

Paperless Administration in Indian Higher Education

Srimathi H, Krishnamoorthy A

Abstract: *The Higher Education sector in India is witnessing massive and exponential growth in terms of number of students and institutions. The procedures associated with the academic processes such as admission, teaching, examination and support services have also grown manifold. Institutions, irrespective of the size and scale, can practice better paperless administration using content ecosystem and digital tools. Both government and institutions make use of digital communication and customized applications. However, the over-dependence on paper in data processing is still a continued practice which necessitates the maintenance of volumes of physical documents by the administrative and academic departments that many times leads to delays in responses. The ideal scenario of a paperless learning environment may not be feasible in reality but the extents of paper usages can be brought down drastically to minimum levels with proper knowledge of information life cycle. The digitization with complete e-governance ensures paperless administration process. The institutions are having improbable idea to process automation and reducing paper consumption. This paper analyses the practices and methods in vogue that minimize usage of paper – based system and explores the feasibilities of interdependent work flow automation to make it better.*

Index Terms: Admission, Paperless, Digital India Initiative, ECM, ERP

I. INTRODUCTION

Though computers are extensively used in universities, the administration process is paper based. The digitization of information content is easy, but there is no clue to proceed further with respect to application integration, control over scattered electronic documents, smooth information flow between departments, consistency and de-duplication, where the Enterprise Content Management (ECM) system provides solution to this. According to (Gartner, 2003), ECM refers all type of enterprise content and a bundle of software products which manage the entire content life cycle. (AIIM, 2010a) further extends ECM definition as “the strategies, methods and tools used to capture, manage, store, preserve and deliver content and documents related to organizational processes including unstructured information”. ECM reduces burden of

toggle between different Enterprise Resource Planning (ERP) applications, Customer Relationship Management (CRM), Learning Management System (LMS) and physical documents for decision support. The main challenge is in creating well-defined document flow since the process deals both structured and unstructured data formats as the activities are interlinked in nature as given in Figure 1. The research is motivated by the growing amount of Government initiatives with Digital India movement and technological implementation in higher education institutions to serve students of digital era. The study examines and evaluates the existing paper processes and workflow which will result in the implementation of electronic solutions. The need of best practices in information exchange, system complying with recordkeeping laws and information security managements is also highlighted.

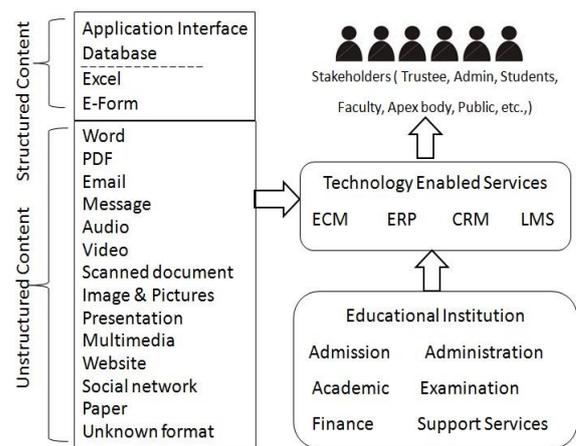


Figure 1. Educational Technology services deal with different content format

II. GOVERNMENT INITIATIVES

Department of Electronics and Information Technology (DeitY), Government of India is taking significant steps towards Digital India program and the same is supported and extended by Ministry of Human Resource Development (MHRD), Accreditation bodies and higher education councils. The announcements, notices, circulars and other communications from apex bodies to respective institutions are shared via email and hosted in website for quick reference. All India Council for Technical Education (AICTE) insists institutions to upload the approval documents of technical and management programme.

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* Correspondence Author (s)

Srimathi H, Assistant Director, Directorate of Admissions, SRM Institute of Science & Technology, Chennai, India.

Krishnamoorthy A, Associate Dean - EIE, SEEE, SASTRA Deemed University, Thanjavur, India..

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University Grants Commission (UGC) accepts online submission for course approvals and institute affiliations in Distance Education, where it continues the hard copy submission for other programmes and affiliations. The online submission and electronic form (E-form) upload can be extended and practiced by UGC and all other statutory professional councils. The E-Form is used in self-study report of accreditation bodies such as National Assessment and Accreditation Council (NAAC) and National Board of Accreditation (NBA). The supporting documents are also to be submitted in the form of scanned digital documents.

The digital submission and facility of system decision support system on various parameters helps the accreditation bodies to scale up their reach and serve as pre-qualifier to plan evaluation. (MHRD, 2017) MHRD has adopted digital technology for information transmission under National Mission on Education through Information Communication Technology (NMEICT):

- Know your college portal for students
- National Program on Technology Enabled Learning (NPTEL). Indian Institute of Technology has promoted Massive Open Online Courses (MOOC) with edX platform (a digital initiative of MIT and Harvard University) to offer quality education from the best teachers to Indian students and ensure the improvement of individual academic performance.
- Educational satellite (EDUSAT) to home platforms
- A-View as multimedia platform for video delivery
- Virtual Labs helps in establishing remote access of lab experiments in various disciplines of science and engineering.
- E-Yantra (next generation embedded system), Talk to teachers, Spoken tutorial and free open source software to be used for academic purpose
- Data collection in data capture format (DCF) in annual All India survey on Higher Education (AISHE) and National Institute Ranking Framework (NIRF). The structured DCF used in data collection fasten the computation of Gross Enrollment ratio (GER) of higher education and useful to other statistical analysis.
- Library Resources: As a part of Universal Digital Library Initiative, the digital library India has scanned books written on English and Indian language. (Balakrishnan et al, 2006) The project fosters several research activities such as language technologies in text summarization, machine translation, hand writing recognition, optical character recognition etc.,
- DigiLocker facility: There are several school boards made their board result certificates digital and this enable the institutions to verify the scores. This will ease the merit list preparation of educational institutions in admission process, when the service is utilized by all boards of school education. As admission application went online, the digital verification of certificates minimizes the submission of hard copy submission of grade sheets and time taken for manual certificate verification as happened in case of Tamil Nadu Engineering Counseling 2018.

(UGC, 2017) UGC has also taken significant digital initiatives at its end and also through Information Library Network (INFLIBNET) as listed in Table 1.

III. AT INSTITUTION LEVEL

Apart from Government directives, institutions realized that the millennial students are technology oriented and demanding quick response on rendered services. The computerized business systems improve administrative efficiency and reduce a toll on management and faculty to process paper documents on students, courses and exams.

Table 1. List of digital initiatives of UGC and INFLIBNET

e-Office implementation	Public finance management system
e-Governance	University activity monitoring portal
Direct benefit transfer	Wifi connectivity to 40 central universities
Regional office website	Integrated portal for planning, finance, coordination
Academic job portal	National academic depository (NAD) exam certificates
UGC NET online	Online courses SWAYAM (Active learning platform)
Public grievance portal	E PG pathshala (Post graduate programme)
Student grievance portal	Shodhganga (digital repository of dissertation)
e-scholarship award & portal	e-ShodhSindhu (access to e-journals, e-books)
Antiragging mobile App	Indcat (online union catalog of bibliographic data)
Uniportal database of universities	Soul (State of art integrated Library Management)
SWAYAMPRAHA DTH channel	IRINS (Web Research Management System)

Universities incorporated electronic communication process for any kind of communication, upload the same on website and sends individual institution approval letter through email. (VTU, 2018) One of the universities hopes to gradually move towards a less paper and paperless office, since it serves digital communication to more than 200 affiliated colleges under its control. (ePravesh, 2015) Considering the Indian youth population who aspires to tertiary education, the 'go online' in admission process reduces the paper usage. In addition, it helps to minimize problems related to overlapping counseling dates and in turn reduce physical / mental / financial burden of candidates due to multiplicity and transportation. The counseling process of engineering, medical and other professional courses are carried out online. Most of the entrance examination, application submissions and counseling are made online. As the medical entrance is mandate for admission throughout India, the strength of students who appear for medical entrance is increased and council planned to conduct medical entrance through online from year 2019. (SRM, 2016) One of the biggest private institutions made its student course registration and support services as online for its fully flexible credit system, where the students have the liberty to choose course of study and select faculty members. Students receive individualized time table upon completion of registration. The students are serviced with quick response on cloud and eliminated to shuttle from one office to another for processing paper documents.. (Mindlogix, 2016) There are quite a few universities adopted paperless exam and digital evaluation system. The first initiative was sending question paper online through a digital secure network and affiliated colleges download the same, take sufficient printout and distribute.



In the next level, the answer scripts are scanned and sent to examiners for evaluation. In the paperless exam, the students will get question paper on their computer screens, which avoid question paper leak and printing & dispatch of answer scripts. The technological advancement in digital exams permit candidates to write exam on flexible Tab devices, automatic dummy number allocation, quick process of multiple and re-evaluation processes, simplify the review of evaluated answer scripts and result processing with dashboard analytics.

(Kaushik, 2015) The university libraries are extended to do innovative e-resource services using technology such as OPAC search facility for both print and e-books of different publishers with links to full texts, digital scanning facility, host vide lectures and archive, online question bank, coordinate with MOOC initiatives, online reservation and renewal of books, indexing & abstracting services usage of Web 2.0 tools to disseminate new arrivals, maintain e-dissertations and subscribe e-journals. The digital libraries also face few challenges like archival of resource, longevity of storage media, removal of obsolete information to speed up the search process, deal copyright issues and intellectual property of resources and Universal access to knowledge and maintenance.

(NDTV, 2017) In accomplishing the government's challenging task of shifting India from cash dependent to a less cash-reliant economy, UGC issued an advisory to adopt online payment methods for tuition fees, exam fees, vendor payments, salary, wages and other campus services. All shops and vendors in institution premises including photocopier services, canteen and cooperative shops have adopted different mode of cashless transactions. In addition, all these shops come equipped with point of sale machines. One of the institutions has introduced smart cards to the students to buy food from canteen and shops in campus premises. The money is deposited by the parents online.

(Chronicle, 2018) Despite the digital initiatives of apex body in central and state governments and higher educational institutions own mission on implementing automation, there are institutions who could not achieve desired result in paperless office. The simple conversion of paper based activities to e-form will not be sufficient. The strong domain expertise with business process workflow, interconnectivity of data must be required. This necessitated knowledge on both ECM guidelines and Higher education administration.

IV. CHALLENGES IN ACHIEVING PAPERLESS

(LaMonte, 2016) indicates that the paper process still dominate in the office administration and increased the challenge on digital transformation. The mere implementation of ECM tools may not be sufficient, the performance to be measured for removing paper from operational processes in terms of response time, collaboration, back-office cost and compliance regulation to be focused as ECM is a process defined & utilized by stakeholder. (Larrivee et al., 2016) survey reveals organization perception (P1 to P5), operation (O1 to O5) and need (N1 to N5) on ECM implementation as shown in the Figure 2. The initial budget on technology investment may be high in paperless, but the paper based operations are costly in terms of back-office operation with duplication and siloed

information. The main difficulties of ECM implementation are listed in the order as follows: re-orienting staff, integration with existing system, define process with clarity and making a business case, convincing legal compliance and dealing exceptions. (Genesis et al., 2018) The paperless higher education mission is affected by organizational cultural change, re-orienting staff, integration with existing system, verbatim implementation of traditional workflow, lack of network connectivity & power supply in rural area and overdependence on consultants. (Isaeva et al., 2016) The goal of developing ECM is to overcome the listed challenges and to make the system more transparent with efficient service integration.

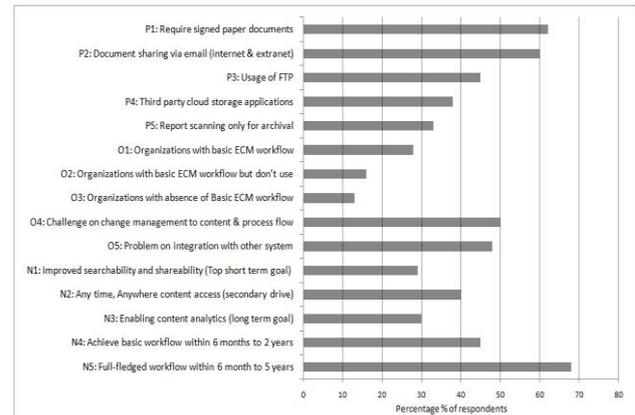


Figure 2. Organization view on ECM implementation (Source: Larrivee et al., 2016)

V. ECM GUIDELINES

(SUMS, 2017) As it is easy to create and repurpose digital documents over paper documents, a number of questions need to be answered prior to implementation.

- (SoftCo, 2016) storing as document as opposed to store as data
- (AIIM,2010b) Assess the functional gap in content management, integration of business application & link to database and document system with its affordability
- (Hullavarad et al., 2015) Version control to avoid duplication and inconsistency especially in concurrent access
- (Katuu, 2012, eGOV-PID, 2013) Fully automated retention rules of those records & documents, Compliance with Institutional governance & Record and Document retention policies
- (eSAFE,2010) Security impact & third party access requirements
- (Nordheim et al., 2004) Balancing user expectations and policies of information governance in customization
- (Cognizant, 2014) Technical viability of current/future content tools with ECM architecture.

(DTCA, 2014) The ECM reference architecture framework given in Figure 3 answers all the listed questions and provides services beyond the expectations.



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Apart from content capture & delivery of both human created and application created information, ECM is designed to manage document, web content, forms, records, digital assets of rich media content, multi-format content repositories, business flow, preservation policies and development tools of workflow, taxonomy, forms template and content authoring. The core content services include indexing, searching, digital rights, security, collaboration, approvals, digital signature and etc, (Alawan et al., 2014) Thus the properly implemented ECM positively influences on speed of problem identification and decision quality. In addition, it ensures centralized control with local flexibility that helps higher educational institutions to provide better services.

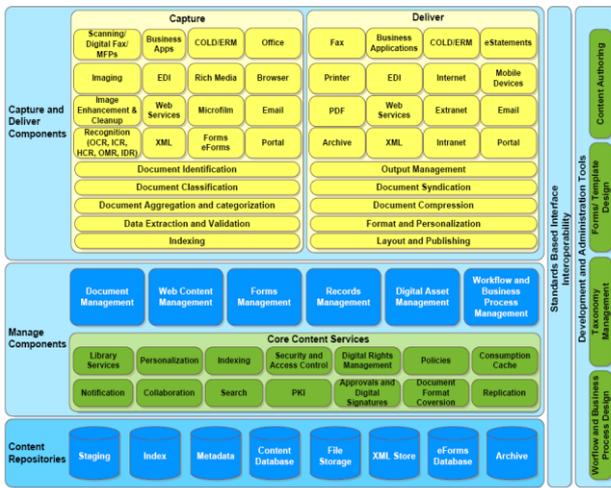


Figure 3. ECM Reference Architecture Framework (Source : DTCA, 2014)

VI. AREAS TO GO PAPERLESS

(AACRAO, 2016) Education sector is one of the important industries which not only creates and maintains large amount of information but also in the need of secured storage access and efficient business process. The functions of higher education system are segmented based on the nature of information impact, stakeholder's presence and kind of ECM implementation. The high impact business information which involves strategic decision on approvals and permanent preservation are grouped and listed in Table 2. The lack on preserving high impact strategic documents creates sever administration issues. The process flow of admission with both paperless and paper-based options is listed in Table 3, where the technology usage in every stage improves response in admission process.

The online admission process will enable the distributed target audience across the country and attract International students. The required ECM guidelines on academic, accounts and support services are briefed in Figure 4. Effective university websites speak clearly, even to yet-to-be students, and make it understandable by all. Table 4 provides guidelines on web content creation / maintenance.

Table 2. ECM guidelines for high impact Enterprise Content

Enterprise Content	Existing practice:
Office of Administration: <ul style="list-style-type: none"> Statutory Approvals, Affiliation, Communication, Act, Statute, Rules, Administration manual, Policy manual, Safety & Security standards Minutes of Board of studies, Academic council, Finance, Senate & Advisory Boards Strategic plan, Operation plan, Situational assessments, Committee & Annual Reports Event Calendar & Approval, Legal contracts, Purchase bids, General insurance Leave rules, Medical insurance, Pension policy, Guest honorarium, Travel grant Office of Internal Quality Assurance Cell (IQAC) <ul style="list-style-type: none"> Quality manual, Accreditation Ranking: Rating: Awards: Recognition, Action taken report Human Resource: <ul style="list-style-type: none"> Building plan, Blue prints, Approvals, Construction, Site photographs, Service contracts, Finance office Corpus fund, Donations, Investments, Loans, Fund disbursement Fee estimation, Budget, Balance Sheet Public affairs: <ul style="list-style-type: none"> Press Release, News, Community events, Branding, Advertisement, Marketing & outreach Admission: <ul style="list-style-type: none"> Vacancy position & norms, Recruitment, Cadre promotion, Sabbatical assignment Intake, Fee Structure, Scholarship / stipend / concession, Admission schedule, refund policy Academic: Academic calendar, Regulation, Curriculum, Syllabus, Lab Establishment, Examination Examination process manual, Result Declaration, Convocation Industry & International Cell Industry memorandum, International alliances, collaborations Purchase Inventory, Invoice, Quality assessment 	<ul style="list-style-type: none"> Paper based works on approvals and distribution through email. Preservation in the form of Office documents / PDF in a scattered manner lack in norms of content repository, which leads to inconsistency, version control in concurrency access, difficulty in document identification and retrieval ECM Guidelines: <ul style="list-style-type: none"> Use of ECM Manage components: Document & Digital Asset Management Storage: Controlled access of centralized location-specific content repository Records management service is to be extended to document preparation of IQAC, Finance, and other departments in data capture & delivery Third party access control to be established in case of Minutes of Boards, Invoice Workflow with strategic Team in one or more content usage scenario such as creation, modification, approvals, collaboration and preservation is required Limited and Controlled final version of Documents in hard copy

Table 3. Admission

Admission Stages	Paperless Service	Paper based service
Marketing	Website, CRM, Digital Marketing (email, SMS, Webinars, Social Media, pay per click, Search Engine optimization, Chatbot, etc.) & Lead conversion from info session & career guidance websites	News Paper advertisement, Banners, Hoardings, Brochure, & Prospectus usage in Open house and Info session
Application	Online	Download Form, Optical Mark Recognition (OMR)
Entrance Exam	Online	Paper-Pencil
Hall Ticket	Download	Through Courier / Postal service (such practice is stopped)
Certificate verification	Online & DigiLocker	Manual verification
Ment list & Counseling schedule	Online	Through Courier / Postal service (such practice is stopped)
Counseling	Online	On-campus
Payment	Online	Demand draft
Enrollment	Online for data capture	On-campus for student ID, document submission
Hostel booking	Online	On-campus

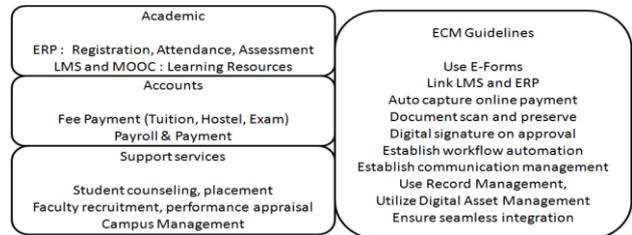


Figure 4. ECM guidelines in Academic, Accounts and support services

Table 3. ECM / Web guidelines & Best practices on Web Content

- Establish Web Governance Board to set the direction and policies, where the process chart should clearly mention the content type and responsibility of contributor, approver and publisher
- Apply Web Accessibility Standard Guidelines to optimize the impact of institution web content
- Ensure all content of university page is published within the university domain (no external website for any reason)
- Gear the content to target audience with quick scan rather than reading (prospective students, parents, current students, faculty, staff, alumni, prospective employee, press and general public)
- Do not upload video content as primary source of information
- Page should contain some useful information, prior to linking
- Emphasize strengths in Placements, Student achievements, Career guidance, Student affairs, Campus life, International alliances & Semester abroad programme, Industry internships, Faculty & infrastructure facilities, Admission procedure and mandate information etc.,
- Utilize content management tool for web publishing (especially pages with frequent updation)
- Audit web content prior to publishing, Perform usability testing to improve



VII. CONCLUSION

(AISHE, 2018) In India, there are 903 universities, 9050 college and 10011 stand alone institutions as on date with cumulative enrollment of 36.6 million. Implementing paperless in simple office communication itself makes great change in cost cutting on paper usage and move towards green imitative. The research covered the government initiatives on digitization and the prospects of paperless in higher education academic, administration, research and support services. The present disintegrated / stand alone applications / paper based services to be integrated using ECM reference architecture with reference to capture / storage / security / access & deliver compliance. The institutions need to understand the importance of managing content life cycle from creation to final disposition. The study recommends the institution to investigate their present operation, future need, scale up with short /mid / long term plan of action in ECM implementation in turn make the administration go paperless. This helps in enhancing the communication, student experience, student support services and creating a campus with technology excellence.

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AUTHORS PROFILE



Prof. H. Srimathi has two decades of experience in higher education and services. She is employed at SRM Institute of Science and Technology since 1999 and served in various domains such as academics and administration. She is passionate about the studies on higher education systems, qualification framework, and academic mobility.



Prof. A. Krishnamoorthy has three decades of experience in engineering education. He is currently employed at SASTRA Deemed University. He is passionate about the studies on optimization techniques, machine design, renewable energy sources and higher education systems.