CHAPTER - II

HISTORY AND DEVELOPMENT OF CLASSROOM TECHNOLOGY: AN OVERVIEW

2.0 Introduction

Education reached students by oral communications, many centuries ago. All the ideas, instructions, customs were transmitted to future generation as stories, making accurate memorization of critical skills. However, by the fifth century B.C, hand written documents were existent in significant numbers in ancient Greece. Written materials, mostly by hand, were in circulation only to those who could afford them. Scrolled manuscripts handwritten by monks existed by around 1200 AD. For the reason that the method of writing on scrolls was so laborious, also only single copy would be available in the library, so students were usually forbidden direct access to such manuscripts. As the old adage states, “necessity is the mother of invention”, the immense need for a solution to this, further led to the revolutionary impact on Education by the invention of the printing press. The mass printing of books made it possible for schools and students to have textbooks.

Technological progress can be considered as the most prime factor motivating the growth of human civilization. As early as 1920s, the British Broadcasting Corporation (BBC) began propagating learning oriented radio programs for schools. Television was said to be first used in education in the 1960s. From the early 1980s until today, we have seen computers become personal, not only for scientists and businesses but also for educational purposes. When new technology was being acquainted within the computer classes, it was considered as a useful tool in the regular classroom. This came to light exactly when self-motivated educators were looking for ways to improve their presentation of teaching material, make learning interactive for students, and provide latest and appropriate information. This integration of technology in the classroom began in around the time when the first Personal Computers (PC) arrived to the market. It became easier for people to purchase and house a computer in a classroom. The process of teaching and learning has since undergone its own evolution and revolution, from fact-focused and dependent upon traditional pedagogy to a more thoughtful process, with prime focus on critical thinking and problem solving.
20th century technology developed rapidly. New technology enhanced transport and communication, thus spreading technical understanding. Rapid progress of technological and scientific knowledge enabled people to make innovative things and assisted humans to explore arenas that they could not previously imagine to reach. Scientific instruments were used to study nature in extra detail than our senses could actually perceive.

In the 1990s, education reform was about choice and innovation, where both software and the hardware were getting more complex with the advent of more powerful PCs, the World Wide Web (WWW), and the propagation of e-mail. It is the 90's that began to see technology supplement instruction in Education. The more advanced countries saw the advent of Computers in school and university classrooms by the early 1980s. Also, by second half of the 1990s, the Broadband connection to academic campuses became commonplace. But the scenario in developing countries seemed to be very limited. According to McCormicks (1992) in the early days of computers in schools, a common rationale for the investment in hardware and software was the idea of awareness about computers. This was based on the view that schools had a vital responsibility to familiarize students to this emerging technology and in order to prepare them for the future fact that one day computers would have a crucial role to play in their daily lives. Computer literacy to students was the initial objective with which Education saw the use of ICT in the classroom.

Then by 2000s, with the rise of portable technology and “smart” devices bringing more connectivity, in the classrooms, technology continued to supplement instruction in more seamless ways. Teachers began using technology oriented syllabi, Learning Management Systems (LMS) and classrooms saw more ubiquitous access to Internet.

In a span of every three decades, computers bring a new surge of things. By 1950, Simulation began in the world by modeling various events and at 1980s Communication revolution by connecting people. Since 2010 through embodiment, computers have began to involve with physical world in a non trivial world (Lampson, 2012).

In the year 2002, the Massachusetts Institute of Technology (MIT) started making its open access recorded lectures available to the public, through its OpenCourseWare
project. *YouTube*, a video sharing website that can be used to share educational lectures, was started in 2005.

Currently, with the rise of tablet PCs and other hand-held, flexible, multi-functional devices, we are witnessing technology becoming an integrated tool in classrooms. It is allowing teachers to express information more proficiently and are paving way for students to study, understand and explore more effectively. For the first time in our human history, visualizing personalization of learning for each individual student has become a reality. With newest technologies on the rise, it has made school environment to be very challenging as well as exciting to see what future years will bring as a technological progress.

### 2.1 Major Information Technology Tools Used In Education

#### 2.1.1 Online learning environments

In 1995, the Web facilitated the progress of the first Learning Management Systems (LMS), like WebCT (which later turned into Blackboard). These LMSs offer an online education environment, where content can be pre loaded and organized, and also provide ‘academic spaces’ for student activities, learning, assignments and student discussion forums. By 1995, the earliest fully online courses started to appear where few used LMSs and others just loaded text as slides or PDF. Lecture capture systems made LMS to come to the mainstream in online learning by around 2008. *McAuley et al. (2010)*, in Canada used Web to build the new online learning medium known as Massive Open Online Course (MOOC). This community linked webinars, blogs and tweets by experts to students. Although it was in 2012, lecture-capture based MOOC on artificial intelligence was launched by professors of Stanford University that attracted more than hundred thousand students, and since then MOOCs have progressed rapidly around the globe.

#### 2.1.2 Social media

Social media are a community based collaborative media that cover a wide range of different applications, including wikis, Facebook, blogs, Twitter, You Tube videos, Skype etc. *Kaplan and Haenlein (2010)* define social media as- “a group of Internet-based applications that allow the creation and exchange of user-generated content,
based on interactions among people in which they create, share or exchange information and ideas in virtual communities and networks”.

2.1.3 Internet

Internet has revolutionized human communication system by breaking beyond barriers of geographical location in such a way that world is now a “Global Village”. Internet is a worldwide network system that use TCP/IP protocol to transmit data through different kinds of media. The terms World Wide Web (WWW) and Internet are often made used interchangeably, but the fact is that the Internet refers to the global communication system, including the hardware and its infrastructure. While the WWW is one of the services that is communicated over the Internet. The Internet is the most economical communication system, where following services are immediately available: email, video conferencing, Online movies, Online gaming, Data transfer, file-sharing, Instant messaging, online forums, Social networking, Online shopping, Information retrieval, Financial services etc.

The Internet saw its humble beginning as ARPANET initiated by the U.S. government, which began building a computer network in the 1960s. Later, in 1995 the system after some evolutions was changed by newer networks owned by commercial Internet Service Providers (ISP). This made the Internet more accessible by public at around this time on a larger scale. Statistics agree the by 2011, Internet was actively used thirty percent of the global population was using the.

2.1.4 YouTube

YouTube is a most popular video sharing website. The registered users of this website can upload videos and then share it to all. Another important feature is that the videos can also be inserted in other sites. YouTube was first developed by the former PayPal employees, in year 2005 and later was bought by Google in 2006.

2.1.5 Educational Websites

The Educational websites are group of websites whose objective is to make learning both fun and interactive by introducing games and other useful media. For example, MathWorld, Fact Monster, Bitesize, Khan Academy etc.
2.1.6 Word Processors

Word Processors are simple computer applications that are used to create, edit, and print documents. Microsoft Word or MS Word developed by Microsoft is one of the most commonly used word processor. The first version of MS Word was released in year 1983. MS Word offers a number of features for easy creation and editing of documents, like: WYSIWYG (what-you-see-is-what-you-get) display, Spell check, Text formatting, Page layout features, Compatibility with numerous other programs. Currently, .docx is default file format.

2.1.7 Spreadsheets

Spreadsheets are interactive computer applications that help in analysis and organization of data in tabular form. Microsoft Excel or MS Excel developed by Microsoft is one of the most commonly used Spreadsheets. It offered some essential features to carry out basic calculations, create graphs, pivot tables etc.

2.1.8 Presentation Software

Presentation software are the applications used to display information in the form of a slide show. Microsoft Powerpoint developed by Microsoft is one of the most commonly used Presentation Software. The application can be used to present information rich in multimedia.

2.1.9 Chat

Chat is the process of communicating for exchanging messages through Internet using a chat-enabled service or application. It is also known as online chat, chatting or Internet chat. Chat involves delivering messages in the form of text, audio, visual, images etc. For instance, Video chat is an online direct visual communication among Internet users using a web camera and a dedicated application. Video chat is usually used when video-based communication is incorporated into a preexisting service. Skype is a example for video-based communication application. Video chat is also known as video conferencing and video calling.

2.1.10 Google Docs

Google Docs is a online document managing application for creating, editing both private as well as public documents that can be stored in Google cloud or on Personal
Computer (PC). These documents can be accessed from any Internet PC where files can be viewed by other members with the document owner’s approval.

2.1.11 Online Maps and Globe

Online Maps are the diagrammatic representation of geographical elements available for access through Internet. Google Maps, Wikimapia, Google Earth, Bhuvan are examples of online map and globe services. For instance, Google Earth is one of the widely used virtual map, globe and cartographic program earlier termed as EarthViewer 3D.

2.1.12 Blogs

Blogs are the informal websites, similar to an online diary/journal, with entries in chronological order sometimes about a specific concept. Common examples of blogs include Teachers blogs for the purpose of classroom instruction, information sharing among teams etc. Educators who blog are called edubloggers. An edublog is a blog formed for educational purposes. Edublogs help student learning by through reflection, inquiring by self, collaboration, creativity and by creating interactive learning environments.

2.1.13 Wikis in the Classroom

Wikis are collective website where the users contribute to its content building activity. Registered users are given the rights to create and edit contents, which helps in easy sharing of information along with features to collaborate and connect with others having common interests. Wikis is an example of Web 2.0 technology that lay emphasis on user-generated content, its usability, and mainly interoperability. Wikis can be aptly denoted to as “Wisdom of Crowds”, referring to its collaborative feature.

2.1.14 Android cell phone

The Android cell phone is a smart phone based on Android Operating System (OS) mostly with a touch screen feature, multiple connectivity, Internet browsing, video playback, camera etc. An Android device may be a smartphone, tablet PC, e-book reader or any type of mobile device. Nexus is an example for the Android Smart phone.
2.1.15 Educational Games

Educational games are designed to impart vital skills among humans, very often about a specific subject. These interactive Games help in learning problem solving, interaction, adaptation, creativity etc by simultaneous fun and entertainment. KnowRe which is a personalized Math learning game.

2.1.16 E-book reader (e.g., Kindle)

The E-book readers refer to portable electronic devices that enable users to read e-books, e-magazines, e-newspapers etc through smart phones, Personal Digital Assistants (PDA) and Tablet PCs. E-ink displays in these readers provide user with the same experience of reading a print book and are less straining to the eyes. Due to its minimal power consumption, the e-book readers are said to operate for long hours. Kindle is an example for an E-book reader.

2.1.17 Smart class

A smart classroom is a classroom that has an instructor equipped with computer and audio-visual equipment, allowing the instructor to teach using a wide variety of media. These include smart interactive white board, DVD's, PPT's and more, all displayed through a data projector. Smart class is a digital initiative of EDUCOMP, which is rapidly transforming the way teachers teach and students learn. With the help of school curriculum, smart classes bring in technology right next to the blackboard for teachers in the classroom. This makes learning an enjoyable experience for the students while improving their overall academic performance in school (UKEssays, 2013).

2.1.18 Search Engines

Search engines are computer programs that helps to find particular information on the Internet based on keywords provided by users. Search engines like Google, Yahoo! and Bing help users to search for information on the WWW.

2.1.19 Accelerated Reader

Accelerated Reader (AR) is software for students of kindergarten to 12th grade. AR are used for monitoring reading. AR was developed by Renaissance Learning, Inc. The two versions of AR are: a desktop and web-based.
2.2 Information Technology in Education: Indian Scenario

Under the Constitution of India, Education is a concomitant subject, with a sharing of duties between the Ministry of Human Resource Development at Centre and Departments of Education at States. Management of schooling has been by tradition, controlled by the District and State administration. With innumerable new initiatives started by the Government of India, it is quite clear that our country is on the threshold of a sea change in the field of Education.

India has the world’s largest population in the age group of 5-24 years and also is expected to continuously increase as one of the world’s highest working population. Considering this reality, the Education system in India should be able to produce a globally competitive students. Literacy in India is one of the important factors fuelling socio-economic progress. Today, IT has transformed India's image from a slow developing economy to a land of innovative Entrepreneurs. About 2.5 million direct employment is generated in India by the IT sector. Now, India is one of the biggest Information Technology capitals of the modern world (Kamdar, 2006).

Slateboards were used in India since 12th century AD, and blackboards by around 18th century. However, Radio is among the first ICT device used in India where educational programmes started being broadcasted in 1937, through School Broadcast Project, simultaneously from all Indian Metropolitan cities. Radio proved to be a foremost educational medium for imparting adult education and civic progress. The Indira Gandhi National Open University (IGNOU) as part of distance learning programme, adopted the next series of radio programmes as the worthy successor of the University Broadcast Project (1965) and the Language Learning Project (1979-80). The “Gyan Vani”, a most widespread FM Radio channel was started in 2001 to provide day-to-day educational programmes.

The implementation of technology in Education has been exponentially growing in India. Also the Government has introduced new initiatives with a focus to utilize the modern IT tools in the best possible manner. It is attempted to give a bird's eye view of such initiatives below:

The importance of ICT applications in Education was recognized by India, as early as in 1984-85 through the Computer Literacy And Studies in Schools (CLASS) Project. Around Twelve thousand computers were disseminated to secondary and higher
secondary schools. It included 2598 schools comprising 325 Kendriya Vidyalayas. The review of the initiative has revealed that in spite of challenges in implementation, an extremely encouraging response was generated in the various states like Andhra Pradesh, Chattisgarh, West Bengal, Manipur and Tamil Nadu.

The National Task Force on IT and Software Development formed in 1998 recommended setting up of computers in all Higher Secondary/ Secondary Schools. Also, the relevant recommendations made are: Shikshak Computer Scheme, School Computer Scheme and Vidyarthi Computer Scheme. These schemes were supported by some initiatives like reduced PC costs, bank loans with easy installments etc.

The Information Technology Act of year 2000, laid emphasis on technical higher Education, such that best placement opportunities would be available to students in the evolving IT sector in India. This also was augmented by the Science and Technology Policy of year 2001, for the teaching Science at school and college levels.

The Government of Karnataka in 2001 under the *Mahiti Sindhu project* had started a comprehensively financed computer education project for students of classes 8th to 10th.

The first Indian satellite designed solely for serving the educational sector named *EDUSAT* was launched by the Indian Space Research Organisation (ISRO) in year 2004. The primary objective of this system was school and college Education, apart from the support to non-formal Education. The launching of INSAT series of satellites were significant milestones in the promoting and development of ICT in educational sector.

The Central Board for Secondary Education (CBSE) has developed “Saransh” which is an state-of-the-art Online self-assessment tool. It could be made used by schools to analyze their performance aggregately. The tool also helps in analyzing the learning level of each student and compare the same with regarding to all CBSE schools at various levels. It is an efficient tool with data of 2.02 crore students & 1.5 lakh teachers belonging to 15,000 schools for a period of 7 years.

A *National Digital Library (NDL)* project has been set up to create collection of e-resources on various subjects for educational purposes. Also, it can establish a platform for qualified teachers of central institutions like IIMs etc. to provide online
courses free of cost. “Swayam”, a massive online open course platform is planned to be hosted on a virtual cloud. Provisions are made through this platform to receive certificates for tests conducted related to the courses.

Moreover, All India Council for Technical Education (AICTE) has created a separate portal in 2011 to enable potential students to which colleges to pursue studies. This portal is backed by a searchable database of all accredited colleges in India with their detailed profiles.

A Geographic Information System (GIS) platform has been utilized by the Ministry of Human Resource Development (MHRD) to chart the entire country in order to categorize habitations where elementary and secondary schools have not yet stepped in.

The Government, apart from initiating scheme has latest technology tools has also brought in new schemes and projects like ”Saksham” to make the Education system viable to the needs of the differently abled' children. Under this scheme, differently-abled students will be provided with a scholarship of upto 30,000 Rs. per year to pursue diploma and undergraduate level course in technical institutions approved by AICTE.

Government has also provided pre-loaded tablet PCs with educational text and video materials, a helpline to enable the students to clarify educational doubts along with 50 mentoring centers across the country accompanying virtual classrooms.

Moreover, a new initiative to bring world class scientists, teachers and entrepreneurs from across the globe to teach in India has been set up which is called as Global initiative for Academic network (GIAN). GIAN aims to augment the country's existing academic resources, and elevate India's technological ability to reach global excellence.

*Rashtriya Avishkar Abhiyan* has been introduced by the Government to revive students’ interest in Science and Technology through innovative learning based on experimentation and observations.

The Government of India has also launched the *Sarva Shiksha Abhiyan* (SSA) meaning Education for All Movement. SSA aims to widespread elementary education in a time-bound method, opening new schools and to enhance prevailing school,
provides grants for developing complementary teaching resources in digitized format. SSA’s main objective in this technological era is to offer computer education to bridge the digital divide.

The Digital India initiative by the Government is launched with a vision to alter India into a knowledge economy and digitally empowered society. Under this initiative all schools will be connected with broadband, Wi-fi will be provided freely in all secondary and higher secondary schools, a digital literacy programme would be introduced and Massive Online Open Courses (MOOCs) will be developed for e-Education. National Optical Fibre Network (NOFN), is all set to expand broadband connectivity and provide faster network. NOFN is anticipated to be the progressive catalyst for promoting e-learning in India.

The Ministry of Human Resource Development (MHRD) also has undertaken several long-term strategies to make sure promote, develop and optimize ICT tools in Indian classrooms along with the traditional outlines of knowledge dissemination. The University Grants Commission (UGC) also launched numerous schemes like setting up of Network Resource Centres in universities, and colleges to promote better integration of ICT in syllabuses to make the next generation of students. Another prestigious projects undertaken by MHRD, along with IITs is the most recent, National Mission on Education through Information and Communication Technology (NMEICT) seeks to holistically transform the educational sector in India by an aggressive movement to implement ICT based education, network access to remote locations, enhance e-content quality, as well as empowering students by providing Akash tablet PCs. Also, the Sakshat website aims to provide quality content where learners can avail open access content.

As a revolutionary step towards creating a knowledge society without boundaries, the National Knowledge Network (NKN) was approved by Government in 2010. NKN is a multi-gigabit network, whose drive is to connect educational institutions in India with a unified high speed network. NKN believes that this fosters collaborative research and knowledge sharing. The entire NKN aims to seamlessly integrate the global scientific community at multiple gigabits per second speed. As on May 2014, NKN has commissioned 1261 operational links to Institutions and also 66 Virtual Classrooms have been set up.
With all the progressive initiatives to empower students with technology, the expectation is that more benefits will accumulate for cause of education in the coming years which is bound to take India at a much faster pace towards the goal of a developed nation.

2.3 Conclusion

Traditional classrooms has evolved from restricted learning to current technology based classrooms. In the recent decade, computers have walked into various aspects of our life and recently its presence has been empowered by the union of computer and communication technologies. The place of computer technologies in schools has evolved from objects of study to tools for teaching, learning and administration. The affinity towards computers is literally fuelled by Internet and the communication technologies, which are set to cause another revolution through their usage and growing influence of life and society.

2.4 References


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