IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A Study on Digital Technology in Teaching and Learning of Education in India

Papai Mondal
Ph.D. Research Scholar
Dept. of Education
The University of Burdwan
&
Sumana Pal
State Aided College Teacher (SACT-I)
Dept. of Education
Raniganj Girls' College
Affiliated to Kazi Nazrul University

Abstract:

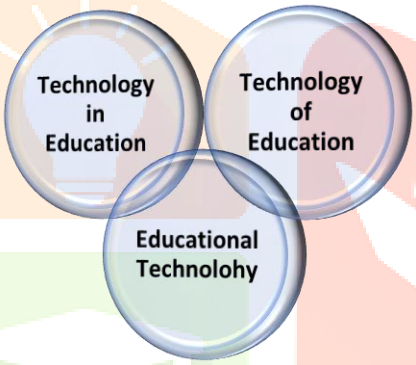
Digital technology has affected almost every aspect of life today, and teaching-learning is no exception. The digital technologies such as ICT based (e.g., mobile phone, tablet, notebook, computer, laptop, smart TV, etc.), social media (e.g., Facebook, YouTube, Blogs, Twitter, LinkedIn, Telegram, WhatsApp web etc.), and Programmed Learning (online courses, e.g., Swayam, Swayam Prabha, MOOC, etc.) have become increasingly popular in recent years. The effect of Digital technology on teaching and learning is examined in this article, which is based on analysis. The Objective of this Study Is to Understand Impact of Digitization in Education Sector and to highlight how it works. This Is Descriptive Study and this study is based on the analysis of secondary data only. All schools, colleges and universities today are focusing more on digital education. Especially since the time of Covid-19, the demand for this technology-based education has been strong. Online courses now have more demand than the traditional face-to-face courses. The Digital technology has a variety of effects on education which very much helps the students to better understand the process and progress required for their future. The online platform is available 24 × 7, so students can participate at their convenient time, as they are not bound by a specific and strict time schedule. This online education is easily accessible on various devices which are easily known to all the students and they are also eco-friendly. The government is also taking a positive attitude towards technology-based education and taking various initiatives, as a result of which this education is reaching even the remote villages today. Online education is a growing face of India's education system. Since the new Education Policy (NEP) in 2020, many changes have been made in the education system, including online education.

Keywords: Digital Technology, Eco-friendly, Online Courses, Teaching-Learning, Traditional Course.

Introduction:

The contemporary era is mostly regarded as the technological era. In the field of education Technology is the application of scientific knowledge about learning and the conditions of learning to improve the effectiveness and efficiency of teaching and learning. When the whole country was under lockdown for Covid-19, e-learning was the best and only alternative for students to learn. In present time, technology is playing a vital role in every aspect of human life. According to current situation, India has been reached to the highest place in the field of education. Digitalization is advancing into the education system of India and is replacing the conventional classroom practice. Indian education framework has received creative aptitudes in order to arrive at the final destination and making reformist methodology towards problem related phenomenon.

Educational Technology is the field of study that investigates the process of analysing, designing, developing, implementing, and evaluating the instructional environment, learning materials, learners, and the learning process in order to improve teaching and learning. Education technology is primarily considered a combination of two interpretations, such as-



1. Technology in Education / Hardware aspects of Education/ ICT based Education &
2. Technology of Education/ Software aspects of Education/ Programmed Learning.

The technology in education concept refers to presenting information in all possible ways. All educational and training gadgets, such as TVs, language test equipment, various project equipment, including all audio-visual aids. Overhead projectors, video cassette recorders, tape recorders, TV monitors, Microcomputers, etc. Technology in Education is also known as the approach of hardware aspects in education, in present scenario which is also known as ICT based education. In the context of ICT-based education, online teaching-learning has been introduced instead of teaching and learning in traditional classrooms. Online classes (Zoom, Skype, Google Classroom, Meet, etc.), online exam, online assessment (Quizziz, Hot Potatoes, Testomoz, etc.) are also introduced by the ICT based education.

In the other context Technology of Education is closely associated with the modern principles of programmed learning and is characterised by task analysis, writing precise objectives, selection of appropriate learning strategies, reinforcement of correct responses and constant evaluation, and also online courses, credit-based achievement, etc. Programmed learning, educational technique characterized by self-

paced, self-administered instruction presented in logical sequence and with much repetition of concepts and there is not fixed time interval for learning. Students may learn at their own pace. Learning by doing maxim of teaching is followed to involve learners in the learning process. Students are exposed only to correct responses, therefore, possibility to commit errors in reduced.

Whatever, the rapid growth of Information and Communication Technologies and innovation in digital systems represent a revolution that has fundamentally changed the way people think, behave, communicate, work and earn their livelihood. The Government of India launched the 'Digital India' initiative in July 2015, to strengthen online infrastructure and expand Internet accessibility among citizens (for example, connecting rural areas to high-speed Internet networks). As part of the 'Digital India' initiative, the government has also launched e-learning initiatives to provide online education in remote and urban areas using smartphones, apps and internet services and also take so many initiatives to promote online education. In specially, the new education policy (NEP 2020) also recommends various initiatives for digital learning, such as- Pilot studies for digital education, creation of Digital infrastructure, Virtual Labs, Availability of Courses in Different languages by synchronous and asynchronous media, Online Assessments and Examination, Digital repository, Content creation, and Dissemination, etc.

Objectives of the Study:

The main objectives of this study are as follows-

I. To understand the historical development of Digital technology;
II. To understand the impact of technology in education and technology of Education in teaching-learning;
III. To understand the digital education initiatives and bridging the Digital Divide.

Research Methodology:

As per the requirements of the study descriptive nature is being adopted in research design. Secondary source and published articles were extensively used for the collection of data. Distinctively used sources were various web articles.

Data Collection:

The research paper depends upon the secondary source of information. To prepare the research paper, the required data is extensively used, as it is descriptive in nature.

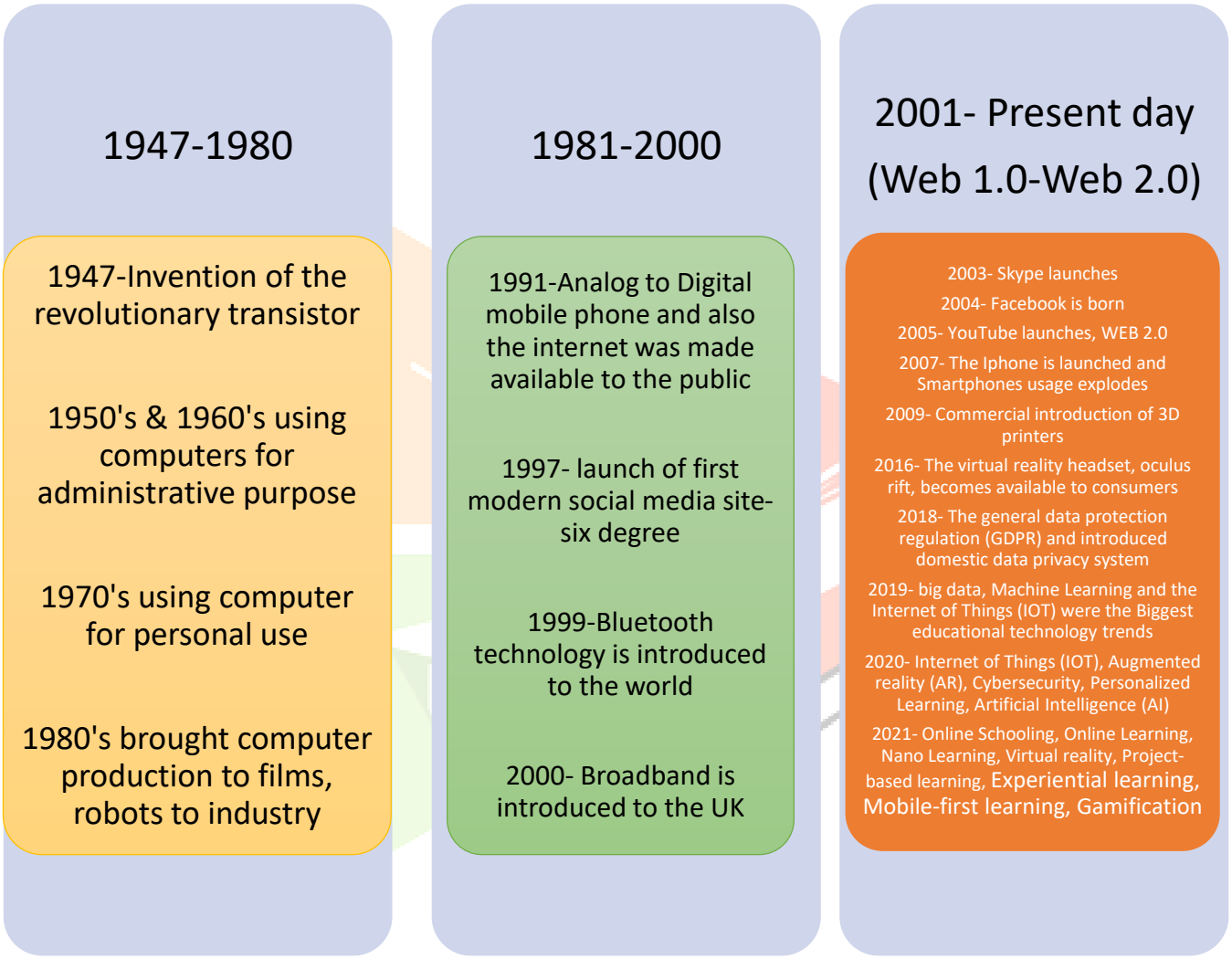
Discussions:

Objectives no-1: To understand the Historical development of Digital technology

the invention of the Revolutionary transistor, Integrated circuit in 1947 the great achievement of digital technology. In the 1950's and 1960's, many administrative bodies, such as- the government, the military, and others sector, were already using computers. Thus, with the advancement of time, technology has improved. The 1980's brought computer production to films, robots to industry, and automated teller machines (ATMs) to banks. Analog mobile phones made way to digital mobile phones in 1991 and the

demand soared. When the 21st century began, cell phones were a common possession and high-definition television became the most common broadcasting method, replacing analog Television. First introduced in 2003, Myspace, Facebook (2004) and Twitter (2007) changed the world of communication, business and the area of knowledge. In addition, the combination of various technologies and its historical development helps to show a new direction in our lives. In terms of data storage, the ability to store information has grown exponentially with terabyte storage now being very accessible.

The historical development of digital technology is shown below through a chart.



Objectives no-II: To understand the impact of technology in education and technology of Education in teaching-learning

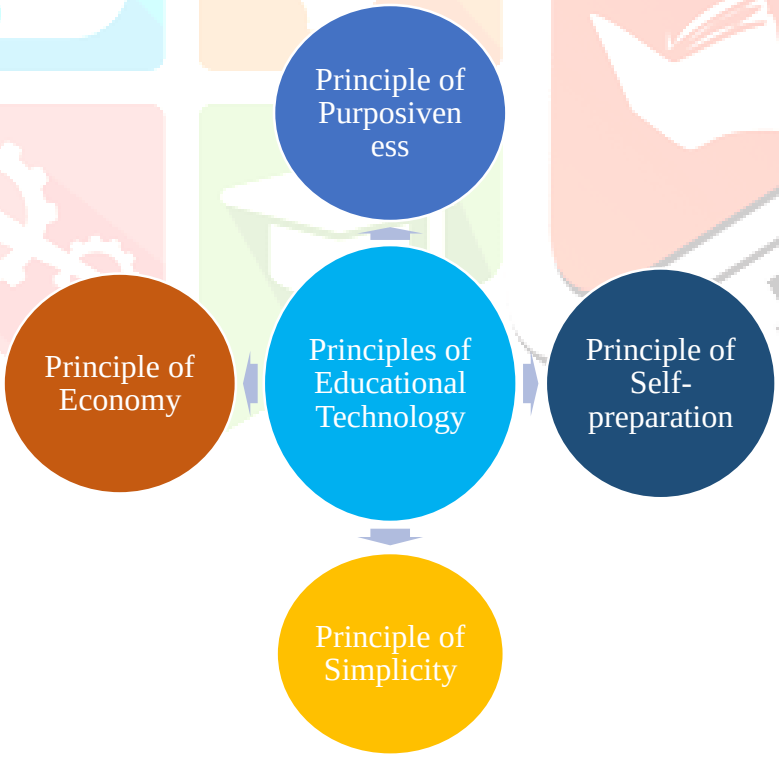
Hardware technology in education refers to the application of mechanical materials and equipment in education. In this sense, audio-visual materials such as charts, models, film strips, slide, audio caste, and fine gadgets and other gadgets, such as film projectors, wireless, tape recorder, record player, TV, video, teaching machine, computer etc. fall into the category of hardware technology. This hardware approach is a by-product of the tremendous advances in science and technology in the twentieth century. As a result of this approach, the teaching process is mechanized so that more students can be taught easily together and

the cost is much less. Education technology is applied in many fields of science to meet the educational needs of individuals and society.

The source of the software approach is behavioural science and its practical aspects associated with learning psychology. This approach stems from research by Skinner and other behavioural scientists. Modern program learning, task analysis, writing specific objectives, selecting appropriate learning strategies, reinforcement with correct answers and endless evaluation are the software. The key to digital education technology is the interconnectedness of the approach of hardware and software. This has led to the emergence of many important components, such as system engineering, education planning, education management and administration, etc. These digital learning technologies affect the learning-teaching process in many ways, such as-

- Arranges teaching-learning according to the personal differences of the students;
- Saves time, energy and resources for both teachers and students;
- Brings clarity and liveliness to the content and inspires both teachers and students;
- Their use increases the students' attachment and helps to maintain it;
- Increases students' chances of participating in lessons, etc.

There are certain principles in the teaching-learning process using digital learning technology, e.g.



1. **Principle of Purposiveness:**

   The use of technical equipment in the classroom must have a specific purpose. It will not be used for any other unnecessary purpose. The main responsibility of the students will be to achieve the right purpose. Right purpose rich the right goal of the students and as well as enrich the students more.

2. **Principle of Economy:**

   When proposing a machine or method, it is very important to consider the purchasing ability, in this analysis the purchasing ability of the buyer and the ability to operate it are also taken into consideration.

3. **Principle of Simplicity:**

   Simplicity is especially important in EdTech products because it naturally makes design solutions more universal. Simplicity enhances the usability of the subject. The transmission of motivation in the lessons of the students reveals the simplicity of the subject, the use of something difficult cannot impress the student as much as the simplicity of the subject.

4. **Principle of Self-preparation:**

   Right Preparation allows time to take the right steps in the right order, there are so many programmed learning in teaching-learning process. These programmed learning always help the students to prepare their learning sequentially with correct feedback.

5. **Principle of Simulation**

   In the context of Teaching- Learning process there are basically three types of Simulation, such as-

   Live: Simulation involving real people operating real systems. Involve individuals or groups.

   Virtual: Simulation involving real people operating simulated systems.

   Constructive: Simulation involving simulated people operating simulated systems.

6. **Principle of Availability**

   Principle of availability means the sources of equipment are available in the field of educational technology.

7. **Principle of Pedagogical Focus**

   The program module will be developed based on the appropriate student mindset and pedagogy.

In addition to these principles, there are some other principles that are-

Principle of Quality, Principle of Sustainability, Principle of Access, Principle of Scalability, Principle of Sharing, Principle of Choice, etc.

Objectives no-III: To understand the digital education initiatives and bridging the digital divide

The digital divide in India is challenging the nation's current educational methods across its entire student body. Digital connectivity is more necessary than ever before in guaranteeing that students can sustain their studies while schools remain physically closed.

Following are the key initiatives/ways taken by the Government of India to enhance and facilitate digital technology education activities.

1. National Digital Library (NDL)

in May 2016, The National Digital library of India is a project under Ministry of Education, Government of India. The target is to gather and collate metadata and supply full text index from several national and international digital libraries, furthermore as other relevant sources. It's a digital repository containing textbooks, articles, videos, audio books, lectures, simulations, fiction and every one different kinds of learning media. The NDLI provides freed from cost access to several books within the Indian languages and English.

2. E PG Pathshala

In 2015, e-PG Pathshala is an initiative of the MHRD under its National Mission on Education through ICT (NME-ICT) being executed by the UGC. The content and its quality being the key component of education system, top quality, curriculum-based, interactive e-content in 70 subjects across all disciplines of social sciences, arts, fine arts and humanities, natural & mathematical sciences, linguistics and languages are developed by the topic experts working in Indian universities and other R & D institutes across the country. Every subject had a team of man of science, paper coordinators, content writers, content reviewers, Language editors and multimedia team.

a. e-Adhyayan

e-Adhyayan could be a repository of e-Books for the Under-Graduate & Post-Graduate Courses. The e-Books are being derived from the e-text of e-PG Pathshala. The project is initiated by the University Grants Commission and Ministry of Human resource Development, Government of India. The author / course coordinator of books is Indian experts. Currently, e-Adhyayan has 50 e-Books in Sociology, Library & informatics, engineering Science & IT. It's available in open access under Creative Common platform. The platform of e-Books is pressbook which is open source. It's been deployed and customised by the INFLIBNET Centre. It also facilitates e-book publishing off-line, where author can write and publish his/her own book.

b. UGC-MOOC

UGC MOOCs- A vertical of Study Webs of Active–Learning for Young Aspiring Minds (SWAYAM) portal, UGC has launched MOOC initiated by the govt. of India with an aim to enable access, equity and quality within the domain of education for the aspirants.

c. e-Pathya

e-Pathya (Offline Access) is another vertical of e-Pathshala which is a software driven course/content package which helps students pursuing education (PG level) through distance learning yet as campus learning mode. This vertical also allows offline access to course content.

3. Shodhganga platform

in June 2009, The Shodhganga@INFLIBNET Centre provides a platform for research students to deposit their Ph.D. theses and make it available to the entire scholarly community in open access. The repository has the power to capture, index, store, disseminate and preserve ETDs submitted by the researchers.

4. e-Shodh Sindhu platform

e-Shodh Sindhu was formed with merger of three consortia, namely UGC-INFONET Digital Library Consortium, NLIST and INDEST-AICTE Consortium in December 2015. The most objective of the e-Shodh Sindhu: Consortia for instruction E-Resources is to supply access to qualitative electronic resources including full-text, bibliographic and factual databases to academic institutions at a lower rate of subscription.

5. e-yantra

The genesis of e-Yantra was within the teaching of the Embedded Systems course at IIT Bombay through the space Education Program of IIT Bombay from 2003 to 2006. The goal is to harness the talent of young engineers to resolve problems using technology across a spread of domains such as: agriculture, manufacturing, defence, home, smart-city maintenance and repair industries. Within the context of e-Yantra there are such a large number of initiatives, such as- e-Yantra Robotics Competition, e-Yantra Summer Internship Program, e-Yantra Lab Setup Initiative, e-Yantra Ideas Competition, e-Yantra Symposium, Task Based Training, etc.

6. FOSSEE

In 2013, FOSSEE (Free/Libre and Open-Source Software for Education) project promotes the use of FLOSS tools in academia and research. The FOSSEE project is a component of the National Mission on Education through Information and Communication Technology (ICT), Ministry of Education (Moe), Government of India. This project is completed by the subsequent medium- i. Scilab, ii. Python, iii. eSim, iv. Osdag, v. DWSIM, vi. Open FOAM, vii. Open Modelica, viii. Open PLC, ix. FLOOS-Arduino, x. SBHS, xi. R, xii. QGIS, xiii. FOCAL, xiv. SOUL

7. Spoken Tutorial portal

The Spoken Tutorial Project is launched under the National Mission on Education through Information and Communication Technology (ICT), by the Ministry of Human Resources and Development, Government of India. The objective of spoken tutorials is to popularize online learning. Spoken Tutorial is a multi-award-winning educational content portal. Here one can learn various Free and online courses all by oneself. Self-paced, multi-lingual courses ensure that anybody with a computer and a desire for learning can learn from any place, at any time and in any language of their choice.

8. Virtual Labs

The Government of India introduced a pilot virtual lab in 2009 and the main one in 2010 to enable undergraduate and post-graduate students (pursuing science and engineering courses) remotely access the labs and enhance their study experience. The virtual labs off er students a Learning Management System and various study aides such as video lectures, web resources, self-evaluate on and animated demonstrate ones.

9. Vidwan portal

In the year 1999, VIDWAN is the premier database of profiles of scientists / researchers and other faculty members working at leading academic institutions and other R & D organisation involved in teaching and research in India. It provides important information about expert's background, contact address, skills and accomplishments.

10. National Digital Educational Architecture (NDEAR)

In the Union Budget 2021-22, the Indian government established the National Digital Educational Architecture (NDEAR). National Digital Education Architecture (NDEAR) is federated, unbundled, interoperable, inclusive, accessible, evolving which aims to create and deliver diverse, relevant, contextual, innovative solutions that benefit students, teachers, parents, communities, administrators and result in timely implementation of policy.

11. PM eVIDYA Programme

The e-Vidya program begun in May 2020 in response to the COVID-19 pandemic. The Pradhan Mantri eVidya is an initiative by the Ministry of Education that will help in facilitating access to digital/online learning as well as teaching materials of various types among students and teachers.

12. DIKSHA

In September 2017, the government introduced DIKSHA. DIKSHA is an initiative of the National Council of Educational Research and Training (NCERT) under the aegis of the Ministry of Education, Government of India. DIKSHA is a unique initiative which leverages existing highly scalable and flexible digital infrastructures, while keeping teachers at the centre. It is built considering the whole teacher's life cycle - from the time student teachers enrol in Teacher Education Institutes (TEIs) to after they retire as teachers. DIKSHA can be accessed free of cost by anyone. It also offers more than 100 microservices as building blocks for the development of platforms and solutions. It is designed to support multiple languages and solutions. At present, it supports 18+ languages and various curricula of NCERT, CBSE and SCERT pan India.

13. SWAYAM

WAYAM is a programme initiated by Government of India on 2017 and designed to achieve the three cardinal principles of Education Policy viz., access, equity and quality. The objective of this effort is to take the best teaching learning resources to all, including the most disadvantaged. SWAYAM seeks to bridge the digital divide for students who have hitherto remained untouched by the digital revolution and have not been able to join the mainstream of the knowledge economy.

14. SWAYAM PRABHA

In 2017, The SWAYAM PRABHA is a group of 22 DTH channels devoted to telecasting of high-quality educational programmes on 24X7 basis using the GSAT-15 satellite.

15. NISHTHA

The Department of School Education and Literacy has launched a National Mission to improve learning outcomes at the elementary level through an Integrated Teacher Training Programme called NISHTHA under the Centrally Sponsored Scheme of Samagra Shiksha in 2019-20. NISHTHA is a capacity building programme for "Improving Quality of School Education through Integrated Teacher Training". It aims to build competencies among all the teachers and school principals at the elementary stage. NISHTHA is the world's largest teachers' training programme of its kind. The basic objective of this massive training programme is to motivate and equip teachers to encourage and foster critical thinking in students. The initiative is first of its kind wherein standardized training modules are developed at national level for all States and UTs.

16. OLabs

To off er student's lab learning experience via the internet, the government introduced OLabs in November 2014 for those who do not have access to physical labs.

17. On Air Shiksha Vani

On Air Shiksha Vani, DAISY by NIOS for differently-abled, e-Path Shala- Radio broadcasting is being used for children in remote areas who are not online (especially for grades 1 to 5).

18. Gyandoot

Gyandoot is an Intranet-based Government to Citizen (G2C) service delivery initiative started in the Dhar district of Madhya Pradesh in January 2000 with the twin objective of providing relevant information to the rural population and acting as an interface between the district administration and the people.

19. Internet Saathi Program

Internet Saathi Program – The Internet Saathi Program was launched in 2015 by Google India and Tata Trusts. The aim of this project is to facilitate digital literacy among rural Indian women.

20. National Education Policy (NEP- 2020)

National Education Policy, 2020 aims at making "India a global knowledge superpower" by introducing several changes from the school to college level in the Indian education system with special emphasis on digital education. Know more on New Education Policy at the linked page.

All these initiatives are very much helpful to our students, society and also help to bridging the gap of digital divide. The shift to online education also brings forward the conversations around digital divide and digital readiness of every stakeholder and institution.

Conclusion:

Overall, study on the effect of computing and emerging technology on teaching-learning consistently finds favourable outcomes. Apart from teaching, there is a touch of technology in every aspect of human life today. Today society is constantly changing. This variability is the law of nature. Due to the change in the flow of this rule, people have adopted this technology today. Technology has taken place in every corner of the society today. Today technology is giving a chance to the backward students to move forward today. The positive steps taken by the Government of India have made the education system of students easier. This study will be very informative to the readers. Analysis of secondary information will influence the reader's mind towards technology-based learning. The progress of society is not a mere measure. Proper use of technology symbolizes the progress of society.

References:

Al-Bataineh, A., Harris, J. L., & Al-Bataineh, M. T. (2016). One to One Technology and its Effect on Student Academic Achievement and Motivation. *Contemporary Educational Technology*, *7*(4). https://doi.org/10.30935/cedtech/6182

Clark-Wilson, A., Robutti, O., & Thomas, M. (2020). Teaching with digital technology. *ZDM*, *52*(7), 1223–1242. https://doi.org/10.1007/s11858-020-01196-0

Deepthi, T. (2021). A Paradigm Shift through Digital Technology in Teaching and Learning Process. *International Journal of Advanced Research in Science, Communication and Technology*, 100–103. https://doi.org/10.48175/ijarsct-v2-i3-317

Greve, K., & Tan, A. (2021). Reimagining the role of technology in higher education: the new normal and learners' likes. *Compass: Journal of Learning and Teaching*, *14*(3). https://doi.org/10.21100/compass.v14i3.1231

Gurukkal, R. (2021). Future Higher Education. *Higher Education for the Future*, *9*(1), 7. https://doi.org/10.1177/23476311211063698

Kalolo, J. F. (2018). Digital revolution and its impact on education systems in developing countries. *Education and Information Technologies*, *24*(1), 345–358. https://doi.org/10.1007/s10639-018-9778-3

Mridul Mazumdar @Mridul Mazumdar May 27, 2020, 18:51 IST. (2020, May 27). *The history and usefulness of online teaching in India*. Times of India Blog. https://timesofindia.indiatimes.com/readersblog/mridul-mazumdar/the-history-and-usefulness-of-online-teaching-in-india-20481/

Nadeem, A., Malik, N., & Noreen, S. (2021). Learning Management System: An Innovation in Teaching Learning Process at University Level. *Journal of Entrepreneurship, Management, and Innovation*, *3*(2), 409–428. https://doi.org/10.52633/jemi.v3i2.106

Olofsson, A. D., Fransson, G., & Lindberg, J. O. (2019). A study of the use of digital technology and its conditions with a view to understanding what 'adequate digital competence' may mean in a national policy initiative. *Educational Studies*, *46*(6), 727–743. https://doi.org/10.1080/03055698.2019.1651694

Pritam, B. P. (2022). Blended Teaching and Learning in Teacher Education Sector in India: Present and Future Prospects. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4027445