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Relevance of ICT in Teaching-Learning Process

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Abstract

As per the aphoristic statement of Nelson Mendela-"Education is the most powerful weapon which you can use to change the world". It is further illustrated by an ancient eminent Philosopher and Mathematician Aristole-"the roots of education are bitter but the fruit is sweet". Technical education is first, Technical education is must for every citizen of the globe irrespective of caste or creed or region or race. Mathematics is the mother of all sciences. For long times, Mathematics, to the most, is considered as a complex and difficult, boring subject, thus creating lack of interest in the topics. This creates a challenge for teachers and educators especially in the primary and intermediate levels. Technology is of the utmost importance in teaching and learning mathematics. The key benefit of ICT is that it promotes more cooperation among students, fosters communication and knowledge sharing. It can curtail an exercise devoted to tedious computations and increase student's focus on more important topics of the subject.

With the advents of rapid progress of ICT and in the era of globalisation, especially in the field of computer which has become part and parcel of every educational institution in one way or the other i.e., digitization of man power, presence or absence of students, digital documentation of result branch, Digital process of control of examination. Digital transaction of financial matters, e-salary, e-attendance, Wi-Fi campus, Surveillance through detective and spy cameras, smart class room, fight against COVID-19, Aarogya-Setu App, Prime minister' Mann ki Bat programme *et al*. On the contrary, it is an irony of the situation that leads to complete dependence on digital apparatuses and a slavery to machine life. This reflects the seamy side of the coin.

Keywords: Technology, teaching and learning, digitization, seamy side, communication, knowledge sharing

Introduction

In this techno-savvy age of computers and laptops, the concept of Information and communication technology (ICT) is progressing by leaps and bounds. It has become the necessity of the learners to cope with advancements occurring in multifarious fields across the globe. Its usage can be prevalently seen almost everywhere ranging from class room to Aarogya setu app or fight with COVID-19, our Prime Minister' man ki baat etc. Both methods traditional or modern having their own significance are necessary to accelerate learning process. There should be "Guru-Shishya" concept vis-a-vis technology. The use of ICT in the class room needs initiative of teachers themselves to assess what is most suitable for their students. Many research scholars have studied the role of ICT in teaching-learning process including Barron, A. (1998) [4] threw light on designing web-based training. Attwell, P and Battle, J. (1999) [3] shared their views on Home Computers and School Performance. Flecknoe, M. (2002) [9] mentioned how ICT can help us to improve education. Sharma, R. (2003) [12] illuminated barriers in using technology for education in developing countries. Cholin,V. S. (2005) [7] exhibited study of the application of information technology for effective access to resources in Indian university libraries. Chong Chee Keong *et al*. (2005) [8] shared a study on the use of ICT in Mathematics Teaching. Chandra, S. & Patkar, V. (2007) [6] studied ICTS: a catalyst for enriching the learning process and library services in India. Bhattacharya & Sharma (2007) [5] examined India in the knowledge economy-an electronic paradigm. Adeyinka Tella *et al* (2009) [1] explained ICT & Curriculum Development: the challenges for education for sustainable development. Meenakshi (2013) [10] made an attempt to explain the importance of ICT in Education. Gond & Gupta (2017) [11] lightened a study on digital education in India: scope and challenges of an Indian society. The use of Information and Communication Technology in variegated fields have been debated much with pro and cons. In fact, ICT tools are utmost need of the society today as we have seen its significance during COVID-19 Pandemic. So keeping in mind the recently increasing significance of the aforesaid topic, I have made efforts to study further the significance of the said concept in teaching-learning mathematics. The aim is not to provide students with a new "Technology toy" but rather to enhance opportunity for active learning that prepares the youngsters to compete with situations happening in the real world. The digital India programme is also implemented by the Govt. of India with a spirit to make India digitally and knowledgably

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powered. Indian brain with usage of information technology makes the better future of India.

Objective

The objective of this exploration is to

i). Analyze, boost urgent need of awareness among teachers and students to cope with techno-savvy world for making teaching-learning process continuous and fruitful.

ii). To observe and share pro and cons of information and communication technology.

Government of India has also laid emphasis on technology oriented/on-line learning as declared in COVID-19 Pandemic.

Methodology

Observation of each and everything in educational institutions during my teaching experience, interacting with students having different backgrounds either rural or urban.

Change of Scenario: The role of mathematics was restricted to be purely academic domain since time immemorial. Now as the science and technology is advancing rapidly, the scope of mathematics is broadened vis-a-vis academic domain. It has entered into every field and every area is incomplete without mathematics i.e. the domain of technology, industry etc. New branches in mathematics like operation research, control theory, signal processing and cryptography have been emerged that require technology.

All of us know that aforesaid subject is highly supportive for science background learners, but still they have very less enthusiasm in this subject. Their intention towards learning this said subject remains restricted to solve problems and just to pass the subject only by any means, if possible, with higher marks. It is viewed that some concepts of this subject are difficult to decipher even at graduate or postgraduate levels, then ICT may have influence or effect in such cases.

The introduction of ICT in teaching mathematics can make the teaching-learning environment more conducive viz-a-viz enhance the student's potential in comprehending novice ideas. Nevertheless, its usage in teaching may face challenges because many obstacles may arise to interrupt. ICT tools can be supportive for explanation of the results when it is difficult and time-consuming to visualize these concepts using only blackboard. In this sense, ICT tools play a supplementary role but cannot be supposed as complete replacement of blackboard work. Blackboard-face to face interaction, students remain conscious, can raise query instantly while solving the problem on blackboard and make the learning process more meaningful.

Many Mathematics Apps are available for IOS and Android devices. Each app is very helpful for students to learn and understand the concepts in a better way. These apps include various types of activities, games, exercises etc. for teaching of mathematics. We can use these apps for our children and students to improve their mathematical skill and sharpen their maths agility.

Technology for Life Long Learning: Mobile devices and laptops are dominating classrooms as educators and developers create more and more products to promote education. We are heading towards a bright future. Video lectures can be obtained for almost all topics in each subject. NPTEL (National Programme on technology Enhanced Learning) initiated by Ministry of HRD, Govt. of India, is a joint initiative from IIT's and IISc to offer online courses and certification in various subjects including mathematics.

Recently Department of Higher Education, Haryana conducted a workshop on digital learning at State University of Performing& Visual Arts (SUPVA), Rohtak to impart knowledge about digital learning. The Key features of this workshop were to

i). Supplement the class-teaching with on-line lectures available on UGC-CEC (Consortium for Educational Communication)

ii). To enrich the college students with digital content available on the site of CEC, which is prepared by eminent scholars.

Haryana is the first state in India to sign MoU with CEC for digital content. Under this MoU, the digital content of nine subjects viz Botany, Maths, Zoology, Hindi, History, English, Commerce, Chemistry &Physics has been provided by CEC to the Department of Higher Education, Haryana so far.

Shiksha Setu App: Recently, the department of Higher education (Haryana) has launched the "Shiksha Setu" mobile application. It will give a variety of information such as college profile, number of seats, admission procedure, internal and external marks and fee structure etc. Students can give their feedback on events, topics and teachers. The App will a long way in transparent administration and better communication among students, teachers and parents.

E-learning Via ICT during Outbreak of COVID-19: In the present scenario, the method of online learning process has maintained the continuity of education at this exigency and supported to reduce the stress of students as well as spread of the contagion (COVID-19) by following the guidelines of government while doing work from home, social distance etc. ICT played very significant contribution during the nation-wide lockdown period to continue learning process while sitting at home. Parents, teachers and students are attending classes on Zoom, WhatsApp, Skype etc. The culture of work from home also developed among teachers/students that can be supportive to utilise their time without wasting even a minute. The youth of today is techno-savvy, they are already using mobile and other gadgets to update their knowledge. Youngsters want more and more. Every problem originates some opportunity also. Thus Corona crisis has taught us to look forward for new India and prepared to face any suchlike situation in future also. Many on-line workshops/webinars, competitions are going to be organised in schools and colleges to engage the teachers and students, to utilise their precious time during lockdown. Universities provided e-resources through e-ShodhSindhu and from publishers to the students/researchers. Students can access the e-resources remotely

SWAYAM: Govt. of India started this programme keeping in view disseminating the best teaching-learning resource to all including the haves and have-nots. This platform facilitates all the courses, started from ninth Class onwards. Anybody can get access these courses from anywhere as and when he/she likes. The best teachers from the country have prepared these courses. All the courses are freely available on line.

e-PG Pathshala: This is a programme of MHRD having its national target on education through ICT executed by the UGC.

e-Pathya: It is one the verticals of e-PG Pathshala which is software driven course/content package that supports learners to continue higher education (PG level) in distance as well as campus learning mode. It also facilitates offline access.

e-Adhyayan: It is an opportunity to provide e-Books for the Post-Graduate Courses. It makes available video-content also. Similarly many other e-resources like UGC-MOOCs (Massive open online courses), Swayam Prabha, Edusat, Google class room etc are made available by the university for students, research scholars and teachers.

The Digital Divide: COVID-19 outbreak has revealed a great digital divide prevailing among students (haves and have-nots). An irony is that millions of students will not even have access to education due to suffering from poor social, economic background and lockdown. According to report of National Sample Survey (2017-18) in India, the Key Indicators of Household Social Consumption on Education: 14.9% rural Indian households have internet as compared to 42% urban households with internet, 4.4% rural Indian households have computer as compared to 23.4% urban households with computer. Recently, in a survey in Delhi University over 51000 students by teacher's union, it was revealed that 85% students are not in a position to take on-line exam. The reason behind is that either they do not have laptop, internet or due to remote area internet is not accessible. But still there exists a ray of hope. During Corona virus period, Haryana government provided some mobile numbers of students to the teachers to build rapport with them about their study and other problems. I also made contact with 50 students of different colleges across the state and found that most of the girl students and poor rural boys didn't own even personal mobile phone. They have given mobile numbers of near and dear at the time of admission in college and some of numbers given at that time of admission are invalid now in this COVID-19 Pandemic. On the other side, we are looking forward towards New India, digital India. But still every cloud has a silver lining. Every tragedy comes with some repercussions either good or bad. Nothing is purely a Boon or a Bane, good or bad. It all depends upon the mindset of people. So looking at the bright side and accepting dark side as a challenge move ahead from' local to vocal and then global 'as said our Prime Minister in his speech on Lockdown.

Benefits of ICT to Teachers

By creating interest among teachers, it helps them to make teaching-learning lively interaction, some other benefits are:

- Supports the teacher to manage their class time viz-a-viz teaching content effectively.
- The teachers can have access relevant information related to student/school/teaching-learning process through web.
- Support in presentation of the complex topic/content in a better way and thus developing more confidence among teacher and getting more expertise in his subject.
- Time of teacher is also saved through usage of ICT during teaching-learning process.

Benefits of ICT to Students

When lectures will be delivered in the classroom through multimedia slides, it develops spirit of learning and enthusiasm among students. They will understand many concepts through interactive audio-visual teaching-learning process. It has played a major role during COVID-19 outbreak to keep their learning alive.

Students can easily get their relevant information including daily time-table, class assignments etc. at any time.

- They can prepare projects and presentation with the help of internet.
- They can easily have access to teaching contents of missed lecture.
- Transformation of teaching from teacher-centred to child-centred.

Challenges of ICT in Education

According to latest census report in 2011, 68.84% population of India lives in villages. Cultural, socio-economic diversities also exist within country. We, Indians face multifold challenges for ICT in education such as:

- **Lack of Resources and Network Connectivity:** The great majority of people face poor network connectivity especially in rural areas, hilly areas and some part of urban areas. They still have no access to internet hence they are techno-illiterate.
- **Lack of Skilled Teachers for ICT Projects:** Due to shortage of formally trained teachers on digital technology hinders the learning process especially in rural area. Even school teachers and college professors are hesitant to use digital tools to deliver lectures. Some of them think that more than required information is provided to the students through the digital medium and students can't cope with the ICT. So, they prefer traditional teaching methods of chalk and blackboard. In rural areas, primary teachers and senior teachers especially women and older teachers are not willing to get skilled.
- **Language and Content Related Challenge:** Language is also one of the main obstacle for the implementation of digital education in India. Students belong to different strata of society and having different family environment. Many different regional languages are spoken in different states all over the country, thus it creates problem for many students and teachers also.
- **Poor Maintenance and up Gradation of ICT Equipment:** Maintenance and up gradation of digital apparatus is one of the notable challenges especially in rural areas. Sometimes problem creates due to insufficient budget from government side. The digital education projects in rural schools are not self-sustainable. Initially various projects are started by government for the boosting of digital education, but after sometime due to lack of proper care for the maintenance of digital apparatus project gets failed which badly affects the digital education up gradation in rural areas as happened with Edusat programme started in Haryana.
- **Insufficient Funds:** Appropriate, updated hardware and software technology present in the market are the most preferred requisition for digital education to cope with the knowledgeable society. Sometimes, redundant and obsolete infrastructure and equipments in remote areas due to lack or inadequacy of funds hampers the learning process.
- Lack of facility/conducive environment at home for students especially vulnerable section of society (especially girls/poor students/disabled children having no learning environment) to access the required content.

To surmount certain impediments this paper suggests an e-portal, consisting of a resource repository and a lesson planner modules that can be supportive for teaching and learning of mathematics. In the present era of digitization, technology is inevitable in teaching and learning mathematics. ICT facilitates to know how mathematics should be taught to make understand basic concepts of the aforesaid subject. The key

benefit-ICT creates greater rapport with students and teachers, encourages communication viz-a-viz reciprocation of information. It makes easy to emphasize on strategies and interpretations of answers rather than spend time on cumbersome computations with mathematical acumen and prowess.

Futuristic Scope of the Paper

Technical Lag: There a technical lag between the knowledge (the haves and the have-nots)-how of the rural students and high-tech technical system prevailing at the urban centric and bureaucratic maze of four walled policies framed at the top level. This gap must be bridged. Technology must be people friendly and bureaucracy ought to be accessible to the rural students to redress their grievances. Educational institutes must be free from political interference in the routine functioning. The youth of today is also getting distracted from their main focus (i.e. study) as seen in many universities. Agitations by students in J.N.U., Jamia Milia Islamia on CAA issue or in other universities are happened frequently.

More motivation and Innovations are required to make the digital education more interactive and robust. The teacher is the best facilitator for students to create learning environment conducive to study. The stereotyped teachers will have to change their mindset towards techno-savvy age. A teacher must have gift of the gab and expertise in his subject as well as skill in using ICT tools. There must be complete thrust on e-learning to implement the policies, programmes and perspectives in letter and spirit. I hope, it would be a welcome step in sensitizing the educational society as a whole.

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