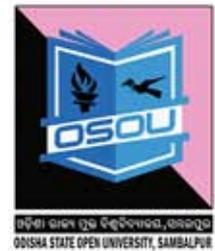


MECE-02
Block-3



MAEC

MASTER OF

ECONOMICS

(ELECTIVE-II)

E-GOVERNANCE

E-GOVERNANCE-III



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Master of Arts

ECONOMICS (MAEC)

MECE-02

ELECTRONIC GOVERNANCE

BLOCK-3

**UNIT 7 PANCHAYATI RAJ INSTITUTIONS: IMPROVING
SELF- GOVERNANCE THROUGH ICT**

**UNIT 8 E-LEARNING: ROLE OF ICT IN EDUCATION AND
TRAINING**

UNIT 9 E-COMMERCE

UNIT 7 PANCHAYATI RAJ INSTITUTIONS: IMPROVING SELF- GOVERNANCE THROUGH ICT

Structure

- 7.0 Learning Outcomes
- 7.1 Introduction
- 7.2 Changing Role of PRIs
- 7.3 ICT Intervention in Local Governance: Need and Importance
- 7.4 ICT in PRIs: Application Areas
- 7.5 E-Panchayat Project: Andhra Pradesh
- 7.6 E-Panchayat: Challenges in Implementation
- 7.7 Conclusion
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- 7.10 Annexe

7.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the significance of PRIs as self-governing institutions in democratic set up;
- describe the changing role of PRIs;
- identify the need and importance of ICT intervention in local governance;
- highlight the application areas of ICT in PRIs; and
- explain the concept of e-panchayat and its challenges.

7.1 INTRODUCTION

Importance of local governance in a democratic polity can hardly be underestimated. In developing countries local governance institutions not only make democracy more meaningful, but provide much needed participation of the masses in the socio-economic transformation of the nations.

The concept of self-governance is one of the cherished values of Indian society. Self-governing institutions at the grassroots played an important role in ancient India. Self-governing village communities had existed in India even in the times of Rig-Veda. In course of time these village bodies took the form of 'Panchayats,' which means an assembly of five persons. The panchayats looked after the affairs of the village. It is believed that these bodies were the pivot of administration and centre of social life. Sir Charles Metcalfe, the provisional Governor General of India (1835-36) called the Indian village communities as 'the little republics.' Now days these little republics are known as Panchayati Raj Institutions (PRIs) in rural areas.

After independence PRIs have come into existence in most of the states since 1959 consequent to the recommendations of Balwant Rai Mehta Committee. The inception of PRIs opened a new chapter in the annals of Indian democracy. In the process of development of the country, PRIs have been playing a vital role as agents of rural transformation. These institutions help in purposeful understanding of the masses and articulation of their responses. Democracy is introduced to grassroots of the country through these institutions. Even the common people of the country are associated with administration through these institutions. Through PRIs, local people not only determine policies but they also guide and control the administration for the execution of these policies. The importance of Panchayati Raj system lies in the fact that it assures expansion of democracy at the grassroots and ensures public participation in development programmes. Therefore, PRIs have become backbone of our democratic set up.

PRIs have undergone many changes especially in its role from the days of the British Empire to the 73rd Constitutional Amendment Act in 1992. In the era of globalisation, PRIs right from the village panchayats to the Zilla Parishad have to redefine their roles as that of catalysts and facilitators. Effective and meaningful functioning of these institutions would depend on active involvement, contribution and participation of citizens. The World Bank Report 2000 stated that 'development must address human needs directly, that institutions of direct democracy, such as, panchayats should be rooted in processes that are socially inclusive and responsive to changing

circumstances'. Therefore, strengthening of PRIs as self-governance institutions at the grassroots level to run the administration of local affairs is much needed for more meaningful democracy. In this context, sincere efforts need to be taken to substantially enhance the knowledge, skills and capabilities of PRIs with the use of ICT. In this Unit an attempt is made to discuss ICT enabled initiatives undertaken in the country to reorient PRIs as self-governing institutions and make them vehicles of socio-economic transformation in rural India.

7.2 CHANGING ROLE OF PRIs

Democracy does not become meaningful without strengthening the grassroots institutions. Local self-government institutions are those institutions constituted at the grassroots level to administer local affairs. These institutions comprise those representatives who are directly elected by the people at regular interval of time. They are constituted by the Acts of state governments. These institutions fulfill the local needs, relieve the administrative burden, secure economy in administration, promote political consciousness, decentralise power and authority and make democracy a success.

Popular participation and strengthening of local governments are essential to achieve development at the local level. Institutions of governance at the local level have a clinching role in promoting a new equilibrium in rural India. The development machinery at the grassroots level work under the control of PRIs. Prior to 1992, state governments adopted different patterns of PRIs and there was no uniformity in the structures, powers and functions, election methods, allocation of financial resources etc. of these institutions. Government of India has brought certain reforms in these institutions through 73rd Constitutional Amendment Act, 1992. This amendment aimed at creating uniform pattern of PRIs in all the states. It devolved a package of powers and functions to the PRIs. These institutions now perform a wide range of functions. This includes maintenance of public streets, proper drainage, electricity supply, lighting, medical relief, construction and maintenance of public toilets, registration of births and deaths, provision of primary education, water supply, maintenance of burial ground, etc. In addition, they are also expected to take up functions, such as, promotion of cottage industries, animal husbandry programmes, pollution control, famine relief, construction of culverts, maintenance of village roads, reading rooms, etc.

The XI Schedule added to the Constitution by the Act lists out 29 subjects to be transferred to Panchayati Raj bodies. They include agriculture, land reforms, minor irrigation, animal husbandry, fisheries, social forestry, small scale industries, rural

housing, rural roads, rural electrification, poverty alleviation programmes, primary, secondary and vocational education; adult and non-formal education, libraries, rural markets, rural health centres, family welfare, women and child development, social welfare and welfare of weaker sections, public distribution system and maintenance of community assets.

The Constitution through 73rd Amendment visualises panchayats as institutions of local selfgovernment. It also devolves the powers, functions and responsibilities to panchayats in respect of 29 subjects to prepare their schemes and development plans and implementation of these programmes of economic and social development. The Constitution enjoins the state government to take steps for devolution of powers and functions to the panchayats to enable them to become 'institutions of self-government'. However, the available information reveals that the process of devolution has not yet been firmed up in most of the states. The extent of devolution of powers and functions is subject to the will of the state legislature. It is found that the steps have been taken in most states on piece-meal basis.

Experience of one decade of implementation of the 73rd Constitutional Amendment Act shows that PRIs in most of the states have not delivered the services to rural people in accordance with the provisions made in the Act. Although the Act empowers them to prepare plans for economic development and social justice and implement the schemes of rural development as may be entrusted to them including those related to matters listed in the XI Schedule, they failed to become the real institutions of self-governance due to lack of community participation and insufficient capacity in running their activities. Therefore, capacity building measures need to be taken at local governance level to strengthen PRIs. Capacity building may be defined as support or intervention that empowers people, communities or organisation to achieve their objectives. Effective capacity building includes learning by doing, access to resources, facilitation, mediation and training. These measures comprise developing community audit skills, facilitating a strategic plan and phased operational measures and encouraging the monitoring and evaluation of progress.

The challenges before the PRIs in the new millennium are formidable. Infact, these institutions are to transform themselves from being representative political institutions to being community institutions of direct democracy with support from the local community. These institutions have to work within the broad framework of good governance. The positive challenges of these institutions are preserving democracy at the grassroots, initiating necessary steps for good governance, maintaining accountability and transparency with the purpose of social audit, exploring possibilities for new initiatives or new power equations, civil society activities through partnership

with NGOs, achieving women empowerment and developing efficient service delivery mechanisms.

Poverty reduction should be the highest priority mission of PRIs in the new millennium. These institutions have to draw long-term plans for rural development and catalyse public-private partnership to realise them in the areas of health, education, roads, water supply and other infrastructure services. They have to ensure that their administration and functions are accountable to the people to facilitate empowerment.

To meet these challenges a considerable number of ICT initiatives have been undertaken by the Central and state governments since 1990s. These initiatives have vast potential to ensure a more accountable, responsive and citizen friendly PRI. Positive harnessing of ICT can open new vistas for PRIs' efficiency and effectiveness.

7.3 ICT INTERVENTION IN LOCAL GOVERNANCE: NEED AND IMPORTANCE

Need of ICT Intervention in PRIs

With the passage of 73rd Amendment Act to the Constitution of India, the panchayats in rural areas received the Constitutional legality to function as local self-governments in the third tier of governance. Enormous authority has been given to them for managing their affairs including the responsibility to plan for their areas and collecting revenues for their sustenance. But even after more than a decade of this Constitutional sanction, the third tier governance is yet to take the full shape. The benefits of ICT are sparsely garnered and in general they function in isolation with little participation of the people in their affairs except to cast vote in an interval of five years.

Governance generally means rule of law, openness and accountability. Using ICT in local self-governance can ensure at least the last two components. Through openness, accessibility can be ensured to the citizens to know about 'what is being done, will be done and has been done' by the state and its agencies. At the local level, for example in the panchayats, the common villagers have very little accessibility to the activities of the panchayats, the funds they are getting and the funds they are raising. Despite of being the people's body the panchayats most often fail to be accountable to the local people in true sense of the term. Accountability means that the conduct of government needs explanation whenever citizens demand such explanation.

At the local level, in particular, non-availability of information leads to adhocism in prioritisation of schemes/ programmes, poor decision-making, slow process of making

corrections during implementation and narrow participation of people in the process. In rural areas, most of the states have adopted the three-tier panchayati raj structure with village panchayat at the lowest level, block panchayat at the intermediate level and zilla panchayat at the district level. It is desirable that there should be a strong organic link all through the process. The present status of data communication system however, is not so effective. Most of the data generated at gram panchayats of the district are stacked at the intermediate levels. Again, the flow of information from the blocks (the middle tier) to district is irregular on one hand and inadequate on the other hand because this data transfer is done manually and through human agencies like postal and courier services.

The state level data on varied items can be available in hard form, but it is partially true for district level data. In case of block level too, data on different development indicators are rarely available. For example, there is no consolidated data on infant mortality rate or fertility rate. Along with this there are problems of accuracy and completeness of data irrespective of the locality where they are gathered/ generated. Accredited agencies like Central Statistical Organisation, National Sample Survey Organisation or Centre for Monitoring Indian Economy (CMIE) goes up to the state level only. Though census provides a lot of data but they have a very defined area of operation and are concerned with specific time period only. For local level planning state level data are of little use. As a consequence, there remains large scope for adhocism.

Next is the case for transparency without which governance at the local level remains incomplete. It is expected that local people should have adequate access to the affairs of management of local bodies. The present practice is to convene meetings of gram sabhas twice in a year for sharing the achievements of gram panchayats. This has the Constitutional sanction (Article 243A). But the higher tiers, that is, intermediate and district have no such platform to share the experiences with the local people.

In case of beneficiary oriented programmes, the panchayats at the village and block levels are mainly entrusted with identification of beneficiaries. Though in matter of identification there are limited deliberations, but the list of selected recipients/beneficiaries is mostly not exhibited either in the office of village panchayat or block (intermediate) panchayat for public viewing. This may lead to corruption in the finalisation of the list. In addition to this when the scheme is actually implemented, i.e. at the time of delivery, local people have no channel to get the information regarding expenditure made or quantum of assistance etc. This lack of transparency further leads to corruption and jeopardises the interests of the people and the government. Manifestation of corruption in different forms distorts the policy objectives of the

government and acts against the interest of the people. Along with transparency, accountability should also be there for successful governance. At the local level there is little scope for interaction between the people on the one hand and local bodies on the other. As there is no regular channel for effective communication between the local bodies and local citizens, the nature of development is not participatory. Lack of information sharing among the functional departments and the panchayats results in problems of interim coordination.

Importance of ICT in PRIs

Effectiveness of any institution depends on the delivery mechanism and the supportive rules and procedures acting in harmony with each other, so that the institution can discharge the functions and play the assigned role. For keeping in track, the institutions interact and exchange ideas with the stakeholders. The direct stakeholders are to be given importance, structures have to be redefined, and procedures and practices of governance have to be brought closer to people. Local governance should be understood from such a perspective, instead of just being seen as an agent of programme implementation. ICT intervention can facilitate this process.

ICT interventions aid in the process of development by sharing knowledge, increasing productivity, overcoming geographical boundaries and facilitating procedural openness. ICTs lead not only to increase in supply of information with economy and reliability, but also consequently, to better decision-making and innovations. It also leads to demand for greater openness and transparency in operations. It is a powerful tool of empowerment.

ICTs can improve local self-governance of PRIs in three distinct ways:

- it creates ‘efficiency benefits’ in the policy cycle. By acquisition, transfer and management of complex policy information and data it helps decision-makers in taking informed decisions;
- it improves the delivery of local government services; and
- it gives a facelift to the government civil society interface by increased access to government information and facilitating dialogue and public feedback on government projects and performance.

ICTs play an increasingly important role in helping policy makers and administrators to better manage the provision of public goods and services at the local level. They can

enhance basic infrastructure services such as water, sanitation and electricity; speed up the approval and delivery of permits, and provide timely and more relevant response to information requests. Thus, ICT has emerged as an effective instrument to bring masses closer to the government. The Working Group on IT for Masses appointed by the Centre perceives ICT providing a unique and new opportunity to address age-old problems in the field of education, health, rural development, poverty alleviation, employment, etc. and to be a major facilitator for information transparency, good governance, empowerment, participative management and grass-root democracy.

Experiences of developing countries like Chile and Uganda encourage us to use ICT for the benefits of rural masses. Based on the experiences of these countries following four aspects can be delineated pertaining to the role of ICTs:

- empowerment of people through their wider participation in planning, implementation and management of programmes;
- transparency and probity by exhibiting the transactions, progress of work, future plans and actions and thus allowing access of the common man;
- increased effectiveness and efficiency of services provided directly by government and its agencies; and
- enhanced coordination within the different segments of the functional departments of the government.

7.4 ICT IN PRIs: APPLICATION AREAS

ICT application has vast potential to ensure more accountable, responsive and citizen-friendly PRIs. Wired PRIs would, not only be more transparent, but also more open to social audit. People can easily register their grievances through e-mail as we see in case of Gyandoot Programme in Madhya Pradesh. Software such as Rural Soft can be used in monitoring rural development programmes and projects. ICT can also help in reducing the corrupt practices in rural infrastructure development projects undertaken by the PRIs. With the aid of Geographical Information System (GIS) and satellite imagery, a detailed visual record of the projects can be maintained, which can be accessed any time with a click of mouse. Physical verification of the projects would be no more at the mercy of time, but can be done by anybody, from anywhere and at anytime. Thus application of ICT can increase legitimacy and acceptability of the PRIs among its stakeholders.

The 'Working Group on IT for Masses' has recommended the need to re-engineer various services such as those related to local governance at block or panchayat levels through extensive use of ICT. It further suggested that ICT should provide relevant information while fulfilling local information needs of the people. ICT enabled initiatives will help in the successful realisation of powers and responsibilities of PRIs through a lot of information input and their efficient analysis. Therefore, ICT enabled initiatives can play a crucial role in the following areas of PRIs:

- **Participatory Planning**

Participatory planning needs access to a wide variety of information by the officials as well as the people and civil society. ICTs have the potential to provide comprehensive information and increase the speed and quality of this process. The concept of GIS can be applied to three major sections, namely inventory, analysis and planning. GIS consists of reliable and accurate spatial and non-spatial information on land and land resources. With the help of GIS, Panchayat Resource Mapping can be done, which can help not only in preparation of local plans, but also in consolidation of these plans at district level. Subject to the state laws, PRIs have the responsibility of agriculture, including agricultural extension, soil conservation, social forestry and farm forestry; all of which needs the aid of GIS and remote sensing data for efficient and effective performance.

At the implementation stage, application of ICT can lead to better resource mobilisation and deployment, manpower management and technical support. ICT can make quick, comprehensive and transparent impact-assessment possible, which can enable better implementation of the projects and plans. Thus, ICT makes decentralised and participatory planning a smooth and simple affair and helps in realising its inherent benefits, i.e. efficiency, equality and empowerment.

- **Taxation**

Subject to state laws, the PRIs can levy, collect and appropriate taxes, duties, tolls and fees. Experience of integrating ICT with the Central and States' tax administration shows more revenue collection and less corruption. The same can be replicated with tax administration and fiscal planning of PRIs.

- **Education**

Subject to state laws, primary and secondary education, vocational education, adult and non-formal education and technical training are the responsibility of the PRIs.

Panchayat centres equipped with ICT tools and services can become major hubs for educating people on a mass scale. ISRO has launched Edusat- world's first satellite dedicated to education to enable radio and TV broadcast, internet based education, data broadcasting, talk-back option, audio video interaction and video conferencing. This will be real-time interactive learning available 24 hours a day. By spending around Rs. 2 lakh for infrastructure, the PRIs can have access to Edusat facilities and take education to the doorsteps of the rural and disadvantaged sections.

- **Training**

Training of numerous functionaries as well as elected representatives has emerged as one of the most challenging areas in the effective functioning of the PRIs. Training is not one time process; rather it needs time-to-time administering on the recipients. Developing appropriate training module needs expertise. ICT can help in easing the difficulties faced in the area of training through District Panchayat LAN (for local contents), internet, video conferencing, etc. It can also provide cyber platform to share variety of panchayat related experiences from across the country.

7.5 E-PANCHAYAT PROJECT: ANDHRA PRADESH

ICT-enabled PRIs or e-panchayat does not mean merely computerisation of backroom offices, but encompasses a wide range of activities and actors. This can result in 4dimensional interface namely:

- P2P: Panchayat to Panchayat
- P2B: Panchayat to Business
- P2G: Panchayat to Gram Sabha
- P2E: Panchayat to Employees

P2P (Panchayat to Panchayat) interface may involve sharing of data and conduct of electronic exchanges amongst different tiers of the PRIs. This also may entail horizontal information sharing with other agencies in their geographical jurisdiction. District Panchayat LAN would connect the PRIs at the district, block and village level and the district would be connected to higher levels of the governments through the internet. District Management Information System (DMIS), based on bottom-up approach would utilise the LAN. P2P interface would help in better coordination of resources, comprehensive planning and effective implementation.

P2B (Panchayat to Business) interface may involve sale of PRIs' goods to the public as well as procurement of goods and services by them. This would require the maintenance of electronic catalogues for purchasing, electronic tender floating and displaying the award and terms of the contract on the net. This may lead to improved transparency and accountability in the transactions of the PRIs.

P2G (Panchayat to Gram Sabha) interface is the foremost objective of e-Panchayat. Generally, P2G interface is thought to be confined to information related with schemes, procedures and forms. But this would be the first level of P2G interface. In the next level, the members would try to obtain information about various rules and laws. After this, efforts to know about the facts related with fund flows would be made. People would start questioning the decisions and their rationale. E-panchayats can help in realising these goals of information dissemination, transparency and accountability and make P2G interface a potent weapon of democratic decentralisation.

P2E (Panchayat to Employees) interface can cover work guidelines, rules and regulations, salary structure and training modules. The local government functionaries including elected representatives are expected to know about Panchayati Raj Act, numerous rules framed under them and various orders issued by diverse governmental agencies. ICT enables accessibility to such updated documents thereby enhancing decision making by PRIs.

E-panchayat is a software product conceptualised, designed and developed by National Informatics Centre, Hyderabad, Andhra Pradesh, as a part of e-governance initiatives. At present, it is being implemented in 450 gram panchayats in the State with an investment touching eight crore rupees. E-panchayat has been designed taking into consideration all the information and knowledge management requirements in a gram panchayat. It covers all information requirements for the village panchayat functionaries and rural citizens. The Constitutional Amendment Act 1992, success stories of gram panchayats in the country, Government orders pertaining to village secretariats and functions of the village secretary and elected representatives of gram panchayat are included in the e-panchayat software package. Thus, e-panchayat fits well into the information systems at gram panchayat level. The software is web-enabled and citizen-centric.

E-panchayat software in Andhra Pradesh comprises nearly 30 main modules and 150 sub-modules in line with the 30 sectoral functions of the gram panchayats. Some of the important modules are explained below:

Gram Panchayat Administration

This module provides following information and services:

- minutes of meetings;
- schedules of Gram Sabhas;
- agenda update;
- certificates and licences;
- bill payments;
- attendance monitoring of Panchayat functionaries;
- gram Panchayat meetings management;
- gram Panchayat cleanliness monitoring;
- registration of births/ deaths/ marriages, etc.;
- issue of trade licences;
- pension schemes management system;
- self-help groups and other villagers welfare schemes management system;
- assets management, property tax assessment and management;
- property lost/found reporting system;
- law and order management system;
- encroachments checking and monitoring module;
- government orders searching and retrieval system;
- village statistics maintenance and reporting system; and
- intensive sanitation management information system.

Agriculture

This module:

- facilitates educational services on the best agricultural practices to enhance the yield and reduce expenditure and enhance the quality of produce for the farmers;
- facilitates agriculture and related departments to provide season-specific, region-specific information services to the farmers;

- enables elected representatives of gram panchayats to manage farmers' grievances;
- enables gram panchayat secretariat to report the details of agriculture production of the village; and
- offers counselling services to the farmers by agriculture experts.

Irrigation and Water Conservation

This module:

- provides information on irrigation canals to the farmers;
- facilitates education on various water harvesting and conservation schemes;
- enables reporting of problems on pipelines, canals, etc. and subsequent review of problems by Sarpanch (or the head of Panchayat or Village Council); and
- facilitates the appraisal of the status of water cess payments and reporting on the dues.

Elections

This module provides the following information services:

- registration of voters;
- objection to voters list;
- elected representative information;
- publication of electoral rolls; and
- dissemination of electoral rolls.

Housing

This module provides information on:

- low cost housing techniques;
- application for housing scheme; and

- loan recovery status

Adult Education

This module provides information on:

- enrolment of adults;
- schedule of education programmes;
- training kits for adult education;
- feedback on education programmes; and
- status monitoring

Cultural Programmes

This module provides information on:

- enrollment of artists;
- training of artists;
- schedule of programmes; and
- information on opportunities

Women and Child Welfare

This module extends information services on:

- immunisation schedules;
- nutrition programme;
- schedule of camps; and
- counselling by health workers

Social Welfare

Under this module services available are:

- atrocities reporting;

- welfare scheme information;
- inventory of handicapped persons;
- donors information;
- counselling; and
- application for schemes

Village Accounting System (VAS)

Following are the features of VAS:

- cash transactions;
- bill receipts;
- ODs and cheques receipts;
- automatic challan submission;
- treasury payments;
- classified accounts;
- all kinds of taxes and fee collections;
- cheques/DDs reconciliation; and
- reports (Daily collection report)

Feedback studies confirm the satisfaction of rural people with the functioning of e-panchayats in the State. E-panchayats have facilitated the implementation of right to information at the village level. They have equipped the rural folk with comprehensive and updated information thereby ensuring transparency in local governance.

7.6 E-PANCHAYAT: CHALLENGES IN IMPLEMENTATION

Some of the challenges in the effective implementation of e-panchayats are mentioned below:

- there is lack of adequate infrastructure that creates regional imbalances;
- the input cost in networking of PRIs is very high;
- there is shortage of software and quality content in regional languages; and
- due place to traditional folk media is not accorded.

E-panchayats should be based on ethnocentric, need-based and bottom up approach. They have to steer clear of these limitations to accomplish the constitutionally mandated goals.

7.7 CONCLUSION

In the process of development of the country, PRIs have been playing a vital role as agents of rural transformation.

In the era of globalisation, PRIs have to redefine their roles as that of catalysts and facilitators. Therefore, sincere efforts need to be taken by these institutions to enhance knowledge, skills and capabilities through ICTs. ICT initiatives lead to greater openness and transparency in operations and empower PRIs as self-governance institutions. ICT initiatives can be applicable in the areas of participatory planning, taxation, education and training, and service delivery.

Further, electronic knowledge-based panchayats, that is, e-panchayats aim at equipping rural people with comprehensive and updated information and ensure transparency in governance. In other words, e-panchayats have strengthened participative democracy at the grassroots.

However, applications of ICT to the PRIs have to address to certain crucial factors- regional imbalances, resources, software development, and high cost- to facilitate rural development and self-governance in the country.

7.8 ACTIVITY

- 1) Let us know about experiments in e-panchayat in other states of India and their experiences.
- 2) List out some of the software developed for rural applications in the country.

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7.10 ANNEXETURE

12,600 Village Panchayats to be Computerised this Year in Chennai Second Phase of the Programme to Kick off Shortly

As part of its efforts to take Information Technology enabled administration and e-governance to villages, the State Government proposes to computerise all 12,618 village panchayats in the current year.

Till date, 1,113 village panchayats have been provided with computers. They were covered in the first phase of the computerisation programme launched in October 2004. In the first phase, 385 panchayat unions, 29 offices of Assistant Directors of Panchayats in the districts and the Directorate of Rural Development were also covered. The total cost was Rs. 10.37 crore.

The second phase, scheduled to be taken up shortly, will cover 5,409 village panchayats. Orders have been placed with the Electronics Corporation of Tamil Nadu Limited (ELCOT). Last week, it informed the Rural Development Department that the supply would be made by the first week of November. The village panchayats have been identified and Rural Development officials have advised them to keep buildings ready for installation of computers.

In the current phase, apart from around 5,400 panchayats, the Local Fund Audit Department will also be computerised. The cost is estimated at Rs. 28 crore.

Funds for the two phases have been provided from the 11th Finance Commission grants.

The Rural Development Department has also initiated steps for the third and final phase. Proposal has been sent to the Government for sanction of about Rs. 32 crore to cover the remaining 6,096 village panchayats.

An elaborate training programme is being given to panchayat Presidents and officials. A web-enabled software, designed by the National Informatics Centre (NIC), in consultation with the Comptroller and Auditor General, is being used for maintenance of accounts of Panchayat Raj institutions.

Asked how the village panchayats were making use of the computers, the officials said the response was encouraging. Of 1,113 panchayats covered under the first phase, nearly 900 were using computers for data entry.

T. Ramakrishnan

October 10 2005, The Hindu

UNIT 8 E-LEARNING: ROLE OF ICT IN EDUCATION AND TRAINING

Structure

- 8.0 Learning Outcomes
- 8.1 Introduction
- 8.2 E-Learning: Concept and Significance
- 8.3 E-Learning: Online Delivery of Education and Training
- 8.4 E-Learning Systems: Virtual Learning Environment
- 8.5 Digital Library
- 8.6 Digital Portfolio
- 8.7 Edusat-India's First Dedicated Satellite for Distance Education
- 8.8 Conclusion
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8.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the concept and significance of e-learning;
- describe the online delivery of education and training through internet;
- discuss the concept and benefits of Virtual Learning Environment;
- highlight the features of digital library;
- explain the importance of digital portfolios; and
- highlight the basic features of the Edusat initiative of the Government of India

8.1 INTRODUCTION

Information and communication technology (ICT) has become an integral part of learning today. Countries across the world are using ICT in facilitating information dissemination and communication in all areas of education and training. There are now educational and training institutions imparting skills in the basic and advanced concepts of ICT. Besides, ICT is being used in facilitating distance learning. It is enabling online designing of courses, online delivery of courses, computer-aided teaching, online assessment, besides management and networking of a large number of educational institutions. ICT based systems and software, CD based courses, online courses, digital libraries, discussion forums, digital portfolios, teleconference, etc. has made e-learning a reality today.

In this Unit, we will be discussing these ICT-based applications in the field of learning, that is, education and training.

8.2 E-LEARNING: CONCEPT AND SIGNIFICANCE

E-learning is an approach to facilitate and enhance learning through, and based on, both computer and communication technology. It refers to the use of computer-based electronic technologies of internet, e-mail, websites and CD-ROMS to deliver, facilitate and enhance both formal and informal learning and knowledge sharing from any place at any time. The communication devices can also include digital television, personal digital assistants (PDAs) and mobile phones.

E-learning is also called Computer-Based Training (CBT). Generally, CBT and e-learning are treated as synonyms, but CBT is the older term dating from the 1980s. The term elearning evolved from CBT along with the maturation of the internet, CDs and DVDs. It includes Internet-based Learning, Web-based Learning and Online Learning.

E-learning: Significance

E-learning is significant in many ways. It

- enables flexible learning where just-in-time learning is possible. It is a means to effective and efficient learning due to its ease of access and the pace being determined by the learner;

- facilitates collaborative internet and web-based learning opportunities to the learners. It supports distance learning with wide area networks (WAN). It addresses the practical side of learning by organising the topics to be taught and creating multimedia CD-ROMs or websites. An important advantage is that hyperlinking is possible and having interactive parts illustrating difficult things or for doing exercises is also possible;
- allows a wider range of learning experiences, such as, educational animation to online learners;
- imparts e-training through the asynchronous and synchronous communication modes, permitting the learners the convenience of flexibility. Asynchronous learning uses technology such as blogs, wikis and discussion boards to allow participants to contribute when time allows. Synchronous activities allow all participants to join in at once with a chat session or a virtual classroom or meeting;
- develops the role competencies of the personnel in an organisation through the use of electronic media. Specialised training is rendered through customised software, which addresses the particular needs of the clientele mostly through the synchronous mode on a dedicated broadband internet connectivity. Equally, it also renders training to the learners through the generic software displaying universal contents in asynchronous mode to the learners through a shared network with limited internet access or on World Wide Web; and
- enhances teaching by professional development of teachers through training on usage of ICT in education. E-learning system like World Links enables the teachers to integrate technology into teaching and thus create dynamic student-centred learning environment in classrooms. The faculties can also interact with their peer groups in the world and exchange ideas and notes on the subject.

Hence, as put by Gupta and Singhal, e-learning is a planned effort towards providing interactive and experiential learning; flexibility in terms of time, place and pace; participation and accessibility; expertise and qualitative subject matter; best resource at the learners' doorsteps and personalised training; and centres round the trainees.

8.3 E-LEARNING: ONLINE DELIVERY OF EDUCATION AND TRAINING

E-learning is basically the delivery of learning via the internet. We can refer to this type of learning as online learning and/or web based learning. With the internet boom since mid-1990s, the concept of online learning has spread broadly. Online learning can be thought of as a subset of the broader e-learning category because it refers specifically to content delivered via the internet or intranet. A growing number of universities and colleges are now offering select set of academic courses via the internet. Universities around the world offer online courses ranging from associate's degrees to doctoral programmes in everything from business administration to criminal justice to nursing. While some programmes require students to attend some campus classes or orientations, many are completely online. In addition, several universities offer online student support services such as online advising, student newsletters, etc.

For the younger children (for example in US) there are free learning sites ranging from those that provide worksheets to those with interactive exercises. But, it is left to the parents to provide continuity, determine and to assemble an overall programme. In addition, there are online subscription services for children that track the children and provide assessment, placement, continuity and reports.

Similarly, there are universities and distance learning systems offering courses online to its learners. Now even the corporate and businesses are using online learning to provide cost-effective training to their employees, partners and customers.

As the number of students taking online classes continues to grow at a quicker pace (owing to the convenience and cost factor) we today have a second wave of online college students who are different. They are students who know the ingredients of a good online class. They are the new savvy consumers of online education. In response to their higher expectations, providers of online education are incorporating increasingly sophisticated teaching approaches, such as, educational animation that address the challenges of presenting dynamic content to learners.

Open source online learning system is growing fast in the education and business world. WebOpenSource.com lists the entire available open source online learning system in the market today. Instructors in education and business organisation may free use it under GNU Software License. One of the best open source online learning system is Moodle. WebClass.com is a professional hosted online learning system based on Moodle.

Internet Forums

ICT facilitates discussion groups, which can enable its participants to exchange ideas, suggestions and discuss crucial pedagogical/educational issues over the internet. This is a facility on the World Wide Web for holding discussions. Hence, the learning community can develop its discussion groups and exchange messages and join in debates through the internet. Some examples of discussion forums are the Manipal Academy of Higher Education Discussion Board, Directorate of Technical Education Discussion Forum, the EDTECH List, which is an international consortium of scholars and teachers; and the HNet that uses communication technology to facilitate the free exchange of academic ideas and scholarly resources thereby advancing teaching and research in arts, humanities and social sciences. Such discussion groups/forums are also referred to as internet forums, web forums, message boards, discussion boards, bulletin boards or simply forums.

A virtual community of teachers, subject experts, professionals, learners and instructors can be developed and they can discuss a number of related themes/topics. Facilities like bulletin boards allow them to dial into the computer system over a phone line and using a terminal programme perform functions, such as, downloading software and data, uploading data and exchanging messages with other learners or teachers. Now it is even possible to have more than one forum dedicated to a particular topic.

As of late, forum software developers have actively encouraged the creation of open source plug-ins, which can be integrated with the software as a means of expansion. Plugins are auxiliary programmes that work with a major software package to enhance its capability. Generally, plug-ins provides more interaction for users and may add special features to the forum software. For example, plug-ins is widely used in image editing programmes, such as, Photoshop to add a filter for some special effect. They are also added to web browsers to enable them to support new types of content such as audio, video, etc.

8.4 E-LEARNING SYSTEMS: VIRTUAL LEARNING ENVIRONMENT

The Virtual Learning Environment (VLE) also called Managed Learning Environment (MLE), Learning Management System (LMS), Course Management System (CMS), Learning Support System (LSS) or Learning Platform (LP) makes possible for a course designer to present to students through a single, consistent and intuitive interface, all the components required for a course of education or training. It makes extensive use of computers and internet to implement all the elements pertaining to learning, such as:

- the syllabus for the course;
- administrative information including the location of sessions, details of pre-requisites and co-requisites, credit information and how to get help;
- a notice-board for up-to-date course information;
- student registration and tracking facilities, if necessary with payment options;
- basic teaching materials. These may be the complete content of the course, if the VLE is being used in a distance learning context, or copies of visual aids used in lectures or other classes where it is being used to support a campus-based course; and
- additional resources, including reading materials and links to outside resources in libraries and on the internet.

Virtual Learning Environment



The above webpage depicts the VLE with:

- navigation menu and icons giving access to automated tools and content pages to the learners;
- self-assessment quizzes which can be scored automatically;
- formal assessment procedures; and

- electronic communication support including e-mail, threaded discussion and a chat room with or without a moderator.

Besides VLE provides differential access rights for instructors and students and causes production of documentation and statistics on the course in the format required for institutional administration and quality control.

All these facilities are capable of being hyperlinked together. Also, easy authoring tools for creating the necessary documents including the insertion of hyperlinks is provided-though it is acceptable for the VLE to be designed so that standard word processors or other office software can be used for authoring. In addition, VLE is capable of supporting numerous courses, so that students and instructors in a given institution (and indeed across institutions) experience a consistent interface when moving from one course to another. Virtual learning software packages like Moodle, works toward a student-centred learning solution by helping educators create quality online courses.

Open Universities and other institutions of higher education are increasingly turning to VLEs in order to:

- economise on the time of teaching staff, especially when they are also involved in research and administration. The extent of the economy over traditional ‘talk-and-chalk’ teaching is not yet clear, but using a VLE almost certainly absorbs less instructor time (and requires less expertise, while producing a more professional result) than creating a home-grown website for a course:
- provide a service for students who increasingly look to the internet as the natural medium for finding information and resources;
- ensure that quality control requirements are met by providing a standard vehicle for collecting the required information; and
- facilitate the integration of distance and campus-based learning or of learning on different campuses.

Rather, open schools and distance education universities should be encouraged to make use of such learning platforms where is possible for every learner to have an access to an online learning space and e-portfolio.

In India, we have conceived an e-learning system namely 'E-Vidyapeeth'. It is a Learning Management System and an e-learning infrastructure product. It has been developed with a vision to transform the internet into a powerful environment for teaching and learning. This system can be used for launching almost all the courses offered by various universities and educational institutions. This system makes it easy to publish documents, lectures and exercises for faculty members and lab faculty members. Besides, it will be a main portal for all the students to get the most up-to-date information for their lectures and exercises. With the help of this system, monitoring student performances will become easier. The system helps in:

- student registration;
- enrollment;
- course delivery;
- online examination;
- discussion;
- chat;
- white board;
- calendar;
- administration; and
- faculty operations

8.5 DIGITAL LIBRARY

According to Wikipaedia, a digital library is a library in which a significant proportion of the resources is available in machine-readable format accessible by means of computers, as opposed to print or microform. The digital content may be locally held or accessed remotely via computer networks.

In libraries, the process of digitisation began with the services in the following order:

First: cataloguing services;

Second: periodical indexes and abstracting services;

Third: periodicals and large reference works; and

Finally to book publishing.

Some of the largest and most successful digital libraries are Project Gutenberg, ibiblio, and the Internet Archive.

Advantages

The Wikepaedia Dictionary has summarised the following advantages of the digital libraries to the traditional libraries:

	Traditional libraries	Digital libraries
• Storage Space	limited	greater with digital information requiring very little physical space to contain them.
• Maintenance Cost	greater owing to payment rent, additional books	lower as they do away with these to staff, book maintenance, fees
• Innovation	casual	innovations in technology is immediately adopted to provide users with improvements in electronic and audio book technology. New forms of communication, such as, wikis and blogs are also presented.
• Physical Boundary	yes	no, as the user need not to go to the library physically. It is widely accessible around the globe with internet.
• Availability	limited	24x7
Access	limited	multiple, as the same resources can be used at the same time by a number of users.
• Approach	time consuming	structured access to much richer content in a more structured manner, i.e. we can easily move from the catalogue to the particular book then to a particular chapter and so on.
• Information Retrieval	time consuming	the user is able to use any search term bellowing to the word or phrase of the entire collection.

- **Preservation** difficult
- **and**
- **Conservation**
- **Networking** no

Digital library will provide very user-friendly interfaces, giving click able access to its resources.

an exact copy of the original can be made any number of times without any degradation in quality.

a particular digital library can provide the link to any other resources of other digital library very easily. Thus, a seamlessly integrated resource sharing can be achieved.

However despite the numerous advantages, certain gaps are to be looked into. Some of these success gaps are discussed below:

Disadvantages

Digital libraries:

- have problems pertaining to copyright laws, as the works cannot be shared over different periods in the manner of a traditional library;
- cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen although this depends heavily on presentation as well as personal preferences; and
- can see some of its content becoming out-of-date and its data becoming inaccessible due to technological developments.

However, despite these disadvantages, the future holds good for digital libraries, as service providers such as Google, the Million Book Project, MSN and Yahoo are undertaking large scale digitisation projects. As digital libraries continue to make improvements in book handling and presentation technologies, such as, through Optical Character Recognition, E-books and Internet Archive, there is a tremendous scope for e-learning today and in times to come.

8.6 DIGITAL PORTFOLIO

According to the Wikipedia Dictionary, a digital portfolio is an evolving tool that documents one's personal, academic and professional development. It is a visual guide that maps out where one has been, where one is going and how one plan to get there. The digital portfolio can also serve as a tool to communicate one's plan to others. Hence, it as much a process as it is a product and is a 'living document' that evolves as one does.

Digital portfolio is a hypermedia document. This simply means that the portfolio is a set of screens (or pages in software terminology) that is linked by buttons on the screen.

When the user clicks the mouse to select a button, the programme reacts typically by navigating to another screen or by showing some additional information.

The opening page of the digital portfolio is an identification of the student and his/her school. In the bar along the bottom of the screen are several buttons; clicking on any of the words in that bar elicits an action. For example, clicking on the 'photo button' allows the user to see a digitised photo of the student. Clicking on the 'information button' shows a screen with additional information about the student, such as his/her years of enrollment and other administrative data. Clicking on the 'instructions button' brings up a screen that tells the user how to navigate through the portfolio.

Digital portfolios are a way of displaying student achievement through class assignments, community service and occupational experience. A digital portfolio means that students can save their work to a disk, a CD, a web page or an internet storage bin. It not only allows students to bring samples of their work to local college and/or job interviews, but it also enables them to send samples of their work at the touch of a keypad to colleges and businesses throughout the country.

Objectives

The purpose of digital portfolio is to:

- allow one to create a tool to assist in presenting what one is learning and planning in his/her personal, academic and professional life and how this learning and planning interconnect;

- provide academic plan that will help one to articulate what one is learning in classes. The portfolios embody student work from every discipline with an emphasis on future academic and career goals. It depicts what one is learning about oneself and one's academic goals;
- depict the personal/professional plan that will help one to reflect on what one is doing outside the classroom and what is one learning. One is, therefore, able to explain the skills and knowledge one has learnt as a result of one's involvement on campus;
- help one to plan professionally and explore career paths;
- serve as a tool to map out one's plan and express one to others. It can also serve as a tool that will help one to keep track of information one will need when preparing for a job or university;
- help professors view the academic, personal and professional goals of a student to get a better understanding of why one is taking a particular course and assist one with his/her personal, academic and professional development; and
- help schools to develop some preliminary answers to questions relating to school improvement plan. These questions may pertain to:

i) What a student of the school should know and be able to do?

The answer to this question is the 'vision' of the qualities that a graduate should possess. The vision needs to be created by the school community, led by the faculty that will be looking for those qualities in their classrooms. Digital portfolios contain the learning goals prescribed by the schools, which the learner has to attain. When a student enters a school, he or she will be given a blank portfolio, containing only screens. The student can browse through the goals and see what it is that he or she is expected to be able to know and do before graduating. One might also expect that incoming students will want to see benchmark performances in goal areas from earlier graduates' folders.

ii) How can a student demonstrate the skills and knowledge that a common graduate should have?

Digital portfolios provide for such demonstrations by students through 'exhibitions' that provide the opportunity for students to demonstrate a skill or

knowledge that is highly valued by the school. These exhibitions or performance based assessments- seminars, research projects, oral and written presentations and timed tests- are completed either individually or collaboratively in the portfolio by the student/s. It allows a school to see what its students have done and to show the community what the school itself is doing. While any kind of information could go into the digital portfolio — including the familiar transcript, report cards and standardised test scores — its strength is its ability to present authentic performance, such as exhibitions, in any media. Thus, digital portfolio, with exhibitions as its core content, presents not only the student but also the values and contours of the school community.

iii) How can the school arrange its system so that all students can exhibit the desired skills and knowledge?

On the basis of the outcomes of students in the portfolio the school can re-look at all its systems -curriculum, pedagogy, assessment, scheduling, administration, and so on -in a sincere way to determine if the decisions it makes are helping students fulfill the vision.

8.7 EDUSAT- INDIA’S FIRST DEDICATED SATELLITE FOR DISTANCE EDUCATION

Indian Space Research Organisation (ISRO) launched a communication satellite called GSAT-3 for exclusive use of education sector. EDUSAT, the Indian Satellite in Education Programme launched in September 20 2004, is India’s ambitious programme to harness satellite technology to reach students in every corner of the country. It aims to provide connectivity to schools, colleges and institutions of higher learning and support non-formal education including developmental communication.

Geographical Coverage

The Edusat is designed to serve for seven years. In these years, the 1950-kg satellite will provide five transponders in the KU Band, each one beamed to cover the northern, north-eastern, eastern, southern and western regions of the country while providing a 45 MBPS broadband link. Another KU Band transponder has the whole of India as its coverage. The KU Band radio signals transmitted, especially in the spot beams, are more powerful than that of the KU Band on the INSAT-3B. This makes the Edusat signals capable of being received with a smaller satellite dish and consequently, the reception terminals become cheaper.

Besides the KU Band, there are another six transponders in the extended C Band. This constitutes a huge resource in bandwidth dedicated to education. The purpose is to connect classrooms with each of the satellite's five spot beams, providing educational programmes to thousands of students.

Usage

Universities and educational institutions will have a studio from where the class will be taken. The teaching can be with a blackboard or even with power point presentations. The lecture is filmed live and uplinked to the satellite, which then broadcasts it to the ground terminals. All colleges and study centres linked to the universities and institutions are provided with two sorts of reception systems- non-interactive and interactive. The non-interactive ones allow the talk with all the audio-visual material to be received. However, questions from the students to the lecturer have to be sent by alternate means, such as over telephone, short message service, fax or email. The interactive terminals, on the other hand, provide a voice channel for students to ask questions.

Services

- it reaches education to remote places where there is dearth of educational institutions, especially in higher education. It can make up for the shortage of teachers, especially in technical programmes. A single teacher/lecturer is able to reach thousands of students across the country/state at the same time;
- a wide range of expertise can be rendered. This teleconferencing mode renders expert and specialist knowledge to the students across the nation by high profile academicians, IT companies, technological institutions, etc. from one place/studio/headquarters. This ensures quality teaching learning environment;
- contents of a lecture, talk, discussion or debate can be stored in a computer file and the students can access it at any time. The content can be made available in CD to the students or learners;
- the primary and secondary schools can be equipped with reception terminals and programmes prepared by respective state education departments and agencies can be broadcast;

- the satellite system can be used to run programmes for soft skills, such as, leadership training, techno-entrepreneurship and career planning, where too the students need to compete with their peers; and
- it enables teacher training.

Edusat Initiatives

- Visvesvaraya Technological University, Karnataka became the first user, linking 120 affiliated engineering colleges to reach 1.3-lakh students in the State with a one way video and two-way audio channel. It has started the live full semester lectures;
- nearly 900 primary schools in Chamarajnagar district of Karnataka are equipped with reception terminals and programmes prepared by the Karnataka Government's Department of State Education, Research and Training are broadcast;
- Kerala has leveraged the telemetry potential of Edusat and linked 45 learning centres, spread across all 14 districts for two way audio and video interaction. Kerala's satellite backed educational initiative, 'Virtual Classroom Technology on Edusat for Rural Schools' (VICTERS), leverages the technology, bottom up, starting with school level education rather than the college and technical end;
- Kerala has launched an 'Eduserve' Project to create a large centralised repository of educational multimedia material. This will enrich the content of education material and can be shared by other states, saving duplication, time and money;
- the YCMOU, Nasik has been given reception terminals at the contact centres, especially those in remote areas. This would enable the subject expertise to reach all the students in such areas;
- the Haryana Government has launched Edusat at 151 government senior secondary schools in urban areas; and
- the nation wide beams are being harnessed by Indira Gandhi National Open University, National Council of Educational Research and Training and the All India Council for Technical Education to reach hundreds of Receive only Terminals and Satellite Interactive Terminals located in schools and colleges, many in remote areas.

Nodal Agency

The University Grants Commission funded 'Consortium for Educational Communication' and the 'Edusat Multi Media Research Centres' are the nodal agencies to help leverage Edusat's potential.

Cost

The reception terminals will have to be paid for by the users, though ISRO has helped users in the pilot phase in providing the reception terminals. Again, generating good content comes at a cost and educational institutions and universities have to pay for content generation.

What is still required is that more valuable content is to be generated to avoid valuable link time getting wasted. Satellite link, which is 24 hours every day has to be maximally used for purposes of information exchange and so appropriate material has to be produced.

8.8 CONCLUSION

It has been oft mentioned in the context of education that e-learning misses the human interaction part owing to virtual teaching and virtual classrooms and some critiques like R. S. Peters argue that the process is no longer 'educational in the highest philosophical sense.' There are others who point out that e-learning software developers tend to limit their focus on course delivery and content, while online education institutions require a much wider range of educational services, especially, the quality and feedback part of it.

No doubt these inhibitions are likely to be raised, especially, by the traditionalist. But these doubts can be solved with the help of a number of learning systems provided by the electronic mode. The web-conferencing programmes, such as, Macromedia Breeze facilitates face to face interactions between the teacher and the learner, thus enabling feedback and expert subject matter to the learners. Again 'blended learning' can be made available by either combining distance learning with direct contact 'close at hand' human educational resources; or combining software driven resources with human intervention (computer mediated- through email or chat; or non-computer mediated- face to face or telephone; or combining software driven resources with any other educational resource TV, radio, books, tapes, etc.).

Also it is important that teachers or trainers should be made to adopt technology in their teaching styles to provide pedagogical and educational gains to the learners. Training programmes should transform the teachers from just being information consumers to that of information producers. They should not only use internet to access resources but they should be able to create, produce and expand this information and add to the information repository.

E-learning has, thus, rendered convenience of online learning to thousands of learners who can not avail the benefits of higher education due to several constraints, such as, of time, cost, geographical location, age, etc. ICT has enhanced distance learning. The teaching community is able to reach far flung areas and learners are able to access qualitative learning environment from anywhere and at anytime. E-learning has proved to be cost effective for both learners and institutions in comparison to the traditional learning. It has fuelled the growth of e-learners in the world today.

8.9 ACTIVITY

You have studied the useful role played by ICT in education and training. Narrate some e-experiments carried out by educational and training institutions in India/abroad.

8.10 KEY CONCEPTS

Computer Based Training : is a general term that relates to all training that is delivered with the assistance of a computer. Delivery of CBT can be via CD, the internet or shared files on a network.

Educational Animation : depictions that support the learning of dynamic content by providing direct information about how changes occur over time.

Hyperlinking : a hyperlink or simply a link is a reference in a hypertext document to another document or other resource. As such, it is similar to a citation in literature. Combined with a data network and suitable access protocol, a computer can be instructed to fetch the resource referenced. Hypertext is a user interface paradigm for displaying documents which 'branch or perform on

request.’ The most famous implementation of hypertext is the World Wide Web.

Managed Learning
: Environment

is a Virtual Learning Environment (VLE) combined with a Managed Information System (MIS).

Moodle
:

is a software package designed to help educators create quality online courses. Such e-learning systems are sometimes also called Learning Management System (LMS), Course Management System (CMS), Virtual Learning Environments (VLE), education via computer-mediated communication (CMC) or just Online Education. Moodle advocates social-constructivism as a pedagogical perspective, whereby learners construct their knowledge through discussions, thereby enhancing their thinking skills. Moodle works towards a student-centred learning solution by building upon a social-constructivist pedagogy.

Blog
:

is a website in which items are posted on a regular basis and displayed in reverse chronological order. The term blog is a shortened form of weblog or web log. Authoring a blog, maintaining a blog or adding an article to an existing blog is called ‘blogging’. Individual articles on a blog are called ‘blog posts’, ‘posts’ or ‘entries’. A person who posts these entries is called a ‘blogger’. A blog comprises hypertext, images and links (to other web pages and to video, audio and other files). Blogs use a conversational style of documentation. Often blogs focus on a particular ‘area of interest’, such as political goings-on.

Blogs can be hosted by dedicated blog hosting services, or they can be run using blog software on regular web hosting services. In the early 21st Century, blogging has quickly emerged as a popular and important means of communication.

A blog has certain attributes that distinguish it from a standard web page. It allows for easy creation of new pages: new data is entered into a simple form (usually with the title, the category and the body of the article) and then submitted. Automated templates take care of adding the article to the home page, creating the new full article page and adding the article to the appropriate date- or category-based archive. It allows for easy filtering of content for various presentations: by date, category, author or other attributes. It usually allows the administrator to invite and add other authors, whose permission and access are easily managed.

Wiki

:

the name is based on the Hawaiian term wiki, meaning 'quick', 'fast', or 'to hasten' (Hawaiian Dictionary). A wiki is a type of website that allows users to easily add and edit content and is especially suited for collaborative writing. The term wiki also sometimes refers to the collaborative software itself (wiki engine) that facilitates the operation of such a website. In essence, wiki is a simplification of the process of creating HTML web pages combined with a system that records each individual change that occurs over time. Some wikis allow completely unrestricted access so that people are able to contribute to the site without necessarily having to undergo a process of 'registration' as had usually been required by various other types of interactive websites, such as, internet forums or chat sites.

A wiki enables documents to be written collectively in a simple mark-up using a web browser. A single page in a wiki is referred to as a 'wiki page', while the entire body of pages, which are usually highly interconnected via hyperlinks, is 'the wiki'; in effect, a very simple, easier-to-use database. A defining characteristic of wiki technology is the ease with which pages can be created and updated. Generally, there is no review before modifications

are accepted. Most wikis are open to the general public without the need to register any user account. Sometimes session log-in is requested to acquire a 'wiki-signature' cookie for auto-signing edits. More private wiki servers require user authentication. However, many edits can be made in real-time and appear almost instantaneously online. This can often lead to abuse of the system.

World Links

:

is a global non-profit organisation whose mission is to improve educational outcomes, economic opportunities, and global understanding for youth through the use of information technology and new approaches to learning.

Microfiche

:

is one of the most compact analogue storage media that provides a comprehensive research library in institutions that could not otherwise afford the floor space. Each microfiche card holds about 100-130 pages depending on the size of the original. A library of 20,000 microfiche, that is, 10,000-20,000 books fits in a cabinet about 1.5×0.5×2 metres.

Synchronous

:

provides for real time communication. The learner and the facilitator are online at the same time. It is a computer-assisted training where the instructor and participants are involved in the course, class or lesson at the same time. Learners receive the content on the screen and may communicate through internet or any other media. Web conferencing is an example of synchronous e-learning. Participants can log on with a trainer and interact with participants at multiple facilities or locations.

Asynchronous

:

computer-assisted training where the instructor and the participants are involved in the course, class or lesson at different times. Participation can be through World Wide Web, threaded discussion boards, blogs and email. Asynchronous mode allows participants to access training materials

round the clock, even when other students and/ or instructor are not present. Rather, asynchronous communication mode may permit the learner and the facilitator not to be online at the same time.

Threaded Discussion
:

is simply a chronological listing of people's comments (with their names linked to their comments). It is a web-based electronic bulletin board. It organises class discussions into easy to read threads (a thread is a single posted message from one person, and to read the thread you simply click on the thread to read the message). The professor or instructor poses a question for the student to answer, and then each student is responsible to respond to the question. It is very simple for students to use and is simple for faculty to customise to their own particular teaching needs.

Each threaded discussion site may have a different look and navigation and will have information on how to use and participate in a discussion.

Learning Management
: System (LMS)

is a software package usually on a large scale that (LMS) enables the management and delivery of learning content and resources to students facilitating 'anytime, anywhere' access to learning content and administration. It is a system for management and tracking of the involvement of participants with specific content, usually with the assistance of a database. Typically, the system tracks who is scheduled to participate in specific training programmes, who has begun the programme, who has completed the training, and what were the participants' test scores. At a minimum, the LMS usually allows for student registration, the delivery and tracking of e-learning courses and content, and testing and may also allow for the management of instructor-led training classes. In the most comprehensive of LMS, one may find tools, such as, competency management,

skills-gap analysis, succession planning, certifications, virtual live classes and resource allocation (venues, rooms, textbooks, instructors, etc.). Most systems allow for learner self-service, facilitating self-enrollment and access to courses.

Some LMS vendors do not distinguish between LMS and LCMS, preferring to refer to both under the term 'LMS', but there is a difference. The LCMS, which stands for 'Learning Content Management System', facilitates organisation of content from authoring tools and presentation of this content to students via the LMS. LMS are based on a variety of development platforms, from J2EE-based architectures to Microsoft .NET, and usually employ the use of a robust database back-end. While most systems are commercially developed, free and open-source models do exist. All LMS cater to and focus on different educational, administrative and deployment requirements. Open source LMS is growing fast in the education and business world.

Authoring tools
:

is a software application used to create multimedia content typically for delivery on the World Wide Web. This can include several types of tools including: HTML editors and e-learning Authoring Tools.

An HTML editor is a software application for creating web pages. Authoring tools can enable, encourage and assist users (authors) in the creation of accessible web content through prompts, alerts, checking and repair functions. It is just as important that all people be able to author content as it is for all people to have access to it. The tools used to create this information must, therefore, be accessible themselves. Adoption of these guidelines will contribute to the proliferation of web content that can be read by a broader range of readers and

authoring tools that can be used by a broader range of authors.

Hypermedia
:

an extension to hypertext that supports linking graphics, sound and video elements in addition to text elements. The WWW is a partial hypermedia system, since it supports graphical hyperlinks and links to sound and video files. New hypermedia systems under development will allow objects in computer videos to be hyperlinked.

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8.12 ANNEXE

A. India Must Quickly 'Light Up' for Science

Without urgent new initiatives in cutting-edge, high-speed networking in research and education, India will fall further behind the world leaders.

Despite its claim to the status of a software superpower, India stands virtually at the bottom of the world table when it comes to high-speed networking and digital connectivity dedicated to research and education. This is the conclusion of an International Committee of Scientists dedicated to the task of monitoring and

promoting networking and connectivity initiatives for research communities across the world.

Using data from the worldwide passive monitoring of networks, the Committee found that India lags at least ten years behind the world leaders, the United States and Western Europe. It is at least three to four years behind countries, such as, Brazil and China, and only two to three years ahead of the Central Asian Republics and Africa.

This gap, the Committee warns, has been widening steadily and will worsen without urgent new initiatives. The urgency of the problem can be gauged by comparing the development of networking in Brazil and India over the past six years. While both countries had 1 mega bit per second (Mbps) connectivity in 2000, the core of Brazil's research network today has 10 gigabit per second (Gbps) connectivity, the standard for high-speed networking in the United States and Europe. Indian science can currently muster only a maximum of 622 Mbps, an international link for demonstration purposes between the Tata Institute of Fundamental Research (TIFR) and Japan. Scientists at TIFR, Mumbai, where the demonstration is currently situated are hopeful of making this a permanent link. Among the networks being planned or partially implemented, the National Grid Computing Initiative GARUDA – being implemented by the Centre for the Development of Advanced Computing (C-DAC), Pune, and the Educational and Research Network (ERNET) – envisages the fastest network speeds with 100 Mbps as access bandwidth.

Harvey Newman, Professor of Physics at Caltech, USA, and the Chair of the Standing Committee for Interregional Connectivity of the International Committee on Future Accelerators (ICFASCIC) that authored the report, presented this data in his lecture at the Sixth International Conference on Computing in High Energy and Nuclear Physics (CHEP06) currently being held at TIFR. Speaking after his presentation, Professor Newman said that there appeared to be no organisation in India charged with the mission of providing leading-edge high-speed bandwidth to education and research. China, on the other hand, handed over 30,000 km of 'dark fibre' rolled out some years ago to CERNET, its educational and research network, to 'light up.' This network is currently moving to a 10 Gbps backbone. This follows the worldwide trend of national education and research networks acquiring or moving to acquire 'dark fibre' expressly for education and research purposes.

A senior Indian networking specialist agreed that the need for a dedicated, cutting-edge, high-performance research and education network, supported by government and industry, was not appreciated in India. This had led to a significant lag in development of research network infrastructure in India, affecting support to science and engineering

research and education. In response to a question about Indian ownership of a good fraction of international bandwidth, Professor Newman said the ‘available bandwidth does not mean just the size of the cable.’ Suitable equipment and installations were needed effectively to utilise the cable for actual connectivity that would be available for other organisations to service the users.

Professor Newman said the growth of connectivity also depend crucially on the business model in place for the pricing of bandwidth. If the goal was substantially to recover cable cost by charging the initial customers heavily and utilising only a small part of the capacity, then the explosive growth of digital connectivity seen elsewhere would not happen. A better model was one in which most of the capacity was available for use early, and research and educational users were encouraged to demonstrate the potential of the high available bandwidth. A suitable concessional tariff for the research and education sector would more than repay the concession in its contribution to development work and in the demonstration effect for the potential customer base.

Senior Indian high-energy physicists at the Conference privately concurred with the assessment of their foreign colleagues on the inadequacy of networking for research and education in India. However, Professors Atul Gurtu and Sunanda Banerjee of TIFR were hopeful of starting a fresh chapter with the current negotiations for their 622 Mbps link through VSNL, which are likely to yield a price that would be competitive by international standards.

T. Jayaraman

Feb. 17, 2006, The Hindu

B. Smooth Passage from Books to Bytes

Extending the reach of libraries through e-books

Five –minutes walk away from the Bugis station of Singapore’s Mass Rail Transit system, a spanking new sixteen-storey tower block is testimony to the fact that the era of digital libraries is already here. While e-books or electronic versions of books have been available for at least two decades, the island state is arguably the first to translate the technology into a virtual reality for its citizens.

And not just for readers in Singapore. From Bangalore, I could register within minutes to become a user of Singapore’s National Library at its portal, [www. nlb.gov.sg](http://www.nlb.gov.sg) and access an awesome range of resources – including its newly created digital library.

Tamil Works Repository

This includes e-books and dozens of special databases. A link took me to the National Library Board – World e-book library, where I could locate the archives of Project Madurai – a repository of rare Tamil works. In seconds, I located Kalki’s classic novel ‘Sivakamiyin Sabadam’ and could download the first 47 chapters in PDF format.

The library’s registered readers in Singapore have the option of downloading and reading at home up to four books at a time – the same number that they were able to hitherto borrow.

The collection includes many recent publications for which the library has obtained the rights to electronically distribute; the titles tend to be popular works of both fiction and non-fiction.

From India, I could also access the digital collection of the British Library in Singapore, which is linked by the National Library. This contains many rare books and pictures, which are part of Singapore’s history.

Indeed the total number of e-book resources is already over 500,000. Dozens of periodicals in English, Chinese and Tamil – the island’s official languages – are also available for online reference, although some are restricted to within the system’s 24 libraries.

Doubling Resources

The physical collection housed in the National Library Board headquarters is just over 600,000 items – so one can see how quickly the e-library option can help a library scale up and almost double its searchable resources.

Having become the first in the world to harness the technology of RFID – Radio Frequency Identification – to tag every book in its collection, Singapore’s National Library has gone where few libraries have ventured – into an e-enabled digital future.

Indian Niche

Interestingly, the mechanics of e-publishing – converting printed texts into-machine-readable electronically distributable versions – is something of an Indian niche.

Tech Books, Versaware, First BPO...these are just three in a long list of names of e-publishing specialists, which have an operation in the Maharashtrian city of Pune that involves dozens of subject experts who help fuel the electronic versions of leading international technical journals and books. Tech Books, in fact, is a Singapore-based corporate.

Anand Parthasarathy

Jan. 5 2006, The Hindu

UNIT 9 E-COMMERCE

Structure

- 9.0 Learning Outcomes
- 9.1 Introduction
- 9.2 E-commerce: Meaning and Tools
 - 9.2.1 Intranet
 - 9.2.2 Extranet
- 9.3 E-commerce: Benefits
 - 9.3.1 Organisations
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 - 9.3.3 Society
- 9.4 E-commerce: Limitations
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 - 9.4.2 Non-Technical Limitations
- 9.5 Electronic Payments
- 9.6 Electronic Trading System
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- 9.8 ICTs and Banking
- 9.9 Computerisation of Treasury System
- 9.10 Conclusion
- 9.11 Activity
- 9.12 Key Concepts
- 9.13 References and Further Readings

9.0 LEARNING OUTCOMES

After studying this Unit, you should be able to:

- explain the meaning of e-commerce;
- describe the ICT tools applied in processing commercial transactions;
- examine the benefits and limitations of e-commerce;

- explain the meaning of electronic payments and electronic markets;
- highlight the role of ICTs in banking operations; and
- describe the role of computerisation in facilitating the treasury system.

9.1 INTRODUCTION

The enormous potential of Information and Communication Technologies (ICTs) to fundamentally transform the nature of economic growth and development has induced both wide-ranging hopes and apprehensions. ICTs are fast flowing phenomenon with rapid and successively overlapping waves of technical advancements and market transformation. The induction of ICTs has provided a platform for economic growth in the countries across the world.

In this Unit, we will discuss the applications of ICT in the financial and commercial sector of the economy. We will discuss about various applications such as e-payment, e-trading, e-markets, e-banking and e-treasury that facilitate e-commerce. To begin with, we will explain the meaning of e-commerce and various tools facilitating it.

9.2 E-COMMERCE: MEANING AND TOOLS

Conducting business electronically using networks and internet is known as electronic commerce. Electronic commerce (EC) is an emerging concept that describes the buying and selling of products, services and information via computer networks, including the internet. EC uses several technologies ranging from Electronic Data Interchange (EDI) to e-mail for commercial transaction processing.

EC applications began in early seventies with innovations, such as, electronic transfer of funds. However, the applications were limited to large corporations and a few small businesses. Then came Electronic Data Interchange (EDI), which expanded EC from financial transactions to other kinds of transaction processing and extended the types of participating companies from financial institutions to manufacturers, retailers and other forms of business. Today, EC is rapidly outgrowing its limited operational sphere to everywhere in the entire globe.

Intranet, Extranet and requisite computer hardware and software are used in processing EC transactions. We will now discuss these tools individually.

9.2.1 Intranet Commerce

The use of intranet is increasing rapidly not only as an internal communication system, but also as a facilitator of electronic commerce. It uses internet-based technology to provide access to a variety of information on a firm, most of which would otherwise require multiple software licenses, substantial data conversion time and different user interfaces. Intranets can facilitate electronic commerce inside a corporation, as they can be used in selling corporate products to employees and/ or selling or trading services and products among business units. Intranet can facilitate external trade as well.

Intranet can facilitate transaction processing in the following ways:

- **Efficient Transaction Entry**

Wherever appropriate, data needed by systems to support financial functions are entered only once and are updated through electronic means, consistent with the timing requirements of normal business or transaction cycles. This helps in reducing errors in transactions, as they are now maintained electronically.

- **Common Transaction Processing**

Common procedures are used for processing similar kinds of transactions, which permit the transactions to be reported in a consistent manner.

- **Consistent Internal Controls**

Internal controls over data entry, transaction processing and reporting are applied consistently throughout the system to ensure the validity of information and the protection of financial resources (Source: unknown).

Intranet is well suited to replace many paper-based information delivery systems within a firm, resulting in lower costs, easier accessibility and greater efficiency. Client access to certain parts of a firm's intranet via an extranet is a value-added service at relatively low cost that acts as a powerful marketing and communication tool.

9.2.2 Extranet Commerce

The exact definition of an extranet is still evolving, but the most universally accepted one is a network that links business partners to one another over the internet by tying together their intranets. The term 'extranet' comes from 'extended intranet'. The main goal of extranet is to foster collaboration between organisations.

An extranet uses the same basic infrastructure components including services, TCP/IP, email and web browsers as the internet. It makes communication over the internet secured. It links the company's intranet with suppliers, customers and trading partners. Extranet may be used, for example, to allow inventory databases to be searched by outsiders or to transmit information on the status of an order. An extranet enables people who are located outside a company to work together with the company's internally located employees.

An extranet, like an intranet, is typically protected by a firewall and is closed to the public. It is open to selected suppliers, customers and other business partners who access it on a private wide area network over the internet or on a Virtual Private Network (VPN), which increases security and functionality.

9.3 E-COMMERCE: BENEFITS

Few innovations in human history encompass as many benefits as electronic commerce. The global nature of technology, low cost, opportunity to reach millions of people, interactive nature, variety of interaction possibilities and resourcefulness and rapid growth of the supporting infrastructure, especially the internet, result in many benefits to organisations, individuals and society. These benefits are just starting to materialise, but they will increase significantly as EC expands.

We will discuss the benefits of EC in terms of:

- Organisations
- Consumers; and
- Society

9.3.1 Organisations

EC expands the market place to national and international markets. With minimal capital outlay, a company can easily and quickly locate more customers, best suppliers and most suitable business partners worldwide. In addition, it:

- decreases the cost of creating, processing, distributing, storing and retrieving paper-based information;
- allows reduced inventories and overhead by facilitating 'pull-type supply chain management'. In a pull-type system, the process starts from customer order and

uses just-in-time processing. This allows product customisation and lower inventory cost;

- reduces the time between the outlay of capital and receipt of products and services;
- supports Business Re-engineering Process efforts. When processes are changed, productivity of salespeople, knowledge workers, and administrators can increase by cent percent or more;
- lowers telecommunications cost; internet is much cheaper than value-added networks (VANs);
- helps small businesses to compete with large companies;
- enables organisations to reach customers outside their immediate area at a minimum cost;
- allows organisations to reach a wide range of suppliers, thereby reducing the cost of supplies and services;
- permits the creation of efficient markets in an industry in which buyers and sellers can share benefits;
- allows companies to auction surpluses or obsolete products quickly with little expenses; and
- facilitates global trade, allowing companies to penetrate foreign markets.

9.3.2 Consumers

EC:

provides customers with more choices; they can select from many vendors and from more products; • frequently provides customers with less expensive products and services by allowing them to shop in many places and conduct quick comparisons; • allows quick delivery of products and services; • enables customers to shop or do other transactions 24 hours a day, year round, from almost any location; • permits customers to receive relevant and detailed information in seconds, rather than in days or weeks; • enables consumers to get customised products from PCs to cars at competitive prices; • makes it possible to participate in virtual auctions; • allows customers to interact with

other customers in electronic communities and to exchange ideas as well as compare experiences; and • capitalises on the general movement from a market-centric to a customer-centric environment.

9.3.3 Society

EC:

enables more individuals to work at home and to do less travelling, resulting in less traffic on the roads and lower air pollution; • allows some merchandise to be sold at lower prices, so less affluent people can buy more and increase their standard of living; • enables people in third world countries and rural areas to enjoy products and services that otherwise are not available to them. This includes opportunities to learn professions and earn college degrees; and • facilitates delivery of public services, such as government entitlements, by reducing the cost of distribution and increasing the quality of the distributing system.

9.4 ELECTRONIC COMMERCE: LIMITATIONS

There are technical and non-technical limitations in the successful implementation of EC in the country. We will discuss the technical and non-technical limitations separately.

9.4.1 Technical Limitations

The technical limitations are as below mentioned:

- there is lack of system security, reliability, standards and communication protocols;
- there is insufficient telecommunication bandwidth;
- software development tools are still evolving and changing rapidly;
- there are difficulties in integrating the internet and EC software with some existing applications and databases;
- there is need for special web servers, in addition, to the network servers (additional cost);

- there is possible problem of interoperability, meaning that some EC software do not fit with some hardware or is incompatible with some operating systems or other components; and
- accessibility to the internet is still expensive and/or inconvenient for many potential customers.

However, these limitations can be overcome with time. Appropriate planning can help in minimising them.

9.4.2 Non-Technical Limitations

Other than technical issues, there are non-technical issues that centres EC. These issues are given below:

- many legal issues are yet unresolved;
- government regulations and standards are not refined enough for many circumstances;
- benefits of EC, such as, web advertisements are difficult to measure. In addition, the methodologies for justifying EC are still in the developmental stage;
- EC is still evolving and changing rapidly. Many people are looking for the situation to stabilise before they enter EC operation;
- customers resist change. To switch from a real to a virtual store may be difficult for many people. It seems that people do not yet sufficiently trust paperless, faceless transactions;
- there are not enough support services. For example, copyright clearance centres do not exist and quality evaluators or qualified EC tax experts are rare;
- there is a perception that EC is expensive and unsecured, so many do not want to use it yet;
- there is not yet sufficiently large number (critical mass) of sellers and buyers that is needed for profitable EC operations; and
- EC could result in breakdown of human relations.

Despite these limitations, rapid progress is occurring in EC. As experience accumulates and technology improves, the ratio of EC benefits to cost will increase, resulting in a greater rate of EC adoption.

9.5 ELECTRONIC PAYMENTS

In EC, payments between buyers and sellers can take place electronically or can be done off line. There are different modes of e-payments. Some of them are briefly mentioned below:

- **Electronic Cash**

Despite the use of cheques, credit cards and other methods of payments, cash is still the most prevalent consumer payment instrument. Merchants prefer cash as they do not have to pay commission to credit card companies and they can put the money to use as soon as it is received. In addition, some people pay with cash because they do not have cheques or credit cards, or they want to preserve their anonymity.

- **Electronic Cheques**

E-cheques are similar to regular cheques. They are secured by public-key cryptography and are even suitable for some micro payments. Here is how they work:

Step one

The customer establishes a electronic cheque service with a bank or financial institution;

Step two

The customer contacts a seller, buys a product or a service, and e-mails an encrypted electronic cheque; and

Step three

The merchant deposits the cheque in his or her account; money is debited in the buyer's account and credited to the seller's account.

Like regular cheques, e-cheques carry an encrypted signature that can be verified. The payer can attach additional information to the cheque. Properly signed and endorsed e-cheques are exchanged between financial institutions through electronic clearinghouses. An e-cheque can also be used as a payment instrument in EDI applications.

- **Electronic Payment Cards**

Electronic payment cards have been in use for several decades. The best known are credit cards, which use magnetic strips that contain limited information, such as the card's number. A more advanced form of this card is the one that you use in your library to pay for photocopies or to pay for telephone calls. Such cards store a fixed amount of prepaid money and each time you use the card the respective amount is reduced.

However, e-payments are not commonly made use of due to the following reasons:

- **Lack of Security**

Securing payments is complicated and expensive. There is no single established standard for providing security for transactions on the internet. Multiple competing standards create confusion for customers and merchants.

- **Handling Micro Payments**

Many electronic commerce transactions are valued at only a few dollars or cents. The cost of processing such micro payments needs to be very low as one would not want to pay \$5.00 to process a purchase valued at only a few dollars, especially, when many payments are even less than \$1.00.

- **Inconvenience**

The buyer must find the transaction convenient. Buyers like to select a payment method, such as, using a credit card that gives them free use of money for up to 50-60 days. However, credit card processing is too costly for micro payments.

- **Incompatibility**

There must be compatibility between the buyer and seller with respect to the methods and standards of payment. If you like to pay with electronic cash, for example, the vendor must be able to accept it.

For these reasons, many EC transactions include non-electronic or semi-electronic payments. For example, when you place an order electronically, you give your credit card number over the telephone or mail a cheque. However, paying with such traditional and non-electronic methods too has several limitations.

To increase security of e-payments, a sender can sign a message electronically with what is called a digital signature. Again, electronic certificates can be issued by a trusted third party, called a Certificate Authority (CA) to verify that specific public

keys belong to specific individuals. In addition to a name, a certificate may verify age, gender and other attributes of the individual to whom the public key belongs. In addition, if the CA is not well known to the user of the certificate, it may be necessary to certify the CA by another more trustworthy legal body. Certificates are valid till the expiration date. It has to be signed by the CA. To assure that a specific sender has indeed sent a given message, the sender attaches his or her digital signature by using his or her own private key. The receiver can use the sender's public key to verify that the specific sender has sent the message. The given message and the digital signature are transmitted together but are encrypted in two different keys by the sender and decrypted in two different keys by the receiver. This will help in ensuring security for both the sender and receiver.

9.6 ELECTRONIC TRADING SYSTEM

ICTs have created paradigm shift in the securities market operations through electronic trading system. Stock exchanges all over the world have realised the potential of the new technologies and have moved on to electronic trading systems. The major changes that have swept the international financial markets since 1975 have been accelerated by the use of computers. Enormous strides were taken towards the computerisation of trading systems in both financial markets and brokerage office. In the late 1980s and in the 1990s the developing countries also moved towards liberalisation of stock markets as part of their reform programmes and attempted to attract foreign capital.

The electronic trading system (ETS) pioneered by US plays a critical role in stock trading. ETS is a set of computer terminals connected via high-speed communication lines to a central host computer. It involves the use of the internet as the medium to communicate orders to the stock exchange through a broker's website. Bids (buying), offers (selling) and trade requests can be entered from even remote terminals. Once a trade is done, confirmation is almost instantaneous and reported immediately to the investor. Computerised order routing and trading has not only enhanced the efficiency of order execution but has also led to the development of new products and trading techniques. ETS has been employed in some instances to replace and in others to complement traditional physical open outcry markets.

9.7 ELECTRONIC MARKETS

Electronic markets are rapidly emerging as a tool for conducting business and commercial transactions. A market is a network of interactions and relationships where information, products, services and payments are exchanged. When the marketplace is

electronic, the business centre is not a physical one but a network-based location where business interactions occur.

In electronic markets, the principal participants-transaction handlers, buyers, brokers and sellers-not only are at different locations but seldom even know one another. They meet online or through the web and all necessary transactions including transfer of money are handled electronically through the net.

Electronic Retailing and Malls

For generations home shopping from catalogues has flourished and television-shopping channels have been attracting millions of shoppers for over a decade. However, television shopping is limited to what is shown on the screen and paper catalogues are sometimes inaccurate. Who would not enjoy the convenience of shopping just by sitting down in front of a computer? The web is open 24 hours a day, 7 days a week, offering a wide variety of products including the most unique items, usually at a lower price. And even if you have to pay the same price, you do not have to spend time for the same or wait for salespeople or push your way through hordes of shoppers. And frequently, you can get your package the next day at no extra cost. Finally, you can shop from anywhere at any time.

Electronic retailing is direct sale (business to customers) through electronic storefronts, usually designed around a catalogue format. Some companies, such as, Wal-Mart sell to corporations as well, usually at discounts for larger quantities. Electronic retailing is mushrooming on the web. There are two types of vendors, namely, solo storefronts and electronic malls. Solo storefronts maintain their own internet name and web site and may or may not be affiliated with electronic malls. Whereas, electronic mall, also known as cyber mall, is a collection of individual shops under one internet address. The basic idea of an electronic mall is the same as that of a regular shopping mall, to provide a place that offers many products and services at one location. Some cyber malls include diverse stores, while others deal with one type of goods, such as, clothing or sporting goods etc.

ICT also enables one stop shopping over multiple malls known as meta malls. Meta malls allow customers to shop in different department stores and many individual stores using one search engine to find items. In addition, it enables the customers to pay only once in a highly secure system. Meta mall can provide other services, such as, comparative pricing and finding substitute products.

9.8 ICT AND BANKING

ICTs are also being used in the banking sector facilitating banking operations and transactions. With the application of ICTs in banking operations and computerisation of banks, banking activities have become easy, efficient, speedy and transparent. With the setting up of ATMs one may get the banking services at any place in the country.

This has lessened long queues in the banks. Rendering online banking services has offered users an unprecedented level of control over their finances. Electronic banking has enabled capabilities ranging from paying bills to securing loans electronically.

There's no waiting until the monthly statement to find out the awful truth about that sudden shopping spree. With a few mouse clicks you can move money to or from other accounts, maximising the interest you receive on savings or minimising bank charges.

While online banking gives you control, many of us may still be worried that if we can view such sensitive information online, then so can others. The banking industry insists that its security technology has improved and the customers can have confidence in the system.

9.9 COMPUTERISATION OF TREASURY SYSTEM

With computerisation of treasuries, the efficiency and accuracy of financial transactions had been improved tremendously. The Treasury Information System (TISNIC) – version 3.0 software helps in:

- bill passing;
- budget controlling;
- on line cheque generation;
- receipt accounting; and
- accounting through computer at the treasury level and generating information for the State Government, Financial and Statistical Directorate, DDO's, HOD's, etc.

9.10 CONCLUSION

There is a profound impact of ICTs on the functioning of vital sectors of the economy today. Commerce, trade, agriculture, banking, rural development is affected by the

electronic transformation being brought about by various technologies like internet and web. Financial and commercial transactions have been facilitated through electronic mode of payments, electronic trading system, electronic markets and electronic banking. Infrastructure in the form of institutions for software development, more resources in terms of finances and professionals and security is very much required to make e-economy more viable.

9.11 ACTIVITY

1. By now you would have got enlightened with the role and applications of ICTs in various sectors of our economy. Please let us know the role played by ICTs in budgetary functions of the government.
2. Narrate about any experiment or software existing for rural economic development in our country.

9.12 KEY CONCEPTS

- E-commerce : business that is conducted over the internet using any of the applications that rely on the internet, such as email, instant messaging, shopping carts, web services, UDDI, FTP, and EDI, among others. Electronic commerce can be between two businesses transmitting funds, goods, services and/or data or between a business and a customer.
- EDI : short for Electronic Data Interchange, the transfer of data between different companies using networks, such as VANs or the internet. As more and more companies get connected to the internet, EDI is becoming increasingly important as an easy mechanism for companies to buy, sell and trade information. ANSI has approved a set of EDI standards known as the X12 standards.
- Extranet : a buzzword that refers to an intranet that is partially accessible to authorised outsiders. Whereas an intranet resides behind a firewall and is accessible only to people who are members of the same company or organisation, an extranet provides

various levels of accessibility to outsiders. You can access an extranet only if you have a valid username and password and your identity determines which parts of the extranet you can view. Extranets are becoming a very popular means for business partners to exchange

TCP : abbreviation of Transmission Control Protocol and is pronounced as separate letters. TCP is one of the main protocols in TCP/IP networks. Whereas the Internet Protocol deals only with packets, TCP enables two hosts to establish a connection and exchange streams of data. TCP guarantees delivery of data and also guarantees that packets will be delivered in the same order in which they were sent.

WAN : a computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local-area networks (LANs). Computers connected to a wide-area network are often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the internet.

Pull type : to request data from another programme or computer. The opposite of pull is push, where data is sent without a request being made. The terms push and pull are used frequently to describe data sent over the internet. The World Wide Web is based on pull technologies, where a page isn't delivered until a browser requests it. Increasingly, however, information services are harnessing the internet to broadcast information using push technologies. A prime example is the PointCast Network.

VAN : Value Added Network refers to a private network provider that leases communication lines to its subscribers. VANs provides specialised services,

such as, assisting with EDI, extra security, message delivery or access to a particular database.

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ଓଡ଼ିଶା ରାଜ୍ୟ ମୁକ୍ତ ବିଶ୍ୱବିଦ୍ୟାଳୟ, ସମ୍ବଲପୁର
Odisha State Open University, Sambalpur

www.osou.ac.in
e-mail: info@osou.ac.in