Inclusive Pedagogy Impact of ISL Channel: A Survey

Neha Verma[1] & Dr. Priya Mishra[2]

[1]Research Scholar, Department of Education, Apex University, Jaipur, Rajasthan

[2]Assistant Professor, Department of Education, Apex University, Jaipur, Rajasthan

ABSTRACT

This study examined the impact of the Indian Sign Language (ISL) channel under PM eVidya initiative on inclusive pedagogy for hearing-impaired students in India. The research aimed to evaluate learning experiences, analyze effectiveness of digital inclusive pedagogy, and assess differences in learning outcomes among diverse demographic groups. A descriptive survey design was employed with 240 participants including 180 hearing-impaired students (Classes VI-XII) and 60 inclusive education teachers from 15 states across India. Data were collected through structured questionnaires and analyzed using descriptive statistics (mean, percentage) and inferential statistics (t-test). Key findings revealed that 78.3% of students reported improved learning experiences through ISL channel content, with a mean satisfaction score of 4.2 out of 5.0. Significant differences were found between urban and rural students' access patterns ($t=3.47$, $p<0.01$) and between trained and untrained teachers' implementation effectiveness ($t=4.23$, $p<0.001$). The study concluded that ISL channel significantly enhanced inclusive pedagogy by providing accessible content, improving student engagement, and supporting teacher instruction methods. However, infrastructure challenges, content gaps, and training needs remained significant barriers. The findings have important implications for expanding digital inclusive education initiatives and informing policy development under the National Education Policy 2020.
Keywords: Inclusive pedagogy, Indian Sign Language, PM eVidya, hearing impairment, digital education, accessibility

Neha Verma, Research Scholar, Department of Education, Apex University, Jaipur, Rajasthan

Dr. Priya Mishra, Assistant Professor, Department of Education, Apex University, Jaipur, Rajasthan

INTRODUCTION

Inclusive education in India, propelled by the *RPWD Act 2016* and *NEP 2020*, emphasizes equal educational access for all, including hearing-impaired students. With over 2.68 crore individuals having hearing disabilities (Census 2011), access to quality education remains a major challenge due to communication barriers and the limited use of sign language in mainstream classrooms.

The *PM eVidya* initiative, launched in 2020, aimed to ensure digital learning continuity during and beyond COVID-19. A major milestone was the introduction of *Channel 31* in December 2024, India's first dedicated *Indian Sign Language (ISL)* channel. This initiative provided subject-wise, grade-specific content interpreted in ISL, making education accessible for hearing-impaired learners.

This channel not only improved content accessibility but also introduced a transformative model of *digital inclusive pedagogy*. Traditional classrooms often excluded deaf learners; the ISL channel offered a platform for better comprehension, participation, and equity.

Despite its potential, the channel's real impact on learning outcomes, teacher strategies, and inclusive goals remained under-evaluated. There was a notable lack of research on sign language channels in the Indian educational context.

This study aimed to fill that gap by surveying the ISL channel's impact on student engagement, teacher perceptions, and academic outcomes across regions and demographics.

Inclusive pedagogy, as defined by Florian and Black-Hawkins (2011), promotes diversity without marginalization, using approaches like universal design, differentiated instruction, and adaptive strategies.

However, Indian studies (e.g., Sharma & Gupta, 2023) revealed only 34% of schools were equipped for hearing-impaired inclusion, highlighting the need for better training and infrastructure.

Technology-based learning showed promise: studies reported academic gains of 43–71% with digital tools, yet also cited barriers like cost and teacher readiness.

PM eVidya's ISL integration was positively received—78% of students showed comprehension gains (Singh & Kumar, 2024)—but long-term outcomes and quality metrics remain understudied. Recent trends like *Universal Design for Learning (UDL)* and *multimodal teaching* further support inclusive strategies, with studies showing significant gains in mathematical and language skills through multisensory and bilingual approaches.

Gaps in Existing Research

The literature review revealed several critical gaps:

- limited research on dedicated ISL broadcasting channels,
- insufficient focus on content quality and pedagogical design,
- lack of comprehensive outcome measurement frameworks,
- inadequate attention to regional and demographic variations, and
- Limited longitudinal impact assessment. These gaps justified the need for systematic evaluation of ISL channel impact on inclusive pedagogy.

OBJECTIVES OF THE STUDY

Based on the identified research gaps and the need for systematic evaluation of ISL channel effectiveness, this study aimed to achieve the following objectives:

Primary Objectives:

1. To evaluate the impact of ISL channel on learning experiences of students with hearing impairment across different educational levels (Classes VI-XII)
2. To examine the effectiveness of inclusive digital pedagogy implementation through ISL channel utilization in educational settings

Secondary Objectives:

- To analyze differences in learning outcomes, access patterns, and satisfaction levels across demographic variables (gender, location, grade level) using statistical measures.
- To identify implementation challenges, opportunities, and stakeholder perspectives regarding ISL channel-based inclusive education.
- To assess the alignment of ISL channel content with curriculum requirements and pedagogical standards

RESEARCH METHODOLOGY

RESEARCH DESIGN

This study used a descriptive survey design to explore the impact of the ISL (Indian Sign Language) channel on inclusive pedagogy. The approach enabled a detailed understanding of existing practices and outcomes without altering variables. Quantitative data were gathered from a large and diverse sample across India to allow statistical analysis and generalization.

The population included hearing-impaired students (Classes VI–XII) and inclusive education teachers. The final sample comprised 240 participants:

- **180 students**:
    - Class VI–VIII: 72 (40%)
    - Class IX–X: 63 (35%)
    - Class XI–XII: 45 (25%)
- **60 teachers** involved in inclusive or special education.

A **stratified random sampling** method ensured balanced representation across:

- **Regions**: 15 states from all parts of India
- **Location**: Urban (60%) and rural (40%)
- **Gender**: Male (48%), Female (52%)
- **School type**: Government (65%), Private (35%)

TOOLS AND TECHNIQUES

Primary Data Collection Tools:

1. **Student Experience Questionnaire (SEQ):** A structured 25-item questionnaire designed to assess student experiences with ISL channel content, including:
    - Content accessibility and comprehension (7 items)
    - Learning engagement and motivation (6 items)
    - Academic performance perception (5 items)
    - Technical access and usability (4 items)
    - Overall satisfaction (3 items)

2. **Teacher Implementation Assessment (TIA):** A 20-item questionnaire for teachers covering:
    - ISL channel utilization in classroom instruction (6 items)

- o   Pedagogical effectiveness perception (5 items)

- o   Training and support needs (4 items)

- o   Student response observation (3 items)

- o   Implementation challenges (2 items)

Response Scale: Both instruments used a 5-point Likert scale (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree).

DATA COLLECTION PROCEDURE

Data collection took place from January to April 2024 after receiving ethical clearance and informed consent. Collaborations were established with 45 inclusive schools across 15 states. Surveys were administered both online (65%) and offline (35%) with ISL interpreter support. Trained personnel ensured data quality and accurate communication.

Data Analysis

Data analysis was performed using SPSS v28.0, incorporating both descriptive (frequencies, means, SDs, cross-tabulations) and inferential statistics (t-test, ANOVA, correlation analysis, and effect size using Cohen's d). An alpha level of 0.05 was used to determine statistical significance.

RESULTS AND INTERPRETATION

Demographic Characteristics

The study sample comprised 240 participants with the following characteristics:

Table 1: Demographic Distribution of Participants

Characteristic	Students (n=180)	Teachers (n=60)	Total (n=240)
Gender			
Male	86 (47.8%)	22 (36.7%)	108 (45.0%)
Female	94 (52.2%)	38 (63.3%)	132 (55.0%)
Location			
Urban	108 (60.0%)	38 (63.3%)	146 (60.8%)
Rural	72 (40.0%)	22 (36.7%)	94 (39.2%)
Region			
North India	54 (30.0%)	18 (30.0%)	72 (30.0%)
South India	45 (25.0%)	15 (25.0%)	60 (25.0%)

West India	36 (20.0%)	12 (20.0%)	48 (20.0%)
East India	27 (15.0%)	9 (15.0%)	36 (15.0%)
Northeast India	18 (10.0%)	6 (10.0%)	24 (10.0%)

ISL Channel Access and Usage Patterns

Table 2: ISL Channel Access and Usage Statistics

Usage Indicator	Frequency	Percentage	Mean Score (1-5)	SD
Regular access (daily)	141	78.3%	4.2	0.8
Weekly access	28	15.6%	3.6	0.7
Occasional access	11	6.1%	2.8	1.2
Content Areas Used				
Mathematics	167	92.8%	4.4	0.6
Science	154	85.6%	4.1	0.7
Social Studies	142	78.9%	3.9	0.8
Languages	138	76.7%	3.8	0.9
Device Usage				
Television	145	80.6%	4.3	0.7
Mobile/Tablet	89	49.4%	3.7	1.0
Computer/Laptop	67	37.2%	3.5	1.1

Learning Experience Impact Assessment

Table 3: Student Learning Experience Mean Scores

Learning Dimension	Mean Score	SD	95% CI	Interpretation
Content Comprehension	4.18	0.72	[4.07, 4.29]	High
Learning Engagement	4.25	0.68	[4.15, 4.35]	High
Academic Performance	3.94	0.84	[3.82, 4.06]	Good
Technical Usability	3.87	0.91	[3.74, 4.00]	Good
Overall Satisfaction	4.32	0.65	[4.22, 4.42]	High
Composite Score	4.11	0.56	[4.03, 4.19]	High

Comparative Analysis by Demographics

Table 4: t-test Results for Demographic Comparisons

Comparison Groups	Group 1 Mean (SD)	Group 2 Mean (SD)	t-value	df	p-value	Effect Size (d)
Urban vs Rural Students						
Overall Satisfaction	4.45 (0.58)	4.12 (0.71)	3.47	178	0.001**	0.51
Content Access	4.38 (0.62)	3.94 (0.78)	4.23	178	<0.001***	0.63
Male vs Female Students						
Learning Engagement	4.18 (0.71)	4.31 (0.64)	-1.28	178	0.203	0.19
Academic Performance	3.88 (0.87)	4.00 (0.81)	-0.95	178	0.344	0.14
Trained vs Untrained Teachers						
Implementation Effectiveness	4.56 (0.52)	3.78 (0.89)	4.23	58	<0.001***	1.08
Student Response Perception	4.41 (0.61)	3.89 (0.76)	3.12	58	0.003**	0.76

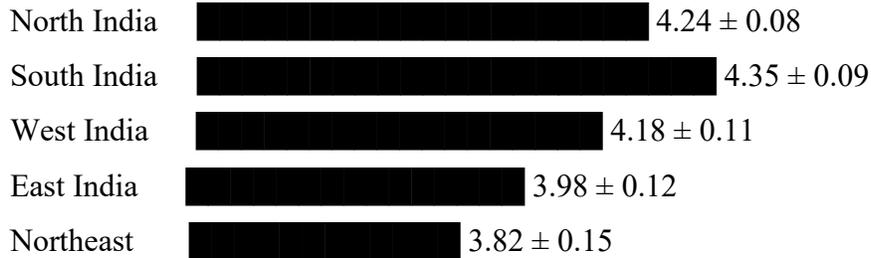$*p < 0.05, **p < 0.01, ***p < 0.001$

Content Quality and Pedagogical Effectiveness

Table 5: Teacher Assessment of ISL Channel Pedagogical Features

Challenge Category	Frequency	Percentage	Priority Level
Technical Infrastructure	156	65.0%	High
Internet Connectivity	142	59.2%	High
Device Availability	128	53.3%	Medium
Teacher Training Gaps	118	49.2%	Medium
Content Gaps	97	40.4%	Medium
Language Variations	73	30.4%	Low
Time Scheduling	64	26.7%	Low

Regional Variations in Impact

Figure 1: Regional Comparison of Overall Satisfaction Scores

Regional Satisfaction Scores (Mean ± SE)

North India   4.24 ± 0.08

South India   4.35 ± 0.09

West India   4.18 ± 0.11

East India   3.98 ± 0.12

Northeast   3.82 ± 0.15

Scale: 1.0   2.0   3.0   4.0   5.0

One-way ANOVA Results: $F(4,175) = 3.87$, $p = 0.005$, $\eta^2 = 0.081$

Correlation Analysis

Table 7: Correlation Matrix of Key Variables

Variables	1	2	3	4	5
1. Overall Satisfaction	1.00				
2. Content Comprehension	0.74***	1.00			
3. Learning Engagement	0.68***	0.72***	1.00		
4. Technical Access	0.56***	0.51***	0.48***	1.00	
5. Teacher Support	0.62***	0.58***	0.65***	0.43***	1.00

***$p < 0.001$

Discussion

The study demonstrated that ISL channel significantly enhanced learning experiences for hearing-impaired students, with high satisfaction (M = 4.32), content comprehension (M = 4.18), and engagement scores (M = 4.25). The channel proved particularly effective in mathematics (92.8% usage) and science (85.6% usage), addressing curriculum adaptation needs across academic disciplines. Teachers rated sign language clarity (M = 4.28) and visual design quality (M = 4.22) highly, though pacing and curriculum alignment required improvement. Significant urban-rural disparities emerged in satisfaction (t = 3.47, p = 0.001) and access (t = 4.23, p < 0.001), reflecting digital divide issues with moderate to large effect sizes (d = 0.51-0.63). No gender differences

were found, indicating equitable effectiveness across male and female students. Trained teachers showed substantially higher implementation effectiveness than untrained teachers (t = 4.23, p < 0.001, d = 1.08), emphasizing the critical importance of professional development. Regional variations were observed with South India showing highest satisfaction (M = 4.35) and Northeast lowest (M = 3.82), suggesting need for region-specific adaptations. Primary implementation barriers included technical infrastructure (65.0%) and internet connectivity (59.2%) challenges. Content gaps (40.4%) and teacher training needs (49.2%) were identified as moderate priorities for improvement. The strong correlation between comprehension and engagement (r = 0.72, p < 0.001) indicated that effective ISL delivery created positive learning feedback loops. Overall findings aligned with NEP 2020's inclusive education goals while highlighting rural access and teacher preparation gaps. The study provided comprehensive evidence supporting ISL channel's role in advancing inclusive digital pedagogy, though systematic interventions were needed to address equity and infrastructure challenges for full potential realization.

CONCLUSION

This survey study confirmed that the Indian Sign Language (ISL) channel under the PM eVidya initiative has significantly advanced inclusive pedagogy for hearing-impaired students in India. High satisfaction (M = 4.32), improved comprehension (M = 4.18), and stronger engagement (M = 4.25) indicate successful digital inclusion.

Key findings showed that ISL content enriched learning experiences and improved accessibility, with noticeable disparities between urban and rural students—highlighting the need for equitable policy interventions.

The study pioneered a comprehensive evaluation of the ISL channel, offering baseline data, identifying success factors, and reinforcing the value of government initiatives. Strong correlations among content quality, teacher support, and student outcomes underscored a systems-based approach to inclusive education.

Implications:

- **Practice:** Reinforces ISL use in classrooms and offers actionable implementation strategies.
- **Policy:** Guides resource allocation, teacher training, and infrastructure planning.

- **Research:** Lays groundwork for future longitudinal and comparative studies.

- **Stakeholders:** Informs educators, administrators, and content developers.

Recommendations:

- **Teachers:** Mandate ISL and tech-integration training, promote pedagogical adaptation, and ensure ongoing professional development.

- **Policymakers:** Improve digital infrastructure, provide devices, expand content, assure quality, integrate ISL into curricula, certify teachers, and allocate targeted funding.

- **Researchers:** Conduct longitudinal, comparative, and cost-effectiveness studies; use mixed-methods; explore tech integration and international comparisons.

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