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Editorial

In the wake of unprecedented global challenges, the realm of education has witnessed a profound shift towards digital platforms, particularly in a country as diverse and populous as India. E-learning, once a supplementary tool, has now emerged as a cornerstone in the educational landscape, offering immense potential to equal access to knowledge and foster inclusive learning environments.

One of the most notable advantages of e-learning is its ability to transcend physical boundaries. In a country where rural areas often lack adequate educational infrastructure, digital platforms offer a lifeline. Students can access courses, materials, and expert instruction regardless of their location, thereby levelling the playing field and empowering learners from all backgrounds.

During the COVID-19 pandemic the adoption of e-learning in India accelerated extensively, albeit under challenging circumstances. Schools, colleges and universities swiftly turned to online modes to ensure continuity in education. While initial hurdles such as internet connectivity and digital literacy were evident, the resilience and adaptability showcased by teachers and students alike underscored the potential of e-learning to transform education delivery.

Digital India is a flagship programme of Government of India with a vision to transform India into a digitally empowered society and knowledge economy to enable its citizens avail Government services electronically and easy-of-use. Initiatives like e-health, e-education and wide ranging variety of citizen-centric services, large–scale skill development programmes are also adding great value to the rural economy. And to popularise e-learning, the Government of India has launched many digital based schemes for education, healthcare, banking, skill development, and agriculture sectors and working relentlessly to strengthen the digital infrastructure in rural areas.

However, in India, the journey towards embracing e-learning is not without its challenges. Disparities in access to technology and internet connectivity persist, particularly in rural and poor communities. Addressing these gaps requires concerted efforts from both government and private sectors to ensure equitable access to devices, internet infrastructure, and digital literacy programmes.

While e-learning in India has made significant strides, its full potential is yet to be realised. By addressing infrastructure gaps, ensuring content quality, and fostering digital inclusivity, India can harness the transformative power of e-learning to empower its youth, drive economic growth, and contribute to a knowledge-driven society.

E-learning being a vast subject, it is not possible to touch upon and to delve into every facet of it, however, all efforts have been made to cover the main aspects like Artificial Intelligence, skill development , social and economic impact in rural India and future of E-learning in this issue of Kurukshetra. We hope that readers will get ample knowledge and information about the present scenario of E-learning in India. ❑

From Classrooms to Screens: Future of Learning with Digital Education

The future of learning with digital education holds immense promise. Advancements in artificial intelligence (AI), virtual reality (VR), and augmented reality (AR) technologies are poised to further revolutionise educational experiences.

If you want to teach people a way of thinking, don't bother trying to teach them. Instead, give them a tool, the use of which will lead to new ways of thinking.

– Richard Buckminster Fuller

***Rajnish Kumar**

Complexity in the field of education is a rapidly emerging challenge. Rigidity and the inability to swiftly adjust to evolving circumstances pose persistent obstacles to the success of educational institutions. In our progressively dynamic and unpredictable world, educators and learners alike must navigate constant change and confront an environment characterised by numerous exceptions. These challenges are growing more crucial as educational institutions encounter fiercer competition, expand their global reach, intensify outsourcing, and contend with an increasingly turbulent world.

The history of technology in education is a fascinating journey that spans several decades. From the early use of audio-visual aids to the integration of computers and the internet, technology has played a significant role in transforming the educational landscape. In the early 20th century, educational institutions began incorporating audio-visual aids such as film projectors, slide projectors, and educational films to enhance classroom instruction. These aids brought visual and auditory elements into the learning environment.

Then in the 1950s and 1960s, television sets became more accessible, leading to the emergence of educational television programs. Educational

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broadcasting allowed students to access educational content from their homes, expanding learning opportunities beyond the classroom.

The introduction of computers in the 1970s marked a significant milestone in educational technology. Early computer systems were large and expensive, but they paved the way for computer-assisted instruction (CAI). Programs like PLATO (Programmed Logic for Automatic Teaching Operations) offered interactive learning experiences and personalised instruction.

The advent of the internet in the 1990s revolutionised education. It enabled the creation of online learning platforms, virtual classrooms, and collaborative tools. Distance learning became more accessible, and students could access a wealth of information and resources from around the world.

With the advancement of technology, multimedia elements such as graphics, videos, and interactive simulations became integral to educational software and digital learning materials. This multimedia approach enhanced engagement and interactivity in the learning process.

Technology has enabled enhanced collaboration and communication among learners and educators. Online discussion boards, video conferencing tools, and collaborative platforms facilitate communication, knowledge sharing, and remote learning opportunities.

These milestones demonstrate how technology has evolved and become increasingly integrated into educational practices, empowering educators, expanding access to knowledge, and transforming the learning experience for students worldwide.

It is important to define the terms: *EdTech and Digital learning.*

EdTech (Education Technology) *includes a wide range of technologies, hardware, software, services and digital resources used to conduct, support or enhance teaching and learning, and facilitate education management and operations.*

Digital learning *is the teaching and learning process that entails the use of digital technologies, including online or offline environments, using distance, hybrid or in- person modalities.*

In the early 20th century, Thomas Edison, promoted mechanical instruction as an application of his motion picture patents. Edison claimed in 1922 that current textbooks functioned at only "two percent efficiency." "The education of the future, as I see it," he continued, "will be conducted through the medium of the motion picture, a visualised education, where it should be possible to obtain one hundred percent efficiency." But Edison soon shut down the programme and problem was that instead of working with teachers and addressing their classroom challenges, Edison evidently believed his prestige would lead educators to revise their curricula around his catalogue.

The Rise of Digital Education

The rise of digital education can be attributed to the rapid advancement of technology. The proliferation of computers, the internet, and mobile devices has opened up new avenues for educational experiences. Digital education refers to the use of digital tools, resources, and platforms to facilitate teaching and learning processes. It encompasses various forms, including online courses, virtual classrooms, educational apps, multimedia content, and interactive simulations.

Facets of Digital Education

Digital education offers numerous benefits that have contributed to its growing popularity. Firstly, it

enhances accessibility and inclusivity by breaking down geographical barriers and reaching learners who may have limited access to traditional educational opportunities. Online courses and virtual classrooms enable students to learn from anywhere, anytime, opening doors to lifelong learning and flexible education options.

Secondly, digital education promotes personalised learning experiences. With digital tools, educators can tailor instruction to individual student needs, providing targeted support and adaptive learning pathways. This personalised approach maximises student engagement and academic success.

Thirdly, digital education fosters interactive and engaging learning environments. Multimedia elements, such as videos, graphics, and interactive simulations, make learning more dynamic and immersive. Students can actively participate, experiment, and explore concepts, deepening their understanding and critical thinking skills.

While digital education brings numerous benefits, its implementation is not without challenges. One significant challenge is the digital divide, where disparities in access to technology and internet connectivity hinder equal educational opportunities. Addressing this divide requires concerted efforts to ensure infrastructure development, affordability, and accessibility of digital tools and internet connectivity for all.

Transforming Learning Experiences

Digital education is reshaping learning experiences in various ways. Firstly, it promotes active and self-directed learning. Students can take ownership of their learning journey, exploring resources, collaborating with peers, and engaging in problem-solving activities. This shift from passive reception to active participation empowers learners and cultivates lifelong learning skills.

Secondly, digital education enables personalized assessments and feedback. Digital tools allow for the collection and analysis of data, providing insights into student progress and learning patterns. Educators can use this data to identify areas of improvement, tailor instruction, and provide timely feedback, fostering continuous growth and improvement.

The Role of Educators in Digital Education

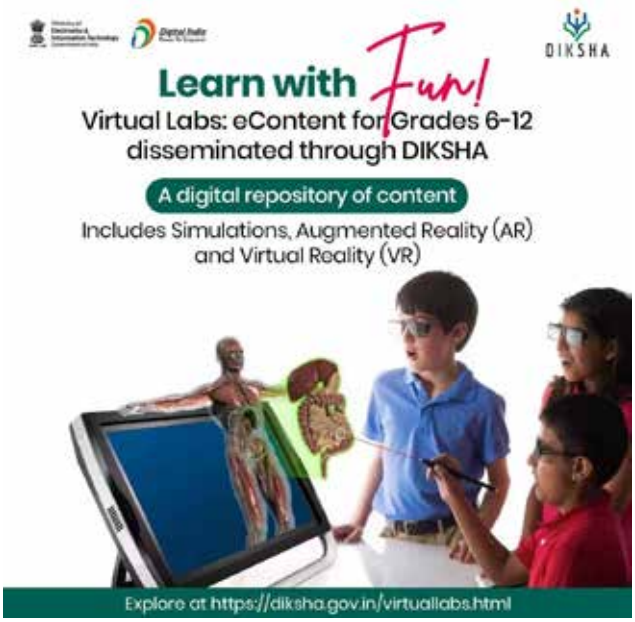
In the digital education landscape, educators play a crucial role as facilitators, mentors, and guides. While digital tools can enhance learning experiences, the human element remains invaluable. Educators provide guidance, support, and expertise, ensuring that students navigate digital resources effectively, develop critical digital literacy skills, and understand ethical considerations in the digital realm. The role of educators extends beyond content delivery to fostering collaboration, critical thinking, and social-emotional skills in digital learning environments.

Future Directions and Implications

The future of learning with digital education holds immense promise. Advancements in artificial intelligence (AI), virtual reality (VR), and augmented reality (AR) technologies are poised to further revolutionise educational experiences. AI-powered adaptive learning systems can provide even more personalised and tailored instruction, adapting to individual learning styles and preferences. VR and AR technologies can create immersive and interactive simulations, enabling students to explore virtual environments and engage in hands-on experiences.

However, as the field of digital education continues to evolve, it is crucial to address ethical considerations, such as data privacy, digital citizenship, and the responsible use of technology. Educators and policymakers must collaborate to establish guidelines and frameworks that ensure the ethical and responsible integration of digital education.

Microlearning and mobile learning have become increasingly popular trends in the eLearning space.



Microlearning entails breaking down learning material into bite-sized, easily digestible segments, while mobile learning enables learners to access content on the move, using their smartphones or tablets. With attention spans dwindling and learners becoming more mobile, these trends are poised to continue gaining traction.

Gamification and game-based learning utilise game design principles to enhance the interactivity and engagement of the learning process. Incorporating features such as points, badges, and leaderboards incentivises learners to successfully complete courses and reach their learning objectives.

Self-learning capability of Digital Systems

Tutoring systems might someday learn from student mistakes and adapt to clarifying subjects just as machine learning enabled the computer AlphaGo to defeat one of the strongest human players of the ancient Japanese game Go—one in which human masters once seemed able to retain their edge over brute computational force for many years after Deep Blue defeated Garry Kasparov at chess in 1997. It is possible that tomorrow's computers will be able to work with human learning styles better than the best teachers can. Of course, it is equally possible that this turns out to be one of those tasks so complex that no efficient algorithm exists for it.

Challenge of making Digital Education offline or on low internet speed

Making digital education accessible offline or in low internet speed environments can be a challenging task. However, there are some strategies and technologies that can help overcome these challenges. Here are a few approaches:

- **Offline Content Delivery**: Provide downloadable content such as PDFs, e-books, videos, or interactive modules that can be accessed without an internet connection. Users can download the content when they have access to the internet and consume it offline at their convenience.
- **Mobile Apps**: Develop mobile applications that can store educational content locally on the device. Users can download the app and access the content without relying on a stable internet connection. Apps can also synchronise data and updates whenever an internet connection is available.
- **Learning Management Systems (LMS)**: Utilise learning management systems that support offline functionality. These systems can provide offline access to course materials, assignments, quizzes, and progress tracking. Once the user connects to the internet, their progress and data can be synchronised with the LMS.
- **USB/CD Distribution**: Distribute educational content through USB drives or CDs. Users can access the content directly from these physical media without requiring an internet connection. This approach is particularly useful in areas with limited or no internet access.
- **Curriculum on Storage Devices**: Store educational content on portable storage devices like SD cards or external hard drives. These devices can be distributed to students, who can access the content on their personal computers or devices offline.
- **Interactive Offline Activities**: Design interactive offline activities, worksheets, or projects that do not require internet connectivity. These activities can engage students and promote learning even in low-tech environments.

It is essential to consider the target audience, infrastructure limitations, and available technology when designing offline or low-internet education solutions.

Open Standards for Digital Education

India has indeed made significant progress in promoting open standards for digital education. The country has recognised the importance of interoperability, accessibility, and affordability in

ensuring widespread access to educational resources. Here are a few examples of India's pioneering work in open standards for digital education:

National Repository of Open Educational Resources (NROER): The NROER is an initiative by the Ministry of Education, Government of India, aimed at creating a centralised repository of open educational resources. It provides a platform for educators to share, collaborate, and access a wide range of digital learning materials, including textbooks, videos, audio resources, and interactive modules.

National Digital Library of India (NDLI): The NDLI is a digital library that offers free access to a vast collection of academic resources, including textbooks, scholarly articles, theses, and other educational materials. It follows open standards and provides multiple formats for content, making it accessible across devices and platforms.

SWAYAM (Study Webs of Active Learning for Young Aspiring Minds): SWAYAM is an online platform that hosts massive open online courses (MOOCs) and other digital learning resources. It allows learners to access high-quality educational content from various institutions and organisations across India. SWAYAM follows open standards to ensure compatibility with different devices and learning management systems.

DIKSHA is a groundbreaking digital platform developed by the National Council of Educational Research and Training (NCERT) in India. It serves as a comprehensive hub of educational resources, providing teachers, students, and parents with access to a wide range of digital learning materials.

NDEAR- National Digital Education Architecture has been envisioned as UPI for Education.

It aims to create a unified digital ecosystem that supports the diverse needs of the education sector by leveraging technology. Key features of NDEAR are:

- **Unified Digital Infrastructure**: NDEAR seeks to provide a scalable and interoperable digital infrastructure to support various educational processes, including teaching, learning, administration, and governance. It aims to ensure seamless access to diverse educational resources and services across the country.
- **Interoperability and Standards**: The architecture emphasises the importance of interoperability, enabling different digital platforms and services to work together effectively. It sets standards and guidelines to ensure consistency and compatibility across various educational technologies and systems.
- **Data-Driven Decision Making**: NDEAR facilitates the collection, analysis, and utilisation of educational data to inform decision-making at all levels, from individual schools to national policy. It promotes the use of data analytics and artificial intelligence to enhance educational planning, delivery, and outcomes.
- **Personalised Learning**: The architecture supports the development of personalised learning experiences tailored to individual student needs and preferences. It enables adaptive learning technologies that can provide customised content and feedback to students.
- **Inclusivity and Accessibility**: NDEAR aims to bridge the digital divide by ensuring that all students,

regardless of their socio-economic background, have access to digital educational resources.

Thus, it represents a transformative approach to integrating technology into the Indian education system. By creating a unified digital ecosystem, it aims to enhance the quality, accessibility, and equity of education across the country.

NDEAR provides the following:

- **Specifications & Standards:** A set of nationally interoperable standards and specifications allowing interoperability and portability across all systems.
- **Microservices & APIs**: A set of unbundled services deployed in a federated manner and available via APIs, which can be used by the ecosystem to build and innovate solutions to address the diversity and scale.
- **Reference Solutions:** A set of reference solutions and apps that can be deployed in a federated manner and used freely out of the box.

To cater to 5 key personas (Student, Parent, Teacher, Administrator, Community members) and 3 key ecosystems (Programs, asset, solution) across 2 core interactions (learning and administration).

From Classrooms to Screens

The future of education is increasingly shifting from traditional classrooms to digital screens, driven by advancements in technology and changing learning needs. Here are some key aspects of this transition:

Online and Blended Learning: The rise of online learning platforms and the integration of technology in education have paved the way for remote and blended learning models. Students can access educational content, participate in interactive activities, and engage in virtual discussions from anywhere with an internet connection. This flexibility allows learners to customize their learning experiences and enables access to a wide range of educational resources.

Personalised Learning Experiences: Digital platforms offer opportunities for personalised learning tailored to individual student needs and preferences. Adaptive learning technologies can analyse student performance data and provide targeted recommendations, adaptive assessments, and customised learning pathways.

Virtual Reality (VR) and Augmented Reality (AR): Immersive technologies like VR and AR are transforming the educational landscape. They enable students to explore virtual environments, conduct virtual experiments, and engage in immersive simulations. These technologies enhance learning by providing interactive and experiential opportunities that go beyond traditional textbooks and lectures.

Collaboration and Global Connections: Digital screens enable students to connect and collaborate with peers and experts from around the world. Through video conferencing, discussion forums, and online collaboration tools, students can engage in cross-cultural exchanges, project-based learning, and collaborative problem-solving.

Data-Driven Insights: Digital platforms capture valuable data on student performance, engagement, and learning patterns. Educators can leverage this data to gain insights into individual and class progress, identify areas of improvement, and make informed instructional decisions. Data-driven analytics support evidence-based teaching practices and help optimise learning experiences.

Lifelong Learning and Microlearning: In the digital age, screens serve as portals to endless learning opportunities. They unlock a wealth of online courses, tutorials, and educational resources, fostering continuous personal growth. The rise of microlearning revolutionises this landscape, offering knowledge in concise, focused modules. This approach caters to modern lifestyles, allowing learners to acquire skills efficiently, fitting education into even the busiest schedules.

As we continue this transformation, it is crucial to fully embrace the opportunities that technology offers while also preserving the human touch of educators. By doing so, we can foster creativity, critical thinking, and support the growth of every learner. ❑

e-learning Barriers in Rural India and Way Forward

E-Learning has emerged as a crucial tool in bridging educational gaps and nurturing rural development across the world, and India is no exception to the trend despite the socio-economic disparities and technological challenges that we face, particularly in the rural part of the country.

* **Balendu Sharma Dadhich**

The potential transformational impact of e-learning for rural populations has been established by innumerable global and local experiences and has drawn attention of global organisations including the United Nations. The UN had, in fact, launched a few online courses itself during the Covid-19 pandemic which are still available to the global population. These courses cover diverse topics, including sustainable development, human rights, climate change, and nuclear safety. These initiatives aim to equip people including those in vulnerable situations, with essential knowledge and skills, through accessible digital education.

India is an appropriate candidate for taking optimum advantage of the ongoing digital education revolution especially due to the challenges our village populations face from the standpoint of traditional, in-person

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educational framework. During a post-budget webinar on 'Harnessing Youth Power - Skilling and Education' last year, Prime Minister Shri Narendra Modi had underlined the importance of e-learning and expressed his vision for e-learning in the country in these words- "Now the role of our teachers will not be limited only to the classroom. More variety of teaching material will be available for our educational institutions from all over the country which will open new doors of opportunities for the teachers while filling the gap between village and city schools."

On one hand, e-learning's potential to democratise access to quality education is beyond any doubts, while on the other hand its effective implementation and delivery in rural areas faces significant challenges. Some of these can be seen in the form of infrastructural limitations, socio-economic disparities, and technological barriers. All of these, and many more, need to be solved if we want to realise the full transformative impact of e-learning in rural India.

There is no denying the fact that the digital divide has some implications on the process of rural development, leading to unequal access to quality education. However, the e-Learning platforms can help in overcoming geographical, infrastructural and technological barriers by providing and delivering educational materials to remote areas.

Rural India, home to approximately 65% of the population, faces multifaceted blockers to quality education. Coupled with insufficient teaching resources such as textbooks and technological tools, these infrastructural gaps hamper educational progress. Moreover, the scarcity of qualified teachers willing to work in rural areas further aggravates the challenge.

Infrastructural Challenges

Infrastructural inadequacies in rural India have the potential to adversely impact the transformative power that e-learning contains. A robust digital infrastructure is the backbone of effective e-learning, yet rural areas struggle with a significant scarcity of essential components.

One of the most critical infrastructural limitations come from the inadequate internet connectivity in rural areas of the country. Low-speed internet connections upset the smooth delivery of e-learning content, making it difficult for students to access and engage with

online resources. This digital divide creates a significant disparity in educational opportunities, as students are unable to participate in online classes, access learning materials, or interact with teachers and classmates in real-time.

Unreliable electricity supply further compounds the problems of internet connectivity. Frequent power outages and voltage fluctuations render devices inoperable, making it difficult for students to utilise e-learning platforms. The scarcity of digital devices such as computers, laptops, and smartphones in rural homes poses another problem and many students lack the necessary equipment to access online educational resources.

Beyond connectivity and devices, the overall digital infrastructure in rural areas is underdeveloped. This includes a lack of digital classrooms, Wi-Fi hotspots, and technical support services. Without these essential components, e-learning initiatives struggle to gain traction and deliver the desired impact.

Technological Barriers

Technological challenges make it harder for e-learning to succeed in rural India. These barriers, combined with problems in infrastructure and how much money people have, make it tough to use digital education well. The gap between rural and city areas in terms of technology is a big issue.

In rural India, about 86% of people have internet access, but most use smart phones that aren't suitable for e-learning for a long time. Also, laptops and computers cost a lot, so it is hard for students to get the tools they need for e-learning.

India has 22 languages recognised by the Indian

constitution, which makes our country diverse and culturally rich. However, not all languages have the same level of technology support, and some face big technology problems. Most digital learning materials are in English, with only a bit available in Hindi and a few other local languages. This language gap makes it hard for students to learn well when the materials are not available in their own language.

Many rural families use cheap smartphones with not enough power or storage for modern e-learning. And because laptops and computers are expensive, it is tough to get quality digital education. The quality and easy availability of digital content are crucial for good e-learning. When a regular and normal student has trouble in getting e-materials, think about how hard it is for a casual and students with disabilities. Similarly, rural students face difficulties in finding good, interesting, and latest materials for their studies, often because of language problems.

For e-learning to work, teachers need to know how to teach well with technology. But many rural teachers don't have enough training and help to use technology in their teaching. This makes it hard to create useful online lessons.

More use of digital tools also makes rural communities at an increasing risk of cyber attacks. Not knowing about online safety, getting tricked by fake websites, and risk of data-theft can put the students and teachers in trouble.

To fix these technology problems, India needs to spend more on better digital systems, train teachers, and prepare digital materials fit for local needs. This will help e-learning work well in rural areas.

Socio-Economic Factors

India is not only a culturally diverse country, but also has big economic differences among its population which has direct effects on the use of e-learning. These barriers, along with other infrastructure obstacles stop digital education from working well. The main problem is that most people in rural areas don't know how to use the digital tools. The population includes students, parents, and teachers who lack the basic skills to use e-learning websites and apps. This lack of digital skills creates problems in using the technology well and makes e-learning less helpful for rural people.

Rural families also face financial problems that make e-learning tough. Buying devices, getting internet, and paying for e-learning stuff costs a lot, and many families can't afford it. Such a fiscal burden means they often have to choose between buying things for school and paying for other important stuff, thus making it even harder to use e-learning.

The ideas from the parents and their involvement can make a significant impact on how well e-learning works. In rural India, regular schools are often seen as better, and parents might not know how good e-learning can be. Without enough help and interest from parents, students might not use online learning tools much. Women also have a harder time getting good education opportunities. Social barriers can stop girls from going to school, and they might have to work at home instead of going to class. This keeps away girls from learning as much as boys, making education system unfair.

Implementation Challenges

Bringing e-learning to rural schools is tough and comes with many problems. Even though it could help a lot, there are several things making it hard to do well. For instance, rural schools often don't have good internet, enough computers, or reliable electricity. These problems make a big gap between rural and city schools. Many rural teachers don't know much about using technology in class. They need more training and chances to learn how to use e-learning tools well.

The stuff students learn and the online materials available might not fit what rural students need. This

can make it hard for students to get interested and learn well.

Some people in rural areas don't like using technology for learning. Helping them learn and getting families involved are important.

Figuring out if e-learning is working well in rural schools is hard. The usual ways of checking how well students are doing might not show if they're learning well online. Keeping It Going and Making It Bigger: Making sure e-learning keeps working in rural areas needs money, fixing things when they break, and helping more schools use it. Making sure it stays good while more schools try it is another big problem.

Fixing these problems needs help from the government, schools, tech companies, and everyone in the community. Investing in better internet, teaching teachers more about tech, making good online lessons, and getting families excited about e-learning can help India use it better in rural areas.

Towards better outcomes

Making e-learning deliver best results for India will need a comprehensive nationwide initiative and strategy. It will also require a sizable amount of investment in technology, infrastructure, training of teaching staff, and suitable digital content. However, by bringing together stakeholders from the central and state governments, private sector, the NGO community, technology organisations and education sector, we can take steps towards efficient strategies and better outcomes. Some effective strategies to address e-learning challenges in rural India can include the following:

- Bridging the Digital Gap: Making sure every student can get a device and good internet is important. This could mean giving out cheaper tablets or helping families get online for less money.
- Personalised Learning: Using AI and data analysis to create adaptive learning platforms that fit each student's needs and learning speed. These platforms can adjust lessons and give feedback to help students learn better.
- Empowering Students: Giving students choices in what they learn and how fast they learn helps them get more involved. Using games and fun activities also makes learning more interesting.
- Supporting Teachers: Teachers should get more training in using technology to teach. They should also get help and support to make sure they can teach well online. They should also get help from other teachers who know more about tech.
- Public-Private Partnerships (PPPs): Working together with companies and groups outside of school can help make e-learning better. They can give money, technology, and people to help rural schools.
- Community Learning Centres: Making centres where students can go to learn outside of school can help. These places should have computers, good internet, and people to help students use technology.
- Cultural Learning: Making sure what students learn online fits their culture is important. This means making lessons in local languages and using ideas and stories from their communities.
- Including Everyone: Making sure students with disabilities can use online learning tools is important. This means making sure websites and apps work for everyone, no matter what.
- Using Data to Get Better: Keeping track of how well online learning works helps make it better. This means looking at how students do, how much they use it, and if teachers like using it.

Let's discuss a good example of a successful rural e-learning project. In Karanjale, Pune, a remarkable change is happening at the local school, thanks to the E-Learning Classroom and Computer Training Project by the Traceable Giving Foundation (TGF). They've brought in modern technology like projectors and computers, replacing old chalkboards with interactive screens that make learning more engaging. Students can now explore subjects like maths and science through 3D simulations and videos, making education more exciting and accessible. Beyond academics, the project promotes art, sports, and local culture, helping students discover their talents and grow personally.

Teachers have also been pivotal, transforming from traditional educators to mentors skilled in digital teaching methods. They use tablets to track student progress in real-time and tailor lessons to individual needs, making education more personalised. This project isn't just about improving classrooms; it is about empowering students like Ravi, who now dreams of exploring space, and Priya, whose artwork reaches far beyond the village. By embracing technology and nurturing talent, this initiative shows how education in rural areas can thrive, unlocking opportunities and nurturing a brighter future for all.

Such success stories can be repeated in villages across the country if we can improve digital education in rural areas by tackling various challenges and using technology wisely. When India helps everyone use tech and learn online, it makes sure all rural students get a good education and can do well in life. To make e-learning work, leaders, teachers, tech companies, and local groups need to work together. This way, e-learning can change lives and give everyone a chance to learn, no matter where they live. ❑

e-learning: Artificial Intelligence Transforming the Learning Landscape in India

Indeed, the advent of Artificial Intelligence (AI) is transforming various sectors globally, and education is no exception. In India, a country with a diverse and vast educational landscape, AI is revolutionising e-learning, especially in areas where access to quality education has been historically limited. This article explores how AI is reshaping e-learning in India, the role of significant investments and initiatives, and the potential of AI to bridge educational gaps in India.

* **Himanshu Joshi**
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Amid the bustling realm of education technology or EdTech, as it is commonly known, India is undergoing a significant transformation in e-learning driven by Artificial Intelligence (AI). The global adoption of technology in the education sector is vastly changing the way we teach and learn. With so much content available at the click of a button, learning has been revolutionised and AI is proving to be a game-changer, bringing significant advancements in teaching methodologies, personalised learning, and overall student engagement. AI in education aims to achieve optimal outcomes for students by leveraging enormous data and combining it with the human interface that a teacher brings in the learning pedagogy.

In India, the integration of AI in education has showcased remarkable potential, reshaped traditional methods, and brought forth a new era of personalised learning and innovation. India holds an important place in the global education industry and has one of

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the largest networks of higher education institutions in the world. According to a recent UNESCO report, the AI market in India is expected to reach $7.8 billion by 2025. Furthermore, AI in the education market would to be valued at around $20.54 billion by 2027.

During the pandemic, India underwent a significant evolution from basic online courses to comprehensive digital education platforms. When the country's dropout rate was more than tripled—from 1.8 percent in 2018 to a staggering 5.3 percent in 2020, e-learning platforms presented promising models of learning from home, school and from anywhere. This shift in learning pattern predominantly impacted children hailing from marginalised communities further exacerbating existing inequalities.

The Evolution of E-Learning in India: Moving towards AI

In recent years, e-learning in India has undergone a remarkable transformation, significantly impacting the educational landscape especially the vast underserved rural areas. This evolution, driven by technological advancements and increased internet penetration, has been pivotal in addressing the educational needs, where traditional learning methods often fall short.

During the COVID-19 pandemic, e-learning experienced a sudden popularity and adoption as traditional learning centres were forced to remain close. The sudden shift to remote learning from traditional setup highlighted the effectiveness of e-learning platforms and tools. Educational institutions, from elementary schools to universities, quickly transitioned to online learning to ensure continuity of education. Teachers and professors embraced various e-learning tools and platforms to deliver lessons, interact with students, and assess their progress. Video conferencing software such as Zoom, Microsoft Teams, and Google Meet which were go-to connecting tools for corporates became the main medium for conducting virtual classes and facilitating real-time communication.

To notch up Edtech game, a lot of startups and platforms have started using AI. This shift is very evident as AI promises to provide a personalised, adaptive learning experience. AI-driven platforms analyse student data to tailor educational content, ensuring that each learner progresses at their own pace. Automated grading and feedback systems streamline assessments, allowing educators to focus on instruction. Additionally, AI-powered chatbots and virtual tutors offer real-time assistance, enhancing student engagement and support. With such an intriguing platter of offerings, AI certainly will be a game changer for Education sector.

Building LLMs for better Learning

Every student is different, and each has their own pace of learning. A notable study --2 Sigma problem-- published in 1984, evaluated classroom teaching in three different settings: conventional teaching, mastery teaching, and tutoring. While tutoring and mastery teaching significantly improved students' overall grasp of the subjects compared to conventional teaching, investing in education to enhance the teacher-to-student ratio is challenging for developing countries like India due to limited resources and constrained budgets. Use of AI in EdTech, specifically in large language modelling(LLM), provides a perfect solution to this problem.

Large Language Models or LLMs are the building blocks of AI. They enable AI systems to interact with humans more naturally, enhancing applications like chatbots, virtual assistants, and automated content creation. Building a versatile and adaptable LLM makes them valuable across different fields, from customer service to education. Moreover, LLMs can process and analyse vast amounts of text, providing insights and facilitating decision-making. Their ability to generate human-like responses and understand context significantly boosts the efficiency and effectiveness of AI applications.

These language models are highly adaptable. Depending on their training data, they can serve various purposes, including acting as personal tutors in educational environments. For example, a model trained on a STEM curriculum can provide individualized attention to students through a conversational interface, helping them to learn at their own pace. They can also generate personalised tests based on the student's progress, addressing a logistical challenge in traditional classrooms. Such solutions can specifically be designed for students in underserved regions of the country where the learning gap is always high. Furthermore, the Internet's vast educational content can be inaccessible due to language barriers, especially for rural populations. Generative AI advancements can easily translate content into most spoken languages in the country, thereby ensuring access to educational content.

Champions of Change

Last year, at a global conference, Sam Altman, Co-Founder, ChatGPT said, "AI will continue to get way more capable and will become ubiquitous as time goes on". He further added healthcare and education are most ripe for innovation, and education is poised to benefit from personalised learning experiences especially through AI disruption.

While traditional learning still holds, adding technology to education will complement the existing learning means. Today more than 2 million students are enrolled on Indian e-learning platforms like Unacademy, Toppr, Simplilearn which is expected to increase two-fold by next year. Some of these platforms are also using technology like AR (Augmented Reality) & VR (Virtual Reality) into the content to enable a more immersive leaning.

While some platforms are just working on e-learning, startups like Miko and Questt are using more immersive technology to become game changers. Miko is an AI-powered companion robot for children that can talk, respond, educate, provide entertainment, and understand the child's needs, emotions, likes, and dislikes integrating with a companion application that allows parents to control and manage the settings. On the other hand, Questt, is AI-based platform offering study planning tools for students. It offers study plans comprising a timetable, quizzes, and learning material. It offers solutions such as a question bank for assigning homework tasks and insights and analytics to distinguish right and wrong answers.

Other startups like Embibe and Toppr are using AI to enhance test preparation by offering personalised practice tests and detailed performance analytics. Embibe's AI-driven platform provides in-depth analysis of students' strengths and weaknesses, while Toppr's adaptive learning technology ensures that each student receives customised study plans. These personalised approaches help build a differentiated learning curve as per the pace of the learner thereby creating significant benefits over the traditional classroom-based approach.

In rural areas, startups such as Doubtnut are breaking language barriers by offering educational content in multiple Indian languages. Doubtnut uses AI to provide instant video solutions to students' queries, making learning accessible to those with limited resources. In a country like India which has 22 Schedule

languages and many dialects, this can be a game changer in terms of reaching out to potential learners in their own language.

These startups are not only enhancing the quality of education but also addressing the digital divide by making learning resources available to students in remote and underserved areas. By integrating AI with education, these startups are transforming the e-learning landscape in India, ensuring that every student has the opportunity to succeed, regardless of their location or background.

AI Penetration in India

Recognising the potential of AI in addressing challenges of accessibility, education, and resource limitations, the Government of India (GoI) announced National Program for AI with a view to guiding the research and development in new and emerging technologies. In 2020, National Artificial Intelligence Portal or 'INDIAai' was launched as a one-stop digital platform for AI-related developments in India. Following, in Dec 2023, Ministry of Electronics and Information Technology (MeitY) submitted the first edition of India-AI report. According to the report, AI will be the kinetic enabler of India's digital economy and make Governance smarter and more data-led. AI is expected to add USD 967 billion to the Indian economy by 2035 and USD 450–500 billion to India's GDP by 2025, accounting for 10% of the country's USD 5 trillion GDP target.

While these initiatives have longer timelines, significant impact has been brought in by *"Bhashini"*, a government-led project aimed at breaking language barriers through AI. Bhashini leverages AI and natural language processing to create digital solutions across multiple Indian languages, ensuring inclusivity and accessibility for rural populations.

Bhashini focuses on developing AI-driven tools that translate and interpret regional languages, making digital content and services available in local dialects. This initiative is particularly vital for frontier and tribal areas, where most communication is in the local language and very less resources are allocated towards information and services. By providing AI-enabled translation and transcription services, Bhashini is trying to ensure that people across in these backward and less accessible regions can access various government schemes, consume educational content, and better use the healthcare infrastructure while communicating in their native languages.

Atal Innovation Mission (AIM), a flagship program of NITI Aayog has been a pioneer in disrupting the Indian education system. With more than 10,000 Atal Tinkering labs (ATLs), AIM has been able to impact more than 1.1 million school students with concepts of innovation, tinkering and entrepreneurship. An ATL is typically a space maker for students to play and tinker with their ideas within school premises. To inculcate a mindset of innovation in young entrepreneurs, ATL has developed curriculum focusing on robotics, 3D printing, computational thinking, space, drones, IoT and AI among others, starting from basic to advanced level. All these courses and resources are available in online versions through www.aim.gov.in. Further AIM with CBSE and Intel partnered together to develop 'AIoT Integration Curriculum' to make tinkering and AI a part of the formal pedagogy. In 2024, AIM, CBSE and Intel jointly launched 'India AI Impact Festival' with an aim to foster AI readiness among students, educators and academic institutions, promoting innovation and problem-solving skills in an inclusive manner.

Equity and quality of education

As India marches towards **becoming a $5 Trillion** economy in the world, it would also be imperative to address the issues of inequity that plague the education sector. While a number of public schools are well endowed (as in the case of Kendriya Vidyalayas

or Navodaya schools), there are thousands of public schools that are still struggling to ensure desired educational results. The main reason remains wide disparities in the infrastructure and resources of the schools across the regions of the country, mainly in the backward Aspirational Districts.

A stratified education system significantly impacts the quality of education by limiting access for all students, especially the most marginalised. This barrier prevents these students from fully participating in school, enjoying the educational journey with proper teacher guidance, classroom resources, and necessary infrastructure, and successfully completing their secondary level education. Initiatives aimed at improving education quality, such as remedial teaching and bridge courses should be a focus of state governments who can partner with local NGOs and Gram Panchayats to help the targeted students.

Technology can be the enabler in ensuring democratisation of the education, and AI can play a big role in it. We have seen how tele-medicine enabled access to doctors in terms of healthcare for far flung areas of the country. In a similar fashion various AI models can be built for students across backward areas in the country and bundled with vernacular content would ensure that each student is able to make the most of the learning opportunities at par with some of the cities.

Responsible AI

Artificial intelligence (AI) is here to stay. Most businesses are evolving with the advent of AI and same shall be the case for learning as well which incudes for government as well as private enterprises. AI is transforming creative, legal, technical, educational, language, and medical sectors and as young people grow up in an AI-driven world, educators, mentors are uniquely positioned to equip the next generation of leaders with the skillset and mindset to use and build AI responsibly.

Responsible AI in the education sector involves creating systems that are fair, transparent, and prioritise student welfare. There is also an element of data privacy where organisations have to ensure compliance as enormous data gets shared to build customised AI models. To maintain ethical standards, regular interventions from the Government are necessary. It is important that educators and policymakers in India continuously monitor AI applications across the globe and build policies and standards that take into account what is best for India.

Conclusion

Artificial Intelligence or AI is transforming e-learning in India, making education more personalised, interactive, and accessible. Increased opportunities for generating ideas and receiving instant feedback, which can support and empower students to analyse topics they are passionate about, is increasing their interest in global platforms like ChatGPT, Gemini and other.

Enhanced availability of assistive technologies to meet the needs of each student, including students who may not have fully participated in education due to geographic, political, technological, or personal constraints. AI gives students greater access to adaptive technologies, which empower young people with disabilities, language barriers, or other challenges through speech recognition, text-to-speech options, the ability to set their own pace, and more. In addition, just as the internet has opened borders and deepened opportunities for global fellowship, AI promises to enable international collaboration unhampered by language, cultural, and geographic differences.

Through initiatives like the India AI Mission, investments by global tech giants, and the efforts of innovative startups, AI is bridging educational gaps and democratising access to quality education. While challenges remain, the future of AI in e-learning is bright, with endless possibilities for innovation and improvement. As AI continues to evolve, it will play a central role in shaping the future of education in India, empowering learners and educators alike to achieve their full potential. ❑

e-GramSwaraj : Simplified work based accounting application for Panchayati Raj

eGramSwaraj application has been monumental in bringing together a tech-based, integrated system of information gathering, micro level planning, work-based accounting for last tier of local self-government called Panchayats. The application has a user base of more than 2.7 Lakh Panchayati Raj Institutions (PRIs); spread across 28 States and 6 UTs. The application has been ever evolving because of the continuous feedback from various critical stakeholders such as State officials, end users at Gram Panchayat level, Ministry of Panchayati Raj, and National Informatics Centre.

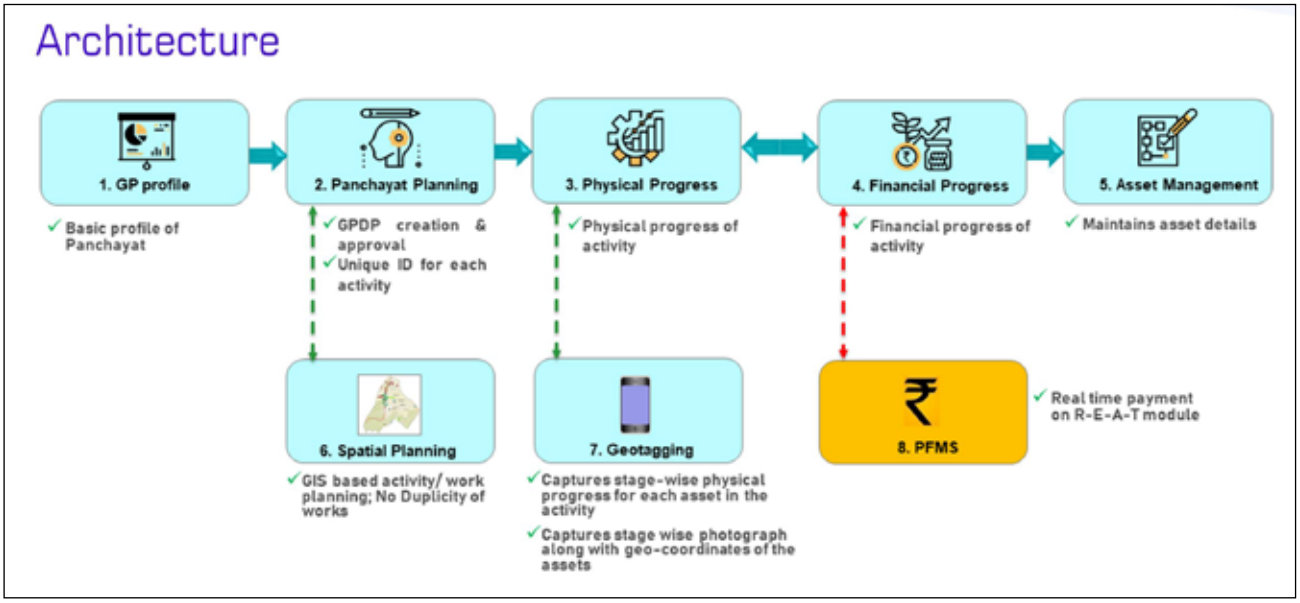
Features

- eGramSwaraj is one of the applications developed as part of Panchayat Enterprise Suite (PES) under e-panchayat Mission Mode Project (MMP3) of Ministry of Panchayati Raj (MoPR).
- eGramSwaraj aims to bring in better transparency and strengthening the e-Governance in Panchayati Raj Institutions (PRIs) across the country through decentralised planning, progress reporting and work-based accounting.
- eGramSwaraj will assist in enhancing the credibility of Panchayats which would induce greater devolution of funds to PRIs. Furthermore, eGramSwaraj provides a platform for effective monitoring by higher authorities.

eGramSwaraj Architecture

eGramSwaraj is designed with the following three key target user groups in consideration:

- **Local Bodies**: Rural and Urban local bodies, together, forms up the primary end users of this application. These users, working at the field level, are primary custodians of numerous critical processes such as formulation of Gram Panchayat Development Plan (GPDP), Works progress



monitoring, Vendor and employee management, and Financial Management.

- **Line Departments**: GPDP cuts across 29 subjects and 18 Ministries of Government of India. These Line Departments are responsible for driving various social welfare programs and schemes. Data driven Planning and Monitoring, naturally, forms the foundation of successful, last-mile, service delivery, especially for robust financial management.
- **Citizens**: While the Gram Panchayat is operated by the elected and selected representatives of the citizens and administration respectively, it is the right and more importantly, the responsibility, of each and every citizen to be vigilant and aware of the status of progress and development taking place in their region. Equipped with ratified and readily available data, the general population plays a significant role in inclusive decision-making process.

Considering the above high-level user personas, the following six modules form the backbone of eGramSwaraj application:

- **Panchayat Profile**: This module consists of General profile of the Gram Panchayat, elected member details (Sarpanch – President to Ward members), Committee member details and employee details. This information helps the citizens and visitors of the website to reach the Gram Panchayat's Elected Representatives and employees easily.
- **Planning**: In the Gram Sabha meeting, a plan of works to be undertaken within a specific period of time is proposed. The approved works in the Gram Sabha are entered as an activity on the eGramSwaraj website by the PRIs. Administrative sanction is provided by District Administration for only those works entered in eGramSwaraj with respect to Budget allocation.

The Ministry has also developed a Spatial Planning Application, Gram Manchitra. The application facilitates the creation of various planning scenarios for facility planning and management, integrated with the priority and needs of the people, ensuring basic facilities, avenues for livelihood, and productive use of resources. It has added objectivity to the planning process by acquiring relevant data and performing planning at the panchayat level with the use of geographic data for sustainable development. It enables the user to take a decision based on geographical data. Drone images, large scale & high-resolution Villages maps can serve for feature extraction of all visible features such as buildings,

roads, land parcels, water tanks, open plots, etc. and for preparation of base map layers in Gram Manchitra Application.

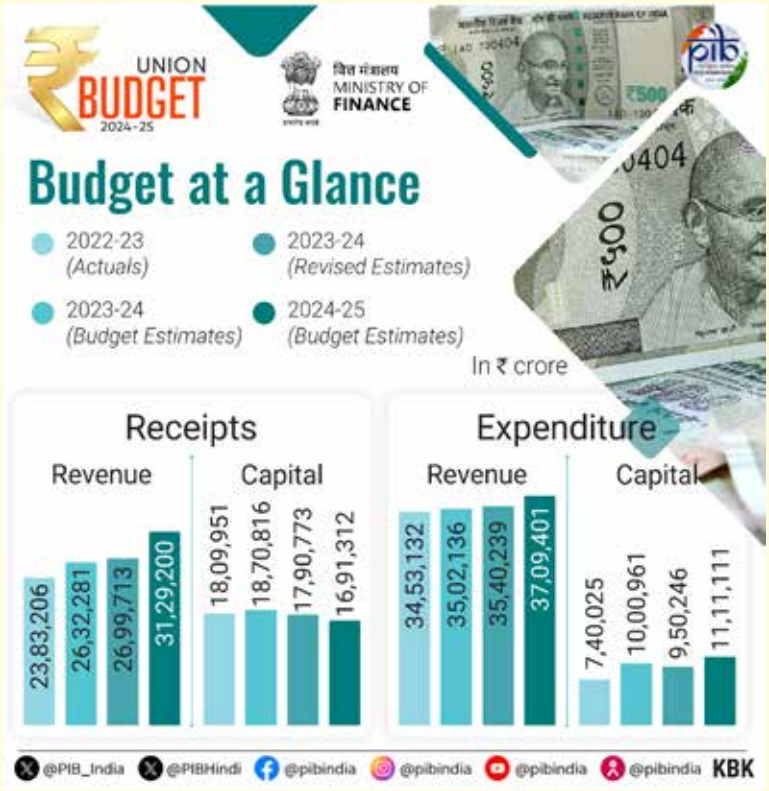
- **Progress Reporting**: This module facilitates reporting of physical and financial progress of the activities included in the Action Plan(s), utilising various Central/State specific schemes and/or other sources of funds. The progress is reflected in the Technical and Administrative approval sections. Technical Approvals keep track of approved cost of the work. Administrative approvals keep track of implementing and executing agency names along with the amount sanctioned for a work.
- **Accounting**: For exercising proper control and securing better accountability, the formats for the preparation of budget & accounts and database on finances of PRIs; MoPR along with C&AG has introduced Model Accounting System (MAS) for Panchayats. Users can select and map the available Central and State schemes, add vendor and employee details, and perform voucher-based, Digital Signature verified transactions. Based on the transaction records and book closings, cash book and bank account reconciliation is performed.
- **Asset Directory**: This module allows updating of the status of an asset as and when it changes. The system captures the status details of the asset including Status Updated To (abandoned/ active/demolished/damaged natural causes/ not due to in use (seasonal)/stolen), Reason for Status Updating, Date on which the Asset Status is Updated, etc.
- **User Management**: This module enables the system administrators at various levels in management of user accounts and their extent of access to various modules and functionalities of the system, along with user credential management for privileged access.

Founded on these modules and their respective functionalities, eGramSwaraj enables seamless, end-to-end digitisation of the works planning and monitoring lifecycle for the Gram Panchayats. From development plan creation to geo-tagged physical progress monitoring and finally to financial progress tracking and PFMS linked online disbursement of funds, eGramSwaraj serves as a one-stop solution to all the critical stakeholders of the Gram Panchayat development ecosystem. ❑

(Source: Ministry of Panchayati Raj website)

HIGHLIGHTS OF THE UNION BUDGET 2024-25

The Union Minister of Finance and Corporate Affairs Smt. Nirmala Sitharaman presented the Union Budget 2024-25 in Parliament on July 23, 2024. The highlights of the budget follows:



Budget Estimates 2024-25

- Total receipts other than borrowings: Rs 32.07 lakh crore.
- Total expenditure: Rs 48.21 lakh crore.
- Net tax receipt: Rs 25.83 lakh crore.
- Fiscal deficit: 4.9 per cent of GDP.
- Government aims to reach a deficit below 4.5 per cent next year.
- Inflation continues to be low, stable and moving towards the 4% target; Core inflation (non-food, non-fuel) at 3.1%.

Focus of the Budget

- The focus of budget is on **EMPLOYMENT, SKILLING, MSMEs, and the MIDDLE CLASS**.

Package of PM's five schemes for Employment and Skilling

- Prime Minister's Package of 5 Schemes and Initiatives for employment, skilling and other opportunities for 4.1 crore youth over a 5-year period.

1. **Scheme A-First Timers:** One-month salary of up to Rs 15,000 to be provided in 3 installments to first-time employees, as registered in the EPFO.
2. **Scheme B-Job Creation in manufacturing:** Incentive to be provided at specified scale directly, both employee and employer, with respect to their EPFO contribution in the first 4 years of employment.
3. **Scheme C-Support to employers:** Government to reimburse up to Rs 3,000 per month for 2 years towards EPFO contribution of employers, for each additional employee.
4. **New centrally sponsored scheme for Skilling**

- 20 lakh youth to be skilled over a 5-year period.
- 1,000 Industrial Training Institutes to be upgraded in hub and spoke arrangements.

5. **New Scheme for Internship in 500 Top Companies** to 1 crore youth in 5 years

Budget Priorities in pursuit of 'Viksit Bharat'

Priority 1: Productivity and resilience in Agriculture

- Allocation of Rs 1.52 lakh crore for agriculture and allied sectors.
- New 109 high-yielding and climate-resilient varieties of 32 field and horticulture crops to be released for cultivation by farmers.
- 1 crore farmers across the country to be initiated into natural farming, with certification and branding in next 2 years.
- 10,000 need-based bio-input resource centres to be established for natural farming.
- Digital Public Infrastructure (DPI) for Agriculture to be implemented for coverage of farmers and their lands in 3 years.

Priority 2: Employment & Skilling

- As part of the Prime Minister's package, 3 schemes for 'Employment Linked Incentive' to be implemented - Scheme A - First Timers; Scheme B - Job Creation in manufacturing; Scheme C - Support to employers.
- To facilitate higher participation of women in the workforce,
  - working women hostels and crèches to be established with industrial collaboration
  - women-specific skilling programmes to be organised
  - market access for women SHG enterprises to be promoted

Skill Development

- New centrally sponsored scheme for Skilling under Prime Minister's Package for 20 lakh youth over a 5-year period.
- Model Skill Loan Scheme to be revised to facilitate loans up to Rs 7.5 lakh.
- Financial support for loans upto Rs 10 lakh for higher education in domestic institutions to be provided to youth who have not been eligible for any benefit under government schemes and policies.

Priority 3: Inclusive Human Resource Development and Social Justice

Women-led development

- Total allocation of more than Rs 3 lakh crore for schemes benefitting women and girls.

Pradhan Mantri Janjatiya Unnat Gram Abhiyan

- Socio-economic development of tribal families in tribal-majority villages and aspirational districts, covering 63,000 villages benefitting 5 crore tribal people.

Bank branches in North-Eastern Region

- 100 branches of India Post Payment Bank to be set up in the North East region.

Priority 4: Manufacturing & Services

Credit Guarantee Scheme for MSMEs in the Manufacturing Sector

- A credit guarantee scheme without collateral or third-party guarantee in term loans to MSMEs for purchase of machinery and equipment.

Credit Support to MSMEs during Stress Period

- New mechanism to facilitate continuation of bank credit to MSMEs during their stress period.

Mudra Loans

- The limit of Mudra loans under 'Tarun' category to be enhanced to Rs 20 lakh from Rs 10 lakh for those who have successfully repaid previous loans.

MSME Units for Food Irradiation, Quality & Safety Testing

- Financial support to set up 50 multi-product food irradiation units in the MSME sector.

E-Commerce Export Hubs

- E-Commerce Export Hubs to be set up under public-private-partnership (PPP) mode for MSMEs and traditional artisans to sell their products in international markets.

Digital Public Infrastructure (DPI) Applications

- Development of DPI applications in the areas of credit, e-commerce, education, health, law and justice, logistics, MSME, services delivery, and urban governance.

Priority 5: Infrastructure

Infrastructure investment by Central Government

- Rs 11,11,111 crore (3.4 % of GDP) to be provided for capital expenditure.

Infrastructure investment by state governments

- Provision of Rs 1.5 lakh crore for long-term interest free loans to support states in infrastructure investment.

Pradhan Mantri Gram SadakYojana (PMGSY)

- Launch of phase IV of PMGSY to provide all-weather connectivity to 25,000 rural habitations.

Irrigation and Flood Mitigation

- Financial support of Rs 11,500 crore to projects such as the Kosi-Mechi intra-state link and other schemes in Bihar.
- Government to provide assistance to Assam, Himachal Pradesh, Uttarakhand and Sikkim for floods, landslides and other related projects.

Tourism

- Comprehensive development of Vishnupad Temple Corridor, Mahabodhi Temple Corridor and Rajgir.
- Assistance for development of temples, monuments, craftsmanship, wildlife sanctuaries, natural landscapes and pristine beaches of Odisha.

Priority 6: Innovation, Research & Development

- Anusandhan National Research Fund for basic research and prototype development to be operationalised.
- Financing pool of Rs 1 lakh crore for spurring private sector- driven research & innovation at commercial scale.

Space Economy

- Venture capital fund of Rs 1,000 crore to be set up for expanding the space economy by 5 times in the next 10 years.

Priority 7: Next Generation Reforms

Rural Land Related Actions

- Unique Land Parcel Identification Number (ULPIN) or Bhu-Aadhaar for all lands
- Digitisation of cadastral maps
- Survey of map sub-divisions as per current ownership
- Establishment of land registry
- Linking to the farmers registry.

(Source: Press Information Bureau)

Read Kurukshetra September 2024 issue for detailed analysis of the Budget 2024-25 for Rural India

Skilling for the Future with e-Learning

India, a rapidly growing powerhouse of youth, talent, and innovation, stands at a critical juncture in its journey to enhance education and professional skills. A revolutionary reform in recent years has been the shift towards skill development and employment through e-learning. This transformation is not only bolstering India's economy but also empowering its citizens to participate in the nation's transformative journey of skilling, reskilling, and upskilling.

* **Jyoti S. Verma**

In today's automation age, where skills define an individual's employment prospects, skilling has aptly become a national priority for India. One of the seven interconnected priorities of the Centre's fiscal strategy, 'Saptarishi,' skill development has been a focal area since 2014. The last decade has seen the foundation of the Ministry of Skill Development and Entrepreneurship and consistent support towards it in terms of budgetary allocations and pioneering programmes to make learning enjoyable and citizens globally employable. For instance, the 2014 Union Budget focused on addressing teacher shortage through training programmes and introduced skills programmes for the first time; Rs 100 crore was also infused for virtual classrooms under Communication-Linked Interface for Cultivating Knowledge (CLICK). In 2015, the Centre placed a strong emphasis on digital literacy and skill development, particularly in rural areas, through its Digital India Mission and National Skill Development Mission, respectively.

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Key Skill Development Programmes

The Pradhan Mantri Kaushal Vikas Yojana (PMKVY) was launched in 2015 with the objective to deliver skills to the youth of the country through short-term training (STT) and recognition of prior learning (RPL), introduced for people already employed/working and to certify the acquired skills by a candidate. The focus of the scheme has been to improve the employability of the candidates across the country by providing quality training in National Skill Qualification Framework (NSQF)-aligned job roles based on demand from the industries in relevant sectors. About 1.40 crore candidates have been trained/oriented under PMKVY as per Skill India Digital till December 13, 2023. Under STT, where placement was incentivised, 42 percent of the candidates were placed in various sectors across the country.

Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) aims at bridging the digital divide, particularly targeting rural population, including the marginalised sections of society, women and girls by covering 6 crore rural households. The National Digital Literacy Mission (NDLM) and Skill India have further strengthened India's workforce by providing training in cutting-edge technologies such as Artificial Intelligence (AI) and promoting entrepreneurship. In addition, Department of Higher Education, Ministry of Education is administering the National Mission on Education through Information and Communication Technology (NMEICT) Scheme, SWAYAM (Study Webs of Active Learning for Young Aspiring Minds), SWAYAM PRABHA, National Digital Library (NDL), Virtual Lab, e-Yantra, NEAT (National Education Alliance for Technology), among others, to ensure quality education through e-learning to students across the country. Online e-mentoring platform, Udyam Disha has been developed to handhold and guide aspiring and existing entrepreneurs and facilitate online mentoring services.

Skill Development Through Digital Learning

In 2023, the Government of India launched Skill India Digital Hub (SIDH), a comprehensive digital platform aimed at synergising and transforming the skills, education, employment, and entrepreneurship landscape of the country. The platform embodies the aspirations and dreams of millions of Indians who seek better opportunities and a brighter future as it extends industry-relevant skill courses, job opportunities, and entrepreneurship support.

SIDH is the Digital Public Infrastructure (DPI) for skilling, education, employment, and entrepreneurship ecosystem of India. Driven by the vision to make skill development more innovative, accessible, and personalised in its embodiment, focusing on digital technology and Industry 4.0 skills, the state-of-the-art platform aims to bring all skilling initiatives together. The open-source platform addresses the skilling needs of India's diverse demography and aims at enabling skilling for all, anywhere, anytime. It covers discovery, assessment, certification, employment and lifelong learning, customisation and personalisation, all made possible by AI. SIDH is specially designed and developed to skill, reskill and upskill Indian individuals through an online training platform, API-based trusted skill credentials, payment and discovery layers for jobs and entrepreneurial opportunities. The improved version of the platform has Udyam, e-Shram, NCS and ASEEM portals interlinked for G2C, B2C and B2B services. It acts as a bridge between the employees and employers and

allows educational institutes to create/modify curricula as per industry demands.

India's Imperative Role in Global Skills Transformation

With its vast, young workforce and cutting-edge digital infrastructure, India stands as a global case study today. SIDH demonstrates scalable, sustainable skill enhancement models essential for inclusive growth and lifelong learning. It addresses the challenges of fragmented access to training and employment opportunities, as well as the broken value chain in skilling at various stages. Different demand and supply geographies create informational asymmetry and migration issues, leading to a mismatch between training and industry needs. Additionally, there is often difficulty in finding and accessing skill centres and job opportunities, along with a lack of a trusted, digitally verifiable pool of users, comprehensive insights for policymakers, and industry-ready skilling courses. SIDH also helps overcome language barriers in accessing skilling resources.

SIDH is designed to encompass all training programmes initiated by both Union and State governments, as well as various departments. This offers users a comprehensive view and facilitates effective implementation. As a one-stop platform, SIDH allows users to access courses, schemes, apprenticeships, and job opportunities aligned with their preferences and aspirations, without requiring registration. It offers advanced personalisation, dynamically showcasing relevant opportunities based on user preferences, enabling efficient exploration within its ecosystem. Its recommendation engine uses machine learning to deliver tailored suggestions for courses, apprenticeships, and jobs, simplifying the search process and enhancing efficiency by providing insights into market demand trends.

SIDH's Learning Management System (LMS) streamlines course management, delivery, and tracking, enhancing learning with features like Content Management, Learner Registration, Content Delivery, Progress Tracking, Assessment, Feedback, and Certification. Virtual instructor-led training (VILT) merges technology with pedagogy, enabling interactive live modules, efficient administration, structured scheduling, and mitigation of geographic limitations, revolutionising the educational landscape.

The platform's Digital Job Exchange is an integrated platform that connects job seekers with employment opportunities tailored to their skills and preferences. Utilising advanced AI and machine learning algorithms, SIDH personalises job/course recommendations based on user profiles, ensuring that candidates find relevant skilling courses and job matches efficiently. Users can also provide/access ratings and feedback on courses and job listings, enhancing decision-making and career development.

An interesting feature is the SIDH Map, which integrates geotagging and advanced mapping for seamless skill centre, job, and institute navigation. It helps in skill centre discovery, educational institution mapping, assessment agency locating, ODOP/Cluster exploration, aspirational district showcasing, 'Near Me' instant proximity, filtering, legend, drag and zoom, map layers, and GIS for policy and infrastructure monitoring.

SIDH dashboards provide key insights into skill development programmes, apprenticeship summary, direct-beneficiary transfer and related market trends. With interactive visualisations, users can make informed decisions, track progress, and optimise strategies for growth. Training infrastructure is monitored real-time through a centralised Control and Command centre, which enables centre-based analytics and monitoring.

SWAYAM Plus

SWAYAM, the Massive Open Online Course (MOOC) platform providing educational opportunities for a vast number of learners, was launched by the Ministry of Education in 2017. In February 2024, the Union Ministry of Education launched the SWAYAM Plus platform, in collaboration with leading industry players such as L&T, Microsoft, and CISCO. In alignment with the National Education Policy (NEP) 2020, the SWAYAM Plus platform will now include courses supporting industry needs that enhance learners' employability.

SWAYAM Plus is being run by Indian Institute of Technology Madras (IIT Madras), one of the founding

institutions of Swayam-NPTEL, a MOOC platform that offers educational opportunities to many learners. A popular e-learning platform, SWAYAM has the largest enrolment base today, with the total enrolment increasing from 31 lakh in 2017 to more than 72 lakh by end of 2023. SWAYAM Plus aims at raising employability of both college students and lifelong learners.

SWAYAM Plus offers "employability, entrepreneurial mode, and job-centric courses, emphasising practical, hands-on learning." Aligned with the provisions of the NEP 2020, which supports multiple entry and exit points, SWAYAM Plus allows individuals to tailor their educational journey at their own pace. This concept is particularly beneficial for working professionals, providing a variety of online courses that enable them to balance work and studies effectively.

SWAYAM Plus offers multilingual content, promoting inclusivity and attracting a diverse audience. An AI-enabled chatbot has also been integrated to assist students in selecting courses tailored to their individual needs. Moreover, SWAYAM Plus ensures credit recognition, establishing credit equivalency for courses offered by industry players. This feature allows students to earn credits simultaneously for their degree requirements, offering academic flexibility and practical benefits.

SWAYAM-NPTEL

The January-April 2024 Semester marked the 20th year of operations and 10th year of offering certifications for Swayam-NPTEL (National Programme on Technology Enhanced Learning) - India's largest online learning platform. NPTEL provides advanced learning opportunities to over 30 lakh learners in areas such as engineering, science, humanities and management disciplines. Its over 720 courses are affordable, certified and delivered by faculties of India's premier higher educational institutions (HEIs). More than 2.5 crore learners have enrolled in NPTEL courses to date. Not just students, over 66,000 faculty members from various educational institutes across India enrolled in NPTEL courses during 2023 as part of their Faculty Development Program, helping improve teaching standards in colleges across India. NPTEL has also facilitated 321 internships and placements for NPTEL toppers at IITs and other institutions last year. It offers fee waiver support through corporate social responsibility partners. Over 1.52 lakh learners from economically disadvantaged backgrounds have benefitted from these fee waivers.

NPTEL+ is a new portal that offers a flexible format that includes self-paced courses and short-term programmes delivered in the online mode. It is designed to complement the NPTEL courses that follow the academic semester and curriculum and contain 30-40 hours of content to study from for each course.

The Rise of Lifelong Learning

Online learning has surged in popularity in recent years. While universities offered distance learning programmes before, the COVID-19 pandemic accelerated the demand for online courses across nations. This, combined with high-speed internet access, widespread digitisation, and government initiatives has opened doors for educational platforms and universities to fully explore the potential of online learning.

Driven by advancements like interactive learning platforms and accelerated by the pandemic, the quality of online degrees has seen a dramatic rise in the last few years. Today, prestigious universities in the West offer fully online programmes that match the precision and quality of their on-campus programmes. Students are leveraging these degrees to pursue new career paths and advance their ambitions.

In India, large companies are increasingly recognising the value of online education. Many universities now offer blended programmes with 20-40% of credits delivered online, providing students with flexibility and access to a wider range of learning

options. This trend is shaping perceptions around the quality of online degrees, positioning them as a credible pathway for career advancement.

Today, everyone - from students pursuing higher education to employees seeking to upskill - can choose from a wide range of career-advancing options. These options include short-term upskilling courses, diplomas, certificates, and full-fledged online degree programmes. With the constant evolution of the job market, online education's flexibility allows individuals to continuously learn and adapt, making it an essential tool for lifelong learning. The interest among aspirants has helped the Indian online education market, which is predicted to grow at a CAGR of 19.9% between 2022 and 2027, driven by the need for skill development and employment, according to a market research report by Technavio.

Technology has paved the way for hybrid learning, which seamlessly combines traditional classroom interactions with digital flexibility. Online learning platforms, virtual reality, and augmented reality have broken down geographical barriers, enabling learners to gain knowledge from various environments worldwide. The integration of AI has personalised learning experiences by providing real-time feedback and supporting adaptable educational methods.

E-Learning, A Way to Bridge India's Skill Gap

According to the World Economic Forum, of the 13 million people who join India's workforce each year, only one in four management professionals, one in five engineers, and one in 10 graduates are employable. As per The Global Skills Gaps Measurement and Monitoring Report of ILO, released in 2023, 47% of Indian workers are underqualified for their jobs, while 62% of females in India are underqualified. The statistics represent the gap that persists between the skill demanded by the industries and what youth possess through education and training. Furthermore, formal vocational training reaches a negligible 2% of the workforce, while non-formal vocational training hardly touches 9%.

On the other hand is the advent of technologies such as Big Data and AI. While beneficial to the industry, these emerging technologies have led to a growing skill gap in India's workforce. This gap is characterised by the availability of more jobs than there are qualified people to fill them. India's recent digital transformation has exacerbated this skills gap in various industries. Keeping

pace with technological advancements is challenging for many, as they struggle to adapt to rapid changes. Despite its booming economy and young, vibrant workforce, India risks missing out on the benefits of its demographic dividend without properly equipping this large workforce with relevant skills.

Online learning can help the country leapfrog this gap, overcoming challenges like the lack of access, quality, and relevance in Indian higher education, while also integrating educational content and credentials from industry educators such as Google, Amazon, and Microsoft.

In fact, digital learning for skill development and employment becomes the need of the hour if one considers the massive demand of skills and courses and the limited seats available at regular colleges. Of the 4.1 crore students in India's higher education, only a few lakh students receive a high-quality education, in the IITs, IIMs, IISc, and other NAAC and NIRF ranked universities. Every year, over 10 lakh students aspire to study engineering, but the 23 IITs together offer only 17,740 seats per year. For the remaining crores of students, access to the best faculty and quality curriculum is out of reach. For years, this has impacted student morale and employability, and resulted in subpar career outcomes for graduates.

It is time that India must utilise its demographic advantage — with over 54 percent of its population below 25 years of age, and 62 percent of working age. The United Nations estimate that the country will add

another 183 million people to the latter group by 2050. This makes skilling and re-skilling of the working age population an urgent imperative. An Accenture report in 2019 said that India could lose 2 to 3 percent of its annual growth or $1.97 trillion in potential cumulative GDP growth over the next 10 years if skill-building does not catch up with the rate of technological progress by 2028. Unfortunately, as per the Global Skills Gap Report, the Indian workforce has the highest skills gap after Brazil. A National Skills Development Corporation report reveals that only 2.3 percent of the Indian workforce has formal vocational skills. A UNICEF study says that, by 2030, over 50 percent of India's youth will lack the requisite skills for employment. E-Learning fills this gap brilliantly and is, therefore, an integral part of most government initiatives under skill development and employment.

Why is E-Learning a Game Changer?

Along with features such as a user-friendly interface, engaging bite-sized content, and personalised learning pathways, online learning does not need time or investment capacity for the expansion of physical campuses or mega entrance examinations to get admission. Recently launched online degrees by leading HEIs have already delivered good results in terms of enrolments, learning and employment. For example, more than 27,000 students are currently studying IIT Madras' online BS Degree in Data Science and Applications. This single programme has more than double the number of learners, at 10,000 students, across all programmes at the IIT Madras campus. The course has enabled over 2,500 students to get jobs or promotions, while over 850 students have been admitted to master's and Ph.D. programmes at universities such as Cornell University, and the Georgia Institute of Technology (USA), and Aalto University (Finland). Some students switched streams from their primary domain to computer science or data science, the institute said in a release.

Like IIT Madras' online BS Degree in Data Science and Applications, BITS Pilani's BSc in Computer Science does not need any JEE or BITSAT. The course has seen more than half of enrolments coming from beyond the top six metros, with students from smaller cities. Innovative performance-based admission tracks for online degrees such as IIT Guwahati's newly launched online Bachelor of Science (Honours) in Data Science & Artificial Intelligence are attracting students from diverse academic backgrounds, including arts and commerce.

Narrowing Gender Gap

The reform of e-learning has proved to be particularly important for women. It is narrowing the gender education and skill gap and preparing women for in-demand jobs in the digital economy by removing barriers, improving gender inclusion in science, technology, engineering, and mathematics (STEM) fields, connecting them to rising skills and job opportunities, and motivating them to explore interests without limits. It is opening new avenues to connect women to the jobs of the future through flexible, affordable, and fast-tracked learning and career pathways. The current enrolment ratio of women to men in online STEM programmes stands at 45:55 ratio, with a notable 12 percent increase in the enrolment of women from 2022-23 to 2023-24, says a report released by ed-tech platform College Vidya. The reasons behind the surge include the flexibility of learning, the equal value of degrees compared to traditional programmes, no geographic constraints, affordability, and increased digital literacy (particularly in tier-II and tier-III cities), said the report.

The Age of Upskilling and Reskilling

With AI infiltrating every facet of operations across organisations, leading to job displacement, there has been a rush to upskill and reskill among professionals, underlines the 11th edition of the India Skills Report (ISR). In the next five years, 23% of global jobs will change due to industry transformation, including through AI and other text, image and voice processing technologies, says the World Economic Forum.

While Government initiatives such as Skill India and Digital India aim to promote digital literacy and upskilling programmes, private online learning platforms and bootcamps contribute to the ecosystem by offering AI-specific courses and certifications. In manufacturing, McKinsey Global Institute estimates that 8,00,000 jobs could be lost to automation by 2030.

However, India's workforce is optimistic about AI, finds Microsoft and LinkedIn 2024 Work Trend Index. Ninety-two percent of knowledge workers in India use AI at work as compared to the global figure of 75%, reflecting employee confidence in AI to save time, boost creativity, and focus. Ninety-one percent of leaders in

India also believe their companies need to adopt AI to stay competitive while 54% worry their organisation lacks a plan and vision for implementation.

To navigate this disruption effectively, fostering collaboration between government, industry, and educational institutions is crucial. This synergy is essential for developing successful upskilling programmes that equip individuals with the skills they need to thrive. Soft skills like critical thinking, problem-solving, and communication are becoming the cornerstones of success in the AI age. Furthermore, individuals must embrace lifelong learning and develop adaptability to navigate the ever-changing job market. In this era of transformative change, adaptation is not just a strategic advantage, it is a necessity for survival.

Focus on Creating Quality Content

The thrust in e-learning has also been driving online content creation, as educators are increasingly turning to creating content that addresses the quality gap in education. The University Grants Commission's (UGC) National Credit Framework (NCrF) allows universities to offer up to 40% of credits through online courses. This opens doors to dynamic curriculum updates using for-credit online content. Thousands of institutions across India are already reaping the benefits of platforms like SWAYAM and Coursera. These platforms enable universities to curate cutting-edge, multidisciplinary learning experiences without needing to build entire new departments or face faculty shortages. Additionally, developments in Generative AI are empowering educators to rapidly create customised online courses that blend global and local content, ensuring education keeps pace with a changing world.

New guidelines by the UGC and National Council for Vocational Education and Training (NCVET) are fortifying university-industry links and promoting job-ready skills in students, paving the way for universities to offer credits for industry micro-credentials. By expanding curricula to include industry micro-credentials, such as Professional Certificates, HEIs can enhance students' employability and better prepare them for in-demand jobs. These online certificates, developed by companies such as Google and IBM, help students build the specific skills needed for entry-level digital jobs. Offering industry micro-credentials can significantly impact enrolment at these institutions.

Skills Empower Businesses and Societies

In July 2024, the Confederation of Indian Industry (CII) and Nasscom joined hands to provide digital skills to youth in sectors other than IT, with an aim to reskill and upskill 1 lakh youth in the next two years. To begin with, the partners have identified seven target sectors, including banking, financial services and insurance (BFSI), manufacturing, logistics, healthcare, green jobs, hospitality and life sciences. The initiative will also help build digital fluency on emerging technologies by providing micro-learning content. Both free and paid competency programmes, such as foundation and deep skilling courses in emerging technology areas will be implemented. The agreement aims to build a digital learning culture through the mass dissemination of cross-sectoral digital content. The intervention would equip working professionals from non-IT sectors to be updated with key trends and challenges in the evolving digital ecosystem and help them make their organisations more relevant and productive. CII has also launched its 12th Centre of Excellence on skills, which will impact 10 million youth over the next five years through the scaling up of its on-ground skill initiatives.

A remarkable achievement has been UNICEF's global learning-to-earning solution, Passport to Earning (P2E), which skilled and certified more than one million young people in India in areas of financial literacy and digital productivity till last year. The milestone marked a major step towards helping the youth gain skills relevant to the future of work and life. Notably, 62 percent of all young learners who benefitted from P2E courses in India were adolescent girls and young women. In India, aligned with the NEP 2020, P2E provides free access to certificate courses in digital productivity, financial literacy, employability skills, and other in-demand, job-ready skills. It also offers provisions for online, hybrid, and offline learning models. The digital learning platform aims to deliver long-term sustainable skills to 5 million youth in the age group of 14-29 in India by 2024 and then connect them to opportunities in job, self-employment and entrepreneurship to be financially independent.

With its accessibility, flexibility, and scalability, digital learning is revolutionising skill development in India. By equipping its workforce with the skills needed for the digital age, the country is on track to unlock its full economic potential and create a generation of empowered professionals ready to thrive in the ever-evolving job market. ❑

Bridging the Gap: e-learning as a Catalyst for Health and Nutrition Awareness

E-learning has emerged as a pivotal tool in enhancing health and nutrition awareness in rural India, bridging significant gaps in education and accessibility. Governmental schemes such as Digital India, Poshan Abhiyaan, and Ayushman Bharat have catalyzed this transformation, yet challenges like digital divide and cultural barriers persist. Proposed strategies to overcome the challenges to an extent include infrastructure development, community engagement, capacity building, and cultural sensitivity, aiming to optimize e-learning effectiveness. By leveraging partnerships, monitoring mechanisms, and diversified content, these strategies aim to overcome barriers, ensuring sustainable health and nutrition education in remote communities, thereby fostering healthier and more empowered rural populations.

*** Dr Akanksha Jain**

In recent years, there is an increasing awareness regarding health and nutrition, driven by the urgent need to improve public health outcomes. In India, particularly in rural areas, disseminating this crucial information has posed significant challenges. However, the emergence of e-learning technologies presents a promising solution. E-learning has the potential to transcend geographical barriers and provide accessible education, making it a powerful catalyst for enhancing health and nutrition awareness in rural communities. With traditional

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methods facing limitations in reaching diverse populations, e-learning offers scalable, interactive, and customisable platforms like online courses, mobile apps, and webinars to effectively educate and empower rural residents.

The Indian government has launched several schemes and programs to promote e-learning and improve health and nutrition awareness in rural areas. These initiatives aim to harness technology to overcome barriers and ensure equitable access to information and services.

1. **Digital India Initiative**: Launched in 2015, the Digital India initiative aims to transform India into a digitally empowered society and knowledge economy. It focuses on providing high-speed internet access, promoting digital literacy, and delivering government services electronically. Under this campaign, various initiatives have been rolled out to enhance e-learning platforms for health and nutrition awareness. The establishment of Common Service Centres (CSCs) in rural areas provides a digital touchpoint for villagers to access e-learning modules and health information.

- **e-Sanjeevani**: A telemedicine service that connects patients in rural areas with doctors and specialists in urban centres through video consultations. This service improves access to healthcare and provides timely medical advice. It aims to bridge the gap between rural patients and healthcare providers through digital platforms.

- **DigiLocker**: An online platform that enables individuals to securely store and share important documents, including health records and educational certificates. This facilitates easy access to personal health information and enhances continuity of care.

- **Pradhan Mantri Gramin Digital Saksharta Abhiyaan (PMGDISHA):** It was launched in 2017 to help people in rural areas become digitally literate. Aimed at making at least one person in every household digitally literate, this program includes modules on health and nutrition awareness.

- **National Digital Literacy Mission (NDLM):** Focuses on providing digital literacy to citizens, including health-related e-learning content.

- **e-Health:** It was introduced to provide timely and effective healthcare services such as online registrations, payments, reports, and claims.

- **E-education:** It was started to provide online education in remote and urban areas using technologies such as smartphones, apps, and internet services.

- **eRaktKosh**: It is a centralised blood bank management system inaugurated on April 7, 2016, for automation of blood banks and has a web-based application with Aadhaar linkage facility.

- **Services e-Health Assistance and Teleconsultation (SeHAT)** is the tri-services teleconsultation service of the Ministry of Defense designed for all entitled personnel and their families. As part of the Government's commitment to Digital India and e-governance, SeHAT was launched on May 27, 2021.

2. **National Digital Health Mission (NDHM)**: Launched in 2020, NDHM aims to create a digital health ecosystem that supports universal health coverage. Key components of the mission include the creation of unique health IDs for individuals, electronic health records, and a health information exchange platform. These initiatives are particularly beneficial for rural populations, as they streamline access to healthcare services and improve health outcomes.

3. **Saksham Anganwadi and Poshan 2.0:** Ministry of Women and Child Development has implemented the Saksham Anganwadi and Poshan 2.0 during the

15th Finance Commission period 2021-22 to 2025-26. Revised guidelines have been released on June 24, 2024 with a focus to strengthen ICT component and better implementation and monitoring of Mission Poshan 2.0 with the directions to follow the provisions with immediate effect including provision of smart phone and data recharge support to Lady Supervisors and Block Coordinators, 2% buffer for Smart phones, etc.

With a view to address various gaps and shortcomings in the on-going nutrition programme and to improve implementation as well as to accelerate improvement in nutrition and child development outcomes, the existing scheme components have been re-organised under Poshan 2.0 into the primary verticals given below:

- Nutrition Support for POSHAN through Supplementary Nutrition Programme (SNP) for children of the age group of 6 months to 6 years, pregnant women and lactating mothers; and for Adolescent Girls in the age group of 14 to 18 years in Aspirational Districts and North Eastern Region (NER)
- Early Childhood Care and Education (3-6 years) and early stimulation for (0-3 years)
- Anganwadi Infrastructure including modern, upgraded Saksham Anganwadi
- **Poshan Abhiyaan:** Launched in 2018, Poshan Abhiyaan aims to reduce stunting, undernutrition, and low birth weight in children, as well as anaemia in children, adolescents, and women. The mission emphasises the use of technology and e-learning to spread nutritional awareness.

The mission leverages mobile applications, e-learning platforms, and social media to disseminate information about nutrition and healthy practices.

ICT-RTM (Information and Communication Technology-Real Time Monitoring) uses mobile applications to monitor and evaluate the nutrition status of beneficiaries. It also provides educational content on nutrition and health practices.

Poshan Maah (Nutrition Month) and Poshan Pakhwada utilises e-learning tools to conduct workshops, webinars, and digital campaigns focused on nutrition awareness about the importance of nutrition and promote healthy eating habits through *Jan Andolan* and *Jan Bhagidari.*

'Poshan Tracker', a robust ICT enabled platform to improve governance with regard to real time monitoring of provisioning of supplementary nutrition for prompt supervision and management of services.

4. **Ayushman Bharat Digital Mission:** The Ayushman Bharat Digital Mission (ABDM) aims to develop the backbone necessary to support the integrated digital health infrastructure of the country.

It will bridge the existing gap amongst different stakeholders of healthcare ecosystem through digital highways. ABDM has the following components:

- **Healthcare Professionals Registry (HPR):** It is a comprehensive repository of all healthcare professionals involved in delivery of healthcare services across both modern and traditional systems of medicine. Enrolling in the Healthcare Professionals Registry will enable them to get connected to India's digital health ecosystem.

- **ABHA Mobile App (PHR):** A PHR is an electronic record of health-related information on an individual that conforms to nationally recognised interoperability standards and that can be drawn from multiple sources while being managed, shared, and controlled by the individual.

- **Health Facility Registry (HFR):** It is a comprehensive repository of health facilities of the nation across different systems of medicine. It includes both public and private health facilities including hospitals, clinics, diagnostic laboratories and imaging centres, pharmacies, etc. Enrolling in the Health Facility Registry will enable them to get connected to India's digital health ecosystem.

- **Unified Health Interface (UHI):** The UHI Network is designed as an open protocol connecting End User Applications (EUAs) and Health Service Provider (HSP) applications. It will facilitate various digital health services, such as appointment booking, teleconsultation, and service discovery, between patients and HSPs.

- **ABHA Number:** Standardising the identification process across healthcare providers is crucial to ensure medical records are correctly issued and accessed with appropriate consent. Issuing a Unique Health ID (UHID) requires collecting basic details such as demographic, location, family/relationship, and contact information, with an emphasis on easy contact information updates. The Ayushman Bharat Health Account (ABHA) Number will uniquely identify individuals, authenticate them, and link their health records across various systems and stakeholders with informed consent.

- **Aarogya Setu** has evolved into a National Health App under ABDM. Users can register for a Digital Health ID, interact with healthcare providers, and seamlessly receive digital lab reports, prescriptions, and diagnoses from verified professionals.

- The **e-Hospital** application is a cloud-based Hospital Management Information System that connects patients, hospitals, and doctors on a single digital platform. It is available to Central and State Government, Autonomous, and Cooperative hospitals via the SaaS (Software as a Service) model.

The mission includes the development of e-learning modules for health professionals and citizens, enhancing their knowledge about health practices, disease prevention, and nutrition.

5. **Swasth Bharat Prerak Programme:** The Swasth Bharat Prerak (SBP) programme, launched in January 2018, is a joint initiative of the Ministry of Women & Child Development and the Tata Trusts. It supplements the path-breaking POSHAN (Prime Minister's Overarching Scheme for Holistic Nourishment) Abhiyaan or the National Nutrition Mission (NNM) by providing managerial and administrative support to the district and state administration for the effective implementation of the mission. The programme aims to improve health and nutrition outcomes by employing technology-driven solutions. It uses e-learning platforms to train community health workers and disseminate health and nutrition information to rural populations.

Swasth Bharat Yatra: A nationwide campaign that includes digital workshops, webinars, and e-learning modules on health and nutrition awareness.

6. **e-School for Farmers:** This program, implemented by the Ministry of Agriculture and Farmers Welfare, provides online courses and training modules on various aspects of agriculture, including health and nutrition. The platform offers video tutorials, interactive sessions, and expert advice, enabling farmers to enhance their knowledge and improve their livelihoods.

7. **National Health Mission (NHM):** Launched in 2013, aims to provide accessible, affordable, and quality healthcare to rural populations. It includes a significant focus on maternal and child health, nutrition, and disease prevention.

The NHM incorporates e-learning strategies to educate healthcare providers and the community about health practices and nutrition.

- **ASHA Training Modules:** E-learning modules designed for Accredited Social Health Activists (ASHAs) to enhance their knowledge about health and nutrition.

- **Janani Shishu Suraksha Karyakram (JSSK):** Uses digital platforms to educate mothers about prenatal and postnatal care, nutrition, and infant health.

8. **School Health Programme under Ayushman Bharat:** This program aims to improve the health and well-being of school children through regular health check-ups, health education, and nutritional interventions. E-learning tools are used to train teachers and health workers in schools about health and nutrition, ensuring that children receive accurate and relevant information.

- **Health and Wellness Ambassadors**: Teachers trained as Health and Wellness Ambassadors use e-learning modules to educate students about health and nutrition.

- **Fit India School Week**: Incorporates e-learning activities and webinars to promote physical fitness and nutritional awareness among students.

9. **Rashtriya Bal Swasthya Karyakram (RBSK)**: It is a child health screening and early intervention program that aims to improve the overall health of children through regular health check-ups and nutritional support. The program uses e-learning platforms to train health workers and educate parents about child health and nutrition.

- **Mobile Health Teams**: These teams use e-learning tools to disseminate health and nutrition information to parents and caregivers during health camps.

- **Child Health Screening App**: An app that provides e-learning content on child health and nutrition to healthcare workers and parents.

10. **PM e-VIDYA:** A comprehensive initiative called PM e-VIDYA was initiated as part of Atma Nirbhar Bharat Abhiyan on May 17, 2020, which unifies all efforts related to digital/online/on-air education to enable multi-mode access to education. The initiative includes:

- **DIKSHA (one nation, one digital platform)** is the nation's digital infrastructure for providing quality e-content for school education in states/UTs and QR coded Energised Textbooks for all grades are available on it. 35 of the 36 states and UTs have on boarded on DIKSHA platform and contextualised the content as per the local need.

- One earmarked **Swayam Prabha TV channel** per class from Class 1 to 12 (one class, one channel).

- Extensive use of Radio, Community radio and CBSE Podcast- **Shiksha Vani.**

- Special e-content for visually and hearing impaired developed on **Digitally Accessible Information System (DAISY)** and in **sign language on NIOS website/ YouTube**.

- Besides, the Ministry has undertaken a proactive initiative, named, 'MANODARPAN' covering a wide range of activities to provide psychosocial support to students, teachers and families for Mental Health and Emotional Wellbeing.

11. **The PM Poshan Scheme (Pradhan Mantri Poshan Shakti Nirman)**, formerly known as the Mid-Day Meal Scheme is aimed to provide one hot cooked meal in Government and Government-aided schools from 2021-22 to 2025-26. Implemented by the Ministry of Education, it includes children in pre-schools or Bal

Vatika (before class I) in primary schools, in addition to children of classes I to VIII. Its main objectives are to combat hunger and improve education by enhancing the nutritional status of children in Government and Government-aided schools, encouraging regular attendance, and aiding concentration in classroom activities.

The scheme plays a significant role in addressing health and nutrition-related awareness in rural India through e-learning initiatives:

- **Integration of Nutrition Education with School Curriculum:** The PM Poshan Scheme incorporates digital learning modules on nutrition and health as part of the school curriculum. These modules are designed to educate children about balanced diets, hygiene

practices, and the importance of various nutrients.

- **Interactive Content**: Utilising multimedia content such as videos, animations, and interactive quizzes, the scheme makes learning about nutrition engaging and informative for young students.

- **Training and Capacity Building for Teachers and Staff**: Teachers and school staff receive training through online platforms on how to integrate nutrition education into their teaching. These programs cover topics like food safety, nutritional requirements, and healthy eating habits.

- **Digital Resources**: Providing access to digital resources and e-books helps educators stay updated with the latest information and teaching methodologies related to health and nutrition**.**

- **Virtual Workshops and Webinars**: The scheme conducts virtual workshops and webinars for parents and community members to spread awareness about the nutritional needs of children and the benefits of the PM Poshan Scheme.

- **Digital Campaigns**: Leveraging social media and other digital platforms, the scheme runs awareness campaigns highlighting the importance of proper nutrition and health practices in rural areas.

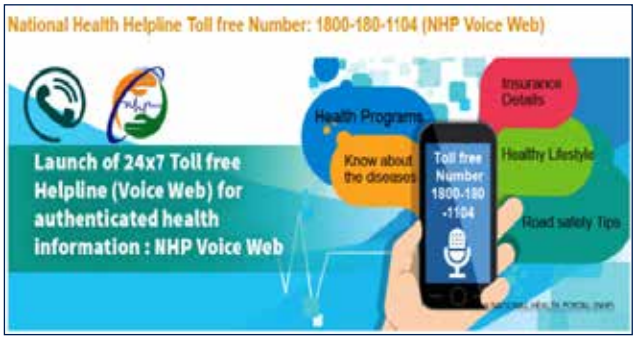
- **Digital Monitoring Systems**: The scheme uses digital tools to monitor the implementation and impact of the program. This includes tracking the nutritional status of children and the effectiveness of nutrition education initiatives.

- **Feedback Mechanisms**: E-platforms provide avenues for collecting feedback from students, teachers, and parents, which helps in continuously improving the program.

- **Collaboration with Other Digital Initiatives**: The PM Poshan Scheme collaborates with initiatives like the Ayushman Bharat Digital Mission (ABDM) to enhance health and nutrition education through shared digital resources and platforms.

- **Partnerships with NGOs and Private Sector**: Partnering with NGOs and private sector players to develop and disseminate high-quality digital content related to health and nutrition.

12. **Mobile Health (mHealth)** Initiatives leverage mobile technologies to deliver healthcare services and disseminate health information. In rural India, mHealth



plays a crucial role in bridging the healthcare gap by providing accessible and cost-effective solutions for health and nutrition-related awareness. This approach harnesses the widespread use of mobile phones to reach even the most remote populations, offering an effective platform for e-learning.

➢ Enhancing Accessibility and Reach: Mobile phones have a high penetration rate in rural areas, making them ideal for delivering health information. mHealth initiatives ensure that health and nutrition information is accessible to a large audience, regardless of geographical barriers.

- **SMS Campaigns**: Sending regular SMS updates with health tips and nutritional advice.

- **Voice Messaging Services**: Using automated voice messages to reach those with low literacy levels.

- **Mobile Academy** is a free audio training course designed to expand and refresh the knowledge of Accredited Social Health Activists (ASHAs) and improve their communication skills via their mobile phones, which is both cost-effective and efficient. It is an anytime, anywhere training course that can train thousands of ASHAs simultaneously via mobile phone.

➢ **Providing Real-Time Information and Support:** mHealth applications can offer real-time updates and support for health and nutrition queries. Timely information helps individuals make informed decisions about their health and nutrition.

Challenges of E-Learning for Health and Nutrition Awareness in Rural Communities	Proposed strategies to overcome the challenges
Digital Divide	**Infrastructure Development**: Expand broadband access through initiatives like BharatNet. **Mobile-Focused Platforms**: Develop mobile-friendly e-learning apps (e.g., Poshan Tracker app).
Low Digital Literacy	**Training Programs**: Conduct digital literacy workshops for community health workers and beneficiaries. **User-Friendly Interfaces**: Simplify interfaces for easy navigation (e.g., using local languages).
Cultural Barriers	**Cultural Sensitivity**: Customize content to align with local beliefs and practices. **Community Involvement**: Engage local leaders and influencers in promoting e-learning initiatives.
Limited Access to Devices	**Device Provisioning**: Provide subsidized or loaned devices (e.g., tablets) for accessing e-learning content. **Community Centres**: Establish e-learning hubs in community centres with shared devices.
Content Relevance	**Localised Content**: Develop region-specific content that addresses local health and nutrition issues. **Interactive Modules**: Incorporate quizzes, games, and interactive content to enhance engagement.
Monitoring and Evaluation	**Impact Assessments**: Conduct regular evaluations to measure the effectiveness of e-learning initiatives (e.g., using data analytics). **Feedback Mechanisms**: Implement feedback loops to gather insights from users for continuous improvement.
Sustainability	**Integration with Existing Programs**: Embed e-learning modules into existing health and nutrition schemes (e.g., Ayushman Bharat Yojana). **Public-Private Partnerships**: Collaborate with private sector for sustainable funding and support.

- **mDiabetes Program**: Real-time SMS alerts for diabetes management and nutritional guidance.

- **Kilkari** (meaning 'a baby's gurgle'), is a centralised interactive voice response (IVR) based mobile health service which delivers free, weekly, time-appropriate 72 audio messages about pregnancy, childbirth, and childcare directly to families' mobile phones from the second trimester of pregnancy until the child is one year old.

➢ **Empowering Community Health Workers:** mHealth tools equip community health workers with resources to educate and assist rural populations. It enhances the capacity of health workers to deliver accurate and consistent health education.

- **Mobile Kunji**: A mobile-based tool that helps health workers educate mothers about nutrition and child health.

- **mSakhi**: An app providing health workers with information on maternal and child health, enabling them to offer better guidance.

➢ **Facilitating Remote Consultations and Telemedicine**: Mobile platforms enable remote consultations, reducing the need for physical visits to healthcare facilities. This increases access to healthcare services and expert advice, especially in remote areas.

- **eSanjeevani**: A telemedicine service offering remote consultations via mobile devices.

- **Promoting Interactive and Engaging Learning:** Mobile applications offer interactive learning modules, quizzes, and multimedia content to engage users. This makes health and nutrition education more engaging and easier to understand.
  - **Poshan Atlas:** An app providing interactive nutritional advice, recipes, and diet plans to embed positive nutrition behaviours among children, youth, etc.
  - **Poshan Abhiyaan**: Uses mobile technology to provide multimedia content on nutrition and health for mothers and children.
- **Monitoring and Data Collection**: Mobile health tools can collect data on health metrics, which can be used for monitoring and improving health interventions. These provides valuable insights into health trends and the effectiveness of health programs.
  - **mHealth4TB**: Uses mobile phones to track TB patients' adherence to treatment.
  - **ANMOL (ANM Online)**: An app for Auxiliary Nurse Midwives to track maternal and child health data.

The integration of e-learning platforms into health and nutrition awareness programs in rural India has the potential to revolutionise public health outcomes. By focusing on infrastructure development, community engagement, capacity building, and cultural sensitivity, these initiatives can become more effective and impactful. Partnerships with various stakeholders, continuous monitoring, content diversification, and strong government support are crucial for sustaining these efforts. Through a combined approach of innovative strategies and practical solutions, e-learning can significantly improve health and nutrition awareness, ultimately leading to healthier and more informed rural communities. ❑

Digital Education in 21st century: Positive Outlooks and Challenges

The era of digital education and learning takes centre stage in the 21st century and contributes towards the aim of transforming education through child-centred, equity-driven, and innovative solutions. The article highlights India's commitment to digital education with several initiatives and a holistic approach to digital learning, this includes increased resources, addressing the digital divides, and meeting the needs of children with quality educational contents to ensure all the vitals to make digital learning safe, equitable, engaging, and effective.

*** Ms. Rashi Sharma**
****Ms. Purabi Pattanayak**

Digital technology has had a significant influence on education in the twenty-first century. The ultimate result of this influence has been the revolution of pedagogy and education due to the adoption of digital technology in the social, political, and economic spheres of society. Nowadays, learning is more strategic and focuses more on virtual collaboration and learner-centric learning. As a result, teachers no longer serve as knowledge sources but rather as learning facilitators. Traditional classroom lectures are no longer the only way that people can learn. Emerging technologies have made knowledge instantly available and being disseminated on an exponential scale. As a whole, schools have not only included technology as a crisis management tool but have also incorporated it into their existing curricula. Teachers can therefore use online learning as a potent teaching tool.

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In the 21st century, India has witnessed a transformative shift in its educational landscape with the advent of digital education. This paradigm shift from traditional chalk-and-talk methods to digital learning platforms has brought forth both promising opportunities and daunting challenges. The National Education Policy 2020 advocates investment in digital infrastructure, online teaching platforms and tools, virtual labs, digital repositories, online assessments, technology and pedagogy for online teaching-learning, and other related areas. This also supports multilingualism and highlights the power of language in teaching and learning through creative and hands-on approaches, such as gamification and apps, and by incorporating the cultural aspects of the languages through films, theatre, storytelling, poetry, and music.

With a compounded annual growth rate of 20.2%, the AI market in India is predicted to reach US$7.8 billion by 2025[1]. In order to prepare students for the AI economy and to bring India's curriculum in line with contemporary requirements, the National Education Policy (NEP) 2020 places a strong focus on the need of imparting the requisite technical skills at all educational levels. It places a strong emphasis on integrating AI into education to support high-quality and skill-based learning. The UNESCO State Education Report India (2022) proposes 10 concrete recommendations that, when implemented, could accelerate India's transformational journey towards technological education and sophisticated tech-driven solutions in educational processes. These recommendations are in keeping with the national vision of Digital India. These 10 recommendations are:

1. Consider the ethics of Artificial Intelligence in Education as an utmost priority
2. Rapidly provide an overall regulatory framework for Artificial Intelligence in Education
3. Create effective public-private partnerships
4. Ensure that all students and teachers have access to the latest technology
5. Expand AI literacy efforts
6. Attempt to correct algorithmic biases and the resulting discrimination
7. Improve public trust in Artificial Intelligence
8. Request the private sector to better involve students and educationists in developing AI products
9. Place ownership of data with the students
10. Embrace the versatility of Artificial Intelligence in Education systems

India's commitment at G20 Platform: Making Tech-enabled Learning more Inclusive, Qualitative and Collaborative at every level

India's G20 Presidency was no doubt an opportunity for the country to shape the agenda for an inclusive and sustainable development. Education is one of the main focus areas of this journey, offering a fantastic opportunity to highlight the rich heritage of Indian knowledge systems. Accordingly, the Education Working Group (EdWG) 2023 has concentrated on areas to promote inclusive, egalitarian, high-quality education and opportunities for lifelong learning for everyone.

The G20 Indian Presidency Education Working Group Report 2023 addresses the role of technologies in learning, the growing trend towards blended and hybrid learning, and the need for countries to identify entry points and levels of investment for their digital transformation while considering their level of readiness, particularly for emerging technologies such as Artificial Intelligence (AI), and the potential risks.

The report highlights key components for enhancing tech-enabled learning: coordination, content, connectivity, capacity, culture, and cost, emphasising the importance of data ecosystems and analytics in improving education management.

The G20 outcome document emphasises India and G20 countries' commitment to digital technologies for inclusive, equitable, and accessible education. It calls for collective development of affordable, accessible technology ecosystems and learning resources including in local languages, wherever applicable, that are affordable and easily accessible, addressing the digital divide and ensuring equitable, inclusive, and secure technological infrastructure.

Positive Outlook

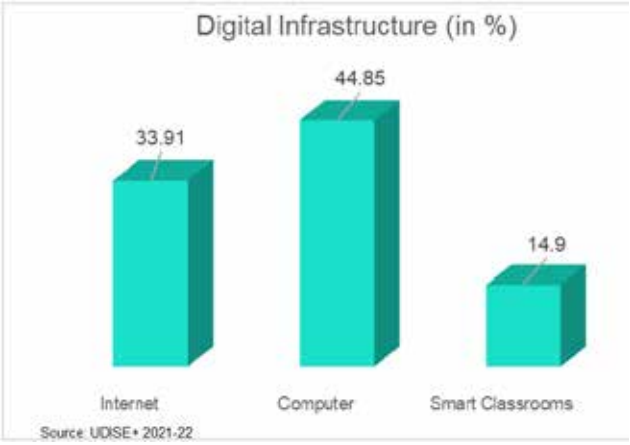
Technology will revolutionise education in this context and beyond because it offers students real-world experience, an audio-visual learning environment, makes studying more enjoyable, a virtual library of knowledge, more tools for teachers, and more interactive learning environments. In this context and beyond, technology will be the imminent of education as it gives practical experience for the future, provides an audio-visual experience, makes studying less boring, a treasure trove of unlimited information, gives additional tools to teachers, and builds more interactive and instils collaborative spirits towards learning. The benefits envisaged for digital education are as follows:

- First, a greater number of population can now access high-quality educational resources thanks to digital education, which has democratised learning. The availability of lectures, study materials, and interactive sessions to students from all across the nation has been made possible by the widespread use of smartphones and reasonably priced internet, leveling the playing field in terms of education.
- Second, pupils' inventiveness and originality are encouraged by digital education. Immersion learning opportunities that foster critical thinking and problem-solving abilities are offered by interactive simulations, multimedia information, and virtual laboratories. Students are more equipped to meet the changing needs of the modern workforce, which values flexibility and creativity, thanks to this.
- Digital platforms also make personalised learning sessions possible. Learning materials can be customised using adaptive learning technologies to fit each student's unique learning preferences and speed. This way, no student is left behind. This tailored strategy improves understanding and recall, which boosts academic performance.
- Moreover, digital education allows for worldwide collaboration and knowledge sharing across national borders. Students can work on projects with peers from other nations, take part in international webinars, and be exposed to a variety of viewpoints, all of which can help them develop a more global perspective.
- Ultimately, lifelong learning is supported by digital education. Professionals can reskill and upskill online, keeping up with the rapidly changing demands of the industry and quick breakthroughs in technology. Online courses and certificates facilitate this process. This culture of ongoing learning improves job opportunities and boosts the economy.

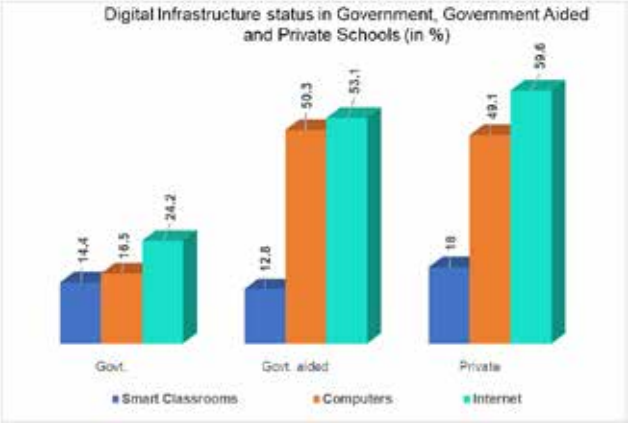
Challenges

When we enable billions of Indians to realise their full capacity for learning and cooperation, we will be able to make rapid progress in education. Learning is the core of education, and it shouldn't happen only in classrooms. Learning for all, learning by all, and learning with all should be the goal. However, there are many obstacles in the way of fully utilising digital education in India.

First of all, there is still a digital divide, uneven distribution of ICT access, a lack of digital literacy, particularly in the community, impedes the growth of digital learning nationwide and presents additional monitoring challenges. Underprivileged groups are still unable to obtain dependable internet access and gadgets. This discrepancy makes educational injustices worse and prevents digital learning initiatives from reaching a wider audience.



Graph 1: National Scenario of Digital Infrastructure in schools



Graph 2: Digital Infrastructure status in Government, Government Aided and Private Schools

The present status of digital infrastructure available in schools across India needs to be addressed on a priority basis for building a more resilient system for the future and to meet the pace with the digitalisation process. Unless these core shortcomings are addressed, inequalities will continue to widen. At the national level, the overall status of availability of digital infrastructure can be observed from the given analysis in Graph 1 and 2. As per the database of UDISE+ 2021-22, out of total 14.89 lakh schools, around 7.07 lakh (47.5%) schools have computer facility, 5.05 lakh (33.9%) schools have Internet facility and around 2.22 lakh (14.9%) schools have smart classroom facility. Graph 2 highlights the management wise availability of digital infrastructure facilities in schools which was found to be inadequate.

Second, there is still effort to be conducted to ensure the reliability and quality of online instructional materials. It is vital to select and validate trustworthy sources due to the deluge of information available on the internet. To maintain educational standards, educators and legislators need to put strong procedures for quality control and content monitoring in place.

Furthermore, a paradigm change in instructional strategies and teacher preparation is required for digital education. For teachers to successfully incorporate technology into the classroom, extensive professional development programs are necessary, as many find it difficult to adjust to digital tools and pedagogies. Subsequently, there are significant risks associated with cybersecurity for digital education systems. Cyberbullying, phishing scams, and data breaches can jeopardise student privacy and erode confidence in online learning settings. As a result, strict cybersecurity guidelines and procedures are necessary to protect private data and guarantee a safe learning environment.

Finally, there are concerns that students' interpersonal skills may decline and social isolation may be reinforced by digital education. For overall development, screen time must be balanced with offline interactions and extracurricular activities. On the whole, we must design education policies aimed at developing students' digital competencies, going beyond the operational capabilities of using apps or the internet and including cognitive skills linked to critical thinking, creativity, and problem solving in digital contexts (OECD, 2019).

Initiatives Taken to Expand Digital Education

India is one of the leading examples of an equity-oriented vision for narrowing the digital learning divide. India's growth story stands on an expansive digital public infrastructure, designed to ensure that no one is left behind. It envisions to transform the entire nation into a digitally empowered society and knowledge economy. Educational technology will play a critical role in bringing this vision to reality. India's approach to building Digital Public Infrastructure in education is to keep the learners at the centre and ensure equitable access and opportunities. For this the government is providing enabling policy framework, building infrastructure and developing the digital content ecosystem that ensures access and equity for all learners. The Ministry of Education has also taken up various digital education activities to widen educational opportunities, promote equity, improve access and

quality of educational processes at the school and teacher education level. The diverse programmes carried out can broadly be categorised as research and development, training, extension and dissemination in the areas of educational technology and Information and Communication Technologies (ICTs) in education.

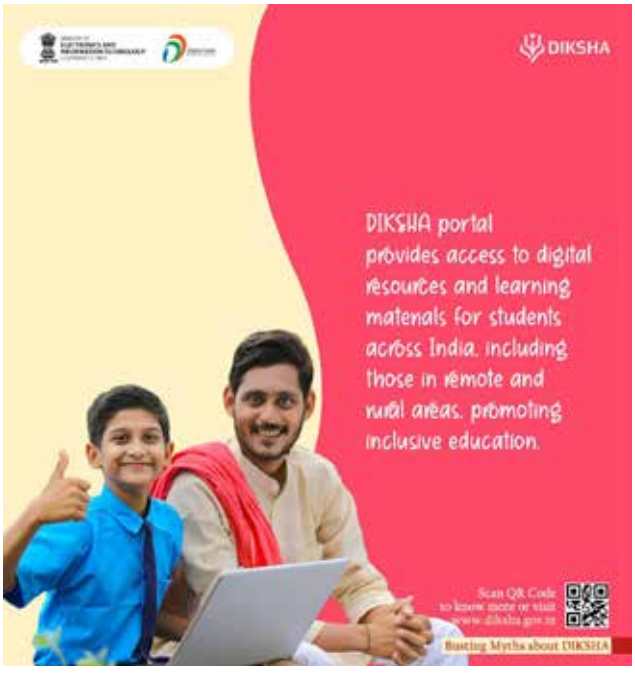
1. **Enhancing and Strengthening the Scope of ICT under Samagra Shiksha Abhiyan:** Samagra Shiksha, the largest Centrally Sponsored Scheme for School Education in India not only provide support for ICT and smart classroom to both Government and Government Aided schools in all states and UTs but also has provisions for making quality e-contents for students and teachers. The scheme is also providing financial support to States and UTs for developing quality e-contents under DIKSHA. Technology will be able to create lifelong learners who can figure out what concepts children need to learn, unlearn and relearn at various stages of life to live sustainably in a green, regenerative future. Acknowledging this, the Government of India is committed to ensure learning for all, with equity, to cover all students at all levels of education and in all geographical locations, even in the remotest parts of the country so that digital learning is no longer the luxury of a few people.

2. **National Digital Library (NDL) - Rashtriya E-Pustakalaya:** This is a pioneering digital library platform which aims to enhance the accessibility of non-academic books for children and adolescents across India. This platform will provide round-the-clock access to books, overcoming geographic limitations. The digital library aims to resolve the 'last mile' accessibility issue for many by offering over 10,000 books in more than 100 languages within the next 2-3 years. Currently, over 1,000 books in 23 languages are available. The initiative, expected to bridge the digital divide, will ensure books are accessible anytime and anywhere, promoting healthy reading habits among youth. The app is available on both iOS and Android platforms.

3. **e-Jaadui Pitara (https://ejaaduipitara.ncert.gov.in) :** Learning Teaching Materials in the form of Jadui Pitara as well as the Digital version of Jadui Pitara have been developed. This is a play-based Learning Teaching Materials for children in the age group 3 to 8 years. It comprises of playbooks,

toys, puzzles, posters, flash cards, story books, as well as reflecting the local culture, social context and languages. It is designed to pique curiosity and accommodate the diverse needs of learners in the foundational stage.

4. **PM e-Vidya 'DIKSHA' :** DIKSHA (Digital Infrastructure for Knowledge Sharing) is a national platform for school education. DIKSHA has been adopted by almost all the States/UTs, central autonomous bodies/boards, including CBSE and NIOS. DIKSHA can be accessed by learners and teachers across the country. Each state/UT leverages the DIKSHA platform in its way, as it has the freedom and



choice to use the varied capabilities and solutions of the platform to design, develop, disseminate e-contents and run capacity building programs for teachers, learners and administrators.

DIKSHA currently hosts 6,500+ textbooks energised with QR codes, including 377 NCERT textbooks and ETBs. There are more than 3.51 lakh digital contents on DIKSHA, including audio-visual content, reading and practice material, interactive resources, and lesson plans. These e-contents are available in 84 languages. For digital content to aid in the teaching and learning processes, a rich repository of varied resources was contributed by schools/ individual teachers, content partners, NGOs and corporates under CSR towards Vidya Daan against the various content requirements of NCERT/ CBSE/ States/ UTs. As of date, more than 2.55 lakh content pieces have been contributed under Vidya Daan.

The National Institute of Open Schooling (NIOS), an autonomous body under MoE, has also been onboarded the DIKSHA plateform as a separate tenant under which more than 3,300 contents (videos+pdfs+e-textbooks) have been uploaded for Secondary (equivalent to 10th grade) and Senior Secondary level (equivalent to 12th grade). NIOS aims to leverage DIKSHA to make education equitable and inclusive for the marginalised and disadvantaged groups. NIOS offers a broad spectrum of courses of study in general, vocational and continuing education and life enrichment courses up to pre-degree level.

Conclusion

For children to live sustainably in a green and regenerative future, technology will be able to develop lifelong learners who can determine what concepts they need to acquire, unlearn, and relearn at different stages of life. In recognition of this, the Indian government made a commitment to ensure equitable access to education for all students, regardless of their educational background or location—including the most distant areas of the nation—so that access to digital learning would no longer be a privilege enjoyed only by the wealthy.

In conclusion, digital education has the potential to completely transform Indian education in the twenty-first century. India can fully utilise digital education to empower future generations and propel socioeconomic progress by bridging the digital divide, ensuring content quality, improving educator readiness, supporting cybersecurity measures, and encouraging holistic development. India can lead the way in creating an innovative, robust, and inclusive education system in the digital era if all stakeholders work together, including educators, legislators, parents, and technology providers. ❑

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