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## Deployment of Automation Software in Professional Institutions – A Case Study

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### *Abstract*

*College students are required to carry a variety of cards such as college i-card, library card, bus pass, etc. This paper describes the development of a 'smart card' which replaces all cards described above and also acts as a debit card in college stationary stores and college canteen. Scope for further improvement includes using it to mark attendance, internet access, etc.*

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### **Introduction**

The automation software for any academic institution should allow the institute to achieve greater efficiency, streamline the academic process and empower the management and administrative mechanism in their decision making process and focus more on the developmental issues leading to create a better brand image. Nowadays, managing an educational institution is a complex task. Automating its entire bundle of functionalities into an integrated package running on the lines similar to that of Enterprise Resource Planning (ERP) package starting from managing the admission process, scheduling timetable, examinations and payroll processing which will save tremendous amount of resources in terms of both money and physical labour.

Conventional systems in college campuses require the students to carry a large number of cards including the photo identity card, bus pass, library card, etc, which in turn lead to serious administrative problems of record

keeping and life cycle management and cause inconvenience for the users. If the systems are computerized in a piecemeal fashion, they further lead to the evolution of completely disjoint systems of ever increasing complexity. The smart campus card is an innovative solution that provides students with a single card that acts as the mobile bearer of all students' related information acting as identity card, library card, academic record tracking etc. – all rolled in one. The same can be further used for many additional functions ranging from marking attendance to being used as limited value debit card for the canteen and on-campus vending machines and even logging on to the campus internet. For the faculty and other staff members the card may also store their personal and service details like the leave record, payroll record, library transaction records, etc.

The Smart Card thus helps in creating a convenient environment for students and staff by deploying an integrated suite of smart card enabled applications. The card enables enterprise resource planning for educational

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Information System Design

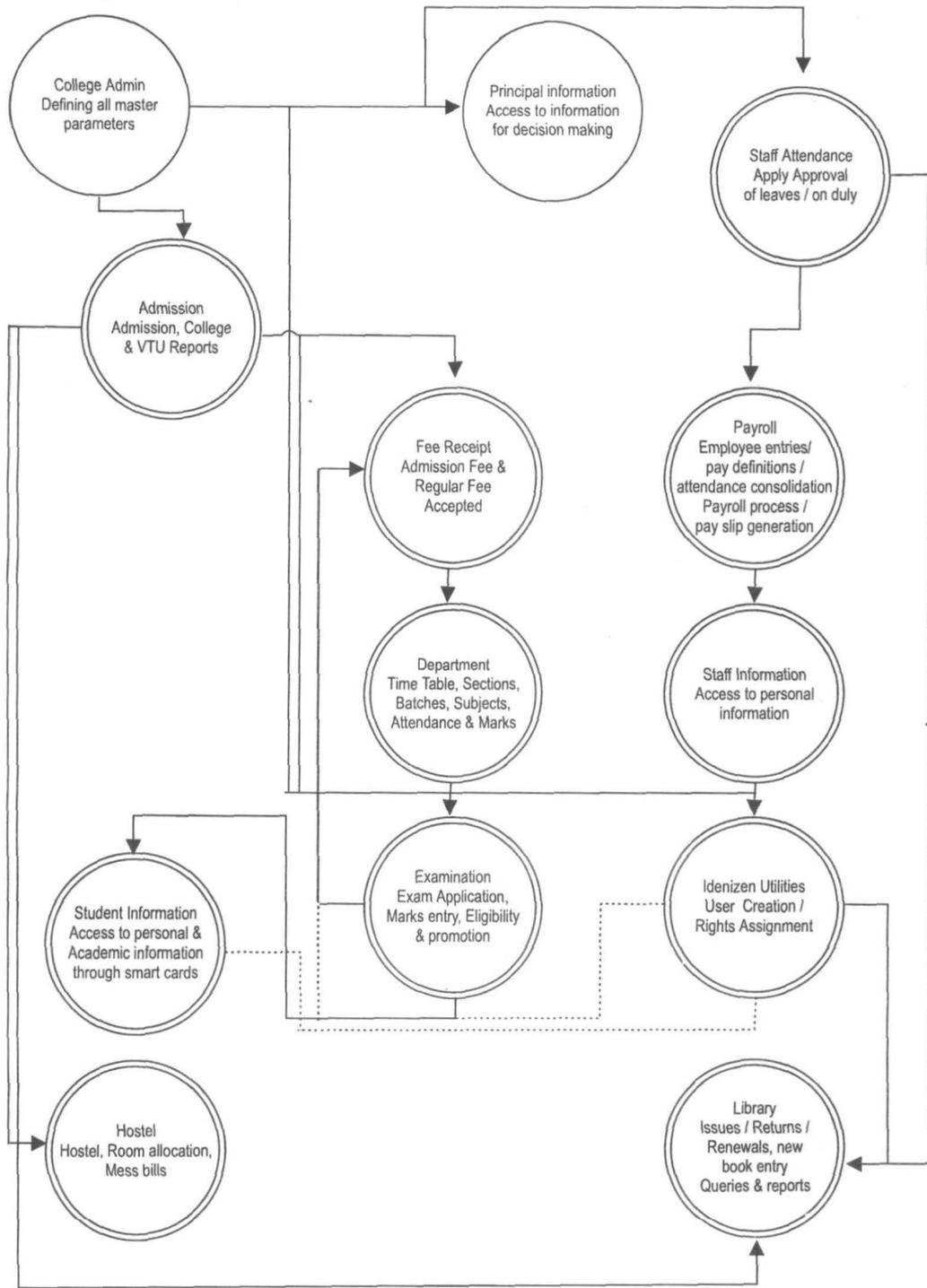


Fig. 1: Processes involved in automation in professional institution

campuses to successfully undertake an end-to-end campus computerization in modular fashion, thereby giving the institutions the freedom to choose and deploy the modules most useful for them, which can also be completely customized to user specific requirements. The availability of a wide range of modules ensures complete scalability integration and allows easy interface with any third party applications.

Educational institutions have found that offline Application Software and online web enabled communication system is effective, economical and efficient. An integrated information system caters to the needs of all types of professional institutions. Typical components of any Smart Card enabled application include software, Card Readers, Smart Cards, Controllers and Computer Systems in a LAN / WAN environment.

This paper is the result of design and development of the automation software implemented at R.V. College of Engineering, Bangalore which is one of the premier technical institutions in the state of Karnataka.

System design involves identifying the typical processes involved in professional institutions. The typical modules include admission, academic planning, timetable management, examination management, attendance and student academic record keeping, library computerization, payroll, accounting and student performance system. The parameters considered in each of the modules are as follows:

- **College administration modules:** This consists of college profile, department, courses, seat matrix, notice board, quota, category, control, fee groups, fees items. Fee structure, subjects, time table entry, class room master, shift timings, designation, Holidays and leaves.
- **Admission module:** Student admission can be made through this module and all the personal details can be entered. Allocation of register numbers, readmission,

cancellation of admission, change of branch, etc., can be carried out.

- **Fee receipt module:** Admission fee and regular fee can be defined as per the quota and category and receipts can be generated.
- **Accounts interface:** The daily financial transactions like fees received etc., will be recorded and reports can also be generated using criteria. The data can also be exported to an xml file. This file can be imported into the Tally package for further processing of data.
- **Scholarship module:** This module will help to keep track of students who are awarded the scholarship and their other particulars can be maintained.
- **Department / academic modules:** This module will be helpful in the following : Defining section batches, time tables, staff workload assignment, subject contents, subject staff allocation, student syllabus, and internal exam schedule, forming the practical batches, section / batch assignment, internal exam, elective assignment, project seminar assignment, class conducted attendance entry and medical, sports, cultural activities and grace attendance.
- **Examination module:** This module will take care of the following : Transact – exam application, Exam fee payment, and revaluation application, Exam marks entry, student eligibility and Student promotion/demotion/demotion. Reports include College reports – eligibility lists, provisional promotions, results analysis.
- **Staff Attendance** will deal with the following: Transact – register attendance, attendance approval, on duty-register, leave application, leave approval and shift change and Query – leave status.
- **Student Information:** Students can access the following information on designated systems with card readers – student profile, time table, attendance, exam results, cumulative mark sheet, arrear papers, fee structure, fee paid / dues list,

syllabus, exam schedule, course structure, internal exam schedules, search for books and notice board.

- **Library:** This will define master data – author, publisher, supplier, bin, category and new books entry and transact – issues, returns and renewal of books.
- **Hostel:** This module will deal with the following:- creating, modifying hostel master, room allocation, defining mess bills, monthly mess bill.
- **Payroll:** Will deal with defining the pay categories, pay period and pay scale, Configuring the earnings and deductions and defining rules and rates, attendance consolidation, and payroll process and pay slip generation.

### Report Generation

Generation of reports in various modules is helpful in providing faster access to information as per the need. The reports are as per the format prescribed by the affiliated / accredited / local governing bodies. The reports can also be exported to an excel format for further analysis. Some of the reports generated in different modules are as follows:

- **Admission Module:** Admission Register, Statistical Reports, Seat Status, Branch Transfer Report, CET Admission Chart, DTE Approval Reports, Form-A, B, C Govt. Quota List, Management Quota List, Diploma Student List, NRI Students List, unfilled students list.
- **Fee Receipt Module:** Group wise fee received report, payment mode wise fee receipt reports, consolidated fee receipt report, report in excel and fee dues report.
- **Department:** Time table reports, electives reports, syllabus, subject topics, absentees report, daily work abstract, final internal assessment marks, MIS reports, attendance register, student progress reports.
- **Examination Module:** University exam list, Branch wise results, electives and arrears

lists, Cancelled / detained students lists, provisional promotes, exam paper indent, placement report.

- **Attendance Module:** Staff attendance register, attendance reports, leave status reports.
- **Library:** Issue / Return ? Renewal / Lost reports, Books purchase reports, Fine collection register, book due / over due register, stock lists user entry register, book circulation history.
- **College Admin:** Department list, course list, branch list, fee structure, exam fee structure, attendance, student addresses.

### Benefits of automation package

Deployment of Smart card enabled systems in professional institutions brings in multiple benefits to students and faculty thus enabling them to focus more on core activities rather than spending time on routine activities. The seamless flow of information across the campus creates an image of a technical savvy institution. Smart Card driven campus provides ample opportunity to the college administration and the management to oversee the operations. Students' academic progress on a day to day basis can be monitored thereby identifying the deficiencies in the academic system and plan for further corrective measures like scheduling of special coaching classes, mentoring the students to overcome the inertia and inhibitions and thus improving the performance of the system. Staff can plan their lessons in advance and keep record of the portions covered in each class thus bringing accountability among the teaching fraternity. The student appraisal and feedback on teaching methodology, complaints and suggestions paves way for the institution to take necessary corrective actions to maintain academic standards and improved student – teacher relationship. The reports sought by the statutory /affiliating /accredited bodies can be printed and dispatched well within the time frame there by avoiding undue delays and errors.

Access to student Information System such as academic calendar, syllabus, time table, fee dues, test and examination schedules, attendance percentage as on a particular date, internal assessment marks and university marks, results and backlogs helps the students and parents to keep track of the performance. The processes which help the faculty are; weekly class schedule, access to student history and evaluation, staff profile and attendance, individual class performance assessment, lesson plans and student feedback. Such systems are also helpful to the management in terms of overall functions of the institution. Some of them are; integrating and streamlining processes of all departments to obtain consolidated information on a central server, single window remittance for fees and payments, automatic transfer of all student payments to accounts, updating of Seat Matrix when a new student is admitted, viewing of information by authorized persons to take decisions, etc.

Easy accessibility of information at one source helps enhance the staff productivity and efficiency, reduce the manual processes and eliminate duplications. The solution is highly flexible enough to meet the present and future needs. Regular updates on news, events, finance, achievements etc. helps in keeping institution community and public informed. The system helps to make paperless office with complete office automation – including finance and accounts, payroll activities, inventory management, hostel management and library management, Instant access to information for parents about their wards helps in better control over students. Office automation provides students' record including admission, academics, examination, health, fee structure and other activities. It also provides complete teachers' record including performance monitoring system.

### Scope for further improvement

The development and use of software is a continuous process. The need keeps on

changing as per the changes in the character of institutions and regulatory bodies. The existing package can be further enhanced to keep pace with the availability of current technology. Some of the improvements that can be incorporated in the existing package are:

1. The student attendance can be made through swipe cards instead of the present system of marking absentees in the class.
2. Information Kiosk – touch screen information kiosk will serve to a greater extent.
3. WEB enabling the relevant information by assigning the user authentication for the parents will be beneficial and improves communication.
4. Biometrics will serve as a fool proof method for all authentication and security related issues.
5. Charging of currency into the cards will serve the purpose of on-line payment of fees, mess bills and other payments within the campus.

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