ICT Tools for Modern Education

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***Abstract*— The present era is the era of technology, with information and communication technology (ICT) being the most important of the technologies. The influence of ICT on the teaching and learning process has become very important as it facilitates the teaching process, creates a favorable learning environment and helps learners to develop creative thinking and self-confidence. It is a force that plays a vital role in all aspects of human life. It integrates the world and changes the entire global economic, social, political and educational landscape. Global growth and development as a whole depend to a large extent on the skilled workforce achieved through quality education. ICT is an educational product, but it is mainly used by business subjects. It gradually transformed education from traditional to higher education, influencing teaching methods, learning methods, scientific research and information gathering. Therefore, this article suggests that the effective introduction of ICT into the teaching process and modern tools for blended learning and teaching are indispensable means to improve it, to develop students, teachers and end-users and to explore potential for future growth and development.**

***Keywords*— ICT, Teaching, Learning, Education, Tools.**

I. INTRODUCTION

IT and ICTs are very often interchangeably used in the context of modern technology infrastructure. ICT is a broad and comprehensive term, which comprises information technology and communication technology. Information technology includes radio, television, computer and internet, teleconferencing and mobile technology. All these information technologies are powered by mainly two types of communication technologies. These are satellite based communication and terrestrial based communication. Satellite based communication is the communication, which takes place between sender and receiver through a communication satellite whereas terrestrial based communication is the communication, which takes place through a network of transmitters spread across a geographical area, a country, or a state. This type of communication is used in the transmission of radio and television in India. However, with the launch of a series of satellites by Indian Space Research Organization (ISRO), satellite based communication is being used for telecommunication. The components of ICT are presented in Fig.1.1

Communicating information effectively by making use of appropriate technology is called information and communication technology (ICT). In all, ICT is an umbrella term that includes many communication devices such as radio, television, cellular phones, computers and network, satellite systems and so on. There are many definitions of ICT. ICTs are defined, as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information.(Blurton, 2002)" These technologies include computers, the Internet, broadcasting technologies (radio and television), and telephony, etc. According to the United Nations Development Programme (UNDP): "ICTs are basically information handling tools — a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information. They include the "old" ICTs of radio, television and telephone, and the "new" ICTs of computers, satellites and wireless technology and the Internet. These different tools are now able to work together, and combine to form our "networked world", a massive infrastructure of interconnected telephone services, standardized computer hardware, the Internet, radio and television, which reaches into every corner of the globe." According to C-DEC, Department of Information Technology, Government of India "the term, information and communication technologies (ICT), refers to forms of technology that are used to transmit, store, create, display, share or exchange information by electronic means. This broad definition of ICT includes such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these

technologies, such as videoconferencing, e-mail and blogs."

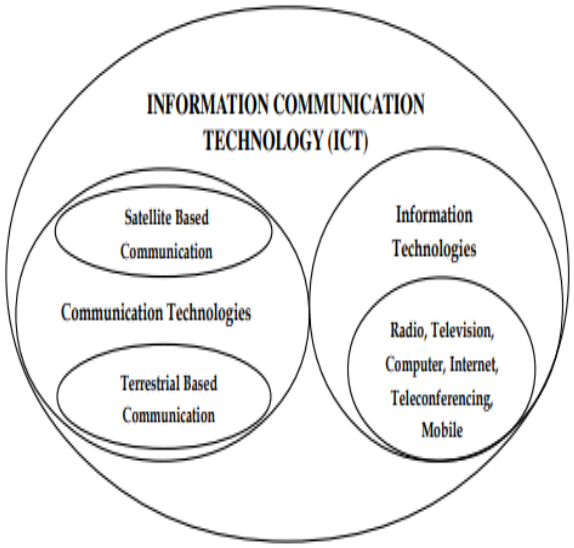

Fig.1.1: Components of ICT

II. ICT FOR TEACHINGAND LEARNING

The ICTs are needed at school and college level for the following activities

- Teaching-learning
- Diagnostic Testing and Remedial teaching
- Evaluation activities
- Psychological analysis of learners
- Development of reasoning and thinking abilities among students
- Instructional material development

2.1. ICT in Teaching-Learning Process

Most teachers feel comfortable in using lecture method, which is not capable of achieving various objectives of classroom instruction. ICT may be of great use in achieving various objectives of teaching –learning process. It provides correct information in a comprehensive manner with different examples. It helps learners to broaden their information base. ICT provides variety in the presentation of content, which helps learners to learn according to their own pace. It helps in better understanding, and long retention of information.

2.2. ICT for Diagnostic Testing and Remedial Teaching

Being a teacher, you must have experienced that there are some students who fail to understand certain concepts or retain certain information for a long time. Due to large class size, non-availability of diagnostic tests in different subjects, lack of training, resources and desire on the part of teacher, etc. teachers do not conduct diagnostic tests and provide remedial teaching. Here ICT can help the teachers as well as students in identifying the problem area. Tests can be made available on the website of the school and students can access them from home also. These practices can be monitored by parents also. It is not easy to organize remedial programme for individual students as problems identified may be of varied nature. For this, ICT can be used for developing, preparing and delivering individual Remedial Programme. These programmes may be online or off-line.

The instructional materials, if designed specifically for meeting the individual needs of students, and are uploaded on the School website, would definitely benefit students. In this way, ICT can be used for providing remedial teaching to students.

2.3. ICT in Evaluation

The objective of school examination system is to assess the academic performance of students. ICT can be used in educational evaluation. Online tests can be used by individual student to evaluate his/ her learning. Students can instantaneously get the feedback about the status of his/ her understanding. If the answer is wrong, he/ she even can get the correct answer. Not only students, even teachers, can also use it to assess their own understanding of the subject.

2.4. ICT in Psychological Testing

There are individual differences. Schools do not have a trained psychologist who can assess students on some of the correlates of academic achievement. It is easy to digitalize all the psychological tests including the scoring process and evaluation. The same may be available on the website and students and teachers can use them, whenever required. Even student can use it individually and can share the results with the teacher who can help him/ her to improve his/ her academic performance. Thus ICT can be used in psychological testing also.

2.5 ICT for Developing Reasoning and Thinking Abilities among Students

ICT can be used in many subjects. ICT provides students a variety of instructional materials and they can choose those that suit them the best. ICT can be used for developing reasoning and thinking abilities among students belonging to different age groups. This is important in the present context as most educational institutions do not pay attention to development of reasoning and thinking abilities among students.

2.6. ICT for Developing Instructional Materials

At present there is a shortage of qualified and competent teachers in almost all subjects at all levels. Sometimes, instructional materials available in the print form are not of quality and updated. The text book reading is very often not enjoyable and does not help students in understanding the concepts and retaining the information. There are many teachers who are well known in different subject areas. Their lectures should be recorded in CD-ROM, or should be made available to all the users through broadcast on radio and television. It enhances the quality of instruction in the classrooms. The teacher can also use them to organize discussion after their presentation or broadcast. Teachers can even directly download those lectures. It makes teaching effective, participatory and enjoyable. Digitalized lectures can be uploaded on websites and student teachers can access them as per their needs.

III. MODERN TOOLS FOR ICT

Information and Communications Technology plays a prominent role in student learning when only the teachers are efficient at incorporating them into curriculum [3]. ICT has also become integral to the teaching-learning interaction, through such approaches as replacing chalkboards with interactive digital whiteboards, using students' own smartphones or other devices for learning during class time. When teachers are digitally literate and trained to use ICT, these approaches can lead to higher order thinking skills, provide creative and individualized options for students to express their understandings, and leave students better prepared to deal with ongoing technological change in society and the workplace. Survey was also conducted to identify the list of ICT Tools used by teachers frequently for Classroom Teaching-Learning [7]. Lot of ICT tools are available for Building courses, creating exams, preparing MCQs, getting feedback from students and making assessments. Maximum of the ICT Tools are very user friendly and provide numerous options to make it as personalized as possible, enabling the teacher to create our own contents. Students can listen to / follow the lessons once prepared by teachers and do their homework also. When ICT Tools are used by the teacher properly, they can understand, what are the struggles faced by the students, which kind of students struggle the most.

3.1. ICT Tools used for Quizzes

- **BookWidgets** -Worksheets, simulations, games & more for use in classrooms and multi-touch books
- **Classkick** - Easy real-time feedback & formative assessment.
- **Classmarker** - Easy online testing
- **Classtools** - Several classtools of any kind
- **Deck.Toys** - In a nutshell: drag-and-drop Lesson creation; differentiate the right way; full control over your lesson delivery and track your students' progress in real-time
- **Educaplay** - Create numerous interactive games with instant feedback
- **Flipgrid** - Create a Grid - that's your classroom or community. Add a Topic or two to spark the discussion. Your students share short video responses to ignite a dialogue. Super simple. Super powerful.
- **Flubaroo** - Assess and evaluate student's work/progress online
- **Formative** - A free platform for creating formative assessments + acting on real-time student insights
- **Genial.ly** - The tool for creating interactive content that makes your audience fall in love. Communicate, educate, and attract by bringing your content to life.
- **Gimkit** - Students earn in-game cash by answering questions correctly. They can invest this money while playing an interactive game.
- **Google Forms** - Easy for quizzes, evaluations or questionnaires
- **Goosechase** - Scavenger hunts for the masses. Bold, crazy and highly addictive. Incredibly easy to use with all the power you could ever want.
- **H5P** - Create, share and reuse interactive HTML5 content in your browser.
- **JeopardyLabs** - allows you to create a customized jeopardy template without PowerPoint
- Kahoot - Interactive and motivational quiz
- **Learnclick** - Create online cloze quizzes. Simply mark words to turn them into gaps, dropdown or drag & drop quizzes.
- **Lightsail** - Formative testing, Lightsail Accelerates Literacy Development And Fosters A Love Of Reading
- **MasteryConnect** - Identify levels of understanding, target students for intervention, and improve learning and instruction.
- **Plickers** - Plickers is a powerfully simple tool that lets teachers collect real-time formative assessment data without the need for student devices
- **Poll Everywhere** - Live interactive audience participation. Engage your audience or class in real time
- **Purpose Games** - Quizzes and knowledge games - topic specific
- **Quizalize** - Create your own quizzes in 1 minute or pick one from our growing Marketplace.
- **Quizlet** - Flashcards, study games, and tests
- **Quizizz** - Quizizz is a fun review tool that allows the entire class to practice together. Its completely free

- **Quizstud** - QuizStud is an online platform where everybody can design and play their own exciting quizzes and where large groups of players can answer the multiple choice questions with their smartphone or tablet.
- **Socrative -** Online quiz where the teacher can keep track of all students' progress
- **SurveyMonkey** - Create Surveys, Get Answers
- **Voxvote** - Free and easy Mobile Voting tool for ANY speaker or teacher.

3.2. ICT Tools used for Presentations

- **Buncee** - Make Learning Fun Your creation and presentation tool
- **Google Slides -** Work on the same presentation at the same time
- **Lesson Up** - Create fun and engaging digital lessons
- **Mentimeter -** Create graphics at an instant using students' input
- **Nearpod -** Create interactive slideshows, using questions, quizzes, images & text.
- **Peardeck -** Create beautiful interactive lessons, presentations, and assessments to engage every student
- **Prezi -** Create an online slideshow
- **Prowise** - Together we can create a learning environment which is more engaging and inspiring and elevate collaboration in your schools.
- **SlideShare** - Share what you know and love through presentations, info graphics, documents and more
- **Sutori** - Presentations for the classroom in a unique timeline format
- **Wooclap** -Rather than fighting smartphones, Wooclap turns them into an exceptional learning tool.

3.3. ICT Tools used for Video creation

- **Animaker -** Animaker is home to the largest collection of animated characters, properties, BGs, icons, charts and maps in the world.
- **Binumi** - The world's first curriculum-linked video assignment tool – assign video projects with a single click
- **Biteable** - The World's Simplest Video Maker
- ChatterPix - ChatterPix can make anything talk - pets, friends, doodles, and more (iPad only)
- **Clipchamp** - Clipchamp offers a free video editor, compressor, converter and webcam recorder. Get started today.
- **DoInk** - Do Ink provides Creativity Apps (Green Screen, Animation and Drawing) for students to show what they know in education
- **EDpuzzle -** Make any video your lesson.
- **Educreations -** Create educational videos (iPad only)
- **GoNoodle** - Discover hundreds of videos that get your kids active at school and at home.
- **Masher** - Mix your photos, music, text and special effects to create professional looking videos in minutes.
- **PlayPosit** - Deliver video like you teach. Your free tool to unleash the power of video and flip the classroom.
- **Powtoon -** Animated videos and presentations
- **Shadow Puppet -** Easily create videos in the classroom.
- **TedEd** - Build a lesson around any TED-Ed Original, TED Talk or YouTube video.
- **Vmaker** - One tool that lets you manage everything right from video creation up to tracking views from a single window.
- **Voki** - Speaking characters for education. Educate, engage, enjoy!

3.4. ICT Tools Used for Online Collaboration

- **Asana -** Asana is the easiest way for teams to track their work—and get results.
- **Edmodo** - The safest and easiest way for educators to connect and collaborate with students, parents, and each other.
- **Google Docs -** Work on the same document at the same time
- **Google Slides -** Work on the same presentation at the same time
- **Google Spreadsheets** - Work on the same spreadsheet at the same time
- **MeisterTask** - MeisterTask is the most intuitive task management tool on the web. Combine it with MindMeister for a complete workflow from first idea to finished project.
- **Seesaw -** Seesaw is a student-driven digital portfolio. We make it simple to get student work in one place and share with parents.
- **Stoodle** - Stoodle makes it easy to learn from and teach fellow peers online.
- **Talky** - Truly simple video chat and screen sharing for groups.

3.5. ICT Tools used for Brainstorm/organizing

- **Answer garden -** Allows students to give answers which will show on the teacher's screen
- **ChartGo** - The online chart maker. Create rich and colorful charts.
- **Coggle** - The clear way to share complex information. Coggle is a collaborative mind-mapping tool that helps you make sense of complex things.
- **Huzzaz** - The place to showcase, discover and collect the videos that matter most

- **Lino it -** Create and share canvases with post-its and other online tools
- **Mindomo** - Easy-to-create and share mind maps, concept maps, task maps and outlines. Mind mapping software for Web, Desktop, iOS and Android. Mind map with us for free!
- **Miro** - Online Brainstorming for Creative Teams
- **Mural** - A digital workspace for visual collaboration
- **Note App**- Bring sticky notes to your team, in real time.
- **Padlet -** Create a poster/brainstorm online
- **Popplet -** To capture and organise ideas (similar to mind maps)
- **Postermywall -** Enables students to create an interactive poster
- **Tagxedo -** Word clouds in various interesting shapes
- **Thinglink -** Enables students to create an interactive poster
- **Timeglider** - Web-based timeline software for creating and sharing history, project planning and more
- **Timetoast** - Timetoast timelines are a beautiful way to share the past, or even the future.
- **XMind -** Amazing brainstorm and mind mapping tool

3.6. ICT Tools used for Creative creations

- **BlendedPlay -** Blended games for the classroom using your content.
- **Canva** - Canva makes design simple for everyone. Create designs for Web or print: blog graphics, presentations, Facebook covers, flyers, posters, invitations and so much more.
- **Infogram** - Create and publish beautiful visualizations of your data in charts and infographics. Interactive, responsive, and engaging.
- **Piktochart -** Create a multimedia infographic
- **Pixton** - The world's best way to make comics
- **ScribbleMap** - The Easiest Way to Draw and Share Maps
- **Storybird -** Easily create your own book
- **Wordle -** Create a 'poster' (word cloud) out of words
- **Venngage** - Everything you need to create and publish infographics is right here.
- **Visme.co** - One intuitive tool for all of your visual communication needs.
- **Vizualize** - Visualize your resume in one click

3.7. ICT Tools used for Studying

- **CoboCards** - The best online flashcard software. For Free.
- **Cram** - Find flashcards to study or create your own
- **Learningpod -** Targeted practice questions for student success.
- **Studyblue -** Provides intelligent learning tools including flashcards, notes, study guides and more
- **Vocabulary** - Acquire vocal easily
- **WRTS -** Study vocabulary easily and effectively

3.8. Learning Management System

LMS is a software that enables teachers to create, manage and deliver eLearning Courses. LMS provides an eLearning Environment and it consists of two parts. A server component which provides main functionality for creating, managing and delivering courses, sending notifications, authentication and more. A Users interface which is inside the browser used by students, teachers and administrators.

Moodle

Moodle is a most popular, flexible, free and open Source Learning Management System. This software is written in PHP and used for flipped classrooms and distance education in universities and schools. Moodle is a user friendly eLearning platform and distributed under GNU General Public License, anyone can create their online learning sites in minutes. Moodle was developed by Martin Dougiamas in the 1970s. Nowadays Moodle is used by maximum of the organizations outside of the education community such as online training, business, corporations, hospitals etc. Moodle is the World's Best LMS, because the users of Moodle grow every day, it is highly flexible, well supported, user-friendly, customizable and featurerich. Moodle enables schools and universities to offer options for flexible learning to their course from their location without any interruption. Using Moodle LMS, teachers can Build their site easily, select various activities and educational tools, include assessments, communicate with their students with video conference tools, add custom certificates and students can learn lessons from their mobile phones.

Google Classroom

Google Classroom is a free LMS tool frequently used by maximum of the teachers. Using Google Classroom, teachers can create an online classroom by submitting the Course Class details and invite students to join by sharing the class id. Using Google classroom, teachers can share the Course Plan, Course Material, eContent, videos for the lesson topic and assignment link so that students can listen to the videos shared by teachers, read the course materials,

and submit the assignments. Teachers can also track the student progress and conversation between students.

4. CONCLUSION

Class technology allows teachers to experiment more in pedagogy and get frequent feedback, educate students with more fun and efficiency. Improved student learning participation, makes many boring work of teachers simple. When a teacher uses technology in class, students can have immediate access to lessons / tutorials / video assignments. Although technology in teaching and in class learning offers many advantages, there are some disadvantages of using technology. Technology allows students to disconnect from social interactions, encourage the trap in class and tasks. All students may not have equal access to online resources. But the benefits of using technology in teaching and learning prevail over the counter. The incorporation of technology in learning of teaching and class will certainly improve the student report, which is the fundamental cause of good education. Technology can be an extremely valuable tool, but it is only a tool and technology "cannot replace a teacher" and is not intended to replace the teacher. A good teacher must digitally be literally and must know the effective way to integrate technology into the curriculum so that teachers can keep the students committed. The use of technology in teaching can be frustrating and opinion, but at the end of the day, the use of technology in education can create new doors, provide new experiences, lead to new discoveries and, finally, new ways to learn and Collaborate.

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