



Online Education as a Crucial Facilitator of Inclusive Learning in India

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Abstract: India's augmentation of online learning offers a special chance to improve inclusive education for students with disabilities, especially those who are deaf or hard of hearing and visual impairment. Digital platforms have emerged as crucial instruments for removing the obstacles that students with disabilities have historically encountered in a nation featuring an extensive array of socioeconomic backgrounds and notable educational disparities. Online learning provides braille-compatible devices, screen readers, and text-to-speech technology to pupils who are visually impaired, allowing them to have more independence and interact with the material. Online education has a great deal of promise to promote inclusive learning, but there are still obstacles to overcome. These include the dearth of using assistive technology in underprivileged and rural locations, gaps in accessible material, and instructors' inability to use digital literacy to successfully apply inclusive pedagogies. Targeted governmental measures, enhanced infrastructure and continuous teacher training are thus necessary to remove these obstacles and guarantee that pupils with hearing and vision problems have equitable access to high-quality education if internet learning is to be genuinely all-encompassing. This work investigates the part of internet education in overcoming obstacles related to cost, teacher scarcity, and geographical distance, while also considering the importance of digital literacy and infrastructure development in ensuring effective implementation. By synthesizing existing research and policy perspectives, this paper highlights the vital role of online education in shaping India's learning future, advocating for targeted interventions and collaborative efforts to harness its full potential for empowering inclusion and driving social transformation.

Index Terms - Inclusive education, online learning, assistive technology, digital literacy, India, visual impairment, hearing impairment.

I. INTRODUCTION

Online education has become a crucial facilitator of accessibility and inclusion in the worldwide educational environment, resulting from the fast growth of digital technology in recent years. The overview of digital learning platforms possesses the capacity to alleviate long-standing obstacles to education for students with disabilities, especially those with visual and hearing impairments, in India, a country characterized by wide socioeconomic gaps, linguistic diversity, and notable educational inequities. Online Education has emerged as a transformative force in the realm of learning, offering flexibility and accessibility that traditional educational models often lack (Kamalakar & Delhi, 2024). These kids have had ongoing difficulties getting access to high-quality education since they are frequently ostracized in traditional educational settings owing to a lack of suitable accommodations and assistive technology. Its origin can be traced back to the late 20th century, with the advent of the internet revolutionizing how knowledge can be shared. Early platforms for online education were primarily geared toward distance learning, offering recorded lectures and study materials to students who could not access physical classrooms. In the Indian context, online education gained momentum in the late 2000s. Afterwards, the integration of Online Education into Inclusive Education in India has opened new doors for marginalized groups, including students with disabilities, those from economically weaker sections, and geographically

isolated communities (Kushwaha et al., 2024).

In contrast, online education provides a structure that is both flexible and adaptable, allowing it to be customized to meet the unique requirements of students with disabilities. Digital tools like **screen readers, braille displays, and text-to-speech technology** provide students with visual impairments alternate ways to interact with academic material. Features that improve accessibility for students with hearing impairments, such as **live captioning, sign language interpretation, and multimedia material with subtitles**, enable increased engagement in the learning process. Additionally, the growing accessibility of reasonably priced mobile devices and internet in both urban and rural regions has further democratized access to these resources, allowing students from a variety of backgrounds to take advantage of inclusive learning settings. Government programs like e-Pathshala and initiatives by NGOs are leveraging technology to ensure that no child is left behind, contributing significantly to the vision of Inclusive Education (Singh, 2023). However, a number of obstacles must be overcome before the full promise of digital learning for pupil with impairments can be realized. These include the requirements for legal structures that guarantee fair access to digital learning materials, holes in the digital infrastructure, absence of specialized assistive technology, and low levels of digital literacy among educators. In order to achieve genuine educational fairness, this study critically investigates how online education may support inclusive learning for students with vision and hearing impairments in India, stressing both the potential it presents and the obstacles that need to be removed. Online Education is a crucial facilitator for Inclusive Education because it provides equitable access to all students with differently-abled, it also removes barriers related to want of awareness and knowledge, teaching style of the instructor, technology, bias attitudes. That's why most of **HI (Hearing Impaired) and VI (Visually Impaired) students** join online courses, but deaf students were not satisfied with accommodation provided during COVID. Deaf students can accommodate through synchronous and asynchronous classes.

1.1. Key Platform Contributions

There are two different options accommodate deaf students synchronous which includes live lecture, visibility; pinging/spotlight and identify who is speaking, turn taking; raise hand feature, media content and asynchronous which includes pre recorded; captioning (video in classroom) and interpreters, lecture classification -where and how does this happen, discussion board and media content. These are multiple ways for the students to engage in class barriers experienced by deaf students: online in using any software because of limitations of it, instructional tools and materials, limited knowledge & with accessibility features, preferred accommodations not approved. There is also a difference between **automated speech recognition (ASR) and speech to text services (STTS)** with ASR, it might be fast and immediate but it also doesn't mean it's reliable. Again we want to put a heavy emphasis on saying that it's often not reliable. It's unreliable due to errors many times such as an example here at National deaf centre (NDC) which we do use speech to text services (STTS) which means it's a live person typing out the captions, which allows for more efficiency and more accuracy instead of relying on automated captions that can have those errors inherent at times. With that system accuracy of automated captions, system can sometimes be as low as 80% to 85% which means that there's a 15% gap. That gap can have complications and impacts on a deaf student while there are in their classroom or during an online learning experience. Through ACR, we can't access the homework online but through STTS. ASR is unable to identify what one says sometimes because of misunderstanding/limitations, which will impact the deaf students.

Online education can be a game-changer for visually impaired students because it provides them with equal access to quality education. Such as **MOOCs, SWAYAM, and e-Pathshala** can facilitate internet & digital education for visual impairments students.

Compatibility with popular screen reader software, such as **JAWS (Job access with speech), NVDA (Non-visual desktop access), and SAFA (Screen access for all)**, should be guaranteed for all online platforms and services. Audio descriptions: To aid visually challenged pupils in understanding visual components, provide audio descriptions for video content. Tactile graphics: Offer tactile graphics, like 3D printed models or Braille labels, to help visually impaired students understand complex concepts. Mentoring initiatives: Establish mentorship programs that pair visually impaired students with trained mentors who can offer direction and support.

By putting these tactics into practice and making use of MOOCs, SWAYAM, and e-Pathshala, we can make online more inclusive and accessible education for adolescents who are hard of hearing or visually impaired.

- **MOOCs:** Accessibility features include closed captioning, transcript availability, and screen reader compatibility. These are available on several MOOC platforms, including Coursera, edX, and Udacity. Learning at your own speed is made possible via MOOCs, which is very beneficial for visually impaired students who might require more time to understand the course material. A broad variety of courses are available through MOOCs, ranging from the arts and social sciences to STEM professions.
- **SWAYAM:** Closing the Digital Gap: SWAYAM, a Government of India program, uses technology to provide high-quality education to everyone, especially the underprivileged. By providing learning materials to students who would not have access to traditional education because of socioeconomic or geographic constraints, it aims to close the digital divide. Affordability and accessibility: SWAYAM courses are free and provide a large audience with excellent educational materials. For many students, this removes the financial barrier to study. Hybrid Learning Models: SWAYAM facilitates blended learning models, which combine online and offline teaching techniques to improve classroom instruction and provide students more flexibility. The platform has a four-quadrant strategy, which includes discussion boards, self-assessment examinations, downloaded reading materials, and video lectures.
- **e-Pathshala:** Digital textbooks: pupils with visual impairments can use screen readers or other assistive technology to access the digital textbooks that e-Pathshala offers for courses 1–12. Audio and video resources: children with visual impairments may find e-Pathshala's audio and video resources, such as audio-books and video lectures, useful. HTML, CSS, SVG, and other resources for distribution in a single file container (<http://www.w3.org>) are examples of accessible formats in which e-Pathshala materials are available. DAISY (Digital Accessible Information System) and EPUB3 define a distribution and interchange format for digital publications and documents.

1.2. Online Education in India – Driving Inclusive Learning in a Digital Era

India's digital education revolution is not just about growth—it's about equity, access, and transformation. The visual of a map with digital nodes spreading from urban to rural areas symbolizes the democratization of learning.

Table 1

Growth and Reach of Online Education in India

Metric	Value	Interpretation
Market Size (2025)	\$7.57 Billion	The online education market is thriving, driven by mobile penetration, affordable data, and demand for flexible learning.
User Base (2029)	309.1 Million learners	A massive learner population is expected, reflecting deep digital adoption across age groups and geographies.
Mobile-Based Learning Boost	+45% Faster Completion	Mobile-first platforms are accelerating learning outcomes, especially among working professionals and rural learners.

Note ARPU (Average Revenue Per User) for 2025 is 2600 rupees

1.3. Segmented Learner Profiles

Online education is diversified by learner intent

- **University Degrees:** Platforms like SWAYAM and Coursera offer structured academic programs, often integrated with NEP 2020's flexible credit system.
- **Skill Development:** Providers such as Byju's and Unacademy focus on K–12, competitive exams, and foundational skills—popular among school and college students.
- **Career Certificates:** Platforms like Simplilearn and NIIT cater to professionals seeking upskilling in areas like data science, AI, and project management.

1.4. Digital Accessibility

India's online education is becoming more inclusive, thanks to policy and tech innovations:

- **Rural Inclusion:** Affordable smartphones and data plans have extended learning to Tier 2/3 towns and villages.
- **Assistive Technology:** Features like screen readers, subtitles, and sign language support (e.g., PM e-Vidya Channel 31) are helping learners with disabilities.
- **Policy Alignment:** Online education is strategically aligned with India's national goals: NEP 2020 emphasizes flexible, multidisciplinary, and tech-integrated learning; the **Digital India Mission** provides infrastructure and digital literacy; and the **RPWD Act (2016)** mandates inclusive education for persons with disabilities, requiring digital platforms to be accessible (Sections 40–46).

1.5. Key Takeaways

Inclusive Growth: Online education is expanding across socio-economic and geographic boundaries. **Learner-Centric Models:** Platforms are tailoring content to individual goals—academic, vocational, or professional. **Policy-Driven Innovation:** NEP 2020 and RPWD Act ensure that digital learning is not just scalable but also equitable. **Tech as Enabler:** Mobile, AI, and assistive tech are reshaping how India learns.

Table 2 SWOT Analysis Regarding Online Education in India

Strength	Weakness
Rapid growth of EduTech sector	Declining learning outcomes across grades
High mobile / internet penetration	Digital divide in a rural / low –income areas
Supportive policies (NEP 2020)	Lack of inclusive design / content
Personalized / self –pace learning potential	Gender & disability in participation
Opportunities	Threats
Expansion to underserved regions	Widening inequality without access equality
All adaptive tech for special needs	Poor regulation of EdTech platforms
Localized, multilingual content	Cultural resistance & low digital literacy
Public- private partnerships	Dropouts due to lack of engagement/ support

II. Review of Literature

The literature review synthesizes perspectives on online learning and students with disabilities, highlighting both potential and persistent challenges.

- **Burdette, Greer, and Woods (2013)** examined K-12 online learning and students with disabilities, stressing the need for a free, suitable public education in the least restrictive setting amidst the fast growth of online learning.
- **Seale (2013)** reported on e-learning and disability in higher education, assessing accessibility research and practice and critiquing the extent to which "best" practices can be confidently identified and disseminated.
- **Catalano (2014)** studied students' experiences with an online library research course, modified to be accessible, to improve distance education for students with special needs.
- **Bjekić et al. (2014)** conducted a study on the e-teacher in inclusive e-education for students with specific learning disabilities, highlighting the important roles of online education and e-teaching in educational technology.
- **Hashey and Stahl (2014)** examined "Making online learning accessible for students with disabilities," emphasizing the critical role of the teacher in making decisions about accessible online

instructional resources.

- **Basham et al. (2015)** studied "Equity matters: Digital and online education for pupils with disabilities," presenting preliminary understandings on emerging trends, outcomes, challenges, and promising practices.
- **Lambert (2020)** conducted a systematic review on MOOCs (2014–2018), concluding that the initial hope that MOOCs would make education fairer faded in light of research showing they favored the already educated and relatively advantaged.
- **Cheng and Lai (2020)** reviewed technology-supported special education studies, noting that technology-supported tools have been adopted to enhance disabled students' adaptability and learning achievement.
- **Young and Donovan (2020)** examined the challenges for students, families, and teachers when shifting special needs students to online learning during the COVID-19 pandemic, predicting a larger role for digital learning post-pandemic.
- **Singh (2024)** investigated the variables influencing online education in Varanasi, India, highlighting the rapid shift catalyzed by the COVID-19 pandemic, which revealed both advantages (flexibility) and challenges (socioeconomic divide).
- **Raval and Vyas (2025)** examined the role of online learning platforms in promoting inclusive education in Gujarat, focusing on challenges like limited internet access and device shortages under NEP 2020, and recommending improvements in digital infrastructure.

III. Significance of the Study

The current study examines how online learning modalities contribute to the advancement of inclusive pedagogical practices in the Indian educational system, thus holding vital importance. The implications are numerous:

- **Progress in Educational Fairness:** This study clarifies how digital platforms reduce structural and socioeconomic obstacles, granting students in geographically isolated and resource-constrained settings fair access to educational materials.
- **Integrating Inclusive Education:** The study emphasizes how online learning may operationalize inclusive frameworks, including **Universal Design for Learning (UDL)** by embracing diverse learner profiles.
- **Implications for Policy and Institutions:** Systemic inclusion is reinforced by the empirical foundation provided by the research findings, which help educational policymakers and institutional stakeholders develop evidence-based strategies that support national directives like the **Rights of Persons with Disabilities Act (RPWD)** and the **National Education Policy (NEP) 2020**.
- **The Mediation of Learning by Technology:** Through the use of digital resources, such as assistive technology and adaptive learning systems, the project advances academic knowledge on how to improve learner engagement and tailor instruction, especially for students who need differentiated help.
- **Adding to the Academic Canon:** This study contributes to the body of knowledge by placing online learning within the larger framework of inclusive education. It also lays the groundwork for further research into the relationship between pedagogy, technology, and social justice in education.
- **Relevance and Impact:** Since online learning has become more popular due to the COVID-19 epidemic, it is imperative to look into how online education might support inclusive education. By concentrating on India, the study guarantees that its conclusions will be applicable to the Indian setting, tackling the particular difficulties and possibilities related to advancing inclusive education there.

IV. Statement of the Problem

Online Education as a Crucial Facilitator of Inclusive Learning in India

V. Operational Definition

Online Education

Online education is a delivery of educational courses through digital platforms, typically via the internet. It also known as a e-learning. In this study, online education means that support the students with disabilities specially for visually impairment and hearing impairment to give access in enhancing their learning.

Inclusive Education

Inclusive education is when all students, regardless of their aptitude, they are categorized by age appropriate general education classes in schools in their own neighborhood to receive high- quality instruction, interventions, and support that enable them to be successful in the classroom. In this study, inclusive education means that accommodate the students with visually impairment and students with hearing impairments through many software like JAWS, SAFA and DAISY PLAYER etc to remove obstacles and provide quality education.

VI. Findings

The exploration of online education in India reveals its significant potential as a catalyst for inclusive education, particularly in a country marked by diverse socio-economic backgrounds and learning needs. The current status of online education highlights a growing infrastructure, with increasing internet penetration and the proliferation of digital devices, facilitating access for a broader range of learners. This shift has the capacity to bridge educational gaps, particularly for marginalized communities who have historically faced barriers to quality education.

However, the journey toward truly inclusive online education is fraught with challenges. The **digital divide** remains a critical issue, as many students still lack reliable access to the internet and digital tools. Furthermore, there is frequently a deficiency of training for educators in effectively utilizing online platforms, which can hinder the delivery of inclusive education. Moreover, content accessibility for students with disabilities and language barriers continues to be a significant concern that needs addressing. Despite these challenges, there are substantial opportunities to innovate and expand online educational offerings. By focusing on developing adaptable and flexible online learning environments, educators and policymakers can create systems that cater to diverse learning needs. The rise of **blended learning models**, which combine online and offline methods, presents a promising avenue for increasing accessibility and engagement.

To promote online inclusive education effectively, several strategies and best practices can be employed. Integrating assistive technologies can enhance the learning experience for students with disabilities, ensuring that educational content is accessible to everyone. Fostering community partnerships can also play a vital part in bridging gaps; local organizations can provide resources and support to learners who may struggle with online education. Furthermore, implementing robust training programs for educators on inclusive pedagogies and technology use is crucial in equipping them to accommodate their pupils' various demands.

Successful initiatives from various regions demonstrate the efficiency of **learner-centered approaches**, where the focus is on adapting the curriculum to fit the kids' unique demands as opposed to the other way around. Continuous feedback mechanisms, which allow for real-time adjustments based on learner experiences, can further enhance the caliber of online education.

VII. Discussion

The importance of inclusive education cannot be overstated. Inclusive education recognizes the diversity of learners and strives to create a supportive learning environment that values and caters to the unique needs of all students (UNESCO, 2020). However, despite the Indian government's efforts to promote inclusive education, significant challenges persist. Online education has emerged as a potential solution to address these challenges. The COVID-19 pandemic has accelerated the adoption of online learning, and India has witnessed a significant surge in online education initiatives (MHRD, 2020). However, the effectiveness of online education in promoting inclusive education in India remains understudied. Ultimately, this research aims to contribute to the growing body of literature on online education and inclusive education, providing insights that can inform the development of effective online inclusive education initiatives in India.

VIII. Challenges

- **Challenges with ASR:** Accurate syntax and punctuation, the ability to recognize and modify many speakers, technical terminology, jargon or proper nouns, homonym distinction, background noises, and environment sounds. It influences how well pupils learn.
- **Legal Framework and Institutional Accountability:** Sections 504 and 508 of the Rehabilitation Act and the American with Disabilities Act (Title ii & iii) provide the legal framework. Colleges and universities must make sure that all media, including films uploaded on their website or social media accounts, extra or required coursework, and other resources like those offered by the campus library, are accessible to deaf people. For efficient correspondence, Institutional accountability is required.
- **System-wide Protocols.** Create standardized procedures for using software and platforms for education. Create a process for producing products that are easily accessible. Establish a mechanism for continuous feedback loops and communication.
- **Staff and Faculty Training.** Raise knowledge of accessibility policies and duties, identify campus experts, give frequent training opportunities, offer troubleshooting advice, communicate often about methods to improve accessibility, and fortify partnerships amongst departments, agencies, and the community.

IX. Conclusion

In conclusion, by leveraging the strengths of online education and proactively addressing its challenges, India can pave the way for a more equitable educational landscape. This approach not only benefits diverse learners but also strengthens the fabric of society by promoting inclusivity and equal opportunities for all. The journey towards inclusive online education is not just a goal; it is a vital necessity for fostering a more just and informed citizenry.

Online education emerges as a vital force in bolstering inclusive education in India, offering unprecedented opportunities for diverse learners to access quality resources and personalized learning experiences. By bridging geographical and socio-economic gaps, it empowers students from marginalized communities to participate actively in their education. Moreover, the flexibility of online platforms accommodates various learning styles and paces, making education more accessible to individuals with disabilities. As we continue to harness technology's potential, it is imperative to ensure that online education is designed with inclusivity at its core, fostering an environment where every learner, regardless of their background or ability, can thrive and succeed. This commitment will not only enhance educational outcomes but also contribute to a more equitable society, where education serves as a powerful tool for empowerment and social change.

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