REDUCING THE LEARNING DISPARITY: IMPLEMENTING EQUITABLE ONLINE AND DIGITAL LEARNING

Mina SABAR,
Assistant Professor in Educational Studies (TE),
D.P.I.A.S.E, Berhampur, Odisha
ORCID iD: 0009-0005-0918-9764
minasabar81@gmail.com

ABSTRACT:
The emergence of pandemics and epidemics have brought attention to the urgent need for substitute forms of high-quality education, prompting the National Education Policy 2020 to support the use of technology to solve new issues. The article explores the necessity of using technology to close the digital gap and provide high-quality education. Key initiatives from NEP-2020 are covered, including improvements in digital infrastructure, online teaching platform and tool improvement, and online education pilot studies. The article additionally takes a look at mass media and virtual labs as means of tackling the digital gap and creating and disseminating content.
Keywords: Online education, digital education, National Education Policy 2020, digital divide, online assessments, blended learning.

Introduction:
During a time of extraordinary global challenges and rapid technology advancement, education is seeing a radical evolution toward online and digital platforms. The recent rise in pandemics and epidemics has highlighted the urgent need for high-quality alternate forms of instruction in situations when traditional, in-person approaches are impractical. The National Education Policy 2020 has acknowledged the need to take advantage of technology's benefits while also being aware of its possible drawbacks and hazards in response to these changing conditions.

Implementing well planned pilot studies to investigate the advantages of online and digital education while addressing any associated obstacles is essential to the NEP-2020's vision. In order to address the current and future demands of providing high-quality education to everyone, this approach highlights the significance of maximizing and expanding current digital platforms and ICT-based educational initiatives.

However, closing the digital gap is necessary before the potential advantages of digital and online learning can be fully realized. Ensuring fair access to technology for educational purposes is made possible in large part by initiatives like the Digital India campaign and the availability of reasonably priced computing devices. Furthermore, in order to effectively use technology in education, educators must receive thorough training and development to give them the tools they need to lead engaging online learning environments.

Additionally, the transition to online assessments brings with it special difficulties, such as the requirement to modify assessment procedures to fit the digital setting and deal with problems like network outages and academic integrity. Additionally, some disciplines have intrinsic limits in the online learning environment, such science practical and performing arts, therefore creative solutions are needed to get around these challenges.

Recognizing the value of combining online learning with experiential and activity-based learning strategies is crucial for tackling these issues. As a result, the possible drawbacks of merely screen-based teaching are avoided and a comprehensive educational experience that includes social, emotional, and psychomotor aspects of learning is guaranteed.

Significance of online and digital education:
The use of online and digital technologies has already become necessary due to the globalization of education. In order to maintain the educational system, the COVID-19 Pandemic has made it necessary the institutions must switch to an online teaching model. Developed nations were prepared to handle this issue. Developing nations, however, put a lot of effort into meeting this criterion. In this crucial era, online and digital technologies have emerged as education's saviour. Online and Digital technologies help students acquire skills including problem-solving, thinking structure construction, and process comprehension—all of which are necessary for professional performance. Digital tools and educational resources contribute to enhancing the classroom environment and enhancing the teaching-learning process. If digital technology is used in the classroom, kids may become more interested in what they are studying. As today's youth are largely habituated to using electronic devices, integrating them into education will surely help to spark their curiosity and increase their engagement levels. Students have an interesting learning experience when technology is incorporated into the classroom, which keeps them focused and engaged in the material. The use of computers, projectors, and other state-of-the-art technology in the

classroom has the potential to make learning engaging and enjoyable for students. By assigning assignments that use digital resources, oral presentations, and group projects, teachers can make their students' education more dynamic and interesting. of the learning process and take a more proactive approach.

NEP-2020: Online and Digital Education Recommendations:
The terms "online" and "digital" education relate to the remote presentation of instructional materials, learning experiences, and educational content via digital devices and the internet. With the use of digital devices like laptops, tablets, or smartphones, students may access course materials, communicate with peers and teachers, and finish schoolwork regardless of where they are in the world.

Courses, programs, and degrees that are offered fully or partially online via learning management systems (LMS), online forums, or virtual classrooms are commonly referred to as online education. It includes a range of modalities, such as recorded video lectures, interactive multimedia modules, discussion boards, live-streamed lectures, and online tests.

On the other hand, a wider range of instructional strategies that make use of digital technologies to improve the teaching and learning process are included in digital education. This includes enhancing traditional classroom instruction, enabling tailored learning experiences, and encouraging active student engagement through the use of digital tools, applications, and resources. In addition to typical online courses, blended learning methods that include digital resources into in-person instruction are also included in the category of digital education.

This Policy suggests the following major efforts in light of the rise of digital technologies and the growing significance of using technology for teaching and learning at all levels, from kindergarten to twelve to higher education.

Pilot studies for online education:
Pilot programs are essential testing grounds for assessing how well digital technologies can be incorporated into teaching methods.

Appropriate agencies, such as the NETF, CIET, NIOS, IGNOU, IITs, NITs, etc. will be identified to conduct a series of pilot studies, in parallel, to evaluate the benefits of integrating education with online education while mitigating the downsides and also to study related areas, such as, student device addiction, most preferred formats of e-content, etc. The results of these pilot studies will be publicly communicated and used for continuous improvement.

National Education on Technology Forum (NETF):
Pilot projects to evaluate the effects of different online education initiatives on diverse educational settings and populations can be led by the NETF. For instance, the NETF and academic institutions might work together to carry out pilot research on how well online learning platforms can help students from a range of socioeconomic backgrounds achieve better learning results.

Central Institute of Education Technology (CIET):
CIET, as a premier institution specializing in educational technology, can conduct pilot studies to evaluate innovative approaches to online education delivery and instructional design. Example: CIET may conduct a pilot study to compare the efficacy of different instructional formats, such as video lectures, interactive simulations, and gamified learning modules, in engaging students and enhancing learning outcomes.

National Institute of Open Schooling (NIOS):
The effectiveness of online learning resources and support services for students participating in open schooling programs can be evaluated through pilot studies that NIOS, a leader in open and distance learning, can carry out. For instance, NIOS might carry out pilot research to assess the effects of offering online mentoring support and virtual tutoring sessions to students enrolled in distance education courses.

Indira Gandhi National Open University (IGNOU):
Being the biggest open university in the world, IGNOU is able to carry out pilot programs to investigate novel approaches to using technology to improve higher education's inclusivity and accessibility. For instance, in collaboration with industry stakeholders, IGNOU may carry out a pilot study to see whether it would be feasible to offer entirely online degree programs that offer flexible learning options.

Institutions of Higher Learning in India (IITs) and National Institutes of Technology (NITs): Pilot studies can be carried out to assess the efficacy of integrating digital technologies into STEM (Science, Technology, Engineering, and Mathematics) education at IITs and NITs, which are well-known for their proficiency in technology and engineering education.

As an illustration, IITs and NITs may work together to carry out a pilot study on the application of virtual laboratories and simulation software to improve engineering students' hands-on learning opportunities.

Constant Communication and Improvement:
The outcomes of these pilot studies have to be made available to all relevant parties, such as legislators, educators, parents, and students, in order to promote openness and responsibility in the execution of online learning programs. For instance: To help with decision-making, research findings from pilot projects could be shared via policy briefings, webinars, public forums, and publications.

3.**2. Digital infrastructure**: There is a need to invest in creation of open, interoperable, evolvable, public digital infrastructure in the education sector that can be used by multiple platforms and point solutions, to solve for India's scale, diversity, complexity and device penetration. This will ensure that the technology-based solutions do not become outdated with the rapid advances in technology.

Building a solid foundation to facilitate the integration of technology in the education sector requires investing in digital infrastructure. Below is an elaboration on digital infrastructure accompanied by illustrations:

Internet connectivity:
Internet connectivity is necessary in order to participate in digital learning activities and access online educational resources.

Example: Government programs to build up broadband infrastructure in rural and distant areas, like India's Bharat Net project, are meant to give underprivileged populations access to high-speed internet connectivity so that teachers and students can take advantage of online learning opportunities.

Network Infrastructure:
The hardware and software elements that provide communication and data transfer over digital networks are collectively referred to as network infrastructure. For instance, to accommodate growing bandwidth demands, educational institutions may decide to upgrade its network infrastructure, which includes servers, routers, and switches.

Learning Management Systems (LMS): LMSs are centralized platforms that facilitate communication between educators and students, manage learning resources, and provide online courses.

For instance, using open-source LMS systems like Moodle or Canvas enables educational establishments to design scalable, adaptable digital learning environments that satisfy a range of student demands and preferences.

Content Management systems (CMS).
Teachers can produce, arrange, and disseminate digital learning materials, such as interactive simulations, multimedia resources, and textbooks, with the use of content management systems (CMS). As an illustration, the development of open and interoperable content management systems (CMS) like Drupal or WordPress enables educators to work together to generate and distribute instructional content across many platforms and devices, guaranteeing flexibility and accessibility in digital learning settings.

Cloud Computing Services: These services offer processing, storage, and online access to digital resources at a reasonable price and with scalability.

For instance, educational institutions can host virtual classrooms, store and manage educational data, and enable collaborative online learning for teachers and students by utilizing cloud-based platforms like Microsoft Azure or Google Workspace for Education.

Interoperability with Open Standards:
A commitment to open standards and compatible technology guarantees interoperability and a smooth transition across various digital platforms and solutions. As an illustration by supporting the sharing and reuse of educational

content, adopting open educational resource (OER) standards like Creative Commons licenses enables educators to work together and modify resources to fit their unique teaching needs and environments.

Measures for Cybersecurity: Securing sensitive educational data requires the use of strong cybersecurity measures. Protecting digital infrastructure from cyber threats and securing sensitive educational data require the implementation of strong cybersecurity measures.

For instance, putting in place firewalls, encryption methods, and authentication systems can reduce the possibility of data breaches and illegal access to educational materials and systems.

Policymakers and educational institutions can make informed decisions and use digital technologies to improve the quality, accessibility, and inclusivity of education for all learners by working with relevant agencies to conduct pilot studies and effectively disseminating the results.

Online teaching platform and tools: The relevant e-learning platforms, such SWAYAM and DIKSHA, will be expanded to give teachers a well-organized, intuitive suite of helpful tools for tracking students' progress. As the current pandemic has demonstrated, two-way video and two-way audio interfaces are essential tools for conducting online classes. A dynamic ecosystem that encourages continuous improvement and improves the calibre and accessibility of digital learning resources for students throughout India can be established by educational stakeholders by building a strong digital repository, encouraging a culture of content creation and innovation, and guaranteeing transparent feedback mechanisms.

Content creation, digital repository, and dissemination:
An easily navigable public rating system for user-submitted evaluations of the efficacy and quality of the content will be integrated into a digital repository that will house coursework, learning games and simulations, augmented reality, and virtual reality. Student-appropriate tools, such as apps that gamify Indian art and culture and are available in several languages with easy-to-follow operating instructions, will be developed for enjoyable, hands-on learning. There will be a dependable fallback method for giving pupils access to electronic content. Here is a thorough analysis complete with examples:

Development of Digital Repositories:
To house a vast array of educational materials, including course materials, learning games, simulations, augmented reality (AR), and virtual reality (VR) resources, a single digital repository will be established.

For instance, the repository might be designed to resemble sites like the Open Educational Resources (OER) Commons or the National Digital Library of India (NDLI), giving teachers access to a wide range of excellent teaching resources.

Content Creation:
Teachers and content producers will have the tools necessary to create engaging and creative learning materials in a variety of disciplines and media, accommodating a wide range of learning preferences and styles.

For instance, educators can be given access to tools like Canva or Adobe Creative Cloud to help them generate visually appealing infographics, presentations, and interactive multimedia content for online learning modules.

Virtual reality and augmented reality:
Technologies like virtual reality (VR) and augmented reality (AR) will be used to build immersive learning environments that mimic real-world situations.

For instance, using programs like Google Expeditions or Merge Cube, students may engage with 3D models, conduct virtual experiments, and explore virtual landscapes. This helps them better understand difficult concepts in science and history classes.

Addressing the digital divide:
Since a sizable portion of the populace currently lacks accessibility to digital media, broadcasts and telecasts will make full use of the mass media already in place, including radio, television, and community radio. These educational programs will be offered in multiple languages around the clock to accommodate the diverse demands of the student body. There will be a particular emphasis on and requirement for content in all Indian languages; digital content must, to the greatest extent feasible, reach educators and learners in the medium of instruction.

TV Broadcasts:
Television stations devoted to education can air instructional programming, reaching TV-owning homes in both urban and rural regions.

Example: Specific time slots can be set aside for the transmission of educational programs covering a range of subjects and grade levels by educational channels such as Doordarshan's DD National and DD Bharati.

Radio Transmissions:
Particularly in rural areas, radio broadcasts offer an affordable and easily accessible way to reach underprivileged and isolated groups with educational content.

Example: In order to create and broadcast educational programming that are specific to the needs and interests of the local community, community radio stations might work with educational institutions and organizations.

Virtual Labs:
Students can carry out hands-on learning activities from a distance with the help of virtual labs, which provide interactive environments and simulations that simulate actual lab investigations.

Virtual lab modules covering physics, chemistry, biology, and engineering are just a few examples of the subjects that can be included in e-learning platforms like DIKSHA, SWAYAM, and SWAYAMPRABHA. These courses may incorporate data analysis tools, virtual experiments, and simulations to give students an immersive education.

We will consider and refine the concept of providing appropriate digital devices—such as tablets with pre-loaded content—to teachers and students studying the Sustainable Development Goals.

Training and incentives for teachers:
Teachers will receive in-depth instruction in learner-centric pedagogy as well as how to use online teaching platforms and tools to create excellent online material on their own. The importance of the teacher in encouraging students to actively engage with the material and with one another will be emphasized. Online tests and evaluations: The development and implementation of assessment frameworks incorporating competency design, portfolio design, rubric design, standardized assessments, and assessment analytics will be carried out by appropriate entities, including the proposed National Assessment Centre or PARAKH, School Boards, NTA, and other identified bodies. Research will be conducted to test novel approaches to assessment that make use of educational technologies and emphasize 21st century capabilities.

Blended models of learning:
Blended learning is the term given to the educational practice of combining digital learning tools with more traditional classroom face to face teaching. In a true blended learning environment, both the student and the teacher should be physically located in the same space.

Blended learning models provide a well-rounded approach that leverages the advantages of both traditional in-person training and digital learning components. Following are some important blended learning models that work well.

Acknowledgment of Face-to-Face Learning:
Blended learning recognizes the importance of in-person communication and involvement between peers and teachers.

Example: Although digital resources offer convenience and a vast array of materials, in-person training facilitates social connection, prompt feedback, and individualized support—all crucial components of comprehensive learning experiences.

Finding Efficient Models:
We will identify and modify a number of successful blended learning models to meet the. unique demands of various subjects, grade levels, and learning contexts. Example: Various strategies are provided by models like the Station Rotation, Flex Model, and Flipped Classroom.

Customized Education:
Personalized learning experiences that take into account each student's learning preferences, pace, and style are made possible by blended learning.

Example: Students can interact with digital content at their own pace while still receiving targeted interventions and support from teachers during in-person interactions thanks to adaptive learning platforms and differentiated instruction.

Resource Optimization: By utilizing digital tools and resources to supplement and improve traditional classroom instruction, blended learning maximizes the use of educational resources. Example: To reinforce important ideas, encourage active learning, and offer chances for independent research and discovery, educators might select and include multimedia materials, interactive simulations, and online tests into their classes.

While promoting digital learning and education, the importance of face-to-face in-person learning is fully recognized. Accordingly, different effective models of blended learning will be identified for appropriate replication for different subjects.

Continuous Improvement and Evaluation: To guarantee efficacy and alignment with educational goals and objectives, blended learning models will be continuously assessed and improved. For instance, in order to pinpoint areas that need development and make well-informed decisions regarding instructional design and delivery, educators can gather input from parents, students, and colleagues, evaluate learning results, and examine data from digital learning platforms.

Laying down standards:
Standards for content, technology, and pedagogy for online and digital teaching and learning will be established by NETF and other relevant entities in tandem with the development of research on online and digital education. These criteria will be useful in developing policies for e-learning that States, Boards, schools, school complexes, HEIs, and other entities can use.

Challenges:
Despite the enormous advantages of online and digital teaching and learning, there are a number of challenges to be addressed in the transition, particularly with regard to equitable access. Access to internet resources is hampered by socioeconomic inequality, insufficient infrastructure in some areas to deliver digital education efficiently, insufficient digital literacy among students and teachers, the digital divide has a disproportionately negative impact on underprivileged populations, exacerbating educational disparities.

Socio-economic disparities hindering access to online resources:
 Socio-economic disparities encompass a wide range of factors including income levels, access to technology, and educational opportunities. Families from lower socio-economic backgrounds may not have the financial means to afford internet connectivity, computers, or other necessary devices for accessing online resources. Limited access to high-speed internet services in rural or remote areas further exacerbates the disparity, as even if devices are available, the cost of internet services may be prohibitive. Additionally, families facing economic challenges may prioritize basic needs over investing in technology or educational resources, further widening the gap in access to online education.

Lack of infrastructure in certain regions for effective digital education delivery: Inadequate infrastructure, particularly in rural or underserved areas, poses a significant barrier to effective digital education delivery. These regions may lack reliable electricity supply, which is essential for powering devices and internet connectivity. Furthermore, the absence of sufficient infrastructure such as broadband connectivity and network infrastructure impedes the seamless delivery of online learning content. Educational institutions in these areas may struggle to provide the necessary technological infrastructure and support to facilitate digital education, limiting opportunities for students to engage in online learning.

Inadequate digital literacy among learners and educators:
 Digital literacy refers to the ability to use digital technologies effectively and responsibly to access, evaluate, and communicate information. Many learners, particularly those from older generations or disadvantaged backgrounds, may lack the necessary digital literacy skills to navigate online learning platforms, access online resources, or engage in digital communication. Similarly, educators may face challenges in adapting to digital teaching methods and incorporating technology into their instructional practices, especially if they have limited training or experience in using digital tools. Without adequate digital literacy skills, both learners and educators may struggle to fully benefit from the opportunities presented by online education, leading to disparities in learning outcomes.

Conclusion

In summary, developing standards, investing in infrastructure, providing teacher training, and implementing inclusive pedagogical approaches are all important components of the complex strategy needed to fully realize the potential of online and digital education. Establishing standards for pedagogy, technology, and content offers the groundwork for quality control and uniformity in online teaching-learning experiences, as was said in the extended material above. These standards offer guidance for curriculum creation, technology integration, and assessment methods, assisting stakeholders at all levels of the education system.

Furthermore, creative approaches including utilizing mass media, granting access to digital gadgets, and advocating for blended learning models are required to close the digital gap. Educational stakeholders embrace digital learning opportunities and acknowledge the value of in-person engagement.

In addition, enhancing access to e-learning platforms, creating virtual laboratories, and investing in digital infrastructure guarantee that all students, regardless of location or socioeconomic status, have fair access to high-quality education. Stakeholders can harness developing technology to improve teaching and learning outcomes and revise and adapt online education programs to meet changing requirements through cooperative efforts and ongoing evaluation.

We can essentially actualize the revolutionary promise of online and digital education by emphasizing learner-centric teaching, encouraging active student interaction, and cultivating a culture of creativity and collaboration. By working together, we can create a future in which every learner has the chance to prosper in a connected and dynamic world.

References

Abdul Jabbar, A. I., & Felicia, P. (2015). Gameplay engagement and learning in game-based learning: A systematic review. Review of Educational Research, 85(4).

Akçayır, M., & Akçayır, G. (2017). Advantages and challenges associated with augmented reality for education: A systematic review of the literature. Educational Research Review, 20.

Bati, K., Yetişir, M. I., Çalişkan, I., Güneş, G., & Gül Saçan, E. (2018). Teaching the concept of time: A steam-based program on computational thinking in science education. Cogent Education, 5(1).

Bubb, S. and M. Jones (2020), "Learning from the COVID-19 home-schooling experience: Listening to pupils, parents/carers and teachers", Improving Schools, Vol. 23/3, pp. 209-222,

Bulman, G. and R. Fairlie (2016), "Technology and Education", in Handbook of the Economics of Education, Elsevier, https://doi.org/10.1016/b978-0-444-63459-7.00005-1.

Chapman, J. (2019). How Safe is Your Data? Cyber-security in Higher Education. Higher Education Policy Institute.

Dlamini, R., Rekai, Z. (2023). Guest editorial: Digital education and online learning to achieve inclusivity and instructional equity (Part B)

Desai, Ashok V. (2006). "Information and other Technology Development" in Encyclopaedia of India (vol. 2), edited by Stanley Wolpert. 269–273. Thomson Gale: ISBN 0-684-31351-0.

Gay, G. (2018). Culturally responsive teaching: Theory, research, and practice (3rd ed.). Teachers College Press.

Gowda, R. S., & Suma, V. (2017, February). A comparative analysis of traditional education system vs. e-Learning. In 2017 International Conference on Innovative Mechanisms for Industry Applications (ICIMIA) (pp. 567-571). IEEE.

Haleem, Abid., Javid, Mohdabid., Quadri, A. Mohd., & Suman, Rajiv. (2022). Understanding the role of digital technologies in education: A review, https://doi.org/10.1016/j.susoc.2022.05.004

Heinrich, J, Carolyn., Darling, Jennifer., Aduana, and G. Good. Annalee. (2020). Equity and Quality in Digital Learning: Realizing the Promise in K–12 Education Publisher: Harvard Education Press, Boston ISBN: 168253510X, Pages: 208, Year: 2020

Henderson, M. B., Houston, D., Peterson, P. E., Shakeel, M. D., & West, M. R. (2020). Amid pandemic, support soars for online learning, parent poll shows. Education Next, 21(1). https://www.educationnext.org/amid-pandemic-support-soars-online-learning-parent-pollshows-2020-education-next-survey-public-opinion/

https://en.wikipedia.org/wiki/Digital_learning#References

Karmakar, Tapas. (2019). Revolutionizing Education: Exploring The Role of Technology in Online and Digital Learning.

Ketkar, Prafulla (2006). "European Union, Relations with (Science and technology)" in Encyclopaedia of India (vol. 2), edited by Stanley Wolpert. 48–51.   Thomson Gale: ISBN 0-684-31351-0 IEEE

Kloos, C. D., Ibáñez-Espiga, M. B., Fernández-Panadero, C., Muñoz-Merino, P. J., Estévez-Ayres, I., Crespo-García, R. M., ... & Pérez-Sanagustín, M. (2014, October). A multidimensional analysis of trends in

educational technology. In 2014 Frontiers in Education Conference (FIE) Proceedings (pp. 1-4). IEEE. https://doi.org/10.1109/FIE.2014.7044053.

K.S. Kumar, M. Mahendraprabu, Open educational practices of SWAYAM pro- gramme among research scholars, Education and Information Technologies (2021) 1–25 . 283

Lee, L. K., & Cheung, S. K. (2020). Learning analytics: Current trends and innovative practices. Journal of Computers in Education, 7(1), 1-6. https://doi.org/10.1007/s40692- 020-00155-8

Mangal, S. K., Uma. (2019). Essentials of Educational Technology, PHI Learning Pvt. Ltd., Rimjhim House, 111 Patparganj Industrial Area, New Delhi, Delhi 110092, ISBN- 9788120337237

Ministry of Human Resource Development. 2020. National Education Policy 2020. MHRD, Government of India, New Delhi. MoE. 2020. Policy on School Bag 2020. National Council of Educational Research and Training, New Delhi.

Nand, K., Baghaei, N., Casey, J., Barmada, B., Mehdipour, F., & Liang, H. N. (2019). Engaging children with educational content via Gamification. Smart Learning Environments, 6(1), 1-15. https://doi.org/10.1186/s40561-0190085-2

Rafalow, M. H. (2020). Digital divisions: How schools create inequality in the tech era. University of Chicago Press.

St. George, D., Strauss, V., Meckler, L., Heim, J., & Nathanson, H. (15 March, 2021). "How the pandemic is reshaping education." The Washington Post. www.washingtonpost.com/education/2021/03/15/pandemic-school-year-changes/.