operations like monitoring inventory on the shelves.

➢ locating missing and incorrectly shelved items, and doing regular stock counts.

➢ Staff members at the library can help patrons since circulation processes take up less time.

➢ Comfortability and adaptability are maintained even when libraries are experiencing personnel shortages and budget limitations.

➢ Ability to incorporate the newest features and products as needed to meet user and financial requirements for security.

➢ Identification and security for library items are incorporated into a single tag, obviating the need to fasten a separate security strip.

## 1.4.2 Benefits to Staff:

❖ Implementing RFID will significantly reduce the amount of time needed for circulation operations, including the issuing, receiving, transporting, sorting, and shelving of library resources.

❖ A handheld reader makes efficient inventory management possible without forcing the library to close and is at least 20 times faster than the current barcode-based approach (RSI) An RFID-based system prevents RSI conditions like carpal tunnel syndrome by reducing the repetitive scanning of individual items at the circulation desk during check-in and check-out.

❖ Compile reliable data and statistical reports on how well users are using the automated library environment.

### 1.4.3 Benefits to Users:

- ❖ Self-check in and self-check-out systems allow users to find what they are seeking for quickly and effortlessly. They also provide reminders for due dates so that users can return borrowed goods on time via SMS or email.
- ❖ Flexible timeframes are made possible by the use of book drops and return cascades for returning library materials.
- ❖ RFID-enabled user cards make it simple to identify users and cut down on errors.
- ❖ Self-service improves the privacy of users
- ❖ Better user services even if there is a staffing deficit in libraries

### 1.5 Objectives of the study:

- ➢ To explain the use of automation with RFID and execution in academic libraries.
- ➢ To share the quality of services to the users by using RFID technology in engineering college libraries.
- ➢ To explain User oriented activities, challenges and drawbacks occurred after RFID technology adaption in engineering college libraries.
- ➢ To show the changes occurred in reports by adopting RRFID technology comparing with Barcode technology in engineering college libraries in coastal Andhra Pradesh.

## II. REVIEW OF LITERATURE:

1. Shabana Sz, Abuzar Saleem, and Sadik Batcha (2018). Automation of libraries' effects in the development era. The importance of library automation, which requires planning, designing, and implementation, is brought up in this essay. By using library automation for gathering, storage, management, processing, safeguarding, and communication, among other things, repetitive manual labour is reduced in library procedures. It increases output both in terms of workings and in terms of service.

2. Md. Selim Reza Bappy, Director of the Department of Information Science and Library Management at the University of Dhaka (2012–2013). Issues and Solutions with Library Technology. For a number of years, libraries all across the world have been working on this difficult set of tests. They have created numerous digital library projects and innovations, as well as a number of domestic structures for sharing and identifying important issues. We can learn about library expertise, technological challenges, and solutions from the aforesaid description. The library today is worthless if it hasn't kept up with technological advancement. Distress over low consumer is the cause.

3. Mishra, Ajay, Santosh Thakur, and Tarseem Singh (2015). Times International Journal of Research, "LIBRARY AUTOMATION: ISSUES, CHALLENGES AND REMEDIES." In this essay, the terms automation and library automation were examined. Attempts to identify the various topics/experiments related to library automation nowadays that have a direct or indirect impact on the work/process of library automation in any organization. The paper also discusses and examines problems including inadequate planning, a lack of financial resources, a lack of capital and knowledge, a lack of qualified personnel, among others. The Paper provides a brief definition of a few issues and solutions for the effective application of library mechanization in the housekeeping and service sectors.

4. Mehtab Alam Ansari, number (2018) Collection development in academic libraries in India: current state, difficulties, and future directions. Gathering and Curating 33. The automation of a library, which fundamentally aims to educate the administration of the library's capitals and grow entrée to these same capitals by users, has taken off in the western world so well that almost all academic libraries in that part of the world have automated most of their services. However, a number of obstacles are making it impossible for academic libraries in Africa to follow suit, depriving them of the numerous praised benefits a library stands to gain from mechanizing its facilities. On one of its campuses, the University for Development Studies (UDS) Library in Northern Ghana began an automation project that has so far succeeded in fully automating the cataloguing and circulation processes. The Library's efforts to automate some of its facilities are supported by this article. Here, the highlights of the automation as well as the actions that were watched are detailed.

5. Tyagi A. K. Senthil V. Library Automation in India: Evaluation of Library Service Platforms Library and Information Technology Journal DESIDOC (2015) The report places a great deal of emphasis on Indian library service platforms. A search on

the internet was conducted to find the cloud-based library software in use, and a list of significant vendors and providers who are pushing this software was then created. In order to combat the non-respondent bias and gather consumption statistics, questionnaires were issued to these merchants. An exploratory research was also done. Through a paid support from three of the eleven suppliers in India, Koha was discovered to be the most popular open source utilized over the cloud. There are now two types of proprietary software that can be used, e-Granthalaya and Cybrarian, with more installations of the former due to government funding. According to a thorough review of an ILS's applicability for a library, single-tenant SaaS models work best for large libraries whereas multi-tenant models work best for smaller groups of homogeneous libraries. In India, library SaaS is still in its infancy.

## III. METHODOLOGY:

The research is purely based on the primary data and the data collected through the records of the college administration office and statistical reports from the office of the engineering college library. Secondary data collected from earlier user database, various research papers, journals, magazines and websites.

## IV. DATA ANALYSIS AND INTERPRETATIONS:

**The comparative analysis of Daily User statistics by Using Barcode Technology and RFID Technology in Central Library, MVGR College of Engineering (A): A pilot study.**

Before undertaking the research I have studied and found some calculations in the college library which I have been working for five years, as an experiment. It is very interesting and I am planned to study for last seven academic years data of the user statistics of the library.

The analysis is been representing in the mode of utilization of the users as

i. Gate Register wise Library walk-ins

ii. Issues of Books

### LIBRARY WALK-INS:

### Table-1

| Daily Users Statistics from the Year - 2015 to 2022 | | |
|---|---|---|
| Year | Total No. of Users (2015-2019) BARCODE TECHNOLOGY | Total No. of Users (2020-2022) RFID TECHNOLOGY |
| 2015 | 5369 | -- |
| 2016 | 6111 | -- |
| 2017 | 6396 | -- |
| 2018 | 6559 | -- |
| 2019 | 7905 | -- |
| 2020 | -- | 5008 |
| 2021 | -- | 14412 |
| 2022 | -- | 14896 |
| Total | 32340 | 35832 |

### Graphical Representation:
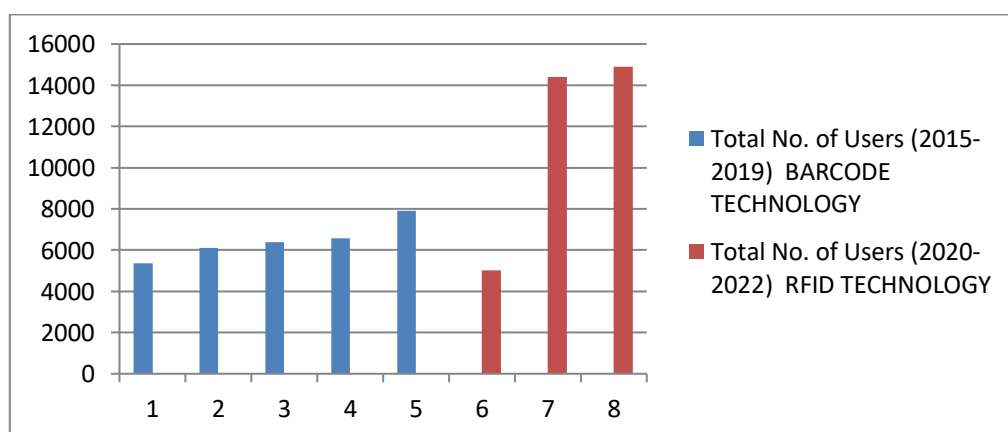
**Interpretation:**

The total number users from the academic year 2015 to 2019, while in the barcode technology were 32340. In 2015 there was least no. of walk-ins happened and the highest no. of walk-ins happened in 2019.Mainly the walk-ins were progressively increased year by year.

From the academic year of 2020 fully established with RFID Technology and the user walk-ins number has been decreased due to the lock down. Even though due to the covid-19 pandemic, the library worked almost for five months. Within the five months the user walk-ins were 5008 at least place from the academic year 2019 to 2022.In the academic year of 2022 walk-in number has been increased and highest in the table as 14896.

## BOOK ISSUES:

### Table-2

| Daily Users Statistics from the Year -2015 to2022 | | |
|---|---|---|
| **Year** | **Total No. of Issues (2015-2019) BARCODE TECHNOLGY** | **Total No. of Issues (2020-2022) RFID TECHNOLOGY** |
| 2015 | 1611 | -- |
| 2016 | 1532 | -- |
| 2017 | 1761 | -- |
| 2018 | 1592 | -- |
| 2019 | 1798 | -- |
| 2020 | -- | 869 |
| 2021 | -- | 3694 |
| 2022 | -- | 3921 |
| **Total** | **8294** | **8484** |

**Graphical Representation:**
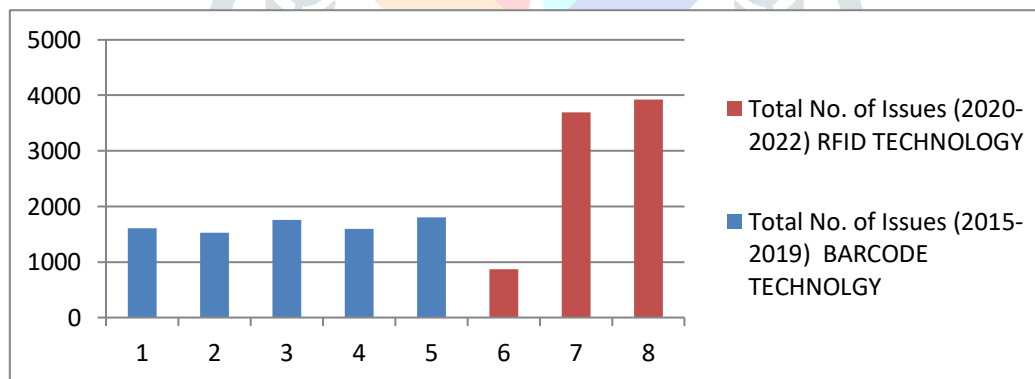


**Interpretation:**

The analysis is done by comparing earlier 7 academic years. In the academic year of 2015-2019, the library used the barcode system. In the academic year of 2020-2022 the library is worked with RFID Technology. Even though there was the pandemic of COVID-19 occurred in the academic year of 2019-2020, the users have been utilised the facilities and services of the library most effectively comparing with the previous academic years. According to the above statistical reports two particular key operations of library, there was drastic change and excellent growth rate in usage of users.

Especially in the circulation of book issues in the table no.2 and graphical representations above are openhanding a clear notation of high growth rate in issues of books in the library. There were a least book issues happened in 2015 i.e 1611 in the entire academic year in barcode usage and the highest in 2019 i.e 1798.

After installing RFID technology in 2020, the book issues were least in 2020 as 869 and highest in 2022 as 3921. The no. of issues has been increased drastically by the speed servicing and sufficient support from the manpower and machine.

Even in the covid-19 pandemic, the library made availability of remote access facility to the users to surf the e-resources easily from their residence also. This facility helps the users to strive for all the e-journals as well as e-books and particularly in the departments like CSE, Mechanical, ECE, Civil, EEE, etc.

## V. FINDINGS:

1. RFID Enabled services are most accurate and speed to serve the users.

2. Circulation services like charging and discharging are very easier to comparing with barcode services.

3. Library user statistics can be increase year by year.

4. Even though in barcode and RFID technology growth rate of user utility of the services becoming higher.

5. Easy to retrieve the statistics to provide to higher authorities.

## VI. SUGGESTIONS:

1. User orientation and education are vital role players to educate the user community.

2. Staff must be trained with equipment and other devices to assist the user community.

3. Users must be aware the systematic approach to use the RFID enabled services.

4. It is one time investment and life time usage for larger work flow libraries, information/ documentation/research/ resource centres.

5. Budget and approvals from the management are crucial to install and enable the services

6. Maintaining the machinery and equipment with skilful manpower with well-organized technical support is very essential.

## VII. CONCLUSION:

This research is projected to give overall view of RFID technology to library community. The information is gathered and compiled with our inputs for librarians to refer this paper as a base, when planning to go for a RFID solution without getting into any technical terminologies. It is an effort to touch base with all the areas relating to use of RFID in Libraries in simplest way. The research would stand as a reference for librarians when they commence conversation with suppliers for execution of RFID in their libraries. RFID is an excellent "progressive" bar-code, but not a replacement and it needs to be improved.

In the MVGR College of Engineering (A) Central Library where I have been working, noticed that after the integration and execution of RFID Technology the work mode is become easier to comparing with earlier system. Book tracing, self-issue (issue kiosk), self-return (Book drop Box), RFID anti-theft detectors are function very effectively to claim all the data of usage statistics.

Apart from RFID Technology, the library has flap-barriers to calculate the walk-ins. While entering into the in-gate, the user should punch his/her RFID Card with registered number. In this flap barrier database, all the particulars of the users would be maintained while registering as a library member.

By using all the above stated facilities like RFID Technology, Flap Barriers etc., the work flow becomes scientific to project the accurate results of the user statistics in the academic committees, inspections and visits from the boards like NAAC, NBA, AFRC, AICTE, HEC, UGC, FFC, etc. At the initial stage, the budgetary requirements may appear large, but later on it will be useful for long years to come.

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