Hyper-digitalization in Education

Dr. Ranjit Singh, FIETE
Department of Electronics Communication Engineering, Ajay Kumar Garg Engineering College,
27 Km stone, Delhi-Meerut Expressway, Ghaziabad 201015 UP India
editor_journal@akgec.ac.in

Abstract -- **Online education had become a necessity for students to learn and teachers to teach due to the effect of pandemic all around the globe. Online teaching methods and pedagogy were a savior for the education field. UNESCO established the Global Education Coalition, to mobilize and support learning continuity. Afterwards, the online-teaching gradually evolved so much that today it is observed that the Google guru is increasingly replacing the Indian Guru-Shishya parampara. Advent of the Artificial intelligence added a new dimension.**
India is already the second largest market for e-Learning after the United States. Online education market in India is projected to achieve CAGR of 25% during 2025 to 2033 due to proliferation of high-speed internet, affordable smart phones & interactive software. What are the implications: Is it a boon or a bane?

Keywords: Online education, Education without borders, Digital education, e-Learning, Paperless learning, Lifelong learning

I. INTRODUCTION

WE now live in an increasingly hyper-connected world. Education system creates hope and it should never aim at creating mere hypes. Today, "Chalk and Talk" approach is giving way to new teaching methodology that may include communication technologies such as audio and video conferencing, PC software and the internet sources. ICT is an effective tool and strategy for producing high-quality human resources as well as for organizations to improve their business activities and market share. It now appears possible to aspire to become a knowledge society. Information kiosks and computer training centers, in addition to online education, can be found even in villages [1].

Online teaching methods proved a savior for the education field during Covid-19. Traditional education involved rote learning methods and not the skills such as critical thinking and adaptability, which are important for success in the future. Here digital learning can play its role [2].

Digital Education can be defined as the usage of a combination of technology, digital content and instructions in the education system to make things more effective and efficient than the traditional education system. Digital education is generating new learning opportunities as students engage in online, digital environments. Faculty also changes educational practices through the use of hybrid courses, personalized instruction, new collaboration models and a wide array of innovative, engaging learning strategies. For online education to sustain in the longer run, proper training, sufficient bandwidth availability, and preparations are imperative [3].

WhatsApp has gained the status of being authentic formal means of communication among the students and the academicians. Abundant information on any subject is available on such sources as Youtube, Facebook, Wikipedia, and Google. Screenshots have taken off the business of photocopy outlets.

There are many institutions such as IITs and IIMs that have in recent years opened satellite campuses abroad, or have signed memorandum of understandings with some foreign universities to offer online education.

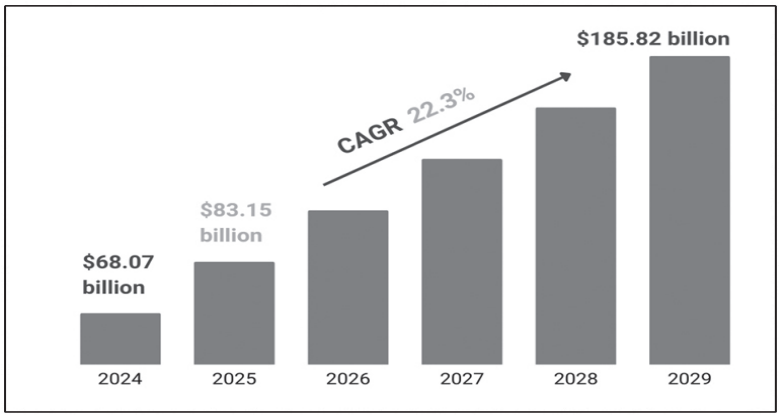

Figure 1. Global online-education market is projected to grow at CAGR 22.3%.

II. DIGITAL WORLD AT CROSSROADS

Technology changes incredibly quickly. Rapid adoption of digital learning tools drew concerns from UNESCO, which made an urgent call for appropriate use of technology in education. The UN agency said that countries should speed up internet connections at schools but warned them to use it in a way that never replaces in-person and teacher-led instruction [4].

Interestingly, Sweden brought back books & pens to its 'hyper-digitalized' schools. Lawmakers and experts in Sweden questioned if their hyper-digitalized approach to education had proven detrimental to children and led to a decline in basic skills. Children in Sweden experienced teachers pushing them to use printed books and engage in quiet reading time as well as handwriting practice, while asking them to devote less time to their independent online research. Students under age 10 need time and practice and exercise in handwriting before you introduce them to write on a tablet. The government reversed the national agency for education's decision to make digital devices mandatory in preschools.

Children should be taught how to use their devices in moderation. For instance, in Victoria, Australia, students must have phones switched off and securely stored during school hours. Each school has its own policy on how this works in practice. Wearable devices, tablets and other personal devices must have notifications turned off.

Global economy is revolutionizing through AI in ways one could hardly imagine just a decade ago: So no one in technology should get too comfortable or complacent [5].

III. THE INDIAN SCENE

Digitalization has been accepted as a powerful tool of empowerment and a way of coming out of marginalization. Online education market in India is estimated over $40 billion. After the United States, India has the second highest number of online course enrolments, with over 1,55,000 students from the country. They avail world-class services at the click of a mouse.

Traditional education system failed to evolve to meet today's rapidly changing demands. The rate of technological advancement and the resulting opportunities is far too rapid for traditional programs and curriculum to keep up. As a result, e-Learning will play a significant role in bringing about a significant change in our education challenges.

Massive Open Online Courses (MOOCs) under the government's SWAYAM initiative have the enormous potential to make higher education accessible to India's youth, who account for more than half of the country's population.

IV. MERITS / DEMERITS OF DIGITAL EDUCATION

Impact of technology on faculty and students is multifaceted, encompassing both advantages and disadvantages. Complexities of technology integration can create enriching and empowering educational surroundings that maximize the advantages of technology even as mitigating its challenges.

Digital education is generating new learning opportunities as students engage in online, digital environments and as faculty change educational practices through the use of hybrid courses, personalized instruction, new collaboration models and a wide array of innovative, engaging learning strategies.

Digital education allows pursuing education alongside other commitments. It is accessible 24x7. It minimizes the need of elaborate infrastructure, thereby reducing the total cost of education that needs to be incurred by the society. It is an effective tool to attain the status of a knowledge society.

Figure 2. Traditional education system failed to evolve to meet today's rapidly changing demands.

Advantages

1. *Efficiency*: Online learning offers teachers an efficient way to deliver lessons to students. Online learning has a number of tools such as videos, podcasts that teachers can use as part of their lesson plans. By extending the lesson plan beyond traditional textbooks to include online resources, teachers are able to become more efficient educators.

2. *Accessibility A*llows students to attend classes from any location of their choice. It also allows schools to reach out to a more extensive network of students, instead of being restricted by geographical boundaries. Additionally, online lectures can be recorded, archived, and shared for future reference. This allows students to access the learning material at a time of their comfort. Thus, online learning offers students the accessibility of time and place.

3. *Affordability:* Online education is far more affordable as compared to physical learning. This is because online learning eliminates the cost points of student transportation, student meals, and most importantly, real estate. Additionally, all the course or study materials are available online, thus creating a paperless learning environment which is more affordable, while also being beneficial to the environment.

4. *Improved Student Attendance:* Since online classes can be taken from home or location of choice, there are fewer chances of students missing out on lessons.

5. *Learning Styles:* Every student has a different learning journey and a different learning style. Some students are visual learners, while some students prefer to learn via audio. Similarly, some students thrive in the classroom, and other students are solo learners who get distracted by large groups.

Benefits to academic Institutions:

- Time, efforts and money of the Institutions is saved.
- Planning to conduct exams online and release the exam results.
- It makes knowledge to transfer easily and equally from teacher to each and every student with the help of effective and advanced technology-based teaching tools.
- It helps in creating interest among students for learning concepts through interactive teaching.
- Easy communication between institution and parents.

Benefits to Students:

- They can easily view their daily time-table, assignments, and planned events.
- They can give online exam and view their results.
- They can access library online.
- They are able to prepare presentation online.

Benefits to Parents:

- They can easily pay the school fees.
- Easily view internal and semester exam schedule and results.
- They can get information on various school events, notices, holidays and can track the presence of ward in the classroom/ outside the class.

Benefits to Teachers:

- It helps the teacher to manage their class time and teaching content effectively.
- It helps in explaining the difficult content easily and effectively.
- They can check daily time-table, assignments, teaching history, events and holiday list, self as well as students attendance etc.

Demerits

The online medium requires a lot of self-discipline which is generally lacking in kids.

1. *Inability to Focus on Screens:* For many students, one of the biggest challenges of online learning is the struggle with focusing on the screen for long periods of time. With online

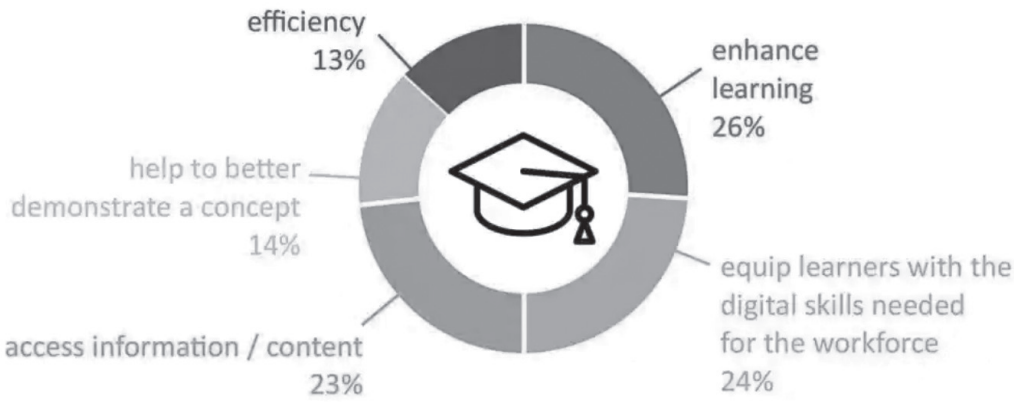

Figure 3. Merits of embracing digital education.

learning, there is also a greater chance for students to be easily distracted by social media or other sites. Therefore, it is imperative for the teachers to keep their online classes crisp, engaging, and interactive to help students stay focused on the lesson.

2. *Technology Issues*: Another key challenge of online classes is internet connectivity. In smaller cities and towns, a consistent connection with decent speed is a problem. This is detrimental to the education process.

3. *Sense of Isolation*: Students can learn a lot from being in the company of their peers. However, in an online class, there are minimal physical interactions between students and teachers. This often results in a sense of isolation for the students. In this situation, it is imperative that the school allow for other forms of communication between the students, peers, and teachers. This can include online messages, emails and video conferencing that will allow for face-to-face interaction and reduce the sense of isolation.

4. *Teacher Training*: Online learning requires teachers to have a basic understanding of using digital forms of learning. However, this is not the case always. Very often, teachers have a very basic understanding of technology. Sometimes, they don't even have the necessary resources and tools to conduct online classes. To combat this, it is important for schools to invest in training teachers with the latest technology updates so that they can conduct their online classes seamlessly.

5. *Manage Screen Time*: Many parents are concerned about the health hazards of having their children spend so many hours staring at a screen. This increase in screen time is one of the biggest concerns and disadvantages of online learning. Sometimes students also develop bad posture and other physical problems due to staying hunched in front of a screen.

Teachers need to adopt different teaching methods when they are teaching online to make students take active participation in studies and do not feel passive. So, online education is a boon if utilized properly, or a bane if you can't grasp the excess out of it, The obstacles are real but not insurmountable.

V. IMPACT OF AI ON EDUCATION

Use of Artificial intelligence (AI) in education refers to the use of computer systems that can perform tasks typically requiring human intelligence to enhance learning experiences, streamline administrative processes, and support educators. AI technologies include machine learning, natural language processing and robotics, which can personalize learning by adapting content and pace to individual student needs. AI-powered tools can analyze vast amounts of student data.

The integration of AI in education has the potential to raise academic standards and improve the overall quality of education. It can help ensure consistency and accuracy in grading, provide access to high-quality resources and support educators in delivering effective instruction.

Government of India launched The IndiaAI Mission in March 2004 to foster AI innovation by democratizing computing access, enhancing data quality, developing indigenous AI capabilities, attracting top AI talent, enabling industry collaboration, providing startup risk capital, ensuring socially impactful AI projects, and promoting ethical AI.

Many higher education institutes are offering unique variations in their courses which students can easily access and learn from the comfort of their homes. Besides India, UK, Canada, USA, Korea, China, Singapore & Finland adopted AI in education to enhance personalized learning, administrative efficiency, and educational research. They leverage AI technologies to innovate teaching methods and improve student outcomes across various educational levels [6].

AI systems need to be designed with human oversight and control. Ensuring the responsible development of AI involves addressing ethical concerns. Whereas AI can be a great teaching tool, the role of real-life educators in fostering critical thinking, emotional intelligence and social skills remains essential in education. AI can help in administrative tasks and providing extra support. While AI can enhance the teaching process, the unique qualities that teachers bring to the classroom make them irreplaceable.

As we increasingly rely on AI-driven tools for teaching, assessment and administrative tasks, we bear the risk of becoming overly dependent on it, which can lead to significant disruptions in the event of technical failures, or cyber-attacks.

VI. DIGITAL EDUCATION IN THE ERA OF INDUSTRY 4.0

Online education seamlessly bridges the gap between academicians, scholars, and teachers. It is not just about using technology; it's about transforming the entire learning experience to prepare students for the future in a world increasingly shaped by Industry 4.0. The goal is to prepare students with the skills and knowledge needed for the digital age and the demands of a rapidly evolving workforce [12].

Protecting student data and online learning platforms from cyber threats is an ever-evolving race to keep ahead of the malicious intent. With the developments in technology and innovation, the manufacturing, workforce, training, and educational systems are impacted. Facing the fourth industrial revolution, academics are researching the possible changes that might arise in education and skills of the future workforce. As the workplace develops, new competencies will surface.

One of the greatest advantages of digital learning in Industry 4.0 is its ability to provide personalized and adaptive training. Instead of following a fixed curriculum, employees have access to learning modules specifically designed for their individual needs and pace. This results in more relevant and effective training that can be directly applied to daily tasks, facilitating the acquisition of practical and immediately applicable knowledge.

VII. CONCLUSION

In the hyper-connected world, every segment of human activity is undergoing a subtle change. Education is no exception. Judicious integration of both traditional offline learning and e-learning is the way forward.

REFERENCES

[1] A. Haleem , M. Javaid, M. A. Qadri and Rajiv Suman, "Understanding the role of digital technologies in education: A Review", *Sustainable Operations and Computers*, Vol. 3, 2022, pp. 275-285.

[2] R. Tandon and S. Tandon, "A New paradigm in transforming the future of education in India," *Int'l J. Innovative Science, Engineering & Technology,* Vol. 7, no. 2. Retrieved from http://ijiset.com/vol7/v7s2/IJISET_V7_I2_04.pdf

[3] R. Bajaj and V. Sharma, "Smart education with artificial intelligence based determination of learning styles", *Procedia Computer Science*, 132, 2018, pp. 834–842.

[4] F. Martin and D.U. Bolliger, "Engagement matters: Student perceptions on the importance of engagement strategies in the online learning environment," *Online Learning*, Vol. 22, no.1, 2018, p. 205.

[5] B. du Boulay, "Artificial intelligence as an effective classroom assistant," *IEEE Intelligent Systems*, Vol. 31, no. 6, 2016, pp. 76–81.

[6]. National Institute for Lifelong Education, "Lifelong Learning in the Republic of Korea" https://www.nile.or.kr/index.do?lang=en

[7] C. Bowers, *Digital detachment: How computer culture undermines democracy*, 2016, New York: Routledge.

[8] Z. Akyol and D.R. Garrison, "Understanding cognitive presence in an online and blended community of inquiry: Assessing outcomes and processes for deep approaches to learning", *British J. Educational Technology*, Vol. 42, no. 2, 2011, pp.233-250.

[9] J. Costley and C.H. Lange, "Video lectures in e-learning: Effects of viewership and media diversity on learning, satisfaction, engagement, interest, and future behavioral intention," *Interactive Technology and Smart Education*, Vol. 14, no.1, 2017, pp. 14-30.

[10] J.R. Chapman and P.J. Rich, "Does educational gamification improve students' motivation?", *J. Education for Business*, Vol. 93, no.7, 2018, pp. 314–321.

[11] S. Bayne, "Teacherbot: Interventions in automated teaching," *Teaching in Higher Education*, Vol. 20, no.4, 2015, pp. 455-467. https://doi.org/10.1080/13562517.2015.1020783

[12] D. Singh and G. Tilak, "Implementation of education model 4.0: Developing industry 4.0 skills in graduate engineers for improving employability skills, *Humanities & Social Sciences Reviews*, Vol. 8, no.2, 2020, pp. 601-613. https://dx.doi.org/10.18510/hssr.2020.8268 10.18510/hssr.2020.8268

Dr. Ranjit Singh (b. 17 Aug 1948) obtained B.Tech, M.Tech. and Ph.D degrees from Indian Institute of Technology, Kanpur in 1969, 1971 and 1975 respectively. He specialized in the area of Electronic communication circuits and devices. He has abiding passion for teaching and research. Guided M. Tech and PhD scholars besides supervising B. Tech projects. His forte is inspiring others to reach full potential. Currently assisting IETE in their noble mission.

He is founding Editor-in-Chief of the *AKGEC International Journal of Technology* -- the Window to New Horizons, running in sixteenth volume. Published large number of technical papers in IETE journals in addition to in-depth technology-reviews covering emerging trends in communications and information technology. He was Editor of IETE journals during 1975-1987; Technical Editor at *Telematics India* during 1987-2001; & Editor of Industrial Purchase journal during 2002- 2008.

From September 2008 to February 2015, he taught at Ajay Kumar Garg Engineering College where, he was a Professor in the Department of Electronics and Communication Engineering. Worked for IEC Engineering College, Greater Noida from April 2015 – May 2016, where he simultaneously headed two Departments of ECE and EI and successfully implemented Technology projects like e-Yantra.

He is Life Fellow of the IETE and ITU-APT Foundation of India. Attended international conferences held in France, Singapore, USA, Hong Kong and Nepal. Delivered Keynote address in the Seminar on 'Mobile Computing' in 2014 and subsequently Guest Lectures on:

- Security Issues in Wireless Communications (Nov 2016)
- Big Data: Challenges and Opportunities (Feb 2017)
- Smart Cities (April 2017)
- Lure of ISM Band (July 2017)
- Lithium Ion Batteries: Answer to Energy Crunch (May 2018).

Daily practices advanced *pranayams* and 'Art-of-Living' meditation. He is passionate about classical music. Also associated with 'Amway' and Insurance sector.