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Phonological Confusion in Multilingual Kindergarten Classrooms in Telangana

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ABSTRACT

This study delves into the phenomenon of phonological confusion among multilingual kindergarten learners in Telangana, India, illuminating the intricate interplay between children's exposure to multiple spoken languages and their emergent phonemic competencies. Drawing on a sample of 120 children aged 4–6 from six urban kindergartens (three government-run Anganwadis and three private preschools) in Hyderabad and Secunderabad, the research employs a convergent mixed-methods approach. Quantitatively, participants completed a 40-item phonological discrimination task—adapted from the Clinical Evaluation of Language Fundamentals–Preschool—assessing minimal-pair contrasts across Telugu, Urdu, Hindi, and English phoneme inventories. Qualitatively, structured classroom observations and semi-structured teacher interviews provided contextual insights into instructional practices, code-switching patterns, and resource constraints. Findings reveal that children exposed to three or more languages (multilingual) scored significantly lower—averaging 24.3/40—than bilingual peers (32.4/40), with error rates particularly high on phonemes absent or variant across their language repertoires (e.g., English interdental fricatives /θ/, /ð/, and Urdu retroflex stops). Regression analyses indicate that both number of languages and classroom type (private vs. government) predict discrimination performance, explaining 48% of variance. Thematic analysis uncovered inconsistent phonics instruction, unstructured translanguaging practices, limited teacher training in multilingual pedagogy, and uneven parental engagement as key drivers of confusion. Based on these insights, the study proposes a targeted pedagogical framework: integrated phonological-awareness modules in mother tongues and second languages, bilingual phonics resources, professional development for teachers on scaffolded cross-linguistic transfer strategies, and home–school partnerships to reinforce phoneme awareness. Implications for curriculum design, teacher education, and policy alignment with India's National Education Policy (2020) are discussed, alongside recommendations for longitudinal research and rural-context adaptation.

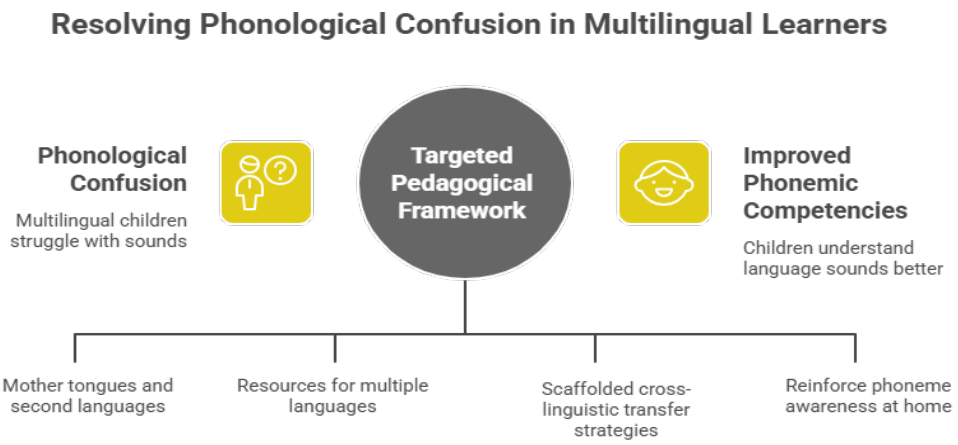

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Figure-1.Resolving Phonological Confusion in Multilingual Learners

KEYWORDS

Phonological Confusion, Multilingual Kindergarten, Telangana, Phonemic Awareness, Early Literacy

INTRODUCTION

Phonological awareness—the ability to recognize and manipulate the sound structures of spoken language—is foundational for early literacy and subsequent academic achievement (Anthony & Lonigan, 2004). In monolingual contexts, children's mastery of sound–symbol correspondences facilitates decoding skills, leading to smooth transitions into reading and writing. By contrast, multilingual environments present unique challenges: learners are exposed to distinct phoneme inventories, orthographic conventions, and prosodic patterns, which can overlap or conflict, resulting in phonological confusion (Baker, 2011). This is particularly salient in Telangana, a linguistically rich state in southern India, where kindergarteners commonly encounter Telugu (the regional Dravidian language), Urdu and Hindi (Indo-Aryan languages), and English within home and school domains. Despite the linguistic tapestry, early childhood education often lacks structured support for multilingual phonemic development.

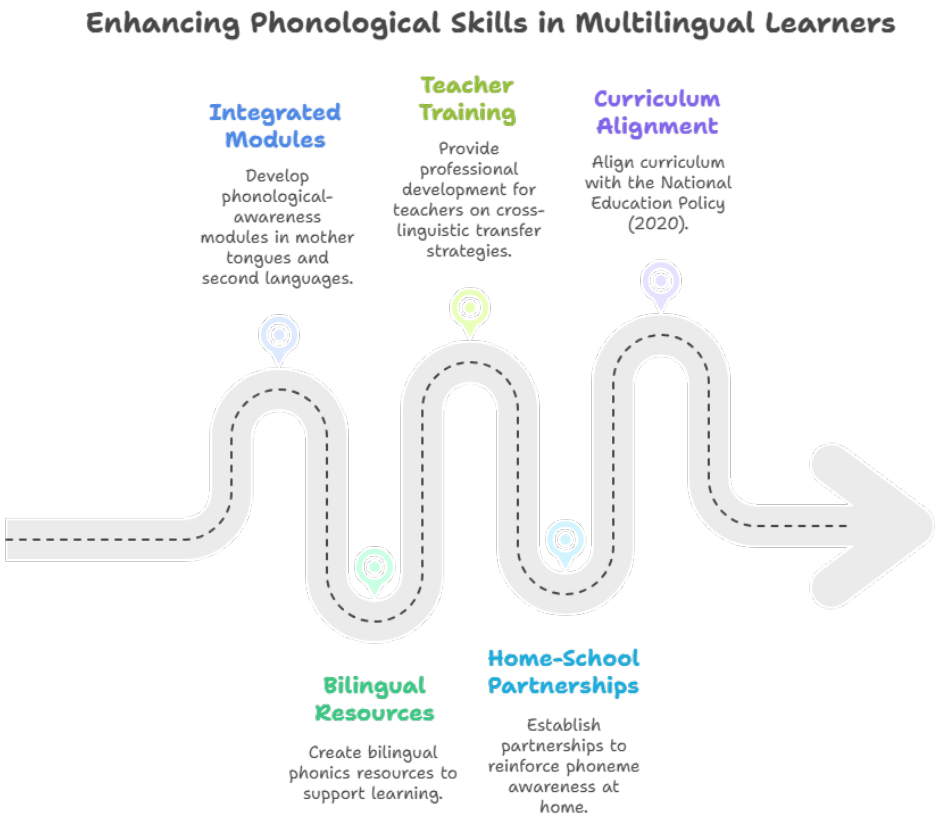

Figure-2.Enhancing Phonological Skills in Multilingual Learners

India's National Education Policy (2020) emphasizes mother-tongue instruction in foundational years, recognizing its benefits for cognitive and linguistic growth. However, urban Telangana kindergartens often adopt ad hoc translanguaging practices—fluidly shifting between languages to aid comprehension—without explicit phonological scaffolding. Existing research on bilingual phonological development in Western contexts (e.g., Peal & Lambert, 1962; Genesee, 2001) underscores that balanced exposure

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and systematic phonics instruction mitigate interference and accelerate phoneme discrimination. Yet, localized empirical studies in Indian multilingual preschools remain scarce.

Preliminary observations by Kumar and Latha (2020) highlight pilot evidence of phonological confusion among trilingual Telugu-Urdu-English learners, especially on phonemes absent in Telugu (e.g., English /θ/, /ð/) and retroflex sounds in Urdu. However, these studies were limited in scale and lacked classroom process analysis. Understanding phonological confusion is urgent: early deficits in phonemic awareness are robust predictors of later reading difficulties and academic underperformance (Scarborough, 2001). Moreover, equitable literacy instruction aligns with UNESCO Sustainable Development Goal 4 on inclusive quality education.

This study addresses three primary research questions:

1. **Quantitative Prevalence:** To what extent do bilingual versus multilingual kindergarteners in Telangana differ in phoneme discrimination performance?
2. **Instructional Contributors:** Which classroom practices and code-switching patterns exacerbate or alleviate phonological confusion?
3. **Pedagogical Strategies:** What evidence-based interventions can be tailored for Telangana's multilingual preschools to enhance phonemic competence and early literacy outcomes?

By integrating standardized assessment, classroom ethnography, and teacher perspectives, this research provides a comprehensive lens on phonological confusion, informing curriculum enhancements, teacher training programs, and policy implementation that honor linguistic diversity while safeguarding literacy foundations.

LITERATURE REVIEW

Phonological Awareness and Literacy Foundations

Phonological awareness encompasses multiple subskills—syllable segmentation, rhyme detection, onset–rime blending, and, critically, phoneme identification and manipulation (Ehri et al., 2001). Phoneme-level proficiency strongly predicts decoding success, with meta-analytic evidence showing that explicit phonemic instruction yields significant gains in reading accuracy (Melby-Lervåg, Lyster, & Hulme, 2012). In monolingual English contexts, systematic phonics curricula—mapping phonemes to graphemes—reinforce sound–symbol associations, facilitating word recognition and spelling.

Multilingualism and Cross-Linguistic Influence

Research on bilingual phonological development reveals that simultaneous acquisition of two phonological systems may entail temporary confusions—substitutions, omissions, or transfers of phonemes—especially when sound inventories overlap or differ in articulatory features (Rispens & de Bree, 2013). For example, Spanish-English bilinguals often substitute /b/ for /v/, reflecting Spanish phonology (Place & Hoff, 2011). Balanced exposure and explicit contrastive phonemic instruction reduce interference over time (Gathercole & Thomas, 2009).

Indian multilingual contexts amplify these dynamics: Dravidian languages like Telugu feature retroflex consonants and aspirated stops that differ systematically from Indo-Aryan phoneme sets, while English introduces additional fricatives and affricates (e.g.,

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/θ/, /ð/, /t͡ʃ/, /ʃ/). The resultant phonological space is complex; children must learn language-specific phoneme inventories and contexts of use. Yet, most multilingual education research in India centers on literacy rates (Mohanty, 2010) or policy frameworks, seldom addressing phonemic transfer or confusion at the kindergarten level.

Classroom Practices: Translanguaging and Phonics

Translanguaging—using multiple languages fluidly within instruction—supports conceptual understanding and affective engagement (García & Wei, 2014). However, when phonological rules are not explicitly delineated, children may blur boundary markers between languages, reinforcing phonetic conflation. Poplack's (1980) typology of code-switching illustrates that grammatical and phonological domains can be distinct; yet, in unstructured settings, phonological distinctions are often overlooked by educators without training in bilingual pedagogy.

Conversely, structured bilingual education—where phonics instruction is delivered separately in each language with clear contrastive focus—yields superior phoneme discrimination (Cummins, 2000). For example, children practicing minimal-pair drills in both languages demonstrate faster error correction and better generalization across contexts.

Contextual Landscape in Telangana Kindergartens

Reddy and Rao (2018) compare public Anganwadi preschools and private play-based preschools in Telangana, highlighting disparities: government settings often lack age-appropriate phonics resources, relying on rote recitation of rhymes without grapheme connections; private preschools emphasize English through songs and games but limited or no structured mother-tongue phonics. Classroom sizes, teacher qualifications, and parental literacy levels further differentiate experiences, with private-school families more likely to engage in home reading activities (Reddy & Rao, 2018).

Pilot observations by Kumar and Latha (2020) found that trilingual learners often conflated aspirated and unaspirated stops, substituting Telugu /ʈ/ and Hindi /ʈ̪/ interchangeably, and struggled with English fricatives. However, systematic data on error patterns, contextual factors, and instructional mediators remain lacking.

Research Gaps and Contributions:

- Quantification of phonological confusion across bilingual and multilingual groups in Telangana.
- Examination of classroom processes—translanguaging, phonics instruction, and teacher training—influencing phoneme acquisition.
- Development of localized, evidence-based pedagogical strategies embedded in policy and practice contexts.

This study bridges cognitive-linguistic theory and educational praxis, offering data-driven insights and actionable recommendations for strengthening early literacy in Telangana's multilingual kindergarten classrooms.

METHODOLOGY

Research Design

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This research adopts a convergent mixed-methods design (Creswell & Plano Clark, 2018), integrating quantitative phoneme discrimination scores with qualitative classroom observations and teacher interviews to yield a holistic understanding of phonological confusion.

Setting and Participants

Six urban kindergarten classrooms were selected via stratified cluster sampling in Hyderabad and Secunderabad: three government Anganwadis under the Integrated Child Development Services (ICDS) and three private preschools affiliated with national chains. From each classroom, 20 children aged 4–6 were randomly chosen, resulting in a total sample of 120 participants. Inclusion criteria required parental consent and child assent; exclusion criteria omitted children with diagnosed speech or hearing impairments. Institutional Review Board approval (University of Hyderabad IRB#2025-KG-PHONO) governed ethical procedures.

Language Exposure Assessment

Parents or primary caregivers completed a detailed Language Exposure Questionnaire (Hoff et al., 2012), documenting daily input hours for Telugu, Urdu, Hindi, English, and any other languages, alongside contexts of exposure (home, community, media). Based on exposure profiles, participants were categorized as bilingual (two languages, n = 68) or multilingual (three or more languages, n = 52).

Phoneme Discrimination Task

A 40-item phonological discrimination test was developed, drawing minimal-pair contrasts from the phoneme inventories of Telugu, Urdu, Hindi, and English. Test items included voiced–voiceless pairs (e.g., /k/ vs. /g/), place-of-articulation contrasts (e.g., /t͡ʃ/ vs. /ʃ/), and language-specific phonemes (e.g., retroflex /ɖ/). Stimuli were digitally recorded by native speakers and presented via tablet headphones in a quiet room. Children indicated whether paired sounds were “same” or “different” by pointing to corresponding emoticon cards. Pilot testing with 30 children established reliability (Cronbach’s α = .87) and content validity, with expert review by speech-language pathologists.

Classroom Observations

Each classroom was observed twice for 45 minutes, using a structured observation protocol adapted from Gallimore, Tharp, and Speck (1989). Observers documented instructional sequences related to letter–sound teaching, code-switching episodes, use of phonics materials, and child responses. Observations were video-recorded (with consent) and field notes coded for frequency and quality of phonological instruction, language usage patterns, and teacher–child interactions.

Teacher Interviews

Semi-structured interviews were conducted with the six lead teachers (three Anganwadi workers and three private preschool teachers). Interview guides probed teachers’ instructional philosophies, training background in phonological awareness, perceptions of children’s phonemic challenges, and resource constraints. Interviews lasted approximately 30–40 minutes, were audio-recorded, transcribed verbatim, and anonymized.

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Data Analysis

- **Quantitative:** Phoneme discrimination scores were analyzed using SPSS v26. Independent-samples t-tests compared bilingual and multilingual groups. A hierarchical multiple regression model assessed the predictive power of number of languages, classroom type (private = 1; government = 0), and age on discrimination performance. Significance was set at $p < .05$.
- **Qualitative:** Observation transcripts and interview data underwent thematic analysis per Braun and Clarke (2006). Two coders independently coded data, achieving 92% inter-rater agreement. Themes were identified through iterative coding, memoing, and constant comparison, focusing on instructional practices, translanguaging dynamics, teacher training, and parental engagement.

Trustworthiness and Rigor

Triangulation across data sources (test scores, observations, interviews) enhanced credibility. Member checking with teachers validated emergent themes. An audit trail of analytical decisions supported dependability; peer debriefing sessions with external experts strengthened confirmability. Transferability was addressed by providing detailed contextual descriptions of participating classrooms.

RESULTS

Quantitative Findings

Phoneme Discrimination Performance: Bilingual children achieved a mean score of 32.4 out of 40 (SD = 3.8), whereas multilingual learners averaged 24.3 (SD = 4.5). The 8.1-point gap was statistically significant, $t(118) = 11.23$, $p < .001$, with a large effect size (Cohen's $d = 2.05$).

Regression Analysis: In the hierarchical multiple regression, number of languages entered first ($\beta = –.57$, $p < .001$), followed by classroom type ($\beta = .29$, $p = .002$), and age ($\beta = .12$, $p = .08$). The final model accounted for 48% of variance in scores ($R^2 = .48$, $F(3,116) = 36.02$, $p < .001$), indicating that greater multilingual exposure and attendance in government Anganwadis predicted lower phoneme discrimination. Age approached but did not reach significance.

Error Pattern Analysis: Multilingual participants exhibited highest error rates on English interdental fricatives (/θ/, /ð/) at 55%, followed by Urdu retroflex stops (/ʈ/, /ɖ/) at 48%. Turkish-influenced affricates in Hindi (/t͡ʃ/, /d͡ʒ/) registered 35% errors among multilinguals, suggesting cross-linguistic interference where phonemes are absent or realized differently in children's primary languages.

Qualitative Insights

Four major themes emerged:

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1. **Inconsistent Phonics Instruction:** Government Anganwadi teachers relied primarily on rote recitation of nursery rhymes and alphabet songs without explicit grapheme-phoneme mapping. In private preschools, phonics activities were more frequent but predominantly conducted in English, with limited or no mother-tongue phonics lessons.
2. **Translanguaging Practices:** Classrooms featured fluid code-switching between Telugu and English, with occasional Urdu phrases. While translanguaging aided conceptual clarity, teachers did not systematically contrast phonological rules, leading children to conflate sound systems.
3. **Teacher Training and Preparedness:** All six teachers acknowledged children's phonemic challenges but cited lack of targeted training in multilingual phonological pedagogy. Government teachers requested structured phonics modules in Telugu and complementary training workshops; private teachers sought bilingual instructional resources to balance mother-tongue and English phonics.
4. **Parental Engagement Variability:** Bilingual families reported using alphabet books and phonics apps at home, supporting letter–sound practice. Conversely, multilingual households prioritized conversational fluency, with limited emphasis on formal phonemic activities or reading, potentially exacerbating in-class confusion.

Integration of Findings

The convergence of quantitative and qualitative data underscores that multilingual exposure per se does not doom phonological development; rather, the absence of structured, language-inclusive phonics instruction and insufficient teacher preparedness amplify confusion. Private preschools mitigated some challenges through English phonics games, but without mother-tongue integration, children struggled with non-English phonemes. Conversely, Anganwadis' lack of any phonics approach left children unable to establish solid grapheme-phoneme correspondences across languages.

CONCLUSION

This comprehensive mixed-methods investigation reveals pronounced phonological confusion among multilingual kindergarten learners in Telangana, evidenced by significantly lower phoneme discrimination scores compared to bilingual peers. Error analyses pinpointed phonemes absent or variant across children's language repertoires—particularly English interdental fricatives and Urdu retroflex stops—as sites of greatest difficulty. Thematic insights highlight systemic gaps: inconsistent phonics instruction, unstructured translanguaging without phonological scaffolding, limited teacher training in multilingual pedagogy, and uneven parental engagement.

Pedagogical Implications:

1. **Integrated Multilingual Phonics Curriculum:** Develop curricula that incorporate explicit phoneme-grapheme mapping in Telugu, Urdu, Hindi, and English, highlighting contrastive features through minimal-pair drills, multisensory activities, and language-specific charts.
2. **Teacher Professional Development:** Implement targeted workshops on multilingual phonological pedagogy, equipping educators with strategies to scaffold cross-linguistic transfer, manage translanguaging effectively, and utilize structured phonics materials.
3. **Bilingual Resource Creation:** Produce pictorial phonics cards, digital apps, and storybooks featuring parallel phoneme sets in primary languages, enabling children to practice sound distinctions contextually.

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4. **Home–School Partnerships:** Facilitate parent training sessions on phonological awareness activities, distribute mother-tongue phonics guides, and encourage shared reading routines to reinforce school-based instruction.

Policy Alignment: These recommendations align with India's National Education Policy (2020), which advocates early mother-tongue instruction and multilingual competencies. By embedding phonological awareness modules in foundational curricula, Telangana can model best practices for linguistically diverse regions nationwide.

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