

Integrating RFID Technology in Campus Management Software with Special Reference to Academic Library

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***Abstract** - The purpose of this study is building a web and windows based intelligent system using web technologies and Radio Frequency Identification technologies (RFID) to strengthen an Library Management System in a campus for monitoring and improving overall performance of academic administration and also to create standards-based secure access to student's and employee's personal data, admission & attendance records, student's mark, bill payment, payroll, examination, hostel, books record etc., by using a single, all in one RFID tags enable card through a Web Based Campus Management Software. This study also proposes an overview of RFID enable Campus Management Software which has assisted smarter campus systems for students, faculty, management and librarian as well.*

Keywords: Web Technology, Radio Frequency Identification, iKollege, Campus Management Software, Library Management etc.

1. Introduction:

Radio Frequency Identification is one of the leading edge technologies which can be integrated to existing systems in order to get more accurate data and faster retrieval. Designing of campus management system based on RFID significantly reduces the efforts involved in management of records. The system not only can improve the work efficiency, student's performance and development, but also can save human and material resources. In recent years, RFID systems have been used in libraries for book identification, for self-check-in, check-out. However, a one in all RFID card tackling all the aspects of campus has not been created yet. This super card will help students, employees in the campus to carry out different tasks with great ease, thus reducing time. RFID technology along with web service will help in establishing an organised system inside the campus. RFID is a combination of radiofrequency based technology and microchip technology. The Electronic product code (EPC) is read by Radio frequency technology regardless of item orientation or alignment. The web based software recognizes the unique id and then grants access to one's account.

In proposed system each faculty, staff and student will be carrying an RFID card while RFID readers will be installed all over the campus. At campus entrance each person's identification will be confirmed and verified with RFID card and finger print. RFID readers will be installed in all campus areas including classrooms, laboratories, cafeteria, library and also campus outdoor areas like car parking, play area for verifying faculty or student identification which will allow individual tracking and will also be helpful for reducing unwanted access of university resources. Faculty and students RFID cards will be used for class room attendance, access control to the university resources, for borrowing library items, any e-payments at campus cafeteria, stationery or library, using transportation services, car parking, sign on in a computer system in labs, visiting any administration offices and locating classroom or exam halls. Administration offices need not to key in student ID number for student details instead student will place his RFID card over a reader and his information will

pop up on screen. Administration will be able to track not only student's activities and academic performance but also monitor teacher's academic performance by monitoring class timings, number of lectures given per subject, duration of lecture class, or any out of class assignment.

2. Campus Management Software (CMS) and RFID:

2.1. Campus Management System/Software (CMS) is a web enabled software designed to manage the entire operations of an institution. Campus Management software is a simple yet powerful one joint integrated platform that connects all the various departments of an institution like administration, examination, library, transportation and many more specialized modules. CMS allows you to store modify and retrieve information using the pull down menus for all the modules. The software includes many modules like: admin task, admission, hostel, marks/attendance, payroll, library management, transportation, online examination, database etc.

Features:

- Browser based single database management system and necessary security is provided against unauthorized access
- Multi User environment and assigning privileges to the users
- Completely user friendly
- The complex task of report generation is an extremely easy work using Campus Management Software
- Graphical Representation of admissions every year and Time Table Generation
- Marks and attendance information
- Mail service
- Promotion of Students to higher semesters
- Teaching dairy & Lecture plan
- Fee management
- Full Fledged Library Management System
- Provides complete features of Payroll Management System like allowances, deductions, generation of pay slip and many more
- Applying Leave in online
- Online Examination module helps you to provide training to the Students appearing for campus interviews
- Transportation management.
- Exporting important reports to Microsoft Excel
- Total hostel management process
- Placements module (under development).

2.2. Radio-Frequency Identification (RFID) is a technology that uses radio waves to transfer data from an electronic tag – called an RFID tag or label, which is attached to an object – through a reader for the purpose of identifying and tracking the object. An RFID system primarily comprises of RFID Tags, RFID Reader, Middleware and a Backend database. RFID Tags are uniquely and universally identified by an identification sequence, governed by the rubrics of EPC global Tag Data Standard². Some RFID tags can be read from several meters away and beyond the line of sight of the reader.

Features:

- Fastest, easiest, most efficient way to track, locate & manage books

- Fast and accurate results display, achieve maximum efficiency & optimum performance
- Efficient Book circulation management
- Automatic Check-in and Check-out
- Unique ID of the RFID tag prevents counterfeiting etc.

3. Integrating Library Management in CMS:

Library Management System is a web-centric comprehensive integrated application. LMS is designed to meet the needs of libraries, both large and small. The system supports all the day-to-day operations of a library. It provides services to members, librarians, and administrators. These services have been designed to help users get their jobs done faster and more efficiently. The graphical interface brings new power and flexibility to libraries and their users. LMS provides an outstanding web based search interface. It is a rapidly deployed out-of-the-box solution, which can be easily customized to organization requirements. LMS automates information management, streamlines administrative processes and eliminates repetitive tasks in the library environment.

LMS takes library management system into a browser environment. This will provide a user friendly browser interface for end users to search for relevant information.

Features:

- Web based and user friendly attractive interfaces
- Comprehensive media search engine (w.r.t accession number, title, author, keywords, rack etc.)The searching criteria is provided based on the media.
- Check availability and reserve media online
- Easy navigation for both librarian and library members
- Highly secure access controlled system
- No limitation of maintaining the media
- Maintaining the media in different types (Issue media, Reference media, temporary media, and weed out media).
- Multi user environment
- Automatic calculation of fine on late deposit of media
- Automatic cancellation of the reserved media when the date exceeds
- Uploading photos for the members of library
- Providing membership for the members of library
- Maintain Library card details
- Transactions of members to the library
- Promote/Demote students to higher/lower semesters
- Maintain library budget information
- Maintenance of vendors information
- Generating quotations and purchase orders
- Magazine/Newspaper Subscription management facility
- Newspaper bill format
- Stock verification
- New Arrivals of media
- Generation of various reports etc.

4. IntegratingRFID in iKollege (CMS):

iKollege is an enterprise class robust, secure, scalable and high available Practice Management System deployed in Software as a Service model (SaaS). It is completely web based an integrated automation software for college/campus management covering all

functional areas and operations of educational institutes and unique, integrated modular design creates a seamless flow of data throughout your campus. iKollege has a customized solution that meets all of your student data management requirements in a single 360-degree package for management, faculties, librarians, front office executives and parents and a completely customizable option hosted on the cloud.

4.1. iKollege Modules:

(i) College Info, (ii) Curriculum, (iii) Staff, (iv) Students, (v) Admission, (vi) Fees, (vii) Attendants, (viii) Time Table, (ix) Scholarship, (x) Library (xi) Asset (xii) Performance, (xiii) Transport, (xiv) Hostel, (xv) Question Paper, (xvi) Front office, (xvii) Extra Curricular, (xviii) Payroll etc.

5. Implementation of RFID in iKollege for Library Management:

The RFID system has been implemented for library management by integrating both RFID and iKollege with wider boundaries and effective solutions. When student enters into library it scans the student ID same as attendance and only allow authenticate students in the library and whenever student leaves the library it checks for the RFID tag.

Challenges: Complexity in maintaining the stock list and the catalogues

Managing the task of tracking books available, issued to the members

Informing the student, staff about available requested for priority

Solution: User friendly search in identifying books

Enable student and the staff to search book availability through online

Library manger can view stocks and books issued, received or lost with RFID integration

Real time reports about available, issued, lost books and due amount.

The customized implementation of RFID in iKollege for library management is shown in below figure.

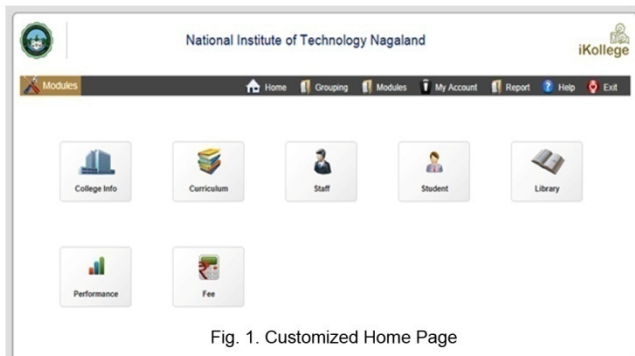


Fig. 1. Customized Home Page

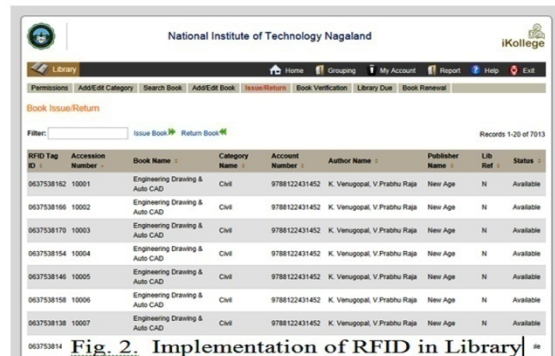


Fig. 2. Implementation of RFID in Library

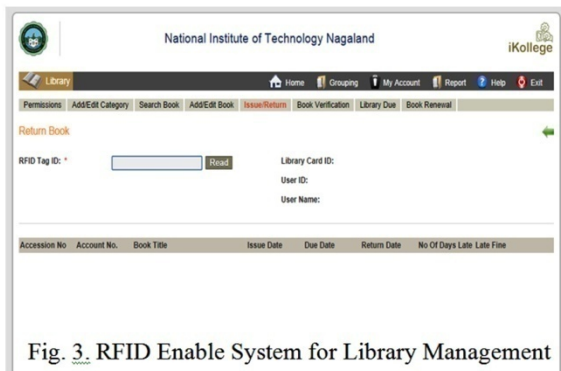


Fig. 3. RFID Enable System for Library Management

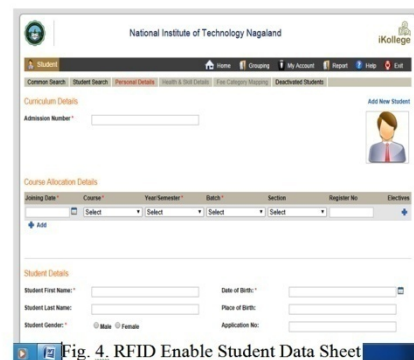


Fig. 4. RFID Enable Student Data Sheet

6. Conclusion:

Integrating RFID in Campus Management System/Software may strengthen daily management and eases supervision of student from when they arrive until when they leave even after campus hours. This system will integrate one of the fastest growing segments of IT, RFID technology, biometric technology, web technology and mobile applications to existing academic management system and provide more fast and easy to access to student profiles. In each student profile student complete history of purchases and attendance along with academic performance will be stored. This designed system will reduce manual effort, time consuming and repetitive tasks and human made mistakes and improve the system security. This system is flexible, which means that it may be extended by adding more modules. The main aim of this paper has been to highlight the potential uses of RFID-technology in academic campus by using campus management software for integrating whole activities of an institute in a common platform and build a system reliant on it.

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