SWOT Analysis of M-Governance in Higher Education Administration

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ABSTRACT
Globalization and technological changes have triggered the transformation in education sector. Indian higher education sector has seen an enormous growth in recent years and continues to expand**.** To sustain in the global competitive environment and to withstand the prolific growth of higher education sector a good technology based administration is very much needed. To overcome the predominant challenges of higher education administration system, mobile governance is emerging as a viable solution. The main objective of this paper is to present the SWOT analysis of existing frameworks of Mobile governance with special reference to higher education system in India.

Keywords
Globalization, Framework , Mobile -Governance, Higher Education .

1. INTRODUCTION

Due to the boom of mobile network & portable device, the administration process (Governance) is evolved from desktop computer to mobile devices. Mobile governance [1] is the use of mobile wireless device for administration while the learner is on the move. Just like the link between e-administration & general administration, the development of mobile governance is not intended to substitute the existing administration system, but to enhance the reach of facilities to the target users. The mobile governance presents the alternate means to provide 24X7 services.

Hence the primary idea of Mobile governance is not to convert all computer based tasks to mobile depended, but to consider how best the mobile phone can be used to strengthen overall administration policy.

The concept of effective governance is not new. The new generation innovative findings are required to face the challenges. In this aspect, the M-governance can facilitate in enhancing the lucidity, participation providing speedy information, distribution, improving administrative efficiency in all the aspects of education. M-Governance is the need of hour for the soft functioning of the system.

Education over the past two decades has undergone a sea change. Technology has fundamentally altered [2] how we live and work as well as how we learn. In the world of higher education, for example: virtually every aspect of scholarship-from conducting research to communicating ideas-has been influenced by technology. As a result, higher education's reach now extends far beyond what was once possible or even imaginable. This informative process will undoubtedly continue as broader bandwidth gives faculty and students, as well as administrators, access to new opportunities.

The exposition of wireless technologies has created a new dimension in education [3]. Wireless, which provides "anytime, anywhere", access to resources, can have a tremendous impact on teaching, learning and student collaboration. Administrators ponder over which wireless technology to invest in on campus, network administrators wrestled with how to ensure proper security and faculty struggle with how best to incorporate wireless into student learning both inside and outside the classroom .

1.1 Concept of M-Governance

M-governance solution in the field of educational sector has changed the total policy of administration, which is designed to make the system easy accessible, time saving and economic. It is an integrated solution in the education sector that facilitates the processing and maintenance of large volumes of information such as: student's registration, admission, personal information, fees, classes, time table, transport, attendance, library, examinations, performance, grades, hostels, security, reports, management, expenses, staff details, salary among various departments in an institution.

M-governance enables the students & administrators to access easily, to use new class of quality of services and to provide multi-channel service delivery system. The vision of M-governance is to renovate service deliverance through the use of IT and Multimedia for performing administrative activities.

1.2 Benefits of M-governance in an education sector

- Improves the efficiency of the various departments and lessen replica [4]
- Preparation of reports becomes easy and faster.
- Easy online information and submission of forms and payment also becomes almost immediate.
- The management, faculty members, students and administrative staff get connected to the each other more easily leading to enhanced efficiency in service by the way of faster diffusion of information economically .
- Equal opportunity to access the information regardless of one's physical location and removing all the distance barriers.
- Leads to reduction of transaction costs, time and space
- Efficient use of Human Resource

Mobile Apps developers for the use of M-governance application, have to work at low level of pensiveness. This means taking care of low level issues such as inter process messaging tools, integration and data modelling etc.

M-government will not replace e-government and in many cases it will be complementary to e-government efforts. The conventional e-government efforts provide services through wired network with interactive and relatively intelligent web applications. The m-government is the key to success because of its applications supporting mobility of the users.

Definition of M-Government [1]

"Strategy and its implementation involving the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving benefits to the parties involved in e-government including citizens, businesses and all government units".

The forces influencing the move from e-government to m-government activities include major changes in the technological infrastructure and the advances in mobile telecommunication services. The technological changes can be broadly described under three major trends:

- Mobile device penetration
- Convergence of wired Internet and wireless telecommunication networks
- The move towards 3G services and higher data transfer rates.

Mobile devices are now taking significant roles in our daily and business life. Now, mobile phones are no longer used only for voice communication but are a convenient way of connecting to the Internet and are used for transferring data, exchanging e-mails, and doing transactions.

2. M-GOVERNMENT AND EDUCATION SYSTEM

Internet and mobile phones play a very important position for an integrated education system, as they provide instant communication among parents, students and schools. Parents can receive frequent updates on academic and non academic performance of their children.

This instant highly appreciated timely communication among educators, parents, and students can prevent academic failure and serious disciplinary actions.

As for the students mobile services provides an opportunity to send and receive announcements on emergencies and public safety, class schedule updates, campus events, traffic and weather conditions, office hours, campus resources available, and exam results. This can help students efficiently utilize mobile phones in a technologically improved academic environment to better inseminate knowledge.

3. GENERATIONS OF MOBILE TECHNOLOGY

The first generation (1G)[5] began in the early 80's with commercial deployment of Advanced Mobile Phone Service (AMPS) cellular networks. Early AMPS networks used Frequency Division Multiplexing Access (FDMA) to carry analog voice over channels in the 800MHz frequency band.

The second generation (2G) emerged in the 90's when mobile operators deployed two competing digital voice standards. In North America, some operators adopted IS-95, which used Code Division Multiple Access (CDMA) to multiplex up to 64 calls per channel in the 800MHz band. Across the world , many operators adopted the Global System for Mobile Communication (GSM) standard, which used Time Division Multiple Access (TDMA) to multiplex up to 8 calls per channel in 900 and 1800MHz bands.

The international Telecommunications Union (ITU) defined the third generation (3G) of mobile telephony standards IMT-2000 to facilitate growth, increase bandwidth, and support more diverse applications. For example: GSM could deliver not only voice, but also circuit-switched data at speeds up to 14.4Kbps. But to support mobile multimedia applications, 3G had to deliver packed switched data with better spectral efficiency, at far greater speeds.

The figure 1 states the comparative analysis of Internet access using mobile device & desktop system. The high speed wireless data transfer service triggered the use of internet access service through mobile phones.

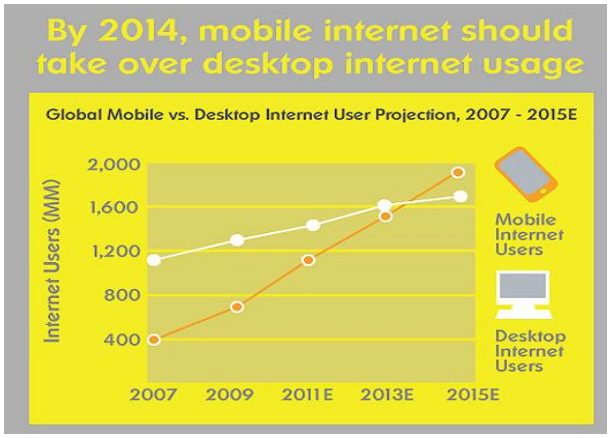

Fig.1 Use of Internet: Mobile V/s Desktop
Source: www.ppchero.com

4. M-GOVERNANCE IMPLEMENTATION STRATEGY [6]

Globally as well as in India, millions of less-privileged individuals without access to the Internet have no alternate way of accessing Government/ public services. Additionally, at the time of conceptualizing the e-Governance strategies globally, the penetration of mobile devices was very low and the capabilities of the devices to carry out data transactions were minimal. However, the scenario has changed completely during the last decade, both in terms of the penetration of mobile devices as well as their computing capabilities. The mobile devices are ideally suited as alternative access and delivery channels for public services.

The M-Governance is currently evolving, not only in developing countries but also in the developed world. The success of the proposed initiative on m-Governance will greatly depend upon the ability of the Government Departments and Agencies to provide frequently needed services to the people, create infrastructure for anytime anywhere mobile-based services, adopt appropriate open standards, develop suitable technology platforms, make the cost of services affordable, and create awareness, especially for people in underserved areas. To ensure the adoption and

implementation of the framework in a time-bound manner, following actions will be taken.

MSDG (Mobile Service Delivery Gateway) is the core infrastructure for enabling the availability of public services through mobile devices.

MSDG shall support the following delivery channels for development and deployment of mobile-based applications. As the mobile-based technologies are constantly evolving, more channels may be added in future as the need arises.

- SMS (Short Message Service)
- IVR (Interactive Voice Response)
- WAP (Wireless Application Protocol)
- USSD (Unstructured Supplementary Service Data)
- CBC (Cell Broadcast)
- SIM Toolkit (STK)/Dynamic STK, 3G-Video
- Others (Wi-Fi / WLan etc.)

The various delivery channels are needed to provide existing services and the development of new services.

a) End User Interface: End-user devices include mobile phones, smart phones, personal digital assistants (PDAs), tablets, and laptops with wireless infrastructure.

b) Content for Mobile Services: Due to lower-bandwidth and smaller-screen characteristics of mobile devices, successful development and deployment of m-Governance will require development of separate mobile-ready content. Similarly, to meet the needs of all the potential users, the applications will need to be developed in the relevant local languages for the various channels of delivery.

c) Mobile Applications (Apps) Store: A mobile applications (m-apps) store will be created to facilitate the process of development and deployment of suitable applications for delivery of services through mobile devices.

d) Application Programming Interfaces (APIs) for Value-Added Services (VAS) providers: MSDG shall offer suitable APIs to VAS providers with appropriate terms and conditions to ensure interoperability and compliance with standards for development of applications for delivery of services**.**

e) Mobile-Based Electronic Authentication of Users: The systematic electronic authentication mechanism is essential for user identification, to provide valuable service and to ensure appropriate privacy and confidentiality of data and transactions.

f) Payment Gateway: MSDG shall also incorporate an integrated mobile payment gateway to enable users to pay for the services electronically.

5.1 Is e-Governance a prerequisite for m-Governance?

Even though M-Governance is forecasted as an extension of M-Governance services, existence of **M-Governance services is not a prerequisite [6] for deployment of m-Governance services.** The E-government services are mainly based on Internet applications. But the M-Government strategy are aimed at extending the access of general services to those sections of the society which are unable or unwilling to access services through internet or those which simply prefer to use mobile devices. The key objective of M-Governance initiatives in the proposed framework is to enhance the bottom-up participation and empower the disadvantaged sections of the society, thus fulfilling the mission of anywhere, anytime services as envisaged under the National M-Governance Plan (NeGP).

M-government is inevitable.[7]

(a)The popularity of Mobile device itself has influenced the implementation of M-governance.

(b) The development in wireless World Wide Web and the Internet technologies

(c) To fulfil the enhanced needs of people's involved in management aspects.

There are various challenges to adapting to coming age of M-government, such as:

- Small screen limit the amount and type of information that can be displayed
- Possibility of data loss due to battery problems
- Problems with linking to networks
- Developing wireless and mobile networks and related infrastructure
- Promoting mobile penetration and increasing accessibility
- Dealing with protecting privacy and providing security for the data and interactions
- Regulating and developing legal aspects of mobile applications and use of the services.

One by one, colleges and universities are taking the bold step in web development and concentrating on the mobile needs. (The comparative chart [table 1] exemplifies the application sectors of mobile devices with special reference to education sector) The mobile based web has huge set of users and is gradually increasing day by day. This has lead to the development of mobile based web apps.

Email Opens Q1/Q2	Percent of All Email Opens: Phones			Percent of All Email Opens: Tablets			% Desktop
BY INDUSTRY	iPhone	Andoid	Total	iOS	Android	Total	Total
Association	14.66%	2.37%	17.03%	6.62%	0.15%	6.77%	76.20%
B2B	11.43%	2.33%	13.76%	2.43%	0.11%	2.54%	83.70%
Cable & Telco	19.71%	6.00%	25.71%	9.71%	0.43%	10.14%	64.15%
Consumer Products	17.90%	4.85%	22.75%	6.13%	0.29%	6.42%	69.83%
Consumer Services	23.79%	10.20%	33.99%	7.77%	0.41%	8.18%	57.83%
Education	19.92%	3.00%	22.92%	9.02%	0.22%	9.24%	67.84%
Entertainment	18.86%	7.62%	26.48%	6.20%	0.62%	6.82%	66.07%
Financial Services	25.82%	6.90%	32.72%	6.98%	0.43%	7.41%	59.87%
Health Care	11.45%	2.15%	13.60%	2.38%	0.10%	2.48%	83.92%
Hospitality	19.74%	4.04%	23.78%	9.68%	0.47%	10.15%	66.07%
Retail	20.39%	4.04%	24.43%	10.65%	0.48%	11.13%	64.44%

Source: Mobile Email Opens Report 1st Half 2012, Knotice

Table 1: Use of Mobile devices in Education Sector
Source: www.massmailsoftware.com

Having a mobile site isn't just about making our current site look pretty on mobile phones [8]. Usability is different. Accessibility is different. Trends are different. The same as with the current site, starting a mobile site means researching our audience(s), and building the tools to meet their needs.

Sites are better than apps. A well designed mobile web site will serve better and be easier to maintain than trying to keep up with several different mobile applications (even if the apps themselves are really cool). If we have the resources, then we can go for it.

The example sites that can be easily operated using mobile phone.

Fig 2: West Virginia University (http://m.wvu.edu/about/)

Fig 3 Oxford University – http://m.ox.ac.uk/:

6. ORGANIZATIONAL STRUCTURE OF M-GOVERNANCE IN HIGHER EDUCATION

The rapid growth in the field of education has made governance in education a composite task. The remarkable progress in technology has led to development in the administrative system. Computers can be used widely for educational administration process of Higher Education Institutions.

The following are some of the areas where the computers can be used for effective educational institution administration

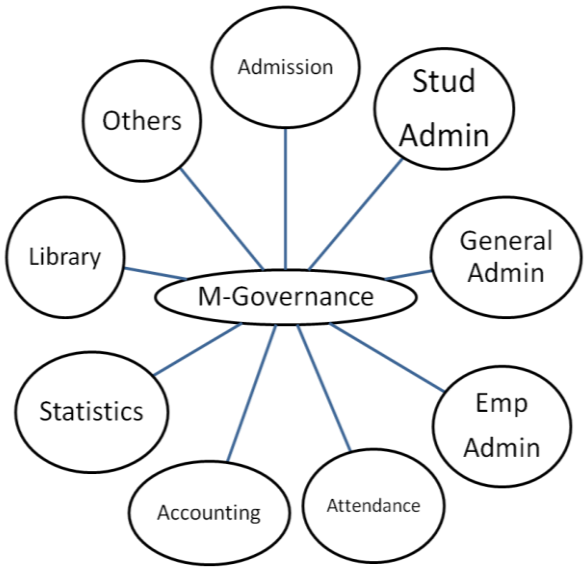

Fig. 4 Organizational Construction of Higher Education Institute where M-governance can be implemented [9].

STUDENT ADMIN:

Admission Enquiry, Applying for Admission, Registration, Course / Subject allocation, Timetable & Schedule list dispatch

EMPLOYEE ADMIN:

Recruitment, Work Allotment, Attendance, Leave, Performance Appraisal

GENERAL ADMIN:

Scheduling Examination Hall, Fee payment, Internal, University, Practical Examination, Day to day activities

ADMISSION MANAGEMENT:

Data regarding admissions, Demographics, Previous academic records, Current academic choices, Nationality and Immigration details

ATTENDENCE MANAGEMENT:

Student & Staff Attendance, Student Grading

ACCOUNTING:

School Billing, Student fee collection Fee statement generation, calculating the dues, Payments received, Transaction history

STATISTICAL REPORTS:

Class performance, Generate reports, Counsel Students (Performance graphs)

LIBRARY MANAGEMENT SYSTEM:

Storage and retrieval of information with ease

OTHER MANAGEMENT SECTORS:

Hostel Management, Automate Student Hostel Accommodation allotment, Transport etc

6.1 SWOT [Strengths, Weaknesses, Opportunities, Threats] of M-governance

Strengths:

- Practical affordable and exiting devices available to enable administration on mobile
- Development platforms are easy to use
- Devices getting faster and better, making it possible for complex applications to reside on devices

7. WEAKNESS

- Innumerable number of operating platforms, device types and variations in supported technologies make it difficult to create a unified solution.
- The technology itself evolves fast making it challenging to keep up both at consumer's end and at the vendor's end
- Concerns still revolve around basic device security and data security
- Lack of common standards for mobiles adds to the confusion
- Lack of tools to create engaging mobile learning content due to lack of flash

8. OPPORTUNITIES

- One of the best ways to offer quick, real-time on-demand performance support
- More than pushing training on to a mobile device, designing mobile performance support solutions would be the greatest opportunity

9. THREATS

- Early stage technology curve
- Lack of standards for learning on mobile and even general use of technology on mobiles
- Lack of vendor focus. Not many vendors have been able to innovate and come up with relevant solutions.
- Multiple platforms and varied technical frameworks adds to complexity in terms of design and development.

10. CONCLUSION

Towards the successful administration of Higher Education institutions, this paper presents the various delivery channels available for the easy adoption of M-governance policies. The organizational structure illustrates the various basic departments existing in higher education institutions where the M-governance to be applied. And also discussed the challenges and various mechanisms used presently.

Future work includes more study on mobile service delivery channels and deliverance strategy to meet the new requirements of mobile administration. More and more existing frameworks should be carefully investigated.

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