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An Overview on Information and Communication Technology (ICT) and Its Recent Applications

Dr Subhash Kumar Sharma
Assistant Professor
Department of Electronics
MGPG College , Gorakhpur

Dr Anil Kumar Mishra
Assistant Professor
Department of Physics
MGPG College , Gorakhpur

Abstract

Now a days Information and Communication Technology (ICT) plays an important role in our life. ICT is an extended term for Information Technology (IT) which provides access to information through telecommunication. It is mostly based on communication technologies. It integrates computer system/hand held system, audio video display and Internet. Information and Communication technology is used in most of the fields such as Education, Agriculture, Medicine, Defense , E-governance , E-Commerce, Banking, Transport, etc. With the advances in technology, computing infrastructure and the need to automate and reduce cycle times, ICT is playing a vital role.

Keywords: Information, Telecommunication, computing, Internet.

1. INTRODUCTION

In earlier days, every work was done manually. Due to improvement in technology, new inventions were found and used in many fields. It reduces time, work load of man power, increases productivity. Systems were automated. Information Communication Technology is used in many fields in day to day life. Some of them are discussed here.

ICT APPLICATIONS

A. ICT IN EDUCATION

In the earlier days, before ICT was implemented, education system was firm. The knowledge gained was based on the information that were in the text books and the limited skill set of the teacher. So there was a huge difference in the education given by various institutions. Due to financial constraints not all teachers could travel to different places to impart education. The typical classroom setup where the teacher wrote on the blackboard and the students copied the data was marks oriented. The system was boring and monotonous. It also resulted in a random evaluation because of lack of identical standards for assessment. The assessment was always based on the current performance and there was no comparison with the previous results, and the actual improvement can be achieved by evaluating the mistakes in the previous assessment and suggesting ways to correct them, but there was no database maintained to ensure that the evaluation of the pupil is preserved. Only a basic report was given out that could map the marks obtained to

his performance and there was no development after that Now with e-learning in place the skill set of a teacher is no more a hindrance as all students have access to top class education. School broadcasting, webcasting of important lectures and direct class teaching can help the students in a big way. In the recent years, there been an increase of interest in how computers and internet could best be bound to enhance the efficiency and effectiveness of education. ICTs also include legacy technologies namely telephone, radio and television which are now not given much importance but have a long and rich history. ICT education also includes power point presentations for better understanding of the students. LCD projectors can be used for effective training.

Fig 1: ICT in Teaching & Learning

Types of ICTs which are commonly used in education:

1) E-learning: E-learning is basically linked with higher level training, which involves harming at both, official and casual level, which makes use of internet, LAN, WAN, partially or completely, for proper communication or interaction.

2) Blended Learning: This type of learning combines traditional method of teaching with e-learning methods. For example in the University of Manchester teachers give hand outs referring to a particular lecture along with which the slides are also uploaded and updated on the university learning management system (LMS). Students could also communicate with the professor through emails or LMS.

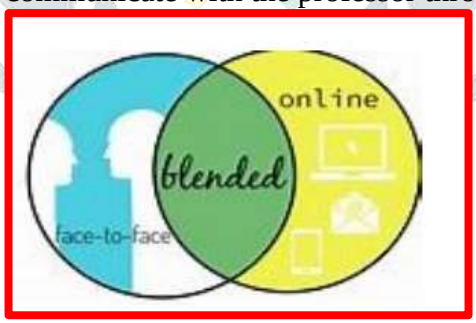

Fig 2: Blended Learning

3) Open and distance learning: The Commonwealth of Learning defines this kind of learning as "a way of providing learning opportunities that is characterized by the separation of teacher and learner in time or place, or both time and place".

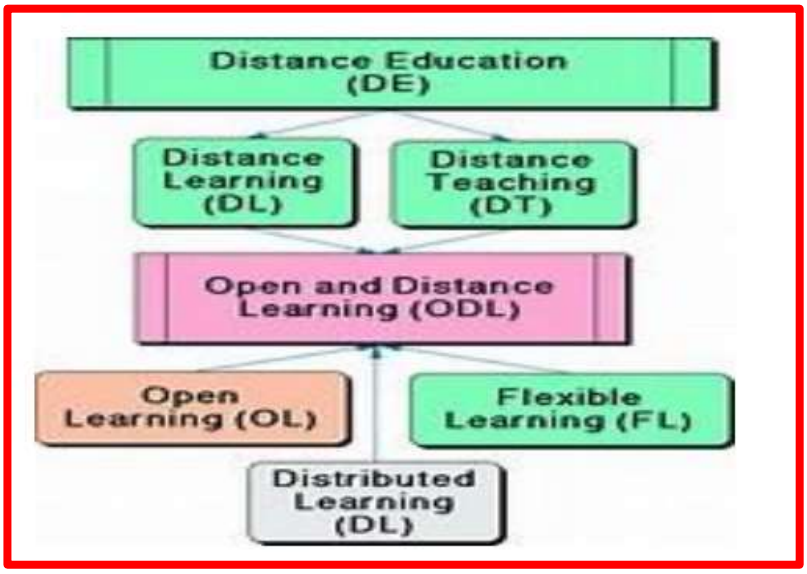

Fig 3: Distance Education

In developing nations, ICTs have the capacity to increase access to and improve quality of education. It therefore represents an equalizing strategy for developing nation. ICTs greatly improve the way knowledge could be acquired and absorbed. It also offers developing nations immense opportunities to improve their educational systems and widen the range of opportunities for the poor .ICTs are extremely powerful tool for providing unbelievable educational opportunities to girls or women who were previously deprived of education due to cultural ethics, or to persons with some kind of disabilities and to poor who could not afford enrolling themselves on campus or elderly who could not attend institutions which were quite far or due to health reasons. With ICT, they have access to a large number of e-books, ejournals, articles or research done by scholars. These materials would be available on the Web anytime and can be accessed from anywhere. ICTs also facilitate access to research done by organizations like IEEE and other researchers and their publications. The future of education technology is all about the cloud. The future education will be mostly based on self-learning. Self-learning refers to anywhere access and anywhere learning. Teaching and learning is going to be social in future. Things are already starting to move this way with the exposure of massive open online courses. Education system will need only one major requirement to be prepared for the future that is the fast and strong internet connection. Infrastructure is paramount to the future of technology in education. With the cloud, the world will be our classroom.

B. ICT IN AGRICULTURE

Food is the basic need for living organisms, without food nothing can survive in this world. Agriculture is the only resource for the production of food. Agriculture is an important sector with the majority of the rural population in developing countries. The sector faces major challenges of enhancing production in a situation of dwindling natural resources necessary for production. The growing demand for agricultural products gives an opportunities for producers to improve their income. Information and communication technologies play an important role in stating these challenges and raising the income of the poor. The benefits of ICT in agriculture include updated information on agriculture related issues such as new varieties release, new threats, weather forecast, pricing control, warning alerts etc.

Fig 4: ICT in Agriculture

ICT in enhancing agricultural productivity:

- The demand of food markets has raised competition and in the production of producing desirable results in the agriculture sector has brought opportunities to include more smallholders into supply chains.
- Information about pest and disease control, especially early warning systems, new varieties, new ways to optimize production and regulations for quality control.
- Better of markets resulting from informed decisions about future crops and commodities and best time and place to sell and buy goods. Market information on prices for commodities are live intimated.
- Agriculture has become flexible and easier by reducing the manual work.
- Overcomes the increasing demand of labourer.
- Reduce social isolation, widen the perspective of local communities in terms of national or global developments, open up new business opportunities and allow easier contact with friends and relatives.

Knowledge is the new paradigm for the future of food and agriculture. From now on, "nourishing people must go hand in hand with nurturing the planet". The future of farming is totally based on machine and technology oriented.

C. ICT IN MEDICINE

Information and Communication technology has brought many changes in medical education and practice in the last couple of decades. The patient records are stored in paper before ICT was implemented but now all has changed. Each and every record are stored in database by the means of technology. All the diseases oriented information are also stored in databases for reference.

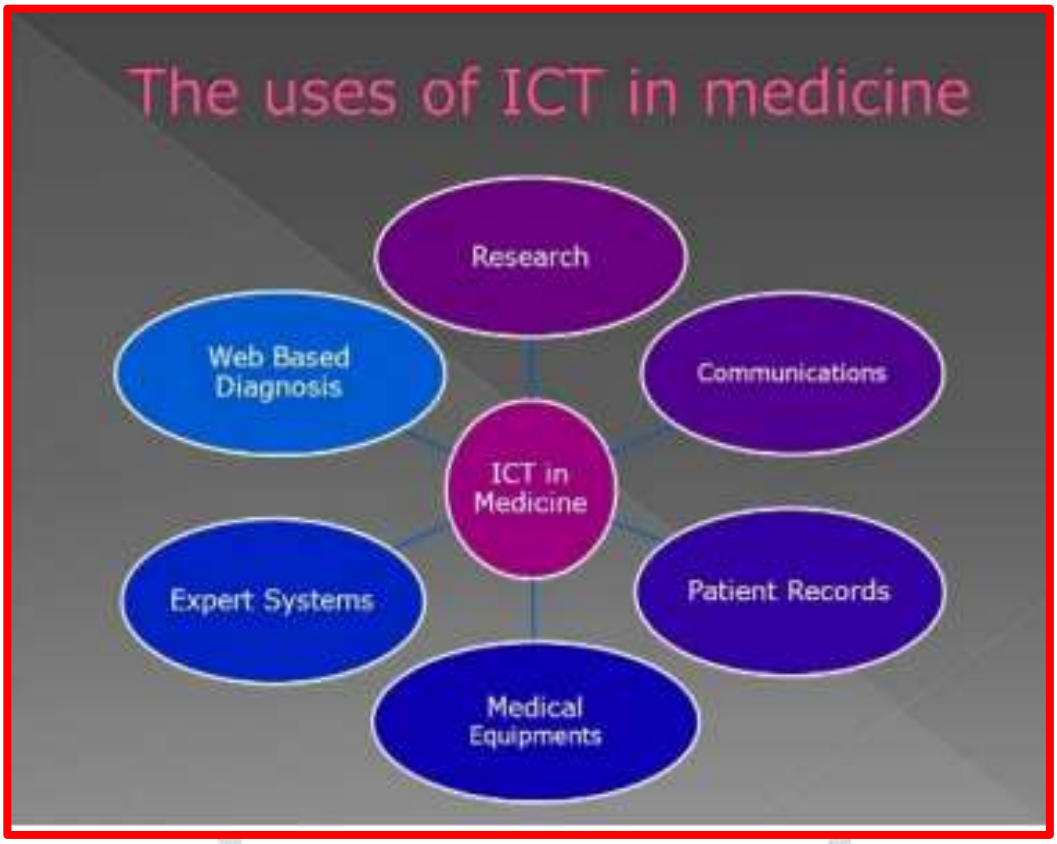

Fig 5: Uses of ICT in Medicine

Develops in medical sector are having dramatic effects on patient care both in terms of treatment and administration. The use of ICT has helped to develop new cures and treatments to help patients suffering from a range of illness. Most of the diseases are cured by the equipment which have emerged in terms of technology. Using computerized equipment refers to MRI, CT scanner, EEG, ECG machine. The use of medical information exchanged from one site to another via electronic communication to improve patient‟s clinical status. E-channeling also plays a vital role in medicine, e-channeling refers to channeling doctors over the internet.

E-health: E-health refers to the use of Information and Communication Technologies in healthcare. An emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies.

Fig 6: ICT in Medicine

The future technology of medicine will be completely based on the nanotechnology, robotics, etc. The world of medicine will adequately be cured by equipment like laser technology and many other new instruments.

D. ICT IN DEFENSE

Defense of the nations have had a strong impact by Information and Communication Technology. ICT and defense industry have strong and progressive relationship. Both have a direct or positive relationship to one another. Advancement in ICT brings benefits to the development in defense industry and vice versa. The traditional economy used dumb bombs, people-centric network battlefields management, aftermath combat, land and sea approach, hardware based force multipliers all these practices lead to inefficiency.ICT had transformed the industry from producing dumb bombs to smart weapons, from people-centric to network-centric battlefields management, from aftermath combat review to real-time combat surveillance, from land and sea to airand outer space superiority, and from hardware-based to software based force multipliers. Defense sector is one of the vital economic units in most nations. It produces weapons and special equipment of war. Some nations have develop their defense sector to the extent of exporting the equipment to others. In general, defense industries outputs can be categorized into two - hardware and software, just like the ICT industries. Cyber warfare is the future technology of defense. It has been defined as the use of technology to disrupt the activities of an organization. Some governments have made it an integral part of their overall defense strategy, with some having invested heavily in cyber warfare capability. Cyber warfare is essentially a formalized version of penetration testing in which a government entity has established it as a war fighting capability.

Fig 7: ICT in Defense

This capability uses the same set of penetration testing methodologies and applies them, in a strategical way to

- Prevent cyber-attacks against critical infrastructure
- Reduce national vulnerability to cyber attacks
- Minimize damage and recovery time from cyber attacks

E. ICT IN GOVERNMENT

E-governance is the application of Information and Communication Technology (ICT) for delivering government services, exchange of information, communication transactions, integration of various stand-alone systems and services between government to citizen, government to business, government to government, government to employees, etc., The goal of government to citizen is to offer a variety of ICT services to citizens in an efficient and economical manner, and to strengthen the relationship between government and citizen using technology. There are several methods of government to customer e-governance. Two-way communication allows citizens to message directly with public administrators, and cast remote electronics votes and rapid opinion voting. Transaction can be completed online or through mobile. Mundane services such as change of name or address, applying for services or grants, or transferring existing services are more convenient. E-governance to employee is the relationship between online tools, sources, and articles that help employees maintain communication with the government and their companies. E-governance with employees allows learning technology in one simple place through online system. The benefits of government to employee expansion include:

Fig 8: ICT in Government

E-payroll: maintaining the online sources to view paychecks, pay stubs, pay bills, and keep records for tax information. E-benefits: be able to look up what benefits an employee is receiving and what benefits they have a right to. E-training: allows for new and current employees to regularly maintain the training they have through the development of new technology and to allow new employees to train and learn over new materials in one convenient location. The future of e- governance relates to safeguarding the legal rights of all citizens, an equally important aspect is concerned with ensuring equitable access to public services and the benefits of economic growth.

F. ICT IN E-COMMERCE

E-Commerce is a transaction of buying and selling of goods and services through network that is the internet. E-Commerce includes internet marketing, chain management, transmitting of data and funds, online shopping etc. E-tail is another source used for the transaction process in online shopping. Online shopping includes purchase of books, music, in the form of digital distribution. These transaction may occur between business to business, consumer to consumer, business to consumer and vice versa. The benefits of e-commerce is easy accessibility, availability of goods and services, accessing speed, anywhere access, shipping etc. This system grows mainly for its secure e-commerce.

Fig 9: ICT in E-Commerce

Online retailing: Online retailing is the form of electronic commerce which allows us to buy goods or service to sellers over internet.eg: Amazon.com

Online auction: An online auction is a service in which auction users sell products or services through internet. Virtual auctions facilitate online activities between buyers and sellers in different locations and geographical areas.

G. ICT IN BANKING

Traditional banking system was a very tedious process. The branches were open only from 9am-3pm Monday to Friday, which was very inconvenient for people who worked for full time. Banks had to employ staffs to deal with customers as this was the only way that services could be provided. Information and Communication Technology in Banking helps customer to open accounts, check balance, money transaction, pay bills, and print statements through online. Most of the banks offer online banking and some banks offer Internet only banking. Banking process can be performed 24 hours without any time limitations. Online bank reduces the work of man, no need of standing in queue, it is a time consumption process.

Fig 10: ICT in Online Banking

E-banking is the future of banking system, e-banking will involve new products and services that were not feasible in traditional banking models. Internet only banking may also become more workable for the purpose of e-banking systems and customers adapt to the new ways of conducting their financial activities.

H. ICT IN TRANSPORT

In ancient days, transportation in India included Human pulled rickshaws, Bicycles, Cycle rickshaws, Bullock carts or by walking. All these kind of transportation medium has not been much convenient for the people. As days passed in order to overcome these issues transportation has brought buses, autos, cars, jeep and many other mediums of transport into existence. Other modes of transportations like railways and airways also did not serve much, only limited seats were available. Passenger have to stand in queue for booking the tickets and there were too many issues in the traditional system. Modern transportation implemented Information and Communication Technology in transport system to comport the society. ICTs has brought many changes in transportation booking system and transportation medium like online ticket reservation for roadways, airways, etc. Cabs can also be booked with the help of applications through online.

Fig 11: ICT in Transport

The future of transportation may lead to driverless automated vehicles, and all the booking system will be reserved only through online system.

CONCLUSION

The evolution of Information and Communication Technology has brought drastic changes and development in several fields. The future life will only be based on technology. Access to the Internet today by several sectors has created a global market for Internet service and has declined an increased productivity in the technological communication field. As we venture farther into the Information Age, the nature of life is evidence that future global development will undoubtedly depend on technological advances, particularly in communications. Understanding the underlying reasons certain types of technologies are in use today plays an important part in the overall use of technology.

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