THE INVOLVEMENT OF ICT IN EDUCATION EVEN DURING THE COVID-19 PANDEMIC

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Abstract

The Covid-19 has created a lot of deadly impact in each and every domain in our day to day life. It has introduced numerous challenges in educational domain across the world. The Information and Communication Technology played a major role in facing the challenges. The Pandemic has converted the real time classroom in to a virtual world. ICT made a lot of major stepping stones and excellent innovations to survive from the crisis and also to open a new path for learning environment. The people all over the world get united to face the challenge made by pandemic with the help of ICT Tools. Due to that reason the educational domain is alive even during the severe pandemic conditions.

Key words: ICT, Education, Smart devices, Cloud

I. INTRODUCTION

Information and communications technology (ICT) is an elaborated term for information technology (IT) that points out the role of integrated communications and the combination of telecommunications and computers, as well as necessary enterprise software, middleware, storage and audiovisual, that allow users to access, store, convey, be aware of and manipulate information. ICT is usually acknowledged to mean all devices, networking components, applications and systems that united allow people and organizations to work together in the digital world. ICT is a broad field, and the concepts keep expanding. ICT refers to any product that will digitally store, retrieve, manipulate, transfer, or receive information. One of many approaches for coordinating and maintaining competencies for ICT professionals in the twenty-first century is the Skills Framework for the Information Age. To keep the learning process live for students during pandemics, the people belonging to the educational domain have been adopting a variety of platforms, including Zoom, Microsoft Team, and Google Classrooms. This has made it easier to have greater faith in the ability of ICT technologies to improve the educational landscape. Additionally, several nations have created broadcast curriculum (a mix of both radio and television), particularly for children in primary and secondary level classes. In order to solve the difficulties of distant learning, MHRD has launched a number of projects to aid students, teachers, and lifelong learners in their pursuit of knowledge [1]. These initiatives cover wide educational requirements, ranging from learners in schools to postgraduates.

II. ICT ENABLED EDUCATION

ICT based tools are used in the educational domain in order to enhance the quality of information communicated between students and faculties. ICT can improve student learning and teaching strategies, according to research conducted globally. According to a report from Japan's National Institute of Multimedia Education, increasing ICT use in the classroom and incorporating technology into the curriculum have a significant and beneficial effect on student accomplishment. The findings demonstrated in particular that children who are regularly exposed to technology in the classroom have greater "knowledge," stronger presentational skills, and more innovative skills than their peers, and are more prepared to engage in learning. The ICT based tools and resources can be used effectively by the teachers and the students can grasp the ideas conveyed by the faculties without much overhead. The blended learning platform especially the technology blended learning creates a positive

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learning environment which is tailored with videos, data storage, guided researches, brainstorming sessions etc. The students will get attracted and interested to these kinds of educational sessions [2].

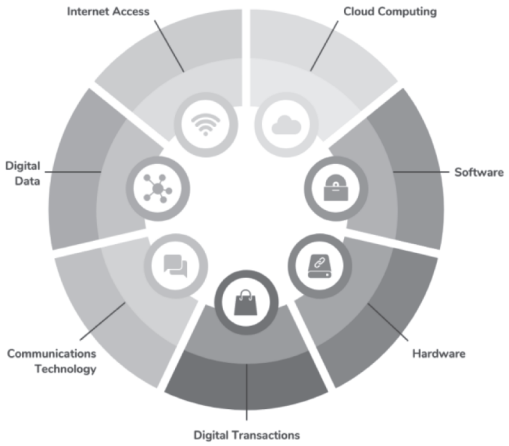
The mobility in learning environment is made live with the help of Mobiles. The classroom oriented constraints is reduced by the usage of mobile based learning. The students can easily access the resources from anywhere and anytime. Now in the modern technological world many of the institutions support these kinds of mobility based learning environment for the smooth conduct of learning activities. The techniques using variety of devices and technology in ICT includes:

- Fetching of class materials with the help of remote devices,
- The repositories in the online digital mode are available for the course contents, lecture session and digital library.
- Academic related activities is synchronized properly with the help of cloud
- Flipped classroom can be implemented easily
- The effective used for making sessions interactive with the help of projectors, hand held computer, smartboards etc.

The increase in the use and growth of various online learning platforms such a Coursera, Udemy, Skillshare etc explains there is a massive demand for 24x7 e-learning platforms and facilities. The education institutions must definitely focus and improve the learning platforms with the help of ICT then only they can satisfy the student community.

III. ELEMENTS OF AN ICT SYSTEM

ICT is a combination of devices and technology using both wired and wireless networks. Now also TV, radio etc is used for educational activities especially during the Covid-19 time along with the modern technological devices and software's integrated with artificial intelligence. IT and ICT is sometimes treated in the same way but ICT is a much more vast area using the latest trends and technology. The cluster of ICT based tools is huge and it's growing every day by day. The use of smart phones, smart panels, online video conferencing apps have developed the learning environment to the next level. ICT is not shrinked to devices only it's a combination of both hardware and software mixture and this combination is very much helpful to the students community to know the classroom sessions effectively. Due to the increased usage of ICT based tools during the pandemic time the projects and innovative ideas coming from the student community has also increased because the can easily know the theory and practical usage of various concepts. The internet is strong backbone behind the ICT resources mostly used during the Covid-19 time.



Cloud Computing

The availability of data storage and fetching resources easily is one of the attractive features of cloud. The functions are distributed over various locations in the case of large clouds and each location is a data center. The "pay-as-you-go" model is used by Cloud computing to share the resources based on consistent approach. Even though this model helps to reduce the initial cost but this may direct to unexpected operational cost for the people who are not that much aware about the technology.

Cloud computing will efficiently handle the data operations like crunching and processing it away from the

device we used to connect it for accessing the details. The work is being shifted to a lot of computers far away from the cyberspace. The Internet will act like the cloud, making your data, work, and applications available anywhere in the world from any Internet-connected device.

Internet access

The individuals can access the resources in the various cloud space with the help of Internet and computer or some hand held devices like smart phones, tablets etc Internet access is sold by The Internet Service Provider will help an individual for the internet access using various network technologies. The data transfer rate is depending on the offers selected by the individual from the ISP. Now a day a lot of organizations and shopping malls are providing free wireless access to a particular range.

IV. SOFTWARE APPLICATIONS MOSTLY USED DURING COVID-19

- **Webex**

  An American firm called Webex by Cisco creates and sells applications for web conferencing, videoconferencing, combined communications as a service, and contact centres as a service. Webex App, Webex Suite, Webex Meetings, Webex Messaging, Webex Calling, Webex Contact Center, and Webex Devices are some of the software solutions it offers. Customers are able to participate in Webex Meetings from anywhere, and they may arrange them easily. It's simple to use, with polling tools, breakouts, easy distribution, and the majority of all, the capability to record audio. [3]

- **Zoom**

  A proprietary video telephony software product created by Zoom Video Communications is called Zoom Meetings (sometimes abbreviated to Zoom and stylized as zoom). The free plan has a 40-minute time limit and supports up to 100 concurrent users. Users can choose to upgrade by signing up for a premium plan. The most expensive package allows for meetings to run up to 30 hours and up to 1,000 people at once. Zoom was heavily used for distant work, distance learning, and online social interactions during the COVID-19 epidemic. Its capacity to standardise business communication and provide a uniform user experience across all use cases. Its strong suits include the simplicity of use, the excellent video, and the clear audio. [4]

- **Google Meet**

  A video communication tool created by Google is called Google Meet (formerly known as Hangouts Meet). On mobile devices, it is also planned to take the place of Google Duo. To secure your data and preserve your privacy, Meet employs the same safeguards that Google does. Our extensive set of security safeguards is regularly updated for further protection, and Meet video sessions are encrypted in transit. Get everyone together in Google Meet so you can discuss projects together, propose business ideas, or just catch up in person. There is no need to install any software for invited participants to join an online video conference from their computer using any current web browser. They can sign up via the Google Meet app on their mobile devices. From the Google Nest Hub, visitors can even join meetings. Google Meet adapts to your network speed to deliver high-quality video calls wherever you are. [5]

V. ADVANTAGE OF USING YOUTUBE VIDEOS AS A LEARNING MATERIAL

The increase in the use of hand held and mobility based devices under ICT has increased the usage of YouTube. By using the YouTube oriented learning approach the students can improve their social, emotional and mental objectives. The feedback/comments given to the particular video involves the social aspect. The owner of the content can definitely improve the next content depending up on the feedback or suggestions. The effective utilization of the

YouTube will also improve the personality and soft skill developments of student. During the Covid-19 situation a lot of students seek the help of You Tube to grasp the ideas shared in their virtual classrooms and also many of them has created channel to share their innovative ideas and projects. The major advantage in doing such kinds of things is that the students as well as the people all over the world can easily access the contents share by the user without much complexity. In the same manner a student watching an educational video will gets motivated to do such kinds of innovative tasks. Another major advantage of You Tube is that if we use it as a learning platform its domain is not narrow down to a particular area for example science or commerce. Using YouTube as a learning platform has the potential to support a user's lifelong academic expertise. [13]

VI. BASIC ICT TOOLS USED WIDELY DURING PANDEMIC SITUATION

The student and teacher interaction is more efficiently handled with the help of latest ICT based devices for example: - Mobile Apps, flipped classroom. ICT tools stand for Information Communication Technology tools. The ICT tools helps to create an effective digital environment for knowledge sharing using computers, laptops, printers, scanners, software programs, data projectors, and interactive teaching panels etc.[2]

- **Interactive flat panel**

  For conference rooms and collaborative spaces, an Interactive Flat-Panel Display (IFPD) is a large-format touchscreen display. With a higher-quality display, improved connectivity, and integrated software solutions, it replaces cumbersome or out-of-date projector technology. This system illuminates various screen pixels. The production of incredibly light and portable panels, which are popular for home and office use, is made possible by the flat panel displays' straightforward and compact architecture. The most recent flat panel display characteristics include flexible display panels made possible by new organic LED lighting processes.

- **Interactive tables**

  Interactive tables are another tool that, although they are less extensive, can be used with groups of children in the infant stage. One advantage is that due to its 27-inch diameter, it can be used by up to six children, who will work with digital content as if it were a digital whiteboard. It is designed to give students a moment's reflection and discussion of the digital content they are working on. They love it because they can touch the screen and all the games are interactive. Its functions are similar to any other digital tool. The difference is that to make it easier to use, the height is adjusted to the smallest. It also includes educational games with which children can learn by having fun and using their fingers intuitively.

- **Tablets**

  If students are struggling to understand the material from a textbook, teachers can use e-Learning on tablets to play games or watch videos to help them understand. The sole distinction between tablets and smartphones is that tablets have screens that are 7 inches or larger in diagonal measurement. Instead of using the mouse, touchpad, and keyboard seen on bigger computers, gestures made with a finger or digital pen (stylus) are used to control the touchscreen display. The existence and design of physical keyboards can be used to categorise portable computers. Viewing presentations, participating in video conferences, reading e-books, watching movies, exchanging images, and more are all common uses for tablet computers.

- **Smartphone**

  Mobile phone and computing capabilities are combined into one small, portable gadget called a smartphone. They differ from feature phones in that they have more

robust hardware capabilities and comprehensive mobile operating systems that enable more software, internet (including web browsing over mobile broadband), and multimedia functionality (including music, video, cameras, and gaming), in addition to basic phone features like voice calls and text messaging.

Benefits of Smart devices for students

- Construct and develop communication
  The use of smart phones by the students will help them to keep in touch with teachers, friends and the institutional authority using various Applications installed in their devices. There is no barrier for communication between the teachers and students [6]

- Priceless sharing in education
  The usage of various online platforms created a virtual world for the educational domain. In that world we can easily share a lot of useful information, course materials and projects without using money. The costless ways of sharing information become much more live during the pandemic time.

- **Student team formation**
  The major drawback of lock down period during pandemic situation is the students are completely removed from their friendly circles and also from the teachers. By using various video conferencing apps like Google Meet, Skype or Zoom created an alternative approach for team building among student communication. The above apps also break the barrier between the communication and resources sharing among teachers and in between students.

Positive indication of using Smart Devices for online learning

- Keep an eye on Home works: The teachers feel great difficulty without using smart devices for communicating with students because of missing the real classrooms. The need for the ICT based tools for monitoring and tracking various projects and home works is very much necessary. The above tasks can be easily executed by using the latest smart devices and mobile Apps.

- **Group notification:** The teachers using the educational Apps installed in the smart devices can use the admin power to handle and execute various tasks related to the content delivery and monitoring. The reminders for each student can also be customized with the help of various AI integrated tools used in the Apps. For example, the mobile app can be used for project & seminar based reminders, tuition fee reminders, and assignment submission reminders.[7]

- On the spot recording of classes: Mobile Apps helps teachers to record the class sessions, taking screen shots etc. The mobile Apps also help faculties to grand permission for the students to fetch various course materials.

- Immediate feedback, comments and note making: Students can dens their instant feedback and comments regarding various topics. Since the Apps installed in smart device is integrated with various sub domains the students as well as teachers can prepare the notes and share it synchronously.

- Discovering ranges of learning Software's: The students could easily access a lot of online base learning apps that improves their knowledge level and skills. The multimedia and the game based learning Apps helps the students to grasp the topics in an easy manner

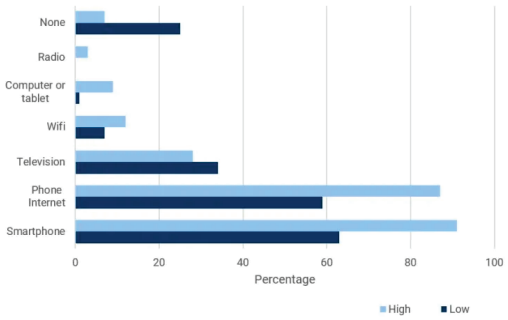


Figure 1. Share of students with access to educational resources, by household income

Source: February 2021 Brookings phone survey [8]

ICT tools in pandemic situations: Benefits

- Visual and video-based lessons are simple for teachers to manage.
- Trainers can tailor well designed classroom activities in teaching.
- Offer a lot of better teaching and learning methods
- Cost-efficient
- Student management is done in a much simple manner
- Value-added modes of communication
- Eco-friendly-Eliminate the usage of paper
- Decrease cost and saves time
- Better-quality data and information security
- Online based tools and learning systems tailor the various stake holders of education [9]

ICT tools' negative aspects

- Creates/ Increase Unemployment
- Deficiency of security/privacy
- Cyber maltreatment [9]
- Dependence on technology
- Increase in the use of Social media
- Groundwork time

VII. ICT INITIATIVES

To tackle the issue called as remote learning the various state governments has come up with a lot of useful ideas to support both students and faculties. A lot of available digital platforms were efficiently utilized to handle the crisis faced due to the pandemic. The various ICT tools like TV, Radio helped the government to initiate some useful sessions to the students ranging from primary education to higher level.

- **SWAYAM PRABHA**

  22 DTH channels collectively known as SWAYAM PRABHA use the GSAT-15 satellite to continuously broadcast top-notch educational programming. The students will be able to select the time of their convenience for at least four hours of fresh content each day, which will then be repeated five more times during the day. From BISAG-N in Gandhinagar, the channels are uplinked. NPTEL, IITs, UGC, CEC, and IGNOU are among the sources of the content. The website portal is kept up by the INFLIBNET Centre. [10]

- **Radio**

  Governments from the central and various states have been using radio channels to spread educational resources widely and with a high level of intensity to the most remote areas. Through territorial stations all throughout the nation, All India Radio (AIR) is utilized to transmit essentially classes and additional educational material. The broadcasts focus their energy on educational activities. Shiksha Vani, a new podcast app, was introduced by the Central Board of Secondary Education (CBSE). [14] This app will distribute important facts to students and parents in a convenient style.

- **Television**

  Kerala has started a programme of online or digital classes called "First Bell," which was designed to be broadcast through VICTERS Educational Channel, to combat the effects of COVID-19 on education [1]. With the assistance of educational professionals, the government carefully planned the programme to guarantee that all kids could access the online classes. On the KITE website, Facebook, and YouTube, the class

sessions were made public. No student will be refused access to the classes if they were missed for whatever reason. If classes were missed, they might be downloaded and utilized later or repeatedly viewed.

VIII. ICT'S SOCIETAL AND ECONOMIC IMPACT

ICT based techniques and Tools are used for social, economical and interpersonal communication and exchanges. ICT has totally altered the way people work, talk, learn and survive. ICT has made a huge revelation especially during the pandemic time that changed the life style of human beings. The smart devices integrated with robotics and AI rarely used before the Pandemic situation is now common among people. The various real life events is happening now in the virtual world and also the society understands that we can effectively utilize 24x7. The ICT based software's and devices can do a lot of human activities there by reducing the effort of human beings. ICT has also made tremendous changes not only in the educations sector but also in the business, medical and various other important domains in our day to day life. ICT also made the interactions that happened face to face to the virtual world. This new era is often called the digital era. [11]

ICT skills and employment

The mixture of ICT based skill development has improved the chance of getting placed as soon as possible. The various online digital platforms have created a golden opportunity for the students to grasp real time knowledge about latest trends in the market. ICT intensive users make up more than 20% of all users in OECD countries, and employment in the ICT sector and employment of ICT specialists both account for up to 5% of total employment in those nations. ICT skilled workers have a higher market and promotion possibility when compared to the other one. ICT based activities play a major role in building the infrastructure of all stages of the economy. All stakeholders trying to connect the economic and social possibilities of these technologies have an increasingly essential goal in mind: the promotion of ICT skills and employment. Many new career opportunities in many different economic sectors have been made possible by the widespread use of ICT. This includes employment both directly in the ICT sector and indirectly through the usage of ICT professionals in non-ICT sectors (such as the health industry) as well as among ICT-intensive users across all industries that depend on ICT skills to do their jobs. The various educational institutions have an important role in providing ICT enabled education to generate a lot of ICT specialists in a nation. The goal of the new computer and information science programmes and curricula being developed by contemporary universities is to address the demand for technology expertise. Even though their curriculum may not be focused on green ICTs, some colleges nonetheless include environmental studies. The refocusing trend is not limited to institutions of higher learning. Workplace training, in addition to formal education, is becoming increasingly crucial for enhancing and adapting workers' abilities due to the extremely new and fast changing nature of advanced ICTs, especially green ICTs. The development of web-based software applications and big data management and analytics skills (such as SQL and Apache Hadoop) are becoming more and more in-demand. Furthermore, as ICTs are used more widely across sectors, there will be a larger need for people with network security abilities. These abilities frequently need to be supplemented by industry-specific knowledge, such that of the environment, or economic and administrative expertise, as in the case of green ICTs. ICT jobs will undoubtedly require a greater degree of experience, thus educational institutions and the government will need to bring a lot of fresh ideas as well as tweak and improve current regulations. [12]

IX. CONCLUSION

Covid 19 has created a lot damages to the real life of human beings. The people will always recover from these kinds of pandemics with the help of knowledge acquired by them. The ICT Tools paved a golden path for the people to

overcome the pandemics in a lot of real life situations especially in the educational domain. The students, faculties and all the stake holders related to the educational domain discovered new wonders in ICT based education. The e-learning platforms have made a lot of tremendous change in the educational culture of the society. The ICT based learning also proved that we can create a strong virtual class room environment that will come up with better results. The use of technology based learning has created a smooth learning environment especially in grasping the theory and the related practical sessions. A major share of new innovations has happened from the students and faculties even during the pandemic situation only because of tailoring ICT based learning culture. The treasure of ICT based education is extracted in a wide manner during the pandemic situation. The people belonging to the educational domain need to extract more and more innovative ideas from this treasure then only the quality of education will improve.

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