Chapter 19

Digital University Framework

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I) OVERVIEW

Digital University framework has been implemented in major regular Universities across Maharashtra to provide 'e Suvidha' to student, colleges and universities at large. In this way services have been reached to every associated district, city, Tahsils which come under the purview of University.

In view of current state of educational e-governance wherein students has to fill number of forms, get in the queues for every concerned activity, have to frequently visit University for various applications and still they face many other hassles. Though some computerization initiatives are taken by Universities and colleges, it failed to provide various required services in an integrated manner. This has most of the times, has resulted into duplication of efforts, loss of productivity, more time consumption and increase in cost at various levels.

If we focus on University and colleges, it is obvious that a university is normally located at a district. Students and colleges have to continuously visit to university or college, though most of the students and college requirements can be fulfilled if we can provide them a common platform on which every entity can perform tasks according to their requirement.

In today's scenario, if we talk about technology, all districts even backward ones are moving one step up. Internet services, mobile services, telephones services are available to everybody. The availability of electronic media has equipped citizens to avail various services such as banking, railways and many more.

This shift still does not give a student leverage to get university services and other career related information. Same is the case with services to colleges and university. 'eSuvidha' is a paradigm shift in the working methodologies of colleges and university, and eventually to provide services to ultimate users, i.e. to Students. It allow student of rural districts and tahsils to avail same services and information as his/ her counterpart in a developed district. Lots of information, applications, and forms are now available to students on a

single click, for which most of the times, they used to travel to universities or colleges. Colleges even are now getting facilitated by services under eSuvidha.

Universities in districts are now more technological and providing services to students and colleges at much faster pace.

Being a very vast framework, it has also given opportunities to develop many other opportunities such as -

- availability of more computer centers,
- computer related jobs opportunities,
- awareness about other jobs,
- scholarships,
- competitive examinations and others.

II) RESULT INDICATORS

1. *Key Performance*

a. *Stakeholder services and benefits achieved through ICT interventions*

SERVICES TO STUDENTS

- Informative Services on portal: About Courses, Colleges, Admissions, Scholarships, Government Schemes, Examinations, Results, Suggestion, Feed backs, News and Events and much more.
  Student's Login on University portal:
- Student's Personalized Profile and services
  Time Table, Hall ticket, Exam form and personalized e-content push through University
  Pre-printed Eligibility/Exam/Admission forms, 16 digits unique permanent Registration Number (PRN), personalized SMS/Emails to students. Application requests for Profile correction, re-evaluation, re-verification, duplicate statement of marks, profile update, change of subject, photocopy of answer-books.
- EASY (Employment Assistance Services to Youth) portal: This service offers Placement Assistance to students, Job listing and Notice Board, Job/Employer search for students, Employee search for employers, Student's professional profile, News, Events and Job fairs, Tips and Tests on Interview assistance, Professional CV templates, Job Calendar, SMS/Email Alerts.
- Various Certificates such **as:** No Objection, Bona Fide, Character, Transfer, Passing Certificates, ID Cards.

SERVICES TO THE UNIVERSITY

- e-Suvidha Scheme: It comprises of services of Digital University® framework with
  unique features of University's Web
- Academics Management (Course and College Management, Affiliations)
- Admissions Management
- Eligibility and Enrollment Management
- Examination Management and reconciliation
- Assessment and Evaluation Management
- Result processing and certification using centralized result processing engine
- Robust University MIS

SERVICES TO THE COLLEGES
- Digital College® Software: Three different software in Digital College® suite include: Digital College Portal, Digital College Smart Client and CCaNad
- Student Admissions
- Managing Student Lifecycle cycle at College by assigning Roll No./division, eligibility reports, Class Time Table, College Notice Board Management.
- MIS for College: More than 100+ reports
- Fee Management for invoices/fee data reports covering
- Utilities include generation and printing of ID Cards, No Objection, Bona Fide, etc.
- Principal's Dashboard, College Administration module
- Digital College Smart Client for seamless integration of University and college

Benefits achieved

Through implementation of framework across universities and colleges; above mentioned services are provided. These services have been offered as one stop services for students, college and University officials.
- Services offered at the doorstep of students.
- Reduction in data duplication efforts at various levels.
- System generated outputs with no errors.
- Personalized services to students.
- Customized sms for faster service delivery
- Profile correction requests
- Personalized login to students for various applications, requests
- Single click applications and forms generation of thousands of students studying in university. For example: Examination Form, Hall tickets etc.

- Reduction in student cycles to colleges and University to submit and receive various applications, Forms, Fees and many others
- Direct student facilitation in terms of
    - Right Information to students at right time through various modes of communication channels such as sms, information in student login, software generated notices in colleges etc.
    - Students online requests for various services through web portal directly reaching to concerned authorities in University followed by subsequent redressal
- Reduction in work load of University staff and college staff.
- All previous academic years' information/ records availability in electronic form.
- Paper less transaction achieved with in University departments, and across Universities and colleges.
- Various reports generation required in various modules.
- Strong student administration MIS at college level.
- Seamless data transaction between college and University. No data duplication.
- Single time student data entry at the time of admissions. Same data is used wherever required. Human efforts are minimized.

b. *% of services covered as ICT interventions*

Services are provided at various levels to Colleges, University and Students at large.' eSuvidha' is meant to provide services to students, all affiliated colleges and university. Basically it provides:
- Complete student life cycle management right from admissions to convocation.
- Student administration in all affiliated college and departments through college software, college intranet portal, college MIS reports.
- University administration such as Academics management, Eligibility and Enrollment Management, Examination Management, Assessment and Evaluation Management, Result processing and certification, University Portal etc.

Being a student centric framework, college and university are able to provide all administrative and informative services through the framework. College starts providing services to student as soon as he/ she admits in college and thereafter University take up further student related services. These two entities work in tandem and in a cyclic manner till student complete his/ her student life cycle in University. This scenario indicates that ICT intervention as 'e Suvidha' is at very high level. A comprehensive list of services provided is given in 'Stakeholder services' under Key performance.

c. Geographical Spread in the State achieved

Digital University Framework has been deployed in following mentioned universities in Maharashtra, geographically it has been initiated and working across every part of State

List of esteemed Universities in Maharashtra

1	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (Maharashtra)
2	Yashwantrao Chavan Maharashtra Open University, Nashik (Maharashtra)
3	North Maharashtra University, Jalgaon (Maharashtra)
4	Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur (Maharashtra)
5	Solapur University, Solapur (Maharashtra)
6	Shivaji University, Kolhapur (Maharashtra)
7	University of Mumbai, Mumbai (Maharashtra)
8	Dr. Babasaheb Ambedkar Technological University, Lonere (Maharashtra)
9	Sant Gadgebaba Amravati University, Amravati (Maharashtra)

List of esteemed Digital University outside Maharashtra

1	Krantiguru Shyamji Krishna Verma Kachchh University, Bhuj (Gujarat)
2	Maharana Pratap University of Agriculture and Technology, Udaipur (Rajasthan)
3	Mahatma Gandhi University, Kottayam (Kerala)

2. *Efficiency improvement*

Category	Sub Category	Time savings		Cost savings	
Reduction in repetitive activity in data entry and form filling by students		College	University	College	University
(Data capture at source)	Standard Admission Form	√			
	Pre Printed Eligibility Form	√			√
	Pre Printed Exam Form		√		√
	Pre Printed Hall Tickets		√		
	Faster Result		√		
Faster communication	sms to students		√		
	Information with college in college login	√			
Faster services delivery	Reports creation on a single click, Intelligent MIS	√	√	√	√

Category	Sub Category	Time savings		Cost savings	
	Automated time table , Fee management	√	√		
	Instant college software creation by University Coordinator	√			
	System generated reports such as ID card, Bona fide certificate etc to students	√			
	Various Reports colleges at University portal		√		
Paper less transaction	All official messages to users through "Messaging" service		√		√
	Meeting agenda, Minutes of Meeting etc through messaging service		√		√
	Student data synchronization to University portal	√		√	
	Circulars, letters		√		√
	Other electronic data transaction from university such as marks data, papers data etc		√		√
	Personalized Course syllabus on web portal				√

When we take into consideration the framework from end user point of view, it can be found that efficiencies have been improved a lot and at every stage . The activities which were earlier carrying out manually have now turned into an automated and structured activity. These set of services are available to all users at a single platform and is available on web from where information can be fetched and used from any location.

We shall be easily able to measure the **time savings/ improvement and cost savings in delivering** these set

With reference to cost mentioned below, it can correctly be said that these cost have reduced substantially.

Logistics cost
Logistics is a big cost to University as they have to send Eligibility Forms, Examination Forms, Hall tickets, Meeting letters, Agenda, Circulars to colleges. These dispatch counts are in lacs where students are involved and are in thousands where colleges are involved directly

Travel cost

This cost has reduced substantially as now most of the time user travel to university only when they have sufficient information in hand. This information is received through electronic communication.

Most of the activities are now become online such as Examination forms, Hall tickets etc. which is generated by University, the same instantly get available in college login. Previously this activity used to be done manually and college staff had to visit to university to collect the same.

Inventory cost

Most of the records in University and colleges have to be kept in physical form; the cost of maintaining them is quite high. These costs now have gone down substantially as now the entire student, college and university data is in electronic form. Data search has become very easy and lots of time is saving in searching, circulation and delivery of data.

Printing Cost

Most of the time University used to print the forms and kept sending the same to colleges, This printing used to cost a lot to university in financial terms. Most of the data, forms are electronically send to colleges and there college take print at their locations only. Also thousands of letters get printed every year in colleges, but in current situation, these letters are easily available to university or college officers in their mail box.

Labor cost

Many times students, colleges and university have to do redundant activities such as information gathering required by authorities and other officers. Frequent visits by students to university, visit of college staff for submission or reception of data/reports and many more. This cost has reduced a lot as more and more users can avail information through common university portal

III) ENABLER INDICATORS

1. *Processes*

a. *Major Front-End and Back-End processes*

Various University and College related processes which were earlier carrying out manually have now been reengineered using this framework.
A comprehensive list of major front end changes have been done and implemented**.**

Major front end process changes and implemented
Academics Management Information and Reports
• Complete Course Structure information availability to students, colleges, University
• All College details availability to students, colleges, University
• Courses colleges/ departments affiliation information and reports
Admissions Management
• Student Admissions through Digital College Software
• Student Intra College Transfers through software
• Preprinted Eligibility Form to all students
• Preprinted admission forms for next year admissions
• Student gets Fee receipts, ID cards and other certificates
• Software generated Time table provided to teachers
• Software generated Notices
• MIS Reports
Eligibility or Enrollment Management
• 16 Digit Permanent Registration Number(PRN) generation and distribution
• List of eligible, not eligible students to colleges
• sms to students for eligibility confirmation
Examination
• Examination schedule information to students and colleges
• Examination time table information to students and colleges
• Pre Printed Examination Forms, Hall tickets generation for all student and colleges
• Various reports to colleges such as Exam Form Submission reports and many more
• Various reports to University or for venue such as paper wise attendance sheet, Exam supervisor report etc.
Student Marks entry
• Various reports such as Paper wise mark list, missing student report, Absent student report
Results
• Delivery of course wise Ledger (tabulation of marks) to students
• Delivery of course wise Statement of Marks to students
• Passing/provisional certificates, Result statistics , press reports and many more
• All student exam history available for Examination department
Online Applications Requests by students
• Application requests for Profile correction, re-evaluation, re-verification, duplicate statement of marks, profile update, change of subject, photocopy of answer-books.

• Application requests for change in contact details
• Application requests re-evaluation, re-verification, duplicate statement of marks, change of subject, photocopy of answer-books.
Web portal
• University Web portal which provides single point for all informative and administrative services
• Complaints, Feedbacks, Suggestions by any stakehold3er of University
• Complaints, Feedbacks, Suggestions , University Photo gallery
Messaging
• Internal messaging services to users
• Fixed Inbox size provided to every user
Meeting Management
• Meeting agenda generation and availability in personal inbox
• Minutes of Meeting reports
• Facility to take points from last MoM for further meeting agenda, List of attendees and many more

A comprehensive list of major back end changes have been done and implemented

Major back end process changes and implemented
Academics Management
• Course Definition (paper structure and paper assessment)
• College Definition (all college related information)
• Course – College affiliations by University staff
Admissions Management
• Student Admissions data entry through Digital College Software
• Dashboard for Principals
• System generated Division and Roll Number for student
• Immediate course affiliations to college through system
• Unique code generation for student identification and transfer between colleges
• MIS Reports
Data transactions
• Seam less student data transaction from college to University and vice versa
• Data import/ Export functionality across various modules to facilitate users, it also provide integration among modules
Eligibility and Enrollment Management
• Single click student eligibility processing (manual or bulk)
Examination
• Exam Center allocation by University
• Exam Venue allocation by University

• Exam seat number generation
• Exam form generation and hall tickets generation
• Exam form in warding
Post Examination
• Various configuration activities such as linking of courses to assessment centers,
• Center and venue creation
• Schedule, Exam event and time table creation
Assessment marks entry
• Centralized/distributed data entry of assessment data
• Coding/decoding of answer books
• Assessment Data, student data synchronization to Result Processing Software
• Data verification and validation,
Result Processing
• All prerequisite data acquisition in electronic form for result processing
• Result processing and ordinance application,
• Passing/provisional certificates, Result statistics , press reports and many more
Organization Structure, Messaging, Meeting Management
• Statutory and Non Statutory OS definition, User and role creation, subjects creation, Meeting templates, agenda creation, Meeting Reports
University content administration module
• Menu and Content creation, photo gallery, file uploading, news, circulars information
Reports and masters creation
• University reports for above said modules, Master database creations for further uses

3. *People and Resources*

a. *Project management & Monitoring – Full time team in place*

Digital University framework is a major e Governance initiative in the area of Higher Education. In current scenario, Universities and colleges are still functioning with same type of old working methods despite the efforts of various statutory bodies.

As we know that in the domain of e Governance, it requires more and more efforts to deploy and implement the software in some geographical areas rather than just developing of the software. It require complete paradigm shift in the mindset of users. It varies right from implementation of framework at user location, reaching to customer at right time, conducting of continuous trainings, communications with in teams, monitoring, issues fixing and many

more. It requires rigorous project management to successful carry out the activities.

The overall project management of the is framework can be explained with following example explanations

Software development and software implementation and overall Project management

Basic Pictorial Design
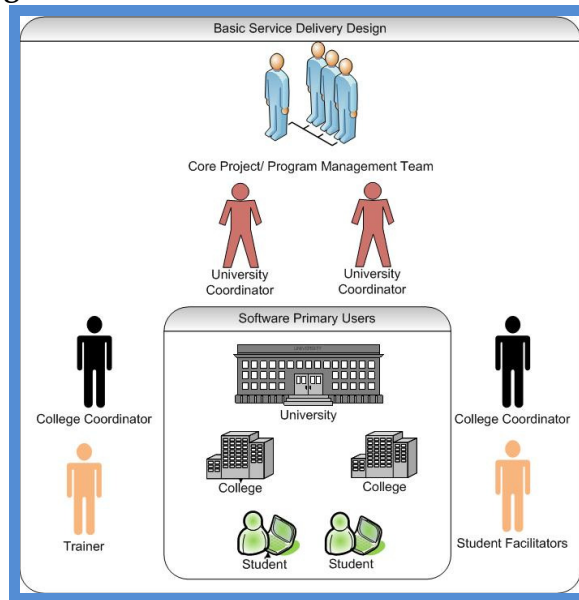
(Mechanism designed to address last mile problems and provide necessary enabling)

Company has its core project Management team which is responsible for successful management of work across all clients. Various level activities such as Business Development, Business Analysis, software Implementation and Operations go hand in hand for comprehensive development.

For every client there is:

- Company's core project Management team, responsible for successful management and implementation of work across all modules on which client is working
- University Coordinator to look after University related activity
- Every affiliated college of University has associated with College Coordinator for support and trainings.

Various Project management activities take place at various levels. Every concerned authority at his level performs various activities as designed. Following activities are generally conducted.

Category	Company Project Management Team	University Coordinators	College Coordinators

Project Planning	√		
Project Scheduling	√	√	
Quality Assurance	√		
Deployment	√	√√	√√
Trainings	√	√√	√√
Monitoring	√	√√	√√
Client Support	√	√√	√√
Resource Management	√	√	
Client meetings and reviews	√	√	√
Issue logging and fixing (software is implemented for issues logging, tracking, and bug fixing. It has made issues tracking an easy task)	√	√	√

b. Achievements of training of internal & external members on the new system

Since the implementation of framework, rigorous trainings are conducted on various levels such as live training sessions, Online training sessions/ distributed classrooms and Workshops. These training have always been conducted on two levels, firstly customized training to specific clients, and secondly common trainings for generic modules

	Training to internal Members	Training to external Members
All Software Modules	√	√
New Enhancements	√	√
Work Methodology	√	√
Workshops	√	√
Issues resolving and tracking	√	√
Awareness camps	√	√

Following are the achievements because of continuous trainings conducted,
- Streamlining of routine activities. Some training are regularly get conducted for new functionalities and new users. These trainings are conducted by internal clients of company (College Coordinators, University Coordinators) to external clients.
- All external clients have started using software without any support and have become technical savvy.
- Coordination skill of both clients has increased substantially.
- Issues are raised and tracked in a predefined sequence.
- Ease in software module deployment at external client location

- Readily available training materials, manuals, documents, presentation for better understanding
- Change in client mind set and seriousness about trainings

c. *Change management strategy defined and implemented*

Following change management activities introduced and implemented religiously.
- Collaborative and Participative approach to develop and implement the framework
- Generic software framework implementation across all Universities.
- Standardized applications and forms designs and implementation of the same across all universities.
- Introduction of formal issues escalation mechanism and tracking.
- Establishment of implementation team at university level, and support team at all college level
- Continuous focus on training through various modes such as training from distributed classrooms, live training at actual user locations. Comprehensive and easy to understand user manuals, flows, help document for end users
- Decentralization of work centers, to improve nearness with the client and to provide last mile user support.
- Able to make difference in working methodologies of Universities and colleges, which are usually manual based.
- Monthly workshops with clients. Demonstration of Live prototypes to gathert feedbacks and further requirements
- Well defined team structures dedicated to clients for operational support.
- Able to manage effective two way communication.
- Well defined roles and competencies across internal clients or teams.
- New and enhanced services, reports to clients to their requirements.
- Merging of technical teams to enhance collaboration and team output.
- Structured software development teams, which work on modules and focus on deadlines.
- Proper handholding planning to deliver various software module activities to end users.

d. *Leadership support (Political, Bureaucratic) and its visibility*

Maharashtra Knowledge Corporation Limited (MKCL) is promoted by the Department of Higher and Technical Education, Government of Maharashtra, India. Department of Higher and Technical Education, Government of

Maharashtra, keeping the objective of facilitating the students by cutting down their costs, avoiding delays and inconvenience and to completely reengineer the traditional processes in the overall interest of the students by exploiting the advances in information technology has issued a Government Resolution (ईसेवा २००६/(१९१/०६)/मशि–१) dated June 19, 2006 in order to provide various "e-services" to the students through implementation of Digital University® and Digital College® software. The Government of Maharashtra (GoM), nine Universities in the state, educational institutions, community institutions, IT and non-IT industries, etc. are among the initial major equity holders of MKCL. With GoM's equity within a range of 26% to 30%, the company has a unique blend of governmental credibility and social responsibility on one hand

The Government Resolution has helped to initiate and propagate the work. After that there is no looking back as more and more services are provided to clients and end user. Now students can avail number of services in his/ her login

e. Financial Model (Funding pattern , Business model PPP etc) defined and implemented

According to GR, "e Suvidha" is to be provided at Rs. 50/- per student which includes all services to students as mentioned earlier.

Digital University project is supported by excellent human resource support to clients and users. As most of the colleges are at rural areas with power cuts or failures and no internet connectivity, it becomes very important to provide support as and when required.

Digital University Framework is based on Public Private Partnership, where all University and College Coordinators work in tandem to provide support to University and colleges respectively.

There are 4 layered service designs to reach to our end consumer of services.
- Core Management Team to manage over all work across universities
- University Coordinator at region level
- College Coordinator at District level
- College Coordinator at Taluka level

In most of the cases, these coordinators are local level entrepreneurs. These coordinators are very much aware of local demography's and are able to support colleges and provide services with high touch. There is a fixed share pattern decided for each level coordinator on the basis of total number of students he served/ supported through the colleges he/ she associated.

In this way, company is able to work on Public Private Partnership and also able to financially support substantial number of entrepreneurs at local level and above all is now able to give high end services to users.

3. Technology

#### a. Disaster Recovery & business continuity plan defined & implemented

Presently, a powerful server is placed alongside the server farm which is in continuous sync with the web and database servers. This server protects against the failure of Load Balancer, Server Hardware, Firewalls and SAN. The server can be made operational within 5 minutes of any failure observed. We are in the process of creating a DR site in a different seismic zone and with a different Data center.

b. Technological solution cost effective and maintenance over time

The server infrastructure is built by using Citrix Essentials for Xen Server licenses which is a cost effective virtualization platform for server virtualization. By using server virtualization and dedicated Load Balancer, maintenance of the virtual machines was found to be very fast as compared to a physical server environment. (Additional information, besides Server Infrastructure, can be obtained from the development team)

c. Security and confidentiality standards defined and implemented

The Server Infrastructure is protected by redundant firewalls for protection against cyber attacks. Also prevention of DoS and DDoS attacks is enabled on the Load Balancer as an added layer of security. Furthermore, the clients do not have direct access to the Server farm as they have to pass through the load balancer for any access. (Additional information, besides Server Infrastructure, can be obtained from the development team)
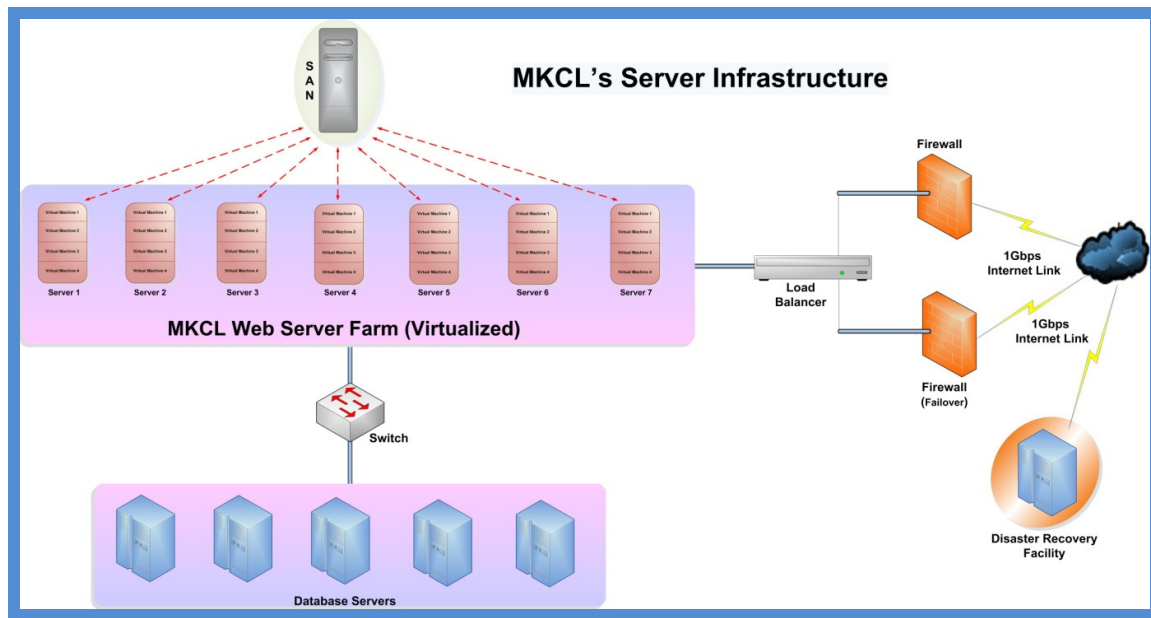
(Vivek Sawant, Managing Director, Maharashtra Knowledge Corporation Limited & Aatul Wadegaonkar, General Manager, Maharashtra Knowledge Corporation Limited, Email: atulw@mkcl.org)