



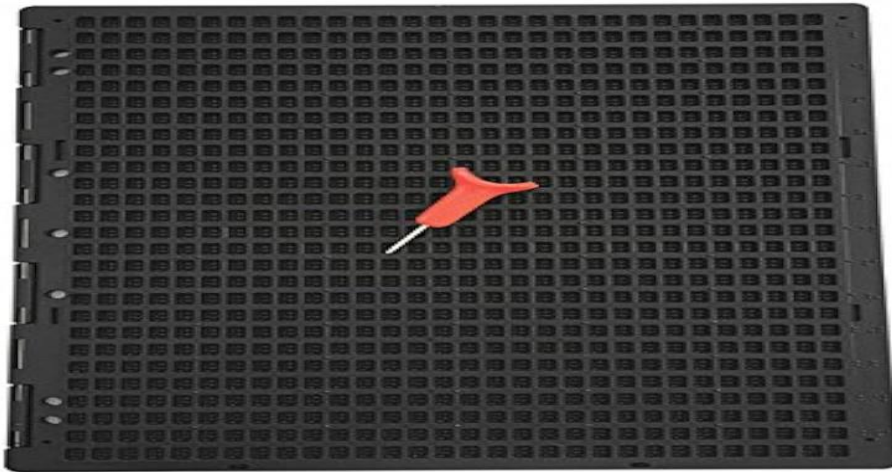
# Low Braille Literacy and Why Braille Uptake Remains Poor in India: Challenges of Cost, Teacher Shortage, and Digital Substitution

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**Abstract** - Braille, developed by Louis Braille in the 19th century, remains vital for literacy and independence among individuals who are blind or people with visual disabilities. Yet, literacy in Braille rates in India continues to decline despite inclusive education policies and technological progress. This study examines the key factors behind the low adoption of Braille, focusing on economic barriers, a shortage of trained educators, and growing reliance on digital and audio-based tools. Analysis of government reports, academic research, and NGO data reveals that high costs of Braille materials, limited funding, and significant urban–rural disparities hinder accessibility. The lack of certified Braille instructors further affects the quality and consistency of instruction. Moreover, while digital technologies enhance accessibility, they have unintentionally diminished tactile reading skills, leading to reduced Braille proficiency. The paper advocates for a dual-literacy approach that integrates Braille with digital tools to promote both cognitive and linguistic development. It recommends expanding teacher training programs, improving Braille infrastructure, and ensuring equitable access to learning resources. Strengthening literacy in Braille is essential for inclusive education, skill development, and sustainable workforce participation of persons with visual impairments in India.

**Keywords:** literacy in Braille, visual impairment, assistive technology, inclusive education, disability policy, India.



## I. Introduction

### Background

Braille, a tactile writing system of raised dots representing letters and symbols, enables individuals with visual impairments to read, write, and communicate effectively through touch. It plays a vital role in fostering independence, critical thinking, and participation in education and employment. In India, however, literacy in Braille remains a challenge despite policy commitments to inclusive education. The country's people with visual disabilities population, estimated at 4.95 million (Census of India, 2011), continues to experience a wide literacy gap. Legislations such as the Right to Education Act (2009) and the Rights of Persons with Disabilities Act (2016) emphasize inclusive education and equitable learning opportunities. Yet, their implementation has been inconsistent, particularly in rural and under-resourced areas. Historically, Braille was the cornerstone of education in schools for the blind, and the establishment of India's first Braille press in 1951 marked a milestone in accessible learning. However, the past two decades have witnessed a



noticeable decline in literacy in Braille rates. This decline is primarily due to limited financial resources, inadequate teacher training, poor infrastructure, and a growing dependence on assistive technologies like screen readers and audiobooks.

### The Changing Educational Landscape

The rapid digitalization of education has transformed how students with visual impairments access information. Increasingly, learners depend on audio-based digital tools—smartphones, screen readers, and computer software—to study and communicate. While these tools promote convenience and autonomy, they fail to replicate the tactile and linguistic benefits that Braille provides. literacy in Braille builds essential spelling, grammar, and comprehension skills that are not equally developed through auditory learning. The shift toward audio learning risks creating a generation of “listeners” rather than “readers and writers.” This overreliance on digital audio tools, though beneficial for accessibility, can undermine tactile literacy, reduce language proficiency, and limit opportunities for academic and professional advancement. Thus, the challenge is not technology itself but its substitution of Braille rather than integration with it.



### Problem Statement

Despite the introduction of several national initiatives—such as Samagra Shiksha Abhiyan, ADIP (Assistance to Disabled Persons), and the Accessible India Campaign—literacy in Braille in India remains low. The reasons are multifaceted: Economic constraints, which restrict access to Braille materials and devices. Shortage of trained teachers, who can effectively teach Braille alongside modern assistive technology. Technological overdependence, which reduces tactile learning opportunities. These challenges highlight a broader concern: while policy frameworks endorse inclusivity, their implementation is hindered by inadequate funding, poor monitoring, and limited institutional support. Hence, the present analysis seeks to explore: Why has literacy in Braille declined in India, and what socio-economic, technological, and policy factors have contributed to its limited uptake?





### Objectives of the Study

The present research aims to investigate the underlying causes of declining literacy in Braille and identify sustainable strategies for its revival. The specific objectives are: To analyze key barriers—economic, educational, and technological—that influence literacy in Braille in India. To examine the impact of teacher shortages and digital substitution on learning outcomes and literacy levels among people with visual disabilities students. To propose a dual-literacy model that integrates Braille and digital learning tools, ensuring that both tactile and technological literacy coexist. To assess the implications for human resource development and inclusive employment, emphasizing the role of Braille in fostering self-reliance and equal participation in the workforce.

### Scope of the Study

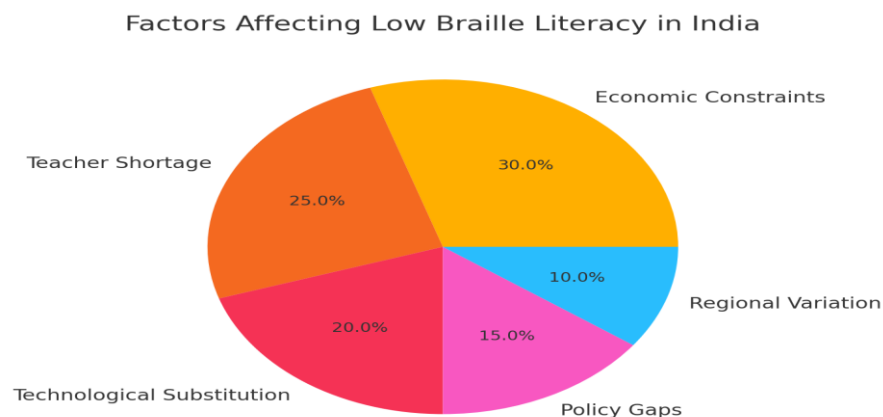
This study focuses on understanding the factors contributing to low literacy in Braille in India. Subject/Theme: Education and Human Resource Development for Persons with Disabilities Organization/Industry: Educational institutions and NGOs serving people with visual disabilities learners Unit/Department: Schools for the Blind and Inclusive Education Departments Geographical Area: Selected states across India, including Kerala, Maharashtra, and Uttar Pradesh Period of the Study: 2019–2024 (covering recent trends and policy implementation)

### Limitations of the Study

The study relies primarily on secondary data, limiting direct interaction with people with visual disabilities learners and educators. Availability of updated state-wise literacy in Braille data is limited, leading to potential variations in interpretation. Technological impact assessment is descriptive rather than quantitative due to the absence of uniform national statistics.

### Analysis of Secondary

Data The study's findings indicate that five primary factors contribute to low literacy in Braille levels in India. Economic constraints are the most significant (30%), followed by teacher shortages (25%) and technological substitution (20%). Policy and administrative gaps account for 15%, while regional disparities make up 10%. The graphical analysis (pie chart) highlights that economic and teacher-related factors together represent over half the challenge, emphasizing the need for targeted funding and capacity building in teacher training programs.



### Relevance of the Study

This study is highly relevant to the Human Resource Management (HRM) discipline because literacy is the foundation of employability, skill development, and self-reliance. For people with visual disabilities persons,



Braille proficiency directly impacts their ability to engage with academic and professional environments. Inadequate literacy not only affects personal empowerment but also restricts access to formal employment opportunities, skill certification, and higher education. Within an HRD framework, inclusive education and skill training for persons with disabilities are vital to achieving Sustainable Development Goals (SDG 4 – Quality Education) and SDG 8 – Decent Work and Economic Growth. The paper thus extends beyond education—it addresses HRM concerns of diversity, inclusion, and equitable opportunity, reinforcing the idea that accessible learning environments are prerequisites for inclusive workforce participation.

## II. Literature Review

### Global Trends in Braille Literacy

Over the last few decades, global literacy in Braille has witnessed a sharp decline. In developed countries, fewer than 10% of blind students in the United States now read Braille, compared to nearly 50% in the 1960s (Rex, Koenig & Wormsley, 2020). Scholars attribute this drop to mainstreaming policies, the increasing use of assistive technologies, and reduced emphasis on tactile learning. According to UNESCO (2022), tactile literacy plays a vital role in strengthening spelling, syntax, and comprehension skills—areas often underdeveloped among students who rely exclusively on audio-based learning. This global trend underscores the need to balance technological access with traditional Braille instruction to preserve foundational literacy skills.

### Braille in the Indian Context

India's efforts toward inclusive education began in the 1950s with the establishment of specialized institutions and Braille printing presses. Key organizations like the National Institute for the Empowerment of Persons with Visual Disabilities (NIEPVD, Dehradun) and the National Association for the Blind (NAB) have played significant roles in promoting Braille education. However, studies indicate a decline in Braille usage among younger generations. Sharma and Sinha (2019) found that only 30–35% of students in special schools demonstrate proficiency in Braille, with many depending primarily on oral or auditory instruction. Despite policy-level commitments, accessibility and resource challenges have limited the widespread adoption of literacy in Braille across both urban and rural India.

### Economic Barriers

Economic constraints significantly hinder literacy in Braille development. The cost of essential Braille technology—such as embossers, typewriters, and refreshable Braille displays—ranges between ₹1.5 to ₹3 lakh, making them unaffordable for many schools and institutions. Although the Government's ADIP (Assistance to Disabled Persons for Purchase/Fitting of Aids and Appliances) Scheme provides financial support, its reach remains limited due to inconsistent funding and administrative delays. Many government-aided schools still rely on outdated Braille equipment, and NGOs struggle to meet demand due to high production costs of embossed materials. Consequently, students in under-resourced regions face prolonged waits for textbooks or learning materials, which directly affects literacy outcomes.

### Teacher Shortage

A major bottleneck in Braille education in India is the acute shortage of trained instructors. The Rehabilitation Council of India (RCI, 2021) reports that fewer than 3,000 certified Braille teachers are currently active nationwide. In many inclusive schools, general educators—without specialized training in visual impairment—are assigned to teach Braille learners, often without sufficient pedagogical tools or understanding of tactile literacy. Rural and semi-urban schools are particularly affected, as resource teachers are scarce and workload distribution is uneven. The absence of systematic teacher training and professional development results in inconsistent instruction quality, further discouraging students from learning Braille effectively.

### Technological Substitution and Cognitive Impact



The increasing availability of assistive technologies such as screen readers (JAWS, NVDA) and smartphone-based accessibility tools (VoiceOver, TalkBack) has provided people with visual disabilities learners with unprecedented independence. However, scholars like Ghosh (2023) and Patel (2020) caution against excessive reliance on auditory learning. While these tools enhance access to information, they cannot replicate the tactile and linguistic depth that Braille offers. Research shows that Braille reading develops fine motor coordination, spatial awareness, and cognitive processing skills related to syntax and spelling—abilities that purely auditory learning often fails to cultivate. Exclusive dependence on technology may thus create a generation of people with visual disabilities learners with functional literacy but limited reading and writing proficiency.

### **Policy and Implementation Gaps**

India's legislative framework strongly supports inclusive education for persons with disabilities. The Rights of Persons with Disabilities Act (RPwD, 2016) and the National Education Policy (NEP, 2020) both emphasize equitable access to educational resources. However, implementation remains fragmented. Kumar (2022) notes that inclusive education initiatives often suffer from inadequate funding, weak monitoring, and lack of interdepartmental coordination. Many states fail to enforce accessibility norms in classrooms or provide sufficient Braille materials to students. Disparities across regions are evident—states like Kerala and Tamil Nadu demonstrate stronger outcomes due to consistent teacher training programs and active collaboration with NGOs, whereas northern states lag behind. Moreover, data gaps on literacy in Braille rates and the absence of standardized assessment mechanisms make policy evaluation difficult.

### **Emerging Challenges and Opportunities**

Beyond traditional barriers, emerging challenges—such as curriculum design, language diversity, and digital exclusion—further complicate literacy in Braille. India's multilingual education system requires the production of Braille materials in multiple regional languages, increasing cost and production time. However, there are promising initiatives that integrate technology with tactile learning. Hybrid approaches, such as Braille e-books and low-cost refreshable displays, have begun to bridge access gaps. Collaborative projects between the private sector, government, and NGOs have shown success in pilot programs, suggesting that sustainable partnerships could revitalize literacy in Braille if scaled effectively.

### **Synthesis and Research Gap**

Across literature, consensus exists that Braille remains indispensable for comprehensive literacy among people with visual disabilities learners. Yet, economic, pedagogical, and systemic factors continue to undermine its spread. While assistive technologies enhance inclusion, they cannot replace the linguistic and cognitive benefits of tactile reading. The gap lies not in the absence of policy but in its execution—particularly in teacher preparation, funding, and localized material development. Existing studies primarily focus on either technological accessibility or institutional shortcomings, leaving limited exploration of how these factors interact in everyday classroom contexts. Therefore, the present analysis aims to bridge that gap by examining the intertwined economic, pedagogical, and policy-related challenges shaping literacy in Braille in India today.

### **Research Methodology**

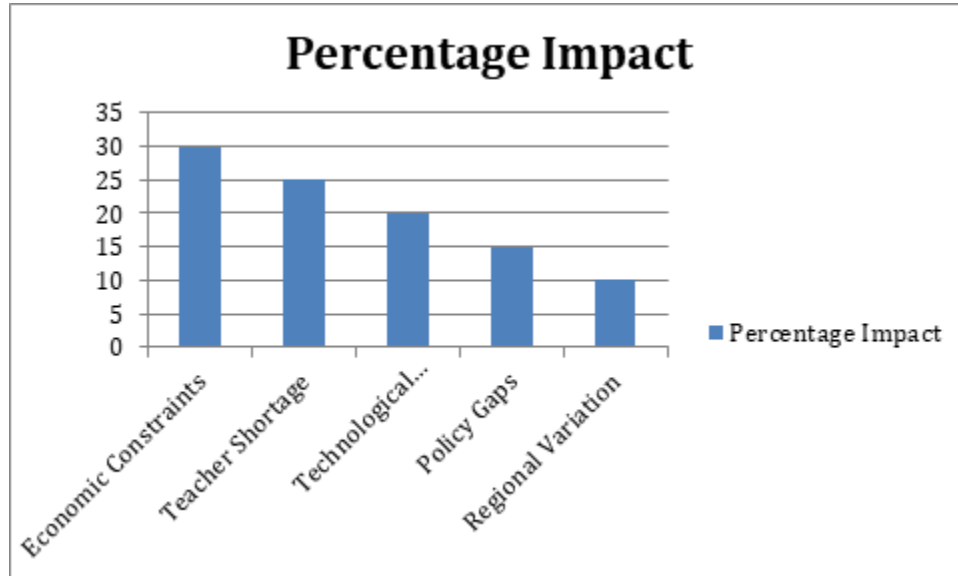
This paper adopts a qualitative, descriptive, and interpretive approach using secondary data analysis.

### **Data Sources**

Government reports: NIEPVD Annual Reports (2021), MHRD (2021), and WHO Vision Report (2023) NGO documentation: CBM, Sense India, Blind People's Association Academic journals: Indian Journal of Special Education, Journal of Disability Studies International references: UNESCO and WHO datasets



## Analysis



### Analytical Framework

The study used thematic analysis to identify recurring patterns related to:

- Economic accessibility
- Teacher availability
- Technological influence
- Policy implementation

Themes were coded and cross-referenced for reliability. Ethical accuracy was maintained by citing credible data and avoiding personal identifiers.

### Findings Economic

#### Constraints:

- Majority of special schools operate on tight budgets, prioritizing basic infrastructure over assistive devices.
- Manual Braille slates and styluses remain common, while refreshable Braille displays are rare due to high costs.
- Rural areas depend heavily on NGOs for material supply.

#### Shortage of Qualified Teachers:

- Only one Braille instructor per 50–60 students in most special schools.
- Teacher training institutions are concentrated in urban states such as Delhi, Maharashtra, and Tamil Nadu.
- Limited refresher training opportunities affect teaching quality.

#### Technological Influence:

- Students increasingly use smartphones for study, preferring convenience over tactile learning.
- Teachers, often untrained in digital-Braille integration, reinforce this substitution.
- Consequently, students exhibit poor spelling and limited written expression.



#### **Policy and Administrative Gaps:**

- Implementation of inclusive education guidelines under Samagra Shiksha Abhiyan is uneven.
- Monitoring of literacy outcomes for people with visual disabilities learners is absent in most state reports.
- Funding delays cause discontinuity in Braille material supply.

#### **Regional Variations:**

- Kerala, Tamil Nadu, and Maharashtra demonstrate higher literacy in Braille due to proactive local governance and teacher training.
- Bihar, Jharkhand, and Uttar Pradesh lag behind due to weak institutional infrastructure.

### **III. Discussion**

#### **Interlink ages of Barriers**

The findings reveal that cost, teacher shortages, and technological substitution are not isolated—they reinforce one another. Without trained teachers, schools underutilize existing devices; without devices, teachers lose motivation to teach Braille.

#### **Technology as a Complement, Not Replacement**

Digital tools expand access but must complement, not replace, tactile literacy. Dual-literacy approaches—teaching Braille alongside digital skills—can enhance comprehension and employability.

#### **Human Resource Development Perspective**

- From an HRD standpoint, literacy directly affects employability and inclusion. Braille proficiency builds foundational communication and analytical abilities. Inclusive HR practices—such as accessibility audits, workplace adaptations, and Braille-based training modules—help integrate people with visual disabilities individuals into formal employment.

#### **Role of NGOs and Public–Private Collaboration**

NGOs like CBM, Sense International, and VIDYA demonstrate effective models by combining resource support with teacher training. Public–private partnerships could replicate these successes at scale.

#### **Case Implications for HRM**

- literacy in Braille is not merely an educational issue—it’s a human resource and workforce development concern. HR managers and educators must recognize that literacy determines employability. Organizations can foster inclusion by:
  - Providing Braille-enabled systems and accessible workplaces.
  - Offering training programs for people with visual disabilities employees using dual-literacy approaches.
  - Embedding diversity and inclusion metrics in HR performance indicators.
  - Supporting corporate social responsibility (CSR) initiatives for Braille education.
- By linking education and employment through inclusive HR strategies, India can unlock the potential of millions of people with visual disabilities citizens, contributing to both social equity and economic productivity.

### **References (APA 7th Edition)**



1. Ghosh, A. (2023). Digital accessibility and its impact on Braille education in India. *Journal of Disability Studies*, 11(2), 55–70.
2. Kumar, P. (2022). Assistive technology and education for the people with visual disabilities in India. NIEPVD Publication.
3. Patel, S. (2020). Teacher preparedness in inclusive classrooms: Challenges and solutions. *Indian Journal of Special Education*, 8(3), 32–48.
4. Rex, E., Koenig, A., & Wormsley, D. (2020). Trends in literacy in Braille: A global perspective. *Journal of Visual Impairment & Blindness*, 114(5), 411–425.
5. UNESCO. (2022). *Education and disability: Inclusive strategies for the 21st century*. Paris: UNESCO.
6. World Health Organization. (2023). *World Report on Vision*. Geneva: WHO.