eISBN: 978-81-686924-4-2

CHAPTER -22
Digital strategies for multilingual education in India: A systematic review

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https://doi.org/10.66483/jsp.2026.001.ch22

ABSTRACT

India has 22 languages in its constitution, as well as numerous regional and tribal languages. It is one of the most linguistically diverse countries in the world. Research shows that learning using mother tongue improves basic understanding, literacy, and confidence. The National Education Policy 2020 strongly encourages the to use multilingual and mother-tongue-based education up to class 5, enabling students to learn more effectively and develop their understanding. At the same time, quick progress in educational technology, like digital learning platforms, artificial intelligence, machine translation tools and open educational resources, has made it possible to support multilingual education on a large scale through digital platforms DIKSHA, SWAYAM, BHASHINI and Regional language digital content platforms, etc.

The objective of this systematic literature review is to investigate the use of digital technologies in supporting multilingual education. Specifically, it aims to identify key digital platforms and tools used in multilingual classrooms, understand the teaching approaches and policies, examine the learning outcomes and challenges reported in existing studies and identify research gaps to suggest future directions for technology-enabled multilingual education.

In this study, a Systematic review is conducted using the PRISMA principles. For this, research articles published between 2017 to 2026 were collected from the ERIC database. The studies were selected using clear inclusion and exclusion criteria, with a focus on multilingual education and the use of technology. The selected studies were then analyzed thematically to find common themes, results and challenges.

The review shows that technology helps to increase access to learning materials in different languages through digital platforms. Students show better interest, understanding and basic reading abilities when they learn using digital resources in their mother tongue. It also helps teachers to access material in multiple languages. These results imply that technology has significant potential to promote multilingual education and enhance educational equity in India.

KEYWORDS: *Multilingual education; Educational technology; Mother-tongue based instruction; Systematic review*

1 Introduction

India is among the nations with the most linguistic and cultural diversity in the world. According to the Indian constitution, there are 22 official languages, although hundreds of regional, local and tribal languages are spoken throughout the country. Many children speak

different language at home and different languages at school. This language gap makes learning more difficult, particularly in the early years of schooling.

According to educational research, children learn better when they are taught in their mother tongue in the early stages. Children who learn in their native language are better able to comprehend concepts, improve their reading and writing abilities more quickly and feel more confident in the classroom (Cummins,2000). The New Education Policy (NEP) 2020 recognized this gap and recommended to use the mother tongue or regional language as the medium of instruction at least through grade 5 or beyond (NEP, 2020).

At the same time, India's digital technology has expanded rapidly over the past two decades. The proliferation of smartphones, digital learning platforms and internet connectivity has changed the teaching and learning process. Artificial intelligence-based language tools, educational apps, online learning platforms and free educational resources offer learning materials in multiple languages(UNESCO, 2022).

Government initiatives like DIKSHA, SWAYAM, and BHASHINI highlight the growing importance of digital strategies in supporting multilingual education in India (Zawacki-Richter et al., 2019). DIKSHA platform offers curriculum-based materials in several languages for educators and students. SWAYAM provides online courses for school and higher education students, whereas BHASHINI focuses on language translation and voice technology to make digital content available in Indian languages. Many states have also created digital content portals in regional languages to help local languages.

These technological advancements are significant for multilingual education because they help to minimise language barriers , provide access to excellent learning materials and promote inclusive education. Because of this, students can learn at their own speed and in their preferred language using digital materials. Students also face different challenges when they use digital platforms in different languages.

In this context, it is important to conduct a through evaluation of existing research to better understand how digital technologies are being utilised to enhance multilingual education in india, what benefits they provide and what problems they faces. This article provides a systematic review of digital techniques for multilingual education in india. It is intended to provide a clear overview of present practices, benefits, obstacles and future directions.

2 Objective of the study

The aim of this systematic review is:

1. To identify the primary digital platforms and technological tools that promote multilingual education in India.

2. To identify teaching strategies and policy efforts of governments at various levels related to technology-enabled multilingual education in India.

3. To find out challenges faced in implementing digital platforms in multilingual education and provide solution for it.

3 Methodology

The PRISMA criteria (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) are followed in this study. This helped us to keep our research systematic and transparent, so our methods are open and easy to understand.

3.1 Data Sources

Research articles were collected from the ERIC database. These sources were chosen because they provide access to a diverse range of peer reviewed educational studies.

3.2 Inclusion and Exclusion Criteria

To select studies that are appropriate for this systematic review, clear inclusion and exclusion criteria were followed. These criteria contributed to the inclusion of only appropriate, high-quality and relevant research articles.

Criteria for Inclusion

Studies were considered for the review if they matched all of the following criteria:

- The study was must be peer-reviewed and full-text research article.
- It must be published between 2017 to 2026.
- It focus on digital strategies, digital technologies or digital platforms or digital platforms used in multilingual education or mother-tongue-based education.
- The study must be conducted in India.

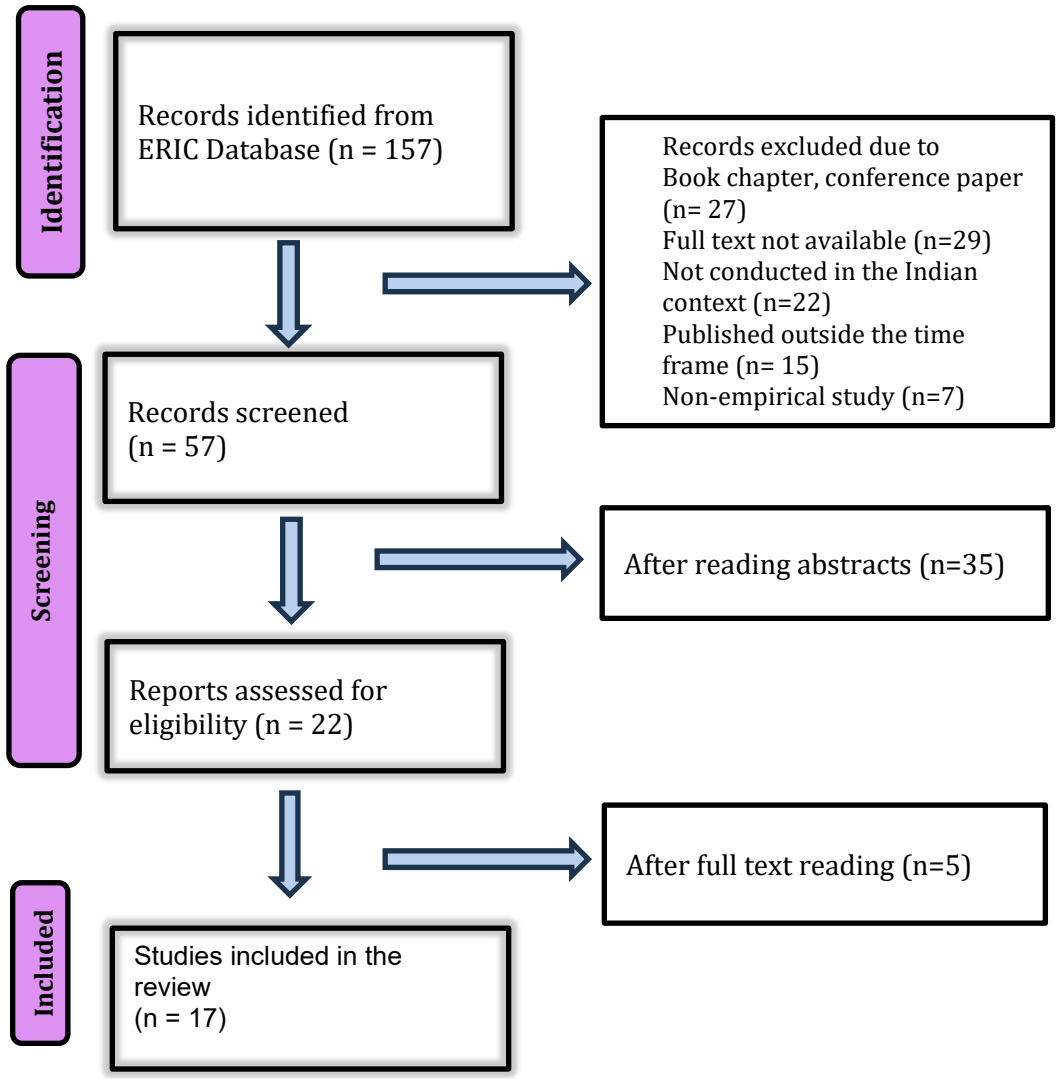
Criteria for Exclusion

Studies were excluded if they didn't focus on multilingual education using digital technology and didn't conduct in Indian context. Articles without full length were also excluded.

3.3 Data Analysis

Thematic analysis was used to evaluate the selected studies. Common themes related to digital technologies, educational methods, learning objectives, difficulties and policy assistance were found and organised.

eISBN: 978-81-686924-4-2



(Fig-3.1 PRISMA flow Diagram) (Page et al., 2021)

4 Findings

Objective 1: To identify the primary digital platforms and technologies that promote multilingual education in India.

According to the previous studies, a variety of digital platforms and technologies are being employed in India to facilitate multilingual education. DIKSHA, SWAYAM, BHASHINI and Bharat Vani are government-supported platforms that provide resources in a variety of Indian languages (Saxena & Kaur, 2025). These platforms help to bring regional, tribal and minority languages into digital educational settings that were previously dominated by English and other major languages (Agarwal & Sengupta, 2019).

AI–powered language technologies are increasingly being employed to help people learn and preserve languages. Studies on Indigenous, Tribal and Minority language efforts reveal that AI and machine learning methods are utilised to create new possibilities for marginalised languages by making them visible in technical and educational contexts. Mobile apps like Busuu and ELSA speak provide individualised and interactive language-learning experiences, especially for academic and professional communication (Divya et al., 2024).

Furthermore, digital archiving projects such as Bharatvani, ELAR, Living Tongues, SiDHELA, and Digital Himalayas play critical roles in preservation of endangered and lesser-known Indian languages. Overall, the findings indicate that digital technologies are being used not only for classroom education, but also for language preservation and revitalisation.

Objective 2:- To identify teaching strategies and policy efforts of governments at various levels related to technology-enabled multilingual education in India.

The study shows that technology-supported and blended teaching methods are commonly used in multilingual education settings. Digital storytelling, online platforms, mobile apps and AI-powered tools are employed in addition to traditional educational techniques (Roy & Bhavani, 2025). Digital storytelling studies suggest that this strategy boosts student involvement, motivation and understanding compared to traditional classroom instruction.

In terms of policy, the National Education Policy (NEP) 2020 is regarded as a revolutionary program that values India's linguistic variety and seeks to foster equity and inclusion in education. It actively advocates for multilingual education and mother-tongue-based instruction. However, the literature also identifies a gap between policy and practice, particularly in school education, due to infrastructure constraints, teacher readiness issues, and a social preference for English-medium instruction.

Overall, the findings indicate that technology-supported teaching approaches are effective in multilingual education, but their effectiveness is dependent on sufficient teacher preparation, institutional support, and the availability of high-quality digital content in all languages. Policies such as NEP 2020 provide clear direction, but successful implementation is required to translate policy objectives into real classroom practices.

Objective 3:- To find out challenges faced in implementing digital platforms in multilingual education and provide solution for it.

The evaluated studies clearly show that digital multilingualism improves learning outcomes. When students learn using digital tools in their regional languages, their interest and motivation increases. They learn more effectively and enhance their listening, speaking, reading and writing abilities. In comparison to traditional teaching methods, digital methods such as digital storytelling method help students to better understand concepts and demonstrate more consistent learning(Roy & Bhavani, 2025). These methods make learning more interesting and meaningful for pupils.

Similarly, studies on Education 4.0 technologies, such as Busuu and ELSA Speak demonstrate that students can enhance their communication skills, particularly for academic and professional purposes (Sri Dhivya et al.,2024). These tools help students to develop confidence and prepare for global and workplace communication.

Challenges: -

The studies highlight a number of problems and challenges faced by teachers and students in achieving favourable learning outcomes. A significant issue is the digital divide. Many

students, particularly in rural and tribal communities, do not have access to digital gadgets and stable internet connections. Another difficulty is the scarcity of high-quality digital content in all Indian languages, especially in tribal and lesser-known languages (Singh, 2023). Additionally, a lot of teachers and educators are not properly trained to use digital technologies in multilingual classrooms.

Other challenges for digital archiving programs include data management issues, ethical concerns, poor community participation and long-term preservation issues (Gupta, 2024). These studies emphasise that technology alone cannot address these difficulties. To achieve success in digital multilingual education, social, community and institutional support are required.

Additionally, the study identifies significant research gaps in the existing literature. Empirical research on tribal and minority languages is extremely rare, particularly in educational settings. Many previous studies are short-term or based on learners' views, and there is a scarcity of long-term studies that track learning results over time (Sri Dhivya et al., 2024; Mahapatra, 2020). Another significant gap is the insufficient testing of huge government digital platforms and AI-based language tools in real-world classroom settings. It is also a social and political process that includes inclusiveness, language hierarchies and power dynamics. Without resolving these concerns, the influence of digital tools will remain restricted.

Overall, the literature reveals that, while digital technologies provide significant prospects for multilingual education, their success is determined by how well they are integrated into pedagogy, policy, teacher training and community participation.

Recommendations:-

Based on analysis of learning outcomes, challenges, and research gaps, the following recommendations are proposed:

1 To minimise the digital divide, governments should provide better access to digital devices and better internet connectivity, particularly in rural areas, tribal and disadvantaged communities.

2 In regional, tribal, and minorities languages, more excellent digital learning resources and learning materials should be created.

3 Teachers should receive ongoing, hands-on, subject-specific multilingual content effectively in multilingual classrooms.

4 Local communities, parents, and language specialists should all play an active role in the creation and maintenance of digital content and tools in different languages.

5 Future research should concentrate on long-term learning outcomes, actual classroom practices and the impact of digital technologies across regions and languages.

6 Large-scale digital platforms and AI language tools should be thoroughly tested to determine their usefulness, inclusivity and limitations.

7 To achieve effective implementation, digital activities should be closely integrated according to NEP 2020 goals, instructional approaches and local language needs.

5 Conclusions

This systematic review investigated how digital technologies support multilingual education in India. The study focused on digital platforms and tools, instructional methods and policies, learning outcomes and obstacles.

First, the research demonstrates how digital platforms such as AI-based language tools, learning applications, online courses and digital archives contribute to the availability of learning resources in numerous Indian languages. These digital tools increase the visibility and accessibility of regional and tribal languages in education. Second, the findings show that multilingualism through technology-enabled teaching methods shows better results than traditional teaching methods. The NEP 2020 strongly encourages mother-tongue-based education, although its success is dependent on adequate teacher preparation and institutional support. Third, research demonstrates that kids learn better when they use digital resources in their native languages. Their motivation, knowledge, reading skills, and communication ability are also increased. However, the review reveals significant problems. These include unequal access to internet and digital devices facilities, insufficient teacher training, varying quality of digital information across languages and inadequate community involvement. These issues limit the effectiveness of digital multilingual education. In conclusion, digital technologies offer significant potential to improve multilingual education and promote equity in education. However, technology isn't sufficient. Success depends on supporting policies, well-trained teachers, high-quality multilingual content and strong community involvement.

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