Focus

From E-learning to Ed-tech; A Case Study of India's Road to Education 4.0

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From E-learning to Ed-tech; A Case Study of India's Road to Education 4.0

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Abstract

After the global closure of schools and other educational institutions, the authorities directed that all educational activities be moved online to ensure academic continuity. While some institutes with enough resources were able to gradually adapt to this paradigm of e-learning, others continue to struggle to create an appropriate digital learning environment for their students. Since then, education has had to keep up with the rapid speed of technological innovation. This rapid speed has grown into the current educational movement, Education 4.0, which entails transforming the future of education using modern technology. The rise of Education 4.0 represents an appropriate path, integrating Fourth Industrial Revolution technology with education. Following the worldwide growth of Education 4.0, the World Economic Forum (WEF) launched the Education 4.0 India project in May 2020 in collaboration with the United Nations Children's Fund (UNICEF) and YuWaah (Generation Unlimited India). Its implementation was a direct result of the Covid-19 pandemic's expanding inequalities in learning results. To solve these difficulties through digital learning, the Education 4.0 India project was initiated, bringing together more than 40 partners from the education technology, government, academic institutions, and start-

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up sectors. The Education 4.0 India Initiative became a benchmark to add value to India's existing rich or rather thriving model of Ed-tech firms. This paper examines India's evolution from e-learning platforms to Ed-tech firms and how these entrepreneurs have relied on proven technologies to help India on its path to Education 4.0. While doing so, it investigates the problems that the introduction of education technology in India encountered, as well as how public and private entrepreneurs are stepping in to fill the void.

Keywords: *Education Technology, Education 4.0, Industrial Revolution 4.0, Startup Ecosystem, Digital Learning*

Introduction

The world is experiencing an unprecedented shift in technological advancements led by massive digital transformation. This digital transformation has enabled the integration of digital technologies across many fields and has proven to be lucrative and effective. The world realized the importance of digitization more evidently after the spread of Covid-19 which disrupted businesses, education, and other activities. While on the one hand, such disruptions affected industries and businesses, on the other, they allowed these businesses to innovatively transform themselves and grow into digital landscapes. An example of such innovation is the Education Technology (Ed-tech) sector, which amply flourished during the pandemic. After the global shutdown of schools and other educational institutes, the authorities ordered to move of all educational activities online for academic continuity. While some institutions—well-equipped with the required resources—were able to slowly adapt to this model of e-learning, others kept struggling to provide a suitable digital learning environment for their students.

Education, since then, has had to cope with an accelerated pace of technological advancement. This fast pace has evolved into the current trend in education, i.e., *Education 4.0*, entailing transformation of the future of education through advanced technology. The emergence of *Education 4.0* symbolizes an optimal route, aligning the technologies of the Fourth Industrial Revolution with education. These cutting-edge developments in education have proven revolutionary in transforming the education system and producing visionary and resourceful employees capable of adapting to the usage of new technology. Following the global development of *Education 4.0*, the World Economic Forum (WEF) in May 2020, collaborated with the United Nations Children's Fund (UNICEF) and YuWaah (Generation Unlimited India) to launch the Education 4.0 India initiative. Its execution was a direct result of widening gaps in learning outcomes caused by the Covid-19 pandemic. Thus, to address these challenges via digital learning, the Education 4.0 India initiative was launched, summoning over 40 partners including, education technology, government, academic institutions, and startup communities.[1] To add value to India's already rich or rather booming model of Ed-tech startups, the Education 4.0 India Initiative became a benchmark. This paper looks at India's growth from e-learning platforms to Ed-tech startups and how these startups have built upon tested technologies to facilitate India's road to Education 4.0. While doing so, it explores the challenges that the introduction of Education Technology faced in India and how public and private startups are contributing to filling the vacuum.

India's Digital Learning Landscape

Covid-19 has had a particularly harsh impact on India. In addition to the devastating impact on human life, it severely

interrupted access to education, with 247 million primary and secondary school students out of school.[2] Being one of the second-largest education systems in the world, India has transformed at a rapid pace to fill in the vacuum generated by the pandemic. It did not let the closure of schools cause a pause in the learning processes and instead adopted digital solutions. Thus, since the end of 2020, e-learning has picked up substantial traction in the country and has digitally revolutionized the entire Indian education sector as teachers have picked up digital tools to work out strategies for both online and offline environments. This has in return enabled a hybrid landscape for students who are returning to classes after the pandemic. Known as HyFlex, a combination of hybrid and flexible approaches, hybrid learning has been a source code for many educational institutes. It provides an opportunity to integrate synchronous (face-to-face) and asynchronous (online) modes into the educational landscape.[3] This model of hybrid learning has enabled the students to access the course material both virtually and in-person and achieve the same learning objectives.

Similar models of learning have been adopted by the Indian Ministry of Education to provide students with an opportunity to learn from the comfort of their homes. The Government of India, in 2019, started consulting various stakeholders for the formulation of an inclusive, participatory, and holistic education policy for India. The idea of this policy was to initially gear itself towards the prerequisites of the 21st century and then base its foundation on the pillars of access, equity, affordability, quality, and accountability. The result was the formation of the 'National Education Policy 2020' with an educational aim, to encourage and enlighten.[4] The policy is expansive and proposes the revision and revamping of the education structure which is linked directly to transforming India digitally.

However, to cater to the needs of Sections 23 and 24 of Part III of the Education policy, the Government of India launched National Digital Education Architecture (NDEAR).[5] NDEAR is a strong component of the Education Policy 2020, serving as a unified National Digital Infrastructure for connecting, energising, and catalysing the education ecosystem to cross-leverage creative solutions. It is a benchmark for facilitating education in an innovative ecosystem. NDEAR allows for a coherent multichannel, multimodal learning continuum. It entails learning at school, after school, at the community centre, and at home, offline/online, synchronous/asynchronous, and self-service/assisted. See Figure 1 for a detailed pictorial explanation.

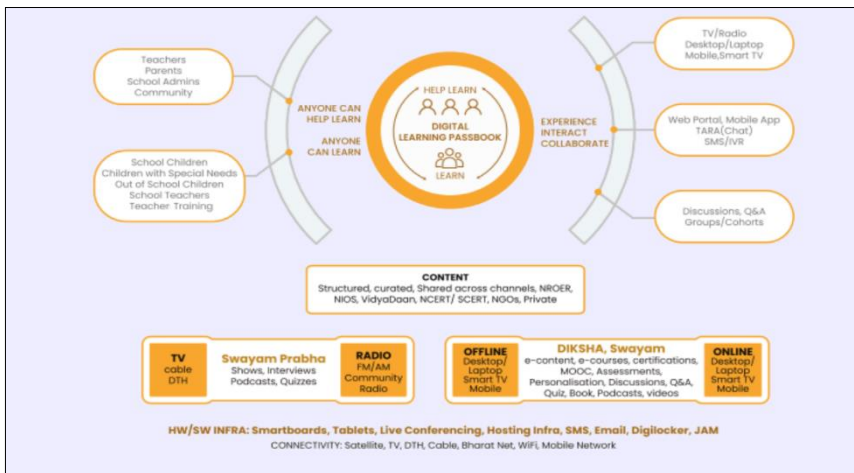**Figure 1:**

Summarized Glance of NDEAR[6]

Figure 1 shows a detailed pictorial display of NDEAR which is expansive and all-encompassing. Two main building blocks of NDEAR are the Digital Infrastructure for Knowledge Sharing (DIKSHA) and Swayam Prabha. An initiative of the National Council of Educational Research and Training (Ministry of Education, Government of India), the DIKSHA acts as a digital

shop stop for learners. With over 5,189,330,654 learning sessions in over 10 states of India, DIKSHA provides engaging and interactive educational resources that are in line with the official curriculum to teachers, students, and parents.[7] It is available on both browsers and as a mobile app, making it easily accessible. Similarly, Swayam is also an initiative of the government of India that complements the National Education Policy of India, 2020. Being host to a country with areas of lower connectivity, Swayam makes sure to connect the digital divide through the technological revolution for all those who are underprivileged. It covers four areas: school education, out-of-school education, undergraduate education, and post-graduate education, and eases the expedition of all four through video lectures, custom-made reading material, self-assessment tests/quizzes, and an online discussion forum for queries.[8] However, this digital outlook of education is enhanced further with the integration of technological advancements like Artificial Intelligence (AI) and Machine Learning. India has, thus, tapped into this opportunity to leverage its Ed-Tech startups to bring about the necessary revolution in the education system of its country.

India's Ed-tech Ecosystem

Ed-tech, or education technology, is the application of information and communication technology to the educational landscape. It involves the utilization of various tools such as computer programs, online platforms, and mobile devices to create interactive and individualized learning experiences. It encompasses not only the hardware and software involved in what is commonly referred to as e-learning, distance learning, or virtual education, but also the content, learning materials, and resources used. Ed-tech tools are transforming the way classrooms are run in a variety of ways. From robots and virtual reality lessons to

gamified classroom activities, students are being kept engaged through interactive and enjoyable learning experiences. Internet of Things (IoT) devices are allowing for the creation of digital classrooms, leveraging students to learn and be held accountable for their homework regardless of their location.[9] Furthermore, machine learning and blockchain technologies are aiding teachers when it comes to grading tests. Ed-tech has had a major impact on the field of education due to its capacity for providing custom-tailored instruction. Each person has their own unique needs and preferences when it comes to learning, and Ed-tech tools allow educators to craft individualized curriculums that account for these differences. By recognizing the distinct learning styles of each student, teachers can help ensure that everyone is engaged and able to maximize their learning potential.

As a result, enhancing the education system to reap the benefits of Ed-Tech and ICT-driven learning would undoubtedly contribute to the total human capital building and a subsequent increase in productivity in India, translating into stronger economic growth. Incentivized by this goal, the Indian education sector has recently become a breeding ground for new Ed-Tech businesses. Both commercial and public sector initiatives have been observed to emerge in an attempt to make Ed-Tech more popular and incorporated into the Indian education system.[10] The Ed-Tech industry in India was valued at a staggering $750 million in 2020 and is estimated to reach $10.4 billion by 2025 with 37 million paid Ed-tech users.[11] This growth is fuelled by the rising demand for non-academic courses from tier II and III cities and the requirement for personalization in the Ed-Tech space. See Figure 2 for a futuristic view.

Figure 2:

Futuristic view of the Indian Ed-Tech Industry (2020-25)[12]
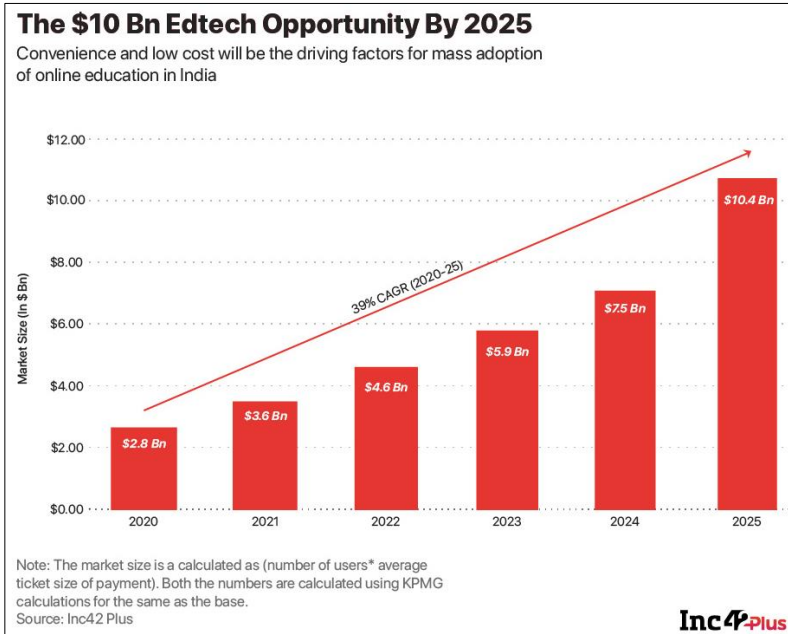
It is estimated that India currently has around 4,530 Ed-Tech startups, around 400 of which were set up after 2019. In the last two years, Indian Ed-Tech startups have managed to garner approximately $4 billion in investments, with $2.2 billion being invested in 2020 after the nationwide lockdown.[13] As per the Inc42 Report titled, *The Future of Ed-tech in India: Decoding The $10Bn Market Opportunity*, the major players in the Indian educational landscape that have the largest market share are Byju's, Unacademy, Vedantu, Coursera, Toppr, and Flintobox.[14] Among them, Byju's recently raised funding of $250 million.[15] Similarly, India's worldwide prominence also reflects its strength in the Ed-tech industry. The 2018 Worldwide Ed-tech Index rated Bangalore and Delhi in the top 15 global cities based on characteristics such as the number of enterprises, funding, community, sector support, and test bed potential. Bengaluru and Delhi NCR are placed 7th and

14th on the list of global cities with the highest Ed-tech index scores, respectively. Both scored high among rising cities at various levels of maturity. The success of Bengaluru and Delhi NCR demonstrates the suitable atmosphere created by the Indian government for the development and expansion of the industry. See the comparative chart in figure 3.

Figure 3.

Ed-tech Index[16]
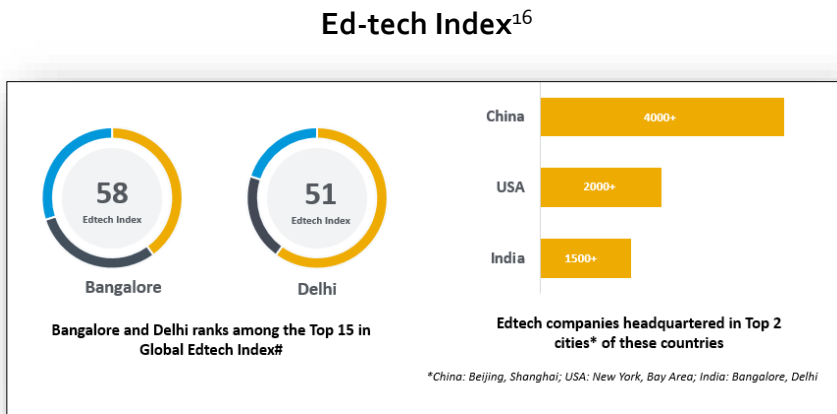
This tremendous growth of Ed-tech startups facilitated by technology-driven solutions shows the necessity of this industry. Therefore, to fully exploit the technological revolution and create a dent in society, Education 4.0 has taken a centre stage. Being a reflection of Industry 4.0, this new concept has taken the Ed-tech ecosystem by storm and is integrating new bits of tech-savviness in the learning methods.

Unfolding Education 4.0

It is important to recognize that the introduction of digital technologies in education has created new opportunities for the evolution of human skills, which has now been termed Education 4.0. The penetration of technology in the education system began

to show up in the new millennium, making education more interactive, networkable, and custom-made. [17] From there emerged a new concept known as Education 4.0. It reflects Industrial Revolution 4.0 and entails the incorporation of similar technologies in the education sector. The Fourth Industrial Revolution is characterized by the integration of revolutionary technologies, processes, and practices, such as AI, machine learning, and algorithms.[18] In the 21st century, higher education is leveraging digital technologies, big data analytics, and intelligent educational models to provide students with personalized learning experiences. This new approach encourages collaboration and allows educators to choose the best learning models for their students while connecting them with communities and resources that can help them advance their skills and knowledge. Additionally, the development of the Industry 4.0 model is making it possible to integrate control computing, big data, the internet of things (IoT), cyber-physical systems (CPS), and intelligent applications and adaptive services, creating a more cohesive and efficient learning environment.[19]

It is noted that the integration of digital devices makes it easier to improve the teaching and learning environment. Also, the current computer-controlled 3-D technologies give a superior learning experience. Using 3-D technology in education to improve abilities and introduce new ways allows for increased employability and potential for engineering studies/degrees as well as developing future students' interest in them. Thus, the Fourth Industrial Revolution is widely regarded as a digital technical advancement based on the convergence of robotics, the Internet of Things, and the Internet of Services.[20] As these devices are widely available to users, they are developing students' talents and capabilities. However, there is still a skills and literacy gap in the educational framework regarding the use of these devices in

the learning process. The shift in how we look at and practice education is a critical component of the Fourth Industrial Revolution. Although digital technologies provide personalized and self-learning models that promote empowerment, users must still have the necessary skills and abilities to operate these devices.

Being evolved from Education 1.0, the tenets of Education 4.0 fall under the umbrella of four core components: competencies, learning methods, information and communication technologies (ICT), and infrastructure. See Figure 4 for a detailed pictorial explanation.

Figure 4:

Core Components of Education 4.0[21]
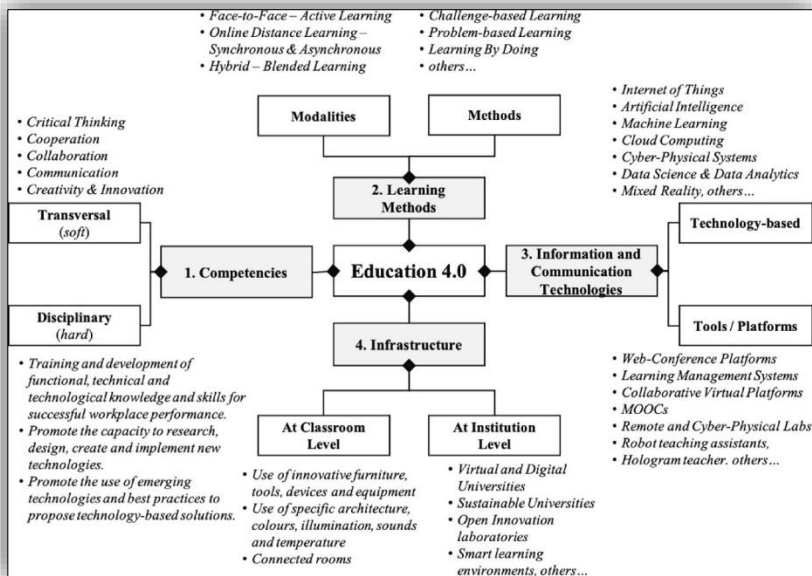
The incorporation of Education 4.0 has revolutionized the way educators and learners interact with each other, enabling them to make use of up-to-date infrastructure and the latest technologies to optimize teaching practices in higher education. This has led to a shift in pedagogical approaches, with educational models

adapting to the changing technological environment to provide a more cutting-edge learning experience. Consequently, educators are enabling the generation of knowledge beyond mere pedagogy and andragogy. Rather, they are now advocating for the integration of *heutagogy*, *peeragogy*, and *cybergogy* into the educational process which are the three most innovative pedagogies of Education 4.0. [22]

Heutogogy:

Heutagogy focuses on self-directed learning and seeks to challenge traditional models of teaching and learning that prioritize teacher-centred instruction and the idea of 'knowledge possession' rather than 'knowledge sharing'. In self-directed learning, learners must possess both competency and capability. Competency can be defined as demonstrated aptitude in attaining knowledge and skills, while capability is characterized by the learner's self-belief in her capabilities and, therefore, her competency to take suitable and effective action to address and solve problems in both known and unknown and ever-changing environments. Heutagogy is focused on looking ahead to a future in which the ability to learn will be a vital skill, due to the ever-changing nature of communities and workplaces and the speed of technological advancements.[23]

Peeragogy

Peeragogy focuses on co-learning and co-creating. It is peer-based learning that involves different actors and promotes bi-directional learning. Peeragogy is a philosophy that emphasizes collaborative and peer-based teaching and learning. It is based on the idea that learning is a socially constructed process involving a continuous dialogue between stakeholders such as individuals, groups, and the environment.[24]

Cybergogy

As technology progresses at a rapid pace, a new approach to education has arisen, i.e., cybergogy. It combines the principles of pedagogy and anthropology to create a new way of learning that incorporates the use of information technology. This cyber-learning is designed to facilitate both adults' and young people's self-directed learning, as well as interactive learning in a virtual environment. Cybergogy recognizes the importance of considering learners' behaviour, intelligence, and emotions when engaging in learning tasks.[25]

In a nutshell, it is essential to integrate these three elements of innovative pedagogy (instructor, student, and resource) to reap the benefits of the Education 4.0 era. The use of the latest technological tools is necessary to ensure that the learning and teaching experiences are immersive, blended, and HyFlex-based, thus equipping students with the knowledge and life skills necessary for their success in the 21st century.

Education 4.0: The Case of India

Following the global development of Education 4.0, the World Economic Forum in May 2020, collaborated with the United Nations Children's Fund (UNICEF) and YuWaah (Generation Unlimited India) to launch the Education 4.0 India initiative. Its execution was a direct result of widening gaps in learning outcomes caused by the Covid-19 pandemic. Thus, to address these challenges via digital learning, the Education 4.0 India initiative was launched, summoning over 40 partners including, education technology, government, academic and startup communities. To add value to India's already rich or rather booming model of Ed-tech startups, the Education 4.0 India Initiative became a benchmark.

The purpose of the Education 4.0 India initiative was to pave the way for all the education technologies tested and adopted during the pandemic and to build on them more effectively. It found gaps in the Ed-tech sector of India and suggested assiduity in four focus areas from kindergarten to K-12 that includes; Foundational literacy and numeracy, teachers' professional development, school-to-work transition, and connecting the unconnected. An important piece of information to note here is that these interventions ultimately complement and amplify two things: India's Education Policy (NEP) 2020 and the National Digital Education Architecture (NDEAR) 2021.

Foundational Literacy and Numeracy (FLN)

FLN refers to children's aptitude to read, comprehend and answer simple math problems by the end of Grade 3. These are crucial foundational abilities that, as the name implies, serve as the foundation. The effective acquisition of FLN allows students to study more meaningfully as they proceed to higher levels and equips them with 21st Century abilities such as critical thinking and problem-solving, which are required for long-term success. The National Education Policy (NEP) 2020 prioritizes attaining foundational literacy and numeracy for all school children by 2025.[26] The Annual Status of Education Report (ASER) 2018 suggests that the FLN challenge is particularly difficult to tackle in rural areas, with only 27.2 per cent of children in grade 3 being able to read a grade 2-level text and just 28.1 per cent being able to perform subtraction from a sample of 100,000 children aged 3 to 5 years.[27]

Teacher-Professional Development

The success of policy implementation on education technology relies on teacher involvement, as they are the key to the successful adaptation of the classroom to the ever-changing

world. With their knowledge and understanding of the current trends, teachers are in the best position to ensure that the Education policy—upholding tech-adaption—is successfully implemented in the classroom. It is essential to create policies and initiatives to help shift the landscape of teacher professional development. As per the guidelines of NEP 2020, all teachers should engage in a minimum of 50 hours of ongoing professional development activities each year, following their interests. They will also have to undergo a 4-year integrated teacher preparation program.[28] These activities should cover up-to-date pedagogies concerning literacy and numeracy at the base level, as well as formative and adaptive evaluation of learning results, competency-based learning, and other related pedagogies like experiential learning, art integration, sports integration, and storytelling-based approaches.[29]

School-to-work Transition

As per the data of the Centre for Monitoring the Indian Economy, India's Unemployment rate has surged to 8.3 per cent from 8 per cent.[30] This surge is seemingly caused by the gap in the education sector and market needs which disconcert the school-to-work transition for many, leading to unemployment. Thus, to break this cycle of unemployment, intervention in the education system is a prerequisite. Doing so will open up opportunities for employment and entrepreneurship.

Connecting the Unconnected

The Ed-tech transformation has a vacuum of disconnection that will only be filled if the rural side is connected digitally. Around 50 per cent of the population in India is subject to either poor or no digital connection at all.[31] Approximately 6 out of 10 schools lack functional computers, and 3 out of 4 schools do not have access to the internet or the ICT infrastructure needed.[32]

Challenges and Mitigation
Strategies Adopted by India

India, in its journey to transforming its education sector, is ultimately building upon the tested technologies adopted during Covid-19. It has succeeded in most areas but there still prevail challenges that need to be addressed if the transformation has to occur in its true form. However, New Delhi has been strategic enough in its thought process to overcome these challenges via different initiatives. Though not fully mitigated, these challenges have been partially dealt with in a very forward-looking way. This portion of the paper thus deals with two areas: firstly, the challenges faced by India in transforming its education system to the advancements bought by Industrial Revolution 4.0, and, secondly, the strategies adopted by the public and private sector of the Ed-tech industry in mitigating those challenges.

The Digital Divide

The greatest problem of all is the digital divide in Indian society. This divide is not just limited to the urban and rural classes of Indian society but is also marked by the gender gap that highly prevails in the system. The National Family Health Survey provided a detailed overview of a rural-urban divide with regard to gender. While 72.5 per cent of urban males and 51.8 per cent of urban females have used the internet at some point in their lives, just 48.7 per cent of rural males and 24.6 per cent of rural females meet this requirement. It is worth noting that, across all states, urban men have the greatest percentages, while rural females have the lowest, as seen in Figures 5 and 6. [33]
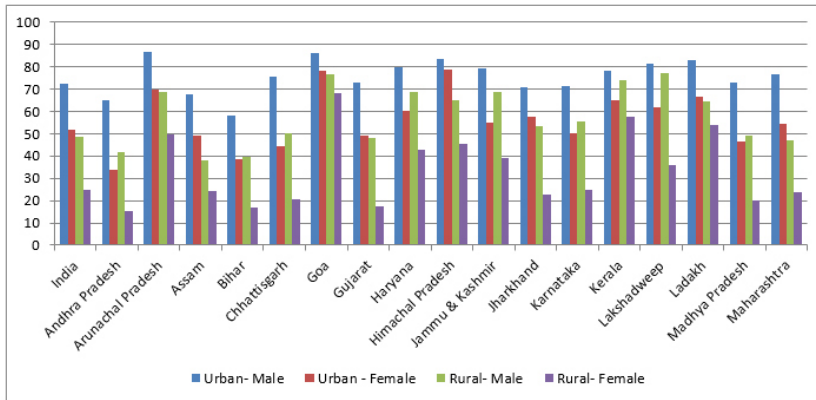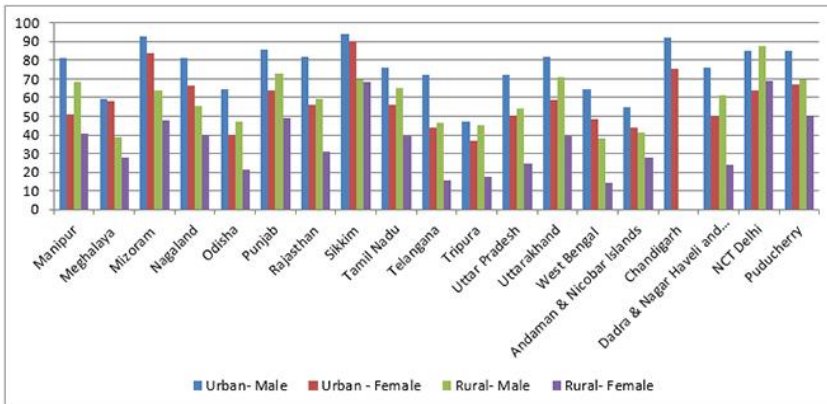
Figure 5:

Access to the Internet I

Figure 6:

Access to the Internet II

These existing socio-economic inequalities have created a vacuum in the system but the government is taking several steps to ensure that the vacuum is filled. For instance, In July 2021, Education Minister Govind Singh Thakur announced the 'Digital Saathi' phone donation program in Himachal Pradesh to distribute smartphones to under-resourced students for remote education.[34] Similarly, there is another initiative of the Government of India's Ministry of Electronics and Information Technology (MeitY) known as the Common Services Centre (CSC) program. The CSCs provide simple network connections for the delivery of numerous digital services to rural and urban Indians, hence helping to a

digitally and financially inclusive society. The CSCs are not just service delivery sites in rural India, but also change agents, fostering rural entrepreneurship and improving rural capabilities and livelihoods.[35] There also exists a potential opportunity with the success of BharatNet but right now, its sustainability of it in terms of operationalization is quite questionable.[36]

Language Barrier

As per the 8th Schedule of the Indian Constitution, there is a total of 22 official languages in India.[37] Such kind of diversity is good for being a primary facet of a pluralistic society but it has also increased the challenges for the education system in India. Today, the English language has maintained its hegemony in the Indian education system which has in return created a class structure in this sector. It also serves as the power relation between the students of English-speaking schools and non-English-speaking schools. Thus, the use of one dominant language in classrooms, which is favoured by the elite, is creating obstacles to the overall acquisition of knowledge and learning, creating a gap between the two groups.[38] English, which is the dominant language of instruction in higher education institutions serves as a way for the privileged to gain control over the less privileged. This can be seen as a way for keeping people of diverse languages away from the learning process.

In mid-2022, the government of India launched Bhashini Project whose mission is to enable accessible internet and digital services in a local language, enabling the citizens to utilize the internet in their language. It is built on three building blocks, i.e., foundation, technology, and products as evident in figure 7.[39] Similarly, Google for India also announced their project on bilingual search results based on over 100 Indian languages. Voice search has been improved to better comprehend people who use

Hinglish, a combination of Hindi and English. This has been achieved through the use of a new neural network model that takes into account the speaker's accent, context, and other factors. This app will be available to Indians in 2023.

Figure 7:

Building Blocks of Bhashini[40]

Academia's Disconnect from Industry

Another major challenge in India is unemployment among youth. As per the data of the Centre for Monitoring the Indian Economy, India's unemployment rate has surged to 8.3 per cent from 8 per cent. This surge is seemingly caused by the gap in the education sector and market needs which disconcert the school-to-work transition for many, leading to unemployment. This stumbling block can be traced back to the school-to-work transition in which the major missing component is industry. The Indian growth story is historically stagnant where the country's growth is not in parallel with the increase in employment. The reason for that is the desync among businesses, schools, and governments.

The government of India—to fill this vacuum—launched the DESH-stack portal (still underway). The purpose of which is to create a digital ecosystem that will skill and reskill via online training. The portal will also enable an application program interface (API); building a system that will help students find jobs and entrepreneurial ecosystems relevant to their field.[41] Another platform is Intershala, it is the top Indian platform for internships and training opportunities, with over 40,000 paid placements available for students of Engineering, MBA, Media, Law, Arts, and more.[42] One of its kind, Certiport also helps businesses and educational institutes in India to produce technically skilled experts. Certiport's programs are tailored to meet the needs of aspiring professionals seeking to become career-ready. The programs are designed to keep up with the ever-evolving IT industry, ensuring that participants remain current and job-relevant.[43]

Algorithm Bias

While AI has become a holy grail of progress with the ideation of neutrality; neither good nor bad, there still entails a social dimension to it. The point to ponder is, it is essentially not the AI itself that generates bias via social dimensionality but AI is designed in a way in which it learns from the data provided by human beings. The more erroneous information is fed to the algorithm, the more likely it is to be prone to prejudice. Henceforth, the possibility of bias in Indian educational content is quite high as India is a hierarchical and feudal society in which caste, gender, religion, and class are all widely marginalized. Thus, India's AI revolution in education can create biases via its social structure and behaviour of marginalization.

To counter that, it is important to establish open and free AI in the education framework. Algorithms, like any educational

framework or model, must be made open source so that they may be reviewed and audited by the public. In this regard, Kerala favoured Free and Open-Source Software (FOSS) and Open Educational Resources (OER) in its educational IT projects, enabling teachers to be co-creators and equal partners. This solution allowed for scalability and sharing while eliminating software and content licenses.[44]

Conclusion

From the above data and analysis, it is evident that the education system in India is striding through a tech revolution facilitated by the technologies of the Industrial Revolution 4.0. The process of revolutionizing began with the pandemic, which enabled both teachers and students to find alternatives to physical classrooms. Thus, the country in full swing started testing technologies and incubating Ed-tech startups that would help the students and teachers survive the pandemic without discontinuity in education. Today, India is building and adopting those tested technologies and translating them to revamp the entire education system toward a more tech-savvy market.

During this process, Indian National Education Policy (NEP) 2020, was of exponential support. It gave the prerequisites for adopting the technologies that are relevant in the 21st century. The introduction of technology into the educational system began in the new century, making education more interactive, networkable, and personalized. Then onwards, a new concept known as Education 4.0 arose as described above in detail. It reflects the Fourth Industrial Revolution and comprises the use of similar technology in the educational sector. The integration of revolutionary technologies, processes, and practices such as AI, Machine Learning, and algorithms characterizes the Fourth Industrial Revolution. However, the introduction of technologies

in countries of the South is a tough row to hoe as it comes with myriad challenges. Especially the challenges of connecting the rural with the devices of the future and then familiarizing them with those technologies.

Nevertheless, the Government of India has established several technologies by putting public and private partnerships in order. Ed-tech startups, public initiatives of the Ministry of Education, Science, and Technology, and other relevant stakeholders have joined hands in making education easy, accessible, and equitable. Although some of the initiatives seem to be doing better, there is still a huge gap in terms of making Ed-tech gender and class/caste neutral. With barriers like un-connectedness and language, a huge portion of the population is kept at bay. Therefore, to reach the international standards of Education 4.0, the Government of India shall adopt them at a faster pace.

Overall, despite the tremendous need for improvement in terms of infrastructure availability, the fast expansion of the components under consideration, along with appropriately directed government policies to complement that growth, makes a positive argument in favour of Ed-tech. India may not be fully prepared yet, but it is on the right route to adopt a more Ed-tech-intensive system in the post-pandemic times.

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