Chapter III

ROLE OF e-GOVERNANCE IN HIGHER EDUCATION

3.1 Need of Information Technology in Education

The application of IT is fairly widespread all sectors in India and particularly in education sector in all over the world. Most of the Universities, private and public now implement e-Governance which collaborate their day-to-day working applications. Most of the Universities are having their digital portal to provide the services to various stakeholders of the education. Our education system is disordered because of lack of infrastructure, obsolete syllabi, scattered government policies, inappropriate funds, unqualified staff, high dropout rate, un-employability of graduate students and a lot. This is because of the current system that lacks of monitoring, evaluation of students and staff, no coordination with industry, no uniform policy by government, no proper utilization of Information and Communication Technologies (ICT) and e-Governance, no transparency in functioning of institutions, visionary leadership etc. By implementing e-Governance in education sector, most of the problems will be dissolved. At the root, it has the power of e-Governance which provides good governance, empowers the stakeholders, cutting the process cost, time, and improves the administrative performance (e-Administration), interacting with industry and society (e-Service and e-Society), providing swift services and so on.

India’s demographic mosaic consists of an increasing demand for education for a population, half of which is below 25 years of age, 68.83% rural, a literacy rate of about 74.04 percent and a linguistic break-up of 15 different major languages. The demand for education far outstrips the conventional system’s ability to provide it, leaving no alternative to the use of technology in education.

3.1.1 Role of ICT in Education

ICT has made a huge impact on almost every aspect of our daily lives - its power influencing Aerospace, Research, Health, Defense, Engineering, Communications, Education, Banking, Finance, Social apps, and Entertainment to name just a few.
Over the past few decades ICT has contributed to real social, economical and cultural development in countries right across the world. Indeed, ICT has opened up opportunities for billions of people not only to earn a living but also to contribute to the social and economical progress of their respective societies.

ICTs play an important role in education, especially higher education, have many arguments that they put forward and most of these arguments center on issues of the global and Indian contexts, the changing nature of the learner and demand of education for all, and the reality that the existing educational system cannot cope with the demand for education on the one hand, and the issues of access, equity, and resources on the other.

In the context of Liberalization, privatization, and globalization constitute the current social, economic, technological and political space within which television and all other media have to exist, survive, and function. Revolutions in ICT have reduced national boundaries to meaningless lines drawn on maps. And in the new scenarios, education has been identified as one of the twelve main services, which need to be opened up for free flow of trade between countries. The form of this flow will become clear only when General Agreement on Trade in Services (GATS) comes into full force after rounds of negotiations among participating countries in WTO. Then, more knowledge is expected to become tradable commodities; and it will be essential that Indian educators keep pace with the change, or else perish in the face of competition from multinational forces in all fields of education and learning.

At the same time, changes in the capabilities, needs, and interests of the user; changes in the medium and its content, the close interdependence of the media and the competition of each medium to survive, and changes in the availability and attractiveness of accessible alternatives; interact freely with social, economical and political and technological contexts.

We are at a life-threatening junction, when the innovative technologies of communication - from the individualized computer assisted learning systems to the more mass directed radio and television today offer an unparalleled opportunity to reconsider conventional educational and learning practices and institutions. The notion that teaching and learning can be taken out of the confines of existing schools and colleges, that teaching can be individualized and insensitive to geo-climatic
distances is one which has emerged out of the telecommunications revolution sweeping across the world in the 1980s and 1990s. And yet, the urban-rural divide in terms of access, equity, and resources will continue to be the main issues that Indian educators, particularly higher education educators will have to address as the needs of the learning community in the new social, economical and political contexts will change.

In the new educational system in current scenario, there are to be four levels of learners.

1<sup>st</sup> Level – It will consist of students, who are able to afford the high cost of education; will obtain it from either public or private higher education institutions. They will be getting the best of the facilities, and will soon form educational elites.

2<sup>nd</sup> Level – The learners will consist of intelligent and competent students, who are unable to afford the cost of education, will obtain it from existing public institutions and will soon be competing with the first level for membership in the educational elite.

3<sup>rd</sup> Level – It will consist of the academically and financially poor students, who will seek access to education from lower quality of higher educational institution.

4<sup>th</sup> Level - Learners would be most of the illiterate and the poor, whom you will be addressing as part of your work.

Current ways of imparting higher education use extensive ground work in the field and require both large numbers of trained personnel as well as dedicated individuals working in a world where access to technology is going to determine the gap between the have and the have-nots.

We no longer have a choice. ICT application constitutes an absolute necessity, given huge dispersed populations in a sub-continent; inadequate resources and mind boggling needs. The new technologies offer us the chance to telescope decades of infrastructure building and development activities by providing us with the advantage of high speed delivery with no dilution in quality; wide reach; individualization of learning in a anytime, anywhere situation; and interactivity, a low per unit cost. These technologies and facilities can be equally used for teaching and higher learning. This
brings the role of the teachers or educators into focus. The educator is a key person in
the whole process of learning and transacting education and a new gateway to the
learner. The accountabilities of the professors or educators are many, and very often
they feel threatened and further challenged when told that they have to use ICTs or e-
Governance.

a) Strengths and Weaknesses of ICTs -

Like all innovations, ICTs also have strengths and weaknesses. We should list these
because they are important to know what they are especially and to plan and use them
effectively. Some of the strengths of the ICTs are as follows:

1. **Individualization of learning**: Students can learn as individual and not as a
   homogenous group. ICTs allow each individual to relate to the medium and its
   content.

2. **Interactivity**: Interactivity is the ways in which a person can relate to the content,
   go forward and backward in the content, start at any point depend upon prior
   knowledge instead of always in a sequential way.

3. **Low per unit cost**: ICTs reduce per person cost of education.

4. **Distance and climate insensitive**: It does not matter where you are, or how the
   weather is, you can still access and learn from ICTs.

5. **It can serve multiple teaching functions and diverse audiences**: ICTs,
   especially the computer and Internet based can be useful in drill and practice; to
   help diagnose and solve problems, for accessing information and knowledge about
   various related themes.

6. **High speed delivery and wide reach at low cost**: There is instant delivery of
   information content at low cost to the wider populations.

7. **Uniform quality (No digital divide)**: If content is well produced and is of good
   quality, the same quality can be delivered to the rich and the poor, the urban and
   the rural equally and at the same low cost.
b) **ICTs also have weaknesses which we must understand. Some of these are as follows:**

1. **High infrastructure and startup costs:** The initial costs to build ICT systems and to maintain them are very high.

2. **Tend toward centralized uniform content creates problem:** The larger the numbers, the lower the cost. This means that sometimes we try to reach large numbers so we make content common, not taking into account individual differences.

3. **Not ideally location and problem sensitive:** Address problems in a general way, but cannot, without special effort, solve local and culturally sensitive problems are difficult task.

4. **Problems of reach and access remain:** Not everyone has equal access; so not everyone benefits equally from the use of ICTs.

5. **Tend to create new class of knowledge rich/knowledge poor:** Those who have access and knowledge through the media become richer and those who do not become poorer, widening the “knowledge or digital gap” between rich and poor.

6. **Essentially delivery systems:** A medium is different from the content; and often we forget that we can deliver any content, because ICTs are essentially meant only to deliver content, not to change attitudes or bring about behavior change.

7. **Hard to assess impact:** Learning from ICT delivered content is difficult to assess since such learning is of a multidimensional and long term kind, rather than from immediate learning assessment as in a classroom test.

8. **Heads, teachers need reorientation and retraining:** Just as people learn to use ICTs, teachers, trainers and heads also need training - something they sometimes resent.

Its attitudinal change to understand of teaching and learning: These are different media and have a different way of teaching from what we are familiar to therefore, they need different ways of understanding what teaching and learning is all about and so, they are a mixed bag and it is necessary that we recognize both their strengths and weaknesses. It is more important that we recognize because if we use a technology thinking it to be ideal one, but not recognizing its limitations, we are likely to fail in our efforts and then to believe that all ICTs are useless and inadequate in education.
Role of ICTs’ in Higher Education- In short, we can explain the role of ICTs as follows:

1. To provide quality education all sections of the society.
2. To increase variety of educational services and medium.
3. To develop a system of collecting and distributing educational information.
4. To promote technological literacy.

3.1.2 Role of ICT in e-Governance

Today’s technology has become a part of our daily lives and will continue to shape the way of our life, work, play and socialite. The digital revolution will facilitate new partnership models with businesses, NGO’s, communities and individuals at multiple levels, beyond basic service delivery and internal integration.

The main goal of these national agendas is to use ICT to facilitate improved collaboration, communication, transparency and citizen empowerment.

E-Governance is the application of ICT for delivering Government Services, exchange of information, communication transactions, integration various stand-alone systems and services between Government to Government (G2G), Government and Citizens (G2C), Government and Business (G2B), Business to Business (B2B) as well as back office processes and interactions within the entire Government framework.

Through the e-Governance, the Government services will be made available to the citizens in a convenient, efficient and transparent manner.

Countries like India, where people are poor and infrastructures are not up to the mark. Under such conditions it becomes very difficult to provide government services to all the people. There are numbers of reasons for not able to implement e-Governance application, these are as follows:

a) Technical illiteracy among the stakeholders.

b) Language Dominance: The dominance of English on the internet constrains the access of non-English-speaking population.

c) Unawareness regarding benefits of e-Governance.


e) Inequality especially between urban and rural communities, between the educated and illiterate, and between the rich and poor.
f) **Operational Reluctance:** The psychology of government servants is quite different from that of private sectors.

We have noticed that literacy rate is increasing in India. Due to British rules on India more than 150 years and half of the world population knowing or speaking English Language. There by Indians are aware the importance of English Language. From last decade India is emerging as one of the fastest developing nations. These factors are not found in most of the developing nations. Now-a-days the role *e-Governance* in the education sector plays a significant role, particularly in the process of empowering the technology into the educational activities. Education sector can be the most effective sector to anticipate and eliminate the negative impact technology. e-Governance or ICT is another side can be the most effective way to increase the student’s knowledge.

Being aware of the significant role of ICT in our life, especially in the educational activities, education authorities should be wise enough in implementing the strategies to empower ICT in supporting the teaching and learning process in the classroom.

ICT is not just the bloom of the educational activities, but also it will be the secondary option to improve the effective and meaningful educational process.

The main purpose of the strategy for e-Governance implementation in education is to provide the prospects and trends of integrating ICT into the general educational activities.

There are some unavoidable facts in the modern education and they couple the integration of ICT or e-Governance is as follows:

1) The ICT has been developing very swiftly. Therefore, in order to balance it, the whole educational system should be transformed and ICT should be integrated into educational activities.

2) The influence of ICT, especially internet such as open source tools cannot be ignored in our students’ lives. So, the learning activities should be reoriented and reformulated, from the manual source centered to the open source ones. In this case, the wide use of internet access has been an unavoidable policy that should be anticipated by Universities and Institutional authorities.
3) The presence of multimedia games and online games by internet has been another serious problem that should be wisely handled by the educational institutions. The students cannot be exterminated from this case. They can have and do with it wherever and whenever they want. Colleges / Institutes, as a matter of fact, do not have enough power and time to prevent or stop it after college times. Meanwhile, most parents do not have enough times to accompany and control their children. So, the students have large opportunities to do with multimedia games or online games or browsing the negative and porn sites. Having been addicted, the students will have too little time to study, and even do not want to attend classes.

In such situation, education institutions play an important role to eradicate these problems. One of which is by facilitating the students to do edutainment or educational games. Besides, they can also support and facilitate their students to have their own blogs in the internet. By doing so, we think our young generation will get more and more information and knowledge by browsing in the internet. They can also create innovation in web design that it may be out of the formal curriculum content, but it will be useful for their future.

4) The implementation of ICT in education has not been an important trend of educational reform and the state paid little attention to it. Therefore, there should be an active participation, initiative and good will of the Colleges/Institutes and the government institutions to enhance ICT implementation at college.

5) The faculties should be the main motivator and initiator of the ICT implementation at colleges. The professors should be aware of the social change in their teaching activities. They should be the mediator of change from the classical method into the modern one. They must also be the part of the global change in learning and teaching reform. Now they want to play the role of facilitator.

**Followings are the aim and objectives of ICT implementation in education:**

1. To implement the principle of life-long learning / education.
2. To increase a variety of educational services and medium / method.
3. To promote equal opportunities to obtain education and information.
4. To develop a system of collecting and distributing educational information.
5. To promote technology literacy of all citizens, especially for students.
6. To develop distance education with national contents.
7. To promote the culture of online and e-learning at colleges.
8. To support in sharing experience and information with others.

3.2 E-Governance in Education

According to Nobel Prize winner and ex-president of South Africa Nelson Mandela “Education is the most powerful weapon we can use to change the world”.

The study shows that among 215 countries, India has secured 180th rank in terms of literacy as per 2001 census. The Current literacy rate of India is 74.04%. Further, the literacy rate is the key challenge which affects major problems of the society and only e-governance is one of the probable ways, which can solve the problem. The rural India suffers from inadequate education services so; e-Governance can play an important role in the delivery of education to rural village. Using technology, students in these villages can be taught by professors in urban areas. The Government of India (GoI) has taken significant steps in this direction like launching of “EDUSAT” the first Indian satellite built exclusively for serving the educational sector. This is a collaborative project of the Ministry of Human Resource Development (MHRD), Indira Gandhi National Open University (IGNOU) and the Department of Space / Indian Space Research Organization (ISRO). It is mainly intended to meet the demand for an interactive satellite based distance education system for the country. It strongly reflects India’s commitment to use space technology for national development especially for the development of the population in remote and rural areas. But despite of that our education system is lacking in terms of awareness and levels in rural areas, which can be improved by strictly directing state governments for ensuring successful implementation up to grass root level and including e-governance and its services as a part of educational curriculum. In order to develop awareness about e-governance, a compulsory subject of e-Governance/ICT should be included at junior college and under graduate classes in their syllabus.

Educational management means the organization and control over the structure, processing and delivery of information management in higher education should include:
i. Information about the Regulatory bodies under Ministry.

ii. Information about the norms / rules / regulations / deadlines pertaining to courses, funds etc.

iii. Centralized information about the faculty members of all Universities.

iv. Information about the colleges/ courses / syllabi.

v. Information about admission in various universities.

vi. Online submission of applications.

vii. Library resources.

viii. Result of different examinations.

ix. Activities including seminars / conferences / alumni.

x. Information on the schemes of Central Government like career advancement.

xi. Information related to teaching and non-teaching staff. i.e Human resource management in higher education.

xii. Information about the courses been offered in the various government aided and self-finance colleges, admission criteria, fee structure, extra-curricular activities being offered in each of the colleges and institutes.

The introduction of e-Governance in higher education is one such concept that can empower the governing bodies to administer, and control over the structure, processing and delivery of information, and develop the educational plan in the whole country and serve various stakeholders in a much better ways.

A) Need of e-Governance in Education Sector:

The main purpose for introducing e-Governance in education is to enhance high-quality education. It provides new ways of communication to the students, new ways of teaching education and new ways of organizing and delivering information and services. The developments in the IT, internet and the mobile communication provide opportunities to transform the relationship between administration and students in a new way, thus contributing to the achievement of the good education goals. The implementation of e-Governance or ICT may increase the broad participation of the student in the process of achieving best educational goals at all levels by providing the possibility of online discussion groups and by enhancing the fast development and effectiveness of the
learning methods. Advantages for the administrative involve that the administration may provide better service in terms of time, making governance more efficient and more effective. In addition, the transaction costs can be lowered and the services become more accessible.

Implementing e-governance in educational system will enable effective monitoring of academic standards. Fry (2001) proposes that if universities are to compete in a global higher education market they must introduce the technological innovations and use them as strategic tool, capable of transforming educational and business practices.

e-Governance in education sectors allows use of ICT with the aim of improving education, improve information and service delivery, encourage students’ participation in the decision making process, making administration transparent and effective use of IT services in educational deployment. The effective use IT services in educational sector can greatly enhance efficiency of the existing system, decreases the costs, and increases transparency in the functioning of various departments. In a broad sense e-Governance in educational sector provides better service delivery and distribution of information to students and faculties using electronic means.

E-governance can also be an important tool to the governing body of the institute. In general, it provides following advantages to the administration:

a) Empowerment of faculties, students and encouragement of their participation in governance process.

b) Transparency and absolute clarity in administration, governing and admission process.

c) Increase efficiency of faculties and of administration process.

The possible areas of implementation of e-governance in educational sector are shown in the following diagram No 3.1 and given below:
Diagram No 3.1
Area of Implantation of e-Governance in educational sector

E Governance

- **E-Administration**: It involves the use of ICT and e-Governance in order to improve administration processes and the internal working of the departments within an educational organization.

- **E-Services**: The main aim to improve the delivery of services to students by providing interactive services. Examples are: Online admission, online syllabus, request for certificates, online results, issuing on-line ID cards etc.

- **E-Democracy**: Direct involvement of stakeholders in administrative and decision making process by using e-governance tools.

Thus, the use of e-Governance in every aspect of life has resulted in faster, easier and much better delivery of services by redefining the fundamental principles of delivery of services and operation of service sectors. Universities and higher educational organizations all around the world have started to implement the advancement in IT to be utilized to provide better services to the students, staff and administration. The ICT imparted e-Governance. When applied in education had provided huge impact on the function of the educational sector by transforming information that is provided to the stakeholders of higher education. As a result, wide ranges of IT applications are being developed and delivered in various educational institutions.
3.2.1 e-Governance learning Objects:

A **learning object** is "*a collection of content items, practice items, and assessment items that are combined based on a single learning objective*". Learning objects have many tags, including content objects, chunks, educational objects, information objects, intelligent objects, and knowledge bits, knowledge objects, learning components, media objects, and reusable curriculum components, nuggets, reusable information objects, and reusable learning objects, testable reusable units of cognition, training components, and units of learning.

E-Governance learning objects offer a new conceptualization of the on-line learning process rather than the traditional "several hour chunk", they provide smaller, self-contained, re-usable units of learning. They are on-Line registration, web based open courses, web conferencing etc. explained as follows:

### 3.2.1.1 On Line Registration systems for students

All the universities in Maharashtra are now going to prepare for on-line student registration for various courses. High ranking Universities, such as Mumbai University is already provided online college and course registration for students. It means if students want to take admission in any college within university for any course, first they have to go through pre online registration. Then they can do on-line registration in any college or course. Otherwise Universities will not grant admission to students. Admission process is conducted for Multi College, Multi programs / courses. Once they submit on line registration form along with it they have to provide email-id and cell phone number. So, they will get SMS alert or email alert message for every further process of admission.

There are several registrations systems are exist in the various Indian universities and colleges, some of them support the online registration features and some do not. Some of these systems were purchased by local or international software companies, and some are developed internally by the software development teams in the computer centers each in the relevant university or college. This registration
system almost distinguished, as it is explicitly used to enroll students for admission and examination process.

A) Advantages to Applicants/Students:

1. Students can apply from anywhere in the world and anytime without travelling physically, initially by purchasing form.
2. The application form is designed for mass personalisation and hence it assists you for filling in your relevant information only.
3. The online application form may be multilingual so everybody can fill it easily.
4. If online application form is invalid, it gives signal. Hence, only valid information should be entered.
5. Online Application only allows correct subject selection as per university rules and hence it will help you for correct subject combination selection.
6. Through a single login, applicant can apply for multiple courses in multiple colleges; without filling the same information again and again.
7. Many of the eSuvidha services will be available to you, right from the day of confirmation of admission by any college online.

1.2.1.2 Web based Open Courses Ware

Web based Open Course Ware (OCW) movement started in 1999 when the University of Tubingen in Germany published videos of lectures online for its timms initiative. The OCW movement only took off, however, with the launch of MIT Open Course Ware at the Massachusetts Institute of Technology (MIT) in October 2002.

MITs reasoning behind OCW were to "enhance human learning worldwide by the availability of a web of knowledge". MIT also stated that it would allow students to become better prepared for classes so that they may be more engaged during a class. Following Image No 3.1 shows how MITs OCW content available?
OCW in Indian point of view -

The National Program on Technology Enhanced Learning (NPTEL) is a Government of India sponsored collaborative educational program. By developing curriculum-based video and web courses the program aims to enhance the quality of engineering education in India. It is being jointly carried out by 7 IITs and IISc Bangalore, and is funded by the Ministry of Human Resources Development (MHRD) of the Government of India.

Flexilearn is a very useful open course portal. It was initiated by Indira Gandhi National Open University (IGNOU), and apart from providing free course materials. It provides opportunities to enroll oneself for a course and appear for examination conducted by university and thereby get certification.

Following are advantages and disadvantages of Open Course Ware-

A) Advantages of OCW include:

a) Improve open access in education, including access to full degree programs.

b) Better integration for non-full-time students, particularly in continuing education.

c) Provision of tools to enable students to solve problems independently.

d) Acquisition of technological skills through practice with tools and computers.

B) Disadvantages of OCW include, that have been found to make learning less effective than traditional class room settings, include:

a) Potential distractions that hinder true learning.

b) Bias towards tech-savvy students over non-technical students.

c) Professors' lack of knowledge and experience to manage virtual Professor-Student interaction.
d) Lack of direct and immediate feedback from Professors.
e) Asynchronous communication hinders fast exchange of question.
f) Danger if delay to upload contents in-time.

C) Problems of OCW-

The creation and maintenance of complete OCW requires big initial and ongoing investments of human labor. Effective translation into other languages and cultural contexts requires even more investment by knowledgeable personnel. This is one of the reasons why English is still the dominant language, and fewer open courseware options are available in other languages.

3.2.1.3 Web Conferencing

Web conferencing is a form of Real-Time Communications (RTC) in which several computer users, all connected to the Internet, see the same screen at all times in their Web browsers. Some Web conferencing systems include features such as texting, VoIP (voice over IP) and full-motion video. It allows users to conduct business meetings and seminars, give demonstrations, make presentations, provide online education and offer direct customer support. Control of the session can be passed among users so that any attendee can act as the main presenter. The most effective Web conferencing solutions require high-speed Internet connections at all user sites. Following Image No 3.2 shows how web conferencing took place.

Image No 3.2
Web conferencing with web cam
Several vendors offer Web conferencing facilities for a minimal monthly fee. System requirements are modest. Most PC’s have adequate resources to use Web conferencing through their existing browsers.

**Web conferencing** refers to a service that allows conferencing events to be shared with remote locations. These are sometimes referred to as **webinars** or for interactive conferences, **online workshops**.

A) Advantages of some video conferencing applications—

1. **ooVoo** is a desktop and mobile application VoIP allowing multi-user video conferencing.
2. **Anymeeting** is a web-based conferencing service. It is designed for hosting meetings of up to 200 delegates.
3. **Dabbleboard** is an online collaboration tool with an interface focused around a shared learning space similar to an interactive whiteboard.
4. **Blackboard collaborate** is a comprehensive learning platform designed specifically for education.
5. **Face Flow** is free video conferencing software which will allow you to converse with up to four participants at a time.

### 1.2.1.3 Learning Management System

The orthodox view of e-Learning is that it is costly; it comes in boxes like uncontrolled Power Point Presentations.

Open e-LMS is the open source e-Learning system designed for business by **business** containing a standard compliant **Learning Management System** as e-learning, which allows you to create ground breaking courses in minutes. Following Diagram No 3.2 shows delivery of Learning Content to users.
Open e-LMS is a result of a collaborative for industry that has taken large years in the making - current users. As such it is flexible, robust and supported with an array of hosting and support options ideally suited to your requirements.

Advantages of Leveraging LMS for Blended Learning:
Following are the advantages of e-Learning to administrations, learners and stakeholders:

A] Benefits of LMS:

1. Intelligent Insights with Reports and Statistics.
3. Easily create and conduct online tests.
4. Save Time and Money.
5. Easily Customize and Update Content.
6. Easy Schedule Training for a Mobile Workforce.
7. Personalized and Interactive Learning.

B] For Administrators

1. Streamline training process.
2. Ability to deliver engaging and motivating training.
3. Scalability and wider reach.
4. Easy and secure exchange of learning data.
5. Technology leverage.
C] For Learners

1. Flexible access to training resource.
2. Multiple learning channels and multiple media formats.
3. Reduced dependency.
4. Increased interaction between learners and trainers/instructor.
5. Twin benefits such as traditional and innovative tool.

3.2.1.5 Online Examination

Unlike the traditional paper-pencil based test which is generally offered on a single day to all candidates. Online examinations or e-examinations are the examinations conducted through the internet or in an intranet for a remote candidate.

Individuals and students must sign in on an assessment program or web link by entering their username and password. Online Exam will be offered over a period of time and the candidate can choose the Center, the Day and Time of his/her convenience to take the test. Then they choose the course that will be tested and the student start answering the questions that is shown on the screen. The answers enter by the students are then evaluated and their score is calculated and saved. After they have finished the examination, the student taking the examination must click on a certain button that would require finishing the examination process.

This score then can be accessed by the college/institutes to determine the passes students or to evaluate their performance.

Following are the most important features of On Line Examination –

1. **End to End Solution:** A completely hosted and managed online solution for Exam Creation and Exam administration can take care of everything.
   a) No software to purchase if you use Cloud Base or University provided.
   b) No IT system to maintain.
   c) Fully Hosted and Managed Solutions by Cloud Computing.

**Test generation:**

a) Create multiple test categories for various subjects or courses.
b) Create multiple tests under those categories or courses.
c) Create Objective as well as Subjective questions for each test.
d) Randomize sequence of questions and responses.
e) Format questions as well as responses as per your requirements.
f) Include images in questions as well as responses.
g) Color coding for responses of questions.
h) Create re-usable question banks.
2. Preview:
   a) Preview questions while setting up the questions.
   b) Preview tests before finalizing and publishing.

3. Scoring and Results:
   a) Multiple Scoring Patterns like - scoring per option, negative marking, etc. are available.
   b) Configure when to publish results - immediately after the examination or on a specific date.
   c) Examiners can add feedback along with the score for each of the subjective questions.

4. Examinee Registration:
   a) One step examinee registration with the help of a simple online form.
   b) Bulk Registration of examinees.

5. Automated SMS and Email Communication:
   a) For conveying exam details to each examinee.
   b) For conveying Exam dates, Result dates, Results, etc.

A) Following are the advantages of online examinations:

1) Cost effectiveness: Substantial cost reduction in the expenses of conducting an online examination:

2) Secured Exams: Better security in all sense as compared to paper base exams
   a) Maintain confidentiality and avoid paper leaks.
   b) Change question papers at the last minute by pulling questions from the Question Banks.
   c) Randomize sequence of questions for each examinee: No two examinees will see the same question at the same time.
   d) No data loss even in situation of power and internet failure.

3) Develop your capacity:
   a) Create multiple exams on multiple subjects for multiple courses.
   b) Create exams in multiple languages and overcome the language constraints.
   c) Conduct exams in several geographically scattered locations at the same time.
   d) Panel of Question Setters and Examiners can be independent of geographical location.
4) **Client Convenience:**
   a) Client can take exams as per their convenience.
   b) Client can view the exam results immediately after the exam.
   c) Option to display the feedback for correct answers.

5) **Analysis:**
   a) Store data for comparison in subsequent years.
   b) Customizable Reports to help you retrieve and analyze the desired statistic data.

6) **Go Green:** You will be saving a substantial amount of paper by using online mode of exams. Prevent the use of paper and save the planet and human lives.

### 3.3 Role of e-Governance in Higher Education

We are living in constantly rising new era of digital world. ICT and e-Governance has an impact on nearly every aspect of our lives – from working to socializing, learning to playing. The digital age has transformed the way youthful people communicate, network, seek help, access information and learn. We must know that three billion young populations all over the world are now on-line and access information through a variety of means such as Cell Phones, Tablets, Laptops or Computers and through TV.

As technology becomes more and more implanted now-a-days in our culture, we must provide our learners with relevant and contemporary experiences that allow them successfully to engage with modern technology and prepare them for life after education.

In general, educators, researchers and policy makers all seem to agree on the potential of ICT and for administration e-Governance which have a significant and positive impact on higher education. What is still being debated, however, is the precise role e-Governance should play in higher education reforms and how best to ensure that potential is fulfilled.

Some of the questions are always raised in our mind. **What role e-Governance to play in higher educational institutions.** They are as follows:

1) What are the **benefits** of e-Governance in higher education?
2) What are the existing **promises** of e-Governance that are used in higher educational system?
3) What are the **limitations and key challenges** of e-Governance’s integration to higher education systems?

The answers of these questions we try to find out from following points:
3.3.1 Benefits of e-Governance

The rise of e-Governance is a striking incident transforming governments across the globe. India’s National e-Governance Plan (NeGP) has put forth the vision of seeing India as one of the lead nations of the world in providing ICT services to its Citizens.

E-Governance offers various benefits and advantages for the government, corporate sector and society. e-Governance helps better delivery of government services to citizens, improved interactions with business and industry, citizen including student, faculties’ empowerment through access to information, or more efficient administrative management. The benefits of e-governance in an educational sector are improved efficiency, increase in transparency and accountability of educational administrative activities convenient and faster access to services, and lower costs for administrative services. It streamlines internal operations and improves performance of educational departments while helping all sections of educational stakeholders to avail e-governance.

These benefits of e-governance are valued in the following ways:

1. The stakeholders get linked to the each other more easily leading to higher efficiency in delivering service by the way of faster dissemination of information that to a very low cost.

2. The cases of human mistake are reduced as accountability and transparency is increased.

3. The same opportunity to access to information is provided regardless of one’s physical location and physical disability thus removing distance barriers.

4. Interdepartmental exchange of information is enhanced between different departments, thereby leading to significant reduction of transaction costs, time, space, and manpower.

Over and done with one integrated e-Government portal, citizens and businesses can avail of various government services, access information and interact with various government bodies without standing in long queues, conduct online transactions, waiting for office hours or handling lot of paperwork, and thus save (TM) time and money.
A) E-Governance leads to multiple advantages to higher education:

Following are the advantages of e-Governance to their stakeholders of educations:

i. It **empowers students and parents** to gather information regarding any course, college, department of universities, government policies and get involved in the process of decision making.

ii. e-Governance strengthens the very fabric of democracy by ensuring greater student, staff and parents **participation** at all levels of governance in universities and institutions.

iii. e-Governance leads to **automation of services**, ensuring that information regarding every work of public welfare is easily available to all stakeholders apart from geographic and language barriers.

iv. This revolutionizes the way governments and universities functioning, ensuring much more **transparency in their functioning**, and thereby eliminating corruption.

v. As the information regarding every activity of government is easily available, it would make every university department responsible as they know that every action of theirs is closely **monitoring** and **audited**.

vi. Proper implementation of e-Governance practices make it possible for students and parents to get their **work done online** thereby sparing themselves of unnecessary **hassles of traveling** to the respective offices.

vii. Successful implementation of e-Governance practices offer **better delivery of services** to students, improved interactions with business and industry, students empowerment, better management, greater convenience, revenue growth, cost reductions etc.

viii. Furthermore, introduction of e-Governance brings **governments closer to students/citizens**. Now-a-days it becomes extremely convenient for student/citizens to get in touch with a colleges, universities and government.

ix. e-Governance practices **help business or industries** to access information that might be important for them at a click. If they want to recruit employees they get online information of intelligent students.

x. **Availability and quick circulation** of material may increase the timeliness or relevance of material being presented.

xi. **Scalability**, course content is easy to distribute widely with little or no cost.

xii. **Enhancement of Regular Course Content**: Multimedia material such as videos can accompany text, 3D animated lectures etc.

xiii. It provides an excellent way **ties for alumni** to the institution, universities and continue with the program of lifelong learning as well get help to the institutions for placement.
3.3.2 Promises to use e-Governance in higher education, they are as follows:

1. Overriding administrative delays in higher educational system.
2. Optimise performance in decision making.
3. It may help e-Governance for efficient administration, cost reduction and timely decision.
4. Build reliable, vertical and horizontal connectivity.
5. Brining in Transparency, Accountability, and timely resolution of process vulnerability that exist within higher education system.
6. Improve quality of higher education.
7. Help on-line examination or test and certification.
8. On-line availability of industry and educational experts on various fields through EduSAT.
9. Empower students and other stakeholders.
10. Create professionals suitable for employment in industry and government departments.
11. Promote inclusion, expansion and excellence in education system as a whole by leveraging use of ICT and e-Governance.
13. To develop universal e-Governance framework for higher education.
14. To remove regional imbalances in access to higher education.
16. To promote autonomy, innovations and academic reforms in institutions of higher learning.
17. To provide opportunities of higher education to socially deprived communities and remove disparities by promoting the inclusion of women, minorities and differently-abled persons.
3.3.3 **Major Initiatives taken by educational Institutions for implementation of e-Governance services to its stakeholders:**

1. On-line course and college information.
2. On-line admission notification.
3. On-line registration for students and staff as well.
4. On-line entrance Examination.
5. On-line admission and validation of documents.
6. Web based course material.
7. On-line filling examination forms.
8. On-line examination system.
9. Distribution of on-line degree and academic certificate.
10. On-line approval of educational Institutes.
    a. HTE (Pilot districts Mumbai, Pune, Thane and Lature) Salaries of Non-Teaching Staff.
11. e-Office in Department of Technical and Higher education.
12. e-Placement.
13. Seeking financial grants such as scholarships for student and staff.

**E-Governance transformation can possible in Higher Education with the help of:**

a. On-line feedback system.
b. Centralized system of checking and monitoring.
c. Staff attendance.
d. Effective staff utilization and mobilization.
e. Grievance Handling.
g. Projects like civil construction, infrastructure and academics etc.
h. Utilization of budget / grand’s.
3.3.4 Key Challenges of implanting e-Governance in higher education:

1. **Less Bureaucracy** – As digital information can move rapidly from liable office to another, without the need to wait for paper documents.

2. **Cyber Crime** – Despite the efforts of government agencies to ensure the safety of citizens; personal data, e-governance websites are still liable to attack from hackers.

3. **Infrastructure Cost** - An efficient e-Governance system requires all stakeholders or at least the vast majority to have access to the Internet. Therefore, Internet-enabled devices are essential to connect to government websites. In addition, universities / institutions need advanced servers and security systems to cope with vast amount of information and complex cyber threats. All these requirements constitute a costly investment.

4. **Inaccessibility** - An e-Governance site that provides web based access and support often does not offer the potential to reach many users including those who live in the remote areas, have low literacy levels and exist on poverty line income.

5. **Lack of Human interaction between Students and Staff** - They will miss out on the discussion and instructor feedback that characterized for credit classes and that makes such classes useful and valuable.

6. **Technological Issues** - Some students may have trouble using e-Governance, if they have slow or erratic internet connection. Others may not have infrastructure as well they are not able to afford it.

7. **Language and/or Cultural Barriers** - Although efforts are being made to make websites available in multiple languages, many are only available in English, limiting their usefulness to Non-English knowledge stakeholders. Additionally, not all resources are culturally appropriate for all stakeholders.
3.3.5 Benefits to Stakeholders of higher education

E-Governance is slowly becoming a buzzword in the corridors of power. It has radically defined the way a government provides service to citizens, businesses and other arms of the government using the following delivery to its stakeholders:

a) **Government**: Parliament responsible for providing an enabling policy and legislative framework for e-government implementation and development.

b) **Government Agencies**: There Center and State Government having department and departments are responsible for providing information within departments, communities, citizens and private sector. They must adopt the transparency, accountability, promptness and speedy delivery of information and services.

c) **Communities**: Communities are spread geographically in different parts of the world. Participants in the process in determining priorities at the local level and actively participating entity in the implementation of community development plans. They are ultimate beneficiaries of e-government transformation process.

d) **Citizens**: Citizens as participants and beneficiaries, who express, via different stakeholder associations, their views before, during and after the policy development process; as consumers and end-users who expect value-for-money, available and affordable services, courteous and responsive service.

e) **Private sector**: Business or industries as a beneficiary of increased efficiency, effectiveness, transparency and accountability of government and increased possibilities to interact and conduct transactions with government. It can also be lending to or partnering in investment vehicles for e-government initiatives; it can act as possible mediator for digital transactions between B2C and C2G; it can enable access to formal capital markets and venture capital; it constitute an interested party to offer their ICT and consultancy services; it can also be a partner in development interested to strengthen capacity for e-government. In the following Table No 3.1(A) and 3.1(B) Shows how different stakeholders group get benefits through e-governance.
Table No 3.1(A)
Different benefits for different stakeholder Groups 1

<table>
<thead>
<tr>
<th>People as service users</th>
<th>People as citizens</th>
<th>Businesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to use</td>
<td>Transparency, openness and trustworthiness</td>
<td>Economic growth and productivity</td>
</tr>
<tr>
<td>Accessibility and inclusivity</td>
<td>Confidentiality and privacy</td>
<td>Cost-effectiveness</td>
</tr>
<tr>
<td>Confidentiality and privacy</td>
<td>Democracy (citizen-centred)</td>
<td>Resource rationalisation, value for money</td>
</tr>
</tbody>
</table>

Table No 3.1(B)
Different benefits for different stakeholder Groups 2

<table>
<thead>
<tr>
<th>Public administrators (employees)</th>
<th>Other Government agencies</th>
<th>Politicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empowers employees</td>
<td>Integrations of e-government processes</td>
<td>Transparency, openness and trustworthiness</td>
</tr>
<tr>
<td>Reduced admin burden</td>
<td>Reduced admin burden</td>
<td>Democracy</td>
</tr>
<tr>
<td>Continuity and stability Easy to use</td>
<td>Standardisation of information and services</td>
<td>Accountability</td>
</tr>
</tbody>
</table>

Cherished goal of e-governance is greater stakeholder participation in the governance of the country. In the context of the statement, a government may theoretically move more towards a true democracy with the proper application of e-governance. With increasing concern about the environment, e-governance has an important benefit. Online government services would lessen the need for hard copy forms and thus produce significant savings in paper, contributing to a greener planet! e-governance holds advantages for the business community too, playing the role of a catalyst and a channel for e-business. But perhaps the single-largest benefit of e-Governance is its potential to give birth to an entire web-based economy.
Some areas for measures and its Impacts on stakeholder:

- Economic productivity
- Economic growth
- Better Job opportunity
- Competitiveness
- Local and regional development
- Environmental improvement and sustainable development
- Inclusion
- Democracy, participation and citizenship
- Quality of life and happiness through service
- Increased justice and security
- Universal rights and peace

e-Governance in educational sector incorporates the latest in technology to bring an e-governance system that combines administrative and university management functions that are necessary to successfully handle all of the challenges of running an educational institution. Automating every unit of an academic institution, it provides real time information processing and knowledge management. It is an integrated solution that facilitates the processing and maintenance of large volumes of information to its stakeholder. e-Governance helps to manage and administrate effectively. Their asset includes lands, buildings, transport facilities, library, employee details and management offices.

E-Governance in the field of educational sector has changed the way administration is being done now. The e-governance system is designed to make the system user-friendly, time saving and cost saving also. Many of them are flexible enough to adapt to the changing educational environment efficiently and quickly.

The Universities all over the Maharashtra through its e-Governance interventions is determined to provide various educational services and information in “Anytime, Anywhere access” format to the doorstep of the students, at an affordable cost. Common Services Centers (CSCs) will work as front-end delivery points for providing various services to every student and citizen. Getting information and other services at their doorsteps through the e-Governance will help all stakeholders of higher education – namely students, faculties, parents, managements, alumni and indeed the regulators discharge their role efficiently and effectively. These have duly in-built compliance with the state policies.
The e-governance initiative has been mooted with an aim to provide faster delivery of services to all stakeholders in higher education sector. Among other features, the e-governance for universities also forecast an exclusive student portal, multiple channels to access services from university, simplified process for submitting various applications and tracking the same, e-payment facility for remitting various fees, simplified process for accessing general services such as requests for certificates, verifications, etc., simplified process for registering grievances against university services and simplified access for viewing academic data.

“While the e-governance platform would be the same for all universities, there will be provisions for custom-made changes as per the requirement of each university." higher education department additional secretary S Ajikumaran explained. So it’s possible in future to connect all universities or make a single portal of all universities inside a state, we called it as digital university.

Since many universities and colleges have already established some e-governance initiatives on their own, the comprehensive e-governance solution would convert all such systems in place into common modules and integrate existing data and solutions with the new system in Maharashtra state and all over India is planned by MKCL.

Stakeholders are people or organizations who either stand to be affected by a project or policy, or could ‘make or break’ the success of a policy or project. They may be winners, losers, included in or excluded from decision making, users of results, and/or participants in the development and implementation process. In Higher educational system students, professors, administrators, non-teaching staff, colleges/Institutions, universities, state and national governments, business or industries and citizens these all are called stakeholders of higher education. How to get benefits by implementing e-Governance to the higher educational stakeholders are shown in the following Table No 3.2.
### Table No 3.2
**Benefits of e-Governance to the various stakeholders of higher education**

<table>
<thead>
<tr>
<th>Stakeholders of Higher Education</th>
<th>Benefits of e-Governance to stakeholders</th>
</tr>
</thead>
</table>
| **1) University**                | a. Centralized information access from anywhere.  
b. Monitoring academic performance of colleges  
c. Increase in student enrollment ratio.  
d. Provide quality e-services, e-participation.  
e. Increase transparency.  
f. Introduction of innovative teaching tools (Video Conferencing, Live Demo etc.)  
g. Improved decision making, Private Public Participation.  
h. Less corruption, less paper work.  
i. Reduction of load on campus administration.  
j. On schedule, hassle free cycle from admission to result.  
k. Optimized and re-engineering process.  
l. Lifelong electronic data for instant retrieval. |
| **2) Students**                  | a. Increase participation in education affairs.  
b. Better access to information and quality services for student.  
c. Personalized login and Password for each student.  
d. Substantial saving in time, cost and efforts.  
e. Better Job opportunities and career advancement opportunities for good students.  
f. Social connectivity for collaboration.  
g. Students can access virtual lectures and webinars.  
h. Students can solve their problems on-line like examination queries, result verification etc.  
i. Students can submit their feedbacks to university.  
j. Improve means of education not only urban but rural student as well. |
| **3) Colleges**                  | a. Improved Quality of service to students.  
b. Transparency in operations.  
c. Increased efficiency of faculties and of administration processes.  
d. Data can be accessed easily.  
e. Integrated e-Governance in education sector.  
f. Saving of hidden operational cost.  
g. Instant statistical report generation.  
h. Students’ data can be captured at source.  
i. Helpful for NBA or NAAC accreditation. |
| 4) **Faculties** | a. To know the latest syllabi.  
| | b. Communication to the business community for syllabi development.  
| | c. On-line appointment of examination.  
| | d. Minimum faculties can set on line examination paper.  
| | e. Sharing new concepts and ideas with faculties and business community.  
| | f. To get on line help for certain topics with experts.  
| | g. Improve quality of services from Universities.  
| | h. To get latest GR and Notification from Universities.  
| 5) **Santhas / Institutions** | a. On-line connectivity's for various Governments agencies.  
| | b. To get latest GR.  
| | c. On-line connectivity for all colleges within organization (Extranet).  
| | d. To know up-to-date admission Status College wise, course wise.  
| | e. To know the present status of staff at various department.  
| | f. Improving services to people and students.  
| | g. Staff attendance.  
| | h. Grievance Handling.  
| 6) **Government / other statutory bodies** | a. Simplicity, efficiency and accountability in the government functioning.  
| | b. Online feedback system.  
| | c. Centralized system of checking and monitoring.  
| | d. To know the latest trends of education.  
| | e. To know the present enrollment for higher education.  
| | f. To know the University wise, college wise, Course wise enrollment status.  
| | g. To know the geographical, gender wise enrollment status.  
| | h. To know the scholarship budget for the financial year.  
| | i. Fund utilization and budget allocation.  
| | j. To get University, Staff and Student progress in terms of global scenario.  
| | k. Make future plan for higher education.  |
3.4 e-Governance frameworks

A research is conducted or being planned the approach is basically defined by two key concepts. Those are the framework and the model. A framework is a way of signifying the empirical relations between every aspect of inquiry when considered a scientific theory or research. It defines the general direction and the constraints of the theory or research.

A conceptual framework is used in research to give an overall picture of the possible courses of action or to bring a preferred approach to a thought or idea. Conceptual framework focuses on presenting the connectivity amongst all aspects of research. Through the framework an organized structure of ideas, concepts, and other things are involved to describe the coherence and to be easily communicated to other people.

There are different frameworks available for the implementation of e-Governance in different countries and different scenario. Some of these frameworks available are as follow:

### 3.4.1 Legal Framework

Legal issues play an important role in determining the growth and progress of the ICT infrastructure and its relative impact on the entire e-Governance system. Government of India has taken such initiative to pass Information Technology Act 2000 known as “IT Act 2000” which is based on Government infrastructure as they are the inherent management and control tools for e-Governance.
The Act was endorsed\footnote{10} to “… provide legal recognition for transactions carried out by means of electronic data interchange and other means of electronic communication, commonly referred to as ‘electronic commerce’ or e-commerce, which involve the use of alternatives to paper-based methods of communication and storage of information, to facilitate electronic filing of documents with the Government agencies and further to amend the Indian Penal code, the Indian Evidence Act, 1872, the bankers’ books Evidence Act, 1891 and the Reserve bank of India Act, 1934 and for matters connected therewith or incidental thereto.”

Thus, the focus of the Act is on e-Commerce and e-Records. The Act contains provisions on legal recognition of digital signatures, digital envelop and authentication of electronic records, attribution, acknowledgement and dispatch of electronic records, security of electronic records, regulation of certifying Authorities, cyber Regulation Appellate Tribunal etc.

3.4.2 Assessment Framework
The Department of Information Technology, Government of India, has felt it necessary to create a rational framework for assessing\footnote{11} e-Governance projects on various dimensions. The justification for creation and use of such a framework is given below:

a) Significant investment of resources into e-Governance projects.
b) Subjective assessments and value judgment.
c) Large National Action Plan.
d) Canalizing ongoing efforts in the right direction.
e) Facilitate funding agencies to take a rational view.

3.4.3 Strategic framework
E-readiness is the ability to use ICT to develop one’s economy and to foster one’s welfare. Each year, the economist intelligence unit produces a ranking of economy and to foster one’s welfare and also produces a ranking of e-readiness across countries, based on six pillars of e-readiness:

a. Connectivity and Technology infrastructure.
b. Business environment.
c. Social and Cultural environment.
d. Legal environment.
e. Government policy and vision and;
f. Consumer and Business adoption.
United State is the first position with e-readiness score 8.95 out of 10. India is at 54th position with e-readiness score of 4.96. On the basis of the study of e-readiness in India and the challenges for the effective implementation of e-governance in India is suggested. This framework is divided into five stages shown in Diagram No 3.3 and they are discussed as follows:

2. Assessment of e-readiness.
3. Overcoming challenges of e-Governance.
4. Developing the environment for e-Governance.
5. Implementation of e-Governance.

Diagram No 3.3
Conceptual framework for implementation of e-governance in India

1. Vision for e-Governance implementation in India:
   “Make all Government services accessible to the common man in his locality, throughout common service delivery outlets and ensure efficiency, transparency and reliability of such services at affordable cost to realize the basic needs of the common man”.
2. **Assessment of e-readiness:**
   The government of India and state of Maharashtra was not investing more than 2% of GDP on e-Governance projects. So it’s time to revise the policy of implementing e-Governance if reduce corruption and transparency in the functioning of e-Governance. To fulfill the vision the e-readiness should be assessed. It is linked with respect to other developing countries.

3. **Overcoming challenges of e-Governance:**
   The challenges specific to India is as lack of integrated services, resistance to re-engineering of departmental processes, attitude of government departments, more than 1 billion population, multi-lingual languages, lack of IT literacy and awareness, e-Governance infrastructure.

4. **Developing the environment for e-Governance:**
   The positive environment needs to be developed to meet the vision of e-Governance in Maharashtra. The state government has taken lots of efforts to increase the environment for e-Governance. The legal, political, cultural and social, economical and technical framework should be ready.

5. **Implementation of e-Governance:**
   If the entire above framework is ready then finally e-Governance should be implemented. This is the final step of the conceptual framework.

3.4.4 **Cloud Base Framework**

As we know that cloud computing is computing over a cloud, where a cloud consists of grids of commodity machines and a software layer called Hadoop, which is responsible for distributing applications data across the machines, parallelizing and managing application execution across the machines, and detecting and recovering from machine failures. We propose that the Hadoop should consist of four components. Each of components must have a specific job. The different components of Hadoop are shown in Diagram No 3.4.
With the help of cloud computing, software applications can be accessed from a network using thin clients/mobiles. Thus cloud computing can help to make computing ubiquitous and bring it within the reach of the masses, especially the poor. They propose a specific framework of e-Governance based on cloud computing, at which Hadoop is at the top, which is being accessed by thin clients or by commodity hardware.

### 3.4.5 Service Delivery Framework

The National e-Governance Plan of Indian Government seeks to lay the foundation and provide the momentum for long-term development of e-Governance within the country. This section provides information on creation of the right governance and institutional mechanisms, setting up the core infrastructure and policies and implementation of a number of Mission Mode Projects at the Center, State and integrated service levels.

One of the goals of the Government to meet this vision is the need to cooperate, collaborate and integrate information across different departments in the Centre, States and Local Government. Government systems characterized by islands of legacy systems using varied platforms and technologies and spread across diverse geographical locations, in varying state of automation, make this task very challenging. The **State e-Governance Service Delivery Gateway** (SSDG), a core component in e-Governance infrastructure under the NeGP, can simplify this task by acting as a standards-based messaging switch and providing seamless interoperability and exchange of data across as shown in following Diagram No 3.5.
Vision of the State e-Governance Service Delivery Gateway (SSDG)

The arrival of many e-governance applications for different departments to provide online services to citizens, businesses and government would require increasing interactions amongst departments and with external agencies at various levels in State Government. Departments would need to develop connectors/adaptors for point to point connections between departments creating a mesh as shown in the above diagram and also tight coupling between applications. This would lead to applications difficult to maintain and upgrade in case of version change and change in government policies and business rules. The SSDG is an attempt to decrease such point to point contacts between departments and provide a standardized interfacing, messaging and routing switch through which various players such as departments, front-end service access providers and back-end service providers can make their applications and data inter-operable. The SSDG aims to achieve a high order of interoperability among autonomous and heterogeneous entities of the states based on a framework of e-Governance standards.
The objectives of the SSDG are:

a) Act as a catalyst in enabling the building of Standards based e-Governance applications with Gateway as the middleware to ensure interoperability.

b) Enable integration across Centre, State or Local Governments there by enabling Integrated Service Delivery and a **Service Oriented Architecture** (SOA) leading to join up government.

c) Help to protect the legacy investments in software and hardware by easily integrating them with other technology platforms and software implementations.

d) De-link the back-end departments/Service Providers (SP) from the front-end Service Access Providers.

e) Share services can be added on to the core services as and when required, as special common services of the Gateway without affecting the core functionality of the Gateway, thereby providing flexibility and modularity.

f) Reduce the cost of e-Governance Projects by rationalizing, distributing and optimizing the services framework.

g) Enable to use PKI infrastructure for secure transactions. Provision exists for encryption of department payload to ensure confidentiality of department data. The gateway provides digital signature and certificates to all stakeholders interacting with the gateway for identification, authentication and authorization. Transaction and audit logs help to track government data.

h) Enable transaction logging and time stamping for tracking of transactions and centralized control.

i) Help the departments’ backend workflow to evolve gradually as the Gateway acts as a middleware de-linking the backend from the front end. This means that even the departments which do not have the complete automation or work flow at the back can still deliver e-Service to the citizens in a limited manner through the Gateway.

3.5 Security of e-Governance in India

All e-Governance projects run on network. Data cannot be confined to one place; the importance of data lies in sharing it. When you share your data, it spreads across different geographical places and devices. You need to secure the end-point. A government department deals with a considerable amount of information that may be critical to several other government departments concerned as well as external parties and citizens. After the Government of India (GoI) passed **IT Act 2000**, it gets strong protection against cyber terrorism or cyber war. Certain agencies had developed ISO 27001 and ISO 27002 standard had been developed. These adopt a framework approach combining the solutions
that are required to cover end-to-end system security. These provide a common language communicating security on a global basis to protect customers, outsourcers, business partners, regulators, auditors and non-security staff. Since the arrival of social networking, there has been a phenomenal growth in data traffic. Number of users is on the rise and many different options to transact data have become available. A significant part of any organization’s IT budget is being spent on security and storage. With increased adoption of ISO17799, ISO 27001, ISO 27002, BS7799, CoBiT certification processes, security is moving beyond firewalls, anti-virus to digital content as well. Apart from it, technologies like digital signature, digital envelop are adopted with the help of Certifying Authorities.

The aim to provide “trusted” services by safeguarding the “information assets” in terms of confidentiality, integration, integrity and availability. The “Value” of information held and processed by e-Governance services needs to be protected at the different layers.

The Government of India (GoI) plans to make large number of services available to the common man through online systems. To provide secure IT infrastructure to host state-level e-Government applications and data, many new State Data Centers (SDCs) are being created.

As data Centers are home to valuable information, security is an important issue. “With huge computational capability present within the data Centers, the security tools need to be able to cope up with the network traffic which can range from Mbps to Gbps. The Vendors within the security market offer a lot of products in hardware as well as software mode which provide perimeter defense, network defense, host and application defense capabilities such as, Context aware Network Firewalls, DDoS mitigation mechanism, and much else,” says official of India Lead, Global Security Solutions, CSC. The UIDAI initiative launched by the GoI is absorbing many Peta Bytes of data in every region. To secure and process the data collected from millions of citizens, the UIDAI operates a highly secure state of the art data center in Bangalore. According to UID officials all the data collected from individuals at the enrolment Centers travels in 2048-bit digitally encrypted packets all the way to the data center. According to Director General & Mission Director, UIDAI, best-in-class strategies from the technology perspective have been employed to keep resident data secure within UIDAI data Centers. Official of UIDAI says, “Security and privacy of data within Aadhaar system
has been foundational and is clearly reflected in UDIAI’s strategy, design and its processes throughout the system.”

State Data Centre (SDC) has been identified as one of the important elements of the core infrastructure for supporting e-Governance initiatives of NeGP. **State Data Centers** (SDC) are multiple data centers\(^{13}\) setup in various states of India to provide fundamental IT infrastructure for various Governance programs being run as part of National e-Governance Plan of India. The main purpose of these Centers is to provide a physical facility for hosting various state level e-government applications similar to what National Informatics Center (NIC) provides to the national level applications. The SDC project was approved in January 2008 as a part of the NeGP.

Under NeGP, it is proposed to create State Data Centers for the States to consolidate services, applications and infrastructure to provide efficient electronic delivery of G2G, G2C and G2B services. These services can be rendered by the States through common delivery platform seamlessly supported by core Connectivity Infrastructure such as State Wide Area Network (SWAN) and Common Service Centre (CSC) connectivity extended up to village level. State Data Centre would provide many functionalities and some of the key functionalities are Central Repository of the State, Secure Data Storage, Online Delivery of Services, Citizen Information/Services Portal, State Intranet Portal, Disaster Recovery, Remote Management and Service Integration etc. SDCs would also provide better operation & management control and minimize overall cost of Data Management, IT Resource Management, Deployment and other costs.

Department of Information Technology (DIT) has formulated the Guidelines to provide Technical and Financial assistance to the States for setting up State Data Centre. These Guidelines also include the implementation options that can be exercised by the State to establish the SDC. SDC scheme has been approved by Government with an outlay of around Rs. 2000 Crores over a period of 5 years. The State Data Centers has been set-up and operationalised in all the States/UTs of India.
3.6 M-Governance

Mobile technology is significantly expanding governments’ capacity to produce benefits and deliver outcomes for governments, citizens, businesses, and to impact positively national overall economical growth.

Mobile governance or m-Governance, is the extension of e-governance to mobile platforms, as well as the strategic use of government services and applications which are only possible using cellular/mobile telephones, tab’s, laptop computers, personal digital assistants (PDAs) and wireless internet infrastructure. The m-Governance services are provided to show in the following Diagram No 3.7
Today “Mobile Phone” has emerged as the strongest technology to bridge digital gap between urban and rural. Within two decades of its launch in India, mobile phone has reached at remote rural hamlet despite the much known hurdles like lack of connectivity and electricity and low level of literacy. In the other side, it has created lakhs of direct and indirect job opportunities for youths.

In the second phase of the development, it has emerged as a delivery channel for different kinds of services and now anyone can transfer amount from one bank account to another using their mobile phone. Government and private agencies have also started using “Mobile Phone” to deliver citizen and business services to common man. Recently, Reserve Bank of India (RBI) has allowed commercial banks to provide banking services on mobile phone, whereas Government of India has approved the “Framework for delivering financial services through mobile phone” developed by Inter-ministerial group. After the launch of 3G technologies in India, users will be able to access health, educational, agricultural, infotainment services on their mobile phone.

“m-Governance is not a replacement for e-Governance, rather it complements to e-Governance.”

m-Governance is not a new concept. The private sector has been greatly leveraging the use of mobile phones for delivery of value added services for the following which however are mostly SMS based:

i) Banking
ii) Media
iii) Airlines
iv) Telecom
v) Entertainment
vi) News
vii) Sports
viii) Astrology
ix) Movie Tickets etc.

A) Definition of m-Governance as stated in The Gazette of India March 2012 “A strategy and its implementation to leverage available wireless and new media technology platforms, mobile phone devices and applications for delivery of public information and services to citizens and businesses.”

m-Governance development will also provide countries with more developed e-government and the opportunity to tackle a number of issues - such as those related to the
digital-divide - which remain a critical factor in the levels of e-government services take-up which are lower-than-expected in many countries. By enabling the development of a whole new set of mG2C, mG2G, mG2B and mG2E application and services, m-Governance affords for instance, a powerful and transformational capacity to extend access to existing services, to expand the delivery of new services, to increase active citizen participation in government operation and to change the way of working within the public sector. m-Governance gives various benefits to the government, citizens and business or Industries for economic growth of the India.

B) Benefits of m-Governance:

1) To Government

Mobile technologies provide government with significant opportunities for achieving greater cost optimisation, improved communications and data co-ordination, expanded service delivery and much progress towards digital equality. Benefits for the government are as follows:

a) Wider reach
b) Mobility and ubiquity
c) More personalisation of services
d) Cost-effectiveness
e) Faster information flow
f) Better management
g) Increased democracy

2) To Citizens

Mobile technologies are empowering citizens in all aspects of their daily lives, improving the quality of life for many. More people can afford a mobile phone than a personal computer and are comfortable learning to use mobile devices in their daily lives. The popularity of social media and use of Web2.0 tools is also transferring easily to mobile applications. Benefits for the citizens are as follows:

a) Convenience and access
b) Health and public safety
c) Education
d) Agriculture
e) Financial management
3) To Businesses for economic growth

Several factors are contributing to the expansion of business use of mobile technologies. Business managers are focused on reducing costs and physical infrastructure, and recognize the capabilities created by key advances in wire-less technology; faster and wider wireless networks; larger device display; and better technical platforms for applications. Benefits for the businesses are as follows:

a) Economic opportunity and improvement
b) Productivity
c) Mobile workers
d) Customer service
e) Green economy

C) Mobile Educational Apps:

As iPhones, iPads, and iPod touches become more integrated in classrooms, educators and students are looking for new ways to apply them for teaching and learning. There are many applications on all of these devices that can help automate current classroom processes or present new ways to learn that previously had been unexplored.

In this special feature, we’ve assembled a list of education “apps” for Apple devices that we think are noteworthy for higher education. The majority are free, while the others charge few dollars.
Reference:

5. Website http://www.educationscotland.gov.uk, extracted on 2010
6. Website http://www.mgrmnet.com
7. Website http://www.universityerp.com extracted on Nov-2013
13. Website http://deity.gov.in
15. Website www.itu.int/ITU-D