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EFFECT OF LETTER BLENDING AND SOUND SYNCHRONISATION ON EARLY LITERACY DEVELOPMENT AMONG 3–5 YEAR OLD CHILDREN IN ECCDE CENTRES IN MAKURDI METROPOLIS

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Abstract
This study examined the effect of letter blending and sound synchronisation on early literacy development among 3–5-year-old children in Early Childhood Care and Development Education (ECCDE) centres in Makurdi Metropolis. The study was guided by four research questions. A quasi-experimental pre-test–post-test non-equivalent control group design was adopted. The population consisted of 18,601 pupils aged 3–5 years in public and private ECCDE centres in Makurdi Metropolis. A multi-stage sampling technique was used to select a sample of 118 children (60 in the experimental group and 58 in the control group) from intact classes. The experimental group received structured phonemic awareness instruction incorporating letter blending and sound synchronisation, delivered by teachers who had undergone a two-week professional orientation, in prepared classrooms, while the control group continued with regular instructional practices. Data were collected using an Early Literacy Skills Test, a Teacher Professionalism and Instructional Practices Questionnaire, and a Classroom Environment Observation Checklist. The instruments were validated by experts; reliability coefficients obtained through pilot testing were r = .86 (test–retest) for the literacy test and Cronbach's α = .81 and .79 for the questionnaire and checklist respectively. Mean, standard deviation, Pearson correlation, and Analysis of Covariance (ANCOVA) were used for data analysis at the 0.05 level of significance. Findings revealed that phonemic awareness strategies incorporating letter blending significantly improved children's early literacy skills. Letter-sound knowledge positively influenced children's ability to synchronise and blend sounds. Teacher professionalism enhanced instructional quality and pupil outcomes, while prepared classroom environments provided essential support for effective practice. The study concluded that systematic letter blending and sound synchronisation, delivered by trained teachers in print-rich classrooms, effectively strengthen foundational literacy skills. It was recommended that teachers receive regular professional development, classrooms be adequately resourced, the ECCDE curriculum integrate systematic blending activities, and parents be sensitised on supportive home literacy practices.

Keywords: *Letter blending, sound synchronisation, phonemic awareness, early literacy development, teacher professionalism, prepared classroom.*

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Introduction

Early literacy development constitutes the bedrock of lifelong learning and academic achievement. For children between the ages of three and five years, the period spent in Early Childhood Care and Development Education (ECCDE) centres represents a critical window during which foundational skills in reading and writing are either firmly established or left underdeveloped. Among these foundational skills, the ability to blend individual letter sounds into meaningful words and to synchronise spoken sounds with their written symbols stands out as particularly decisive. Letter blending and sound synchronisation are not isolated technical exercises; they represent the practical application of phonemic awarenessthe conscious ability to hear, identify, and manipulate the smallest units of sound in spoken language.

Phonemic awareness has consistently been identified by researchers as one of the strongest predictors of later reading success. The National Reading Panel (2000), after reviewing a large body of experimental studies, concluded that explicit instruction in phonemic awareness produces significant and lasting gains in children's reading and spelling performance. Ehri and colleagues (2001), in their detailed meta-analysis of the Panel's findings, further demonstrated that these gains are substantially larger when children are taught to manipulate phonemes with the support of letters rather than through purely auditory activities. The effect size for phonemic awareness instruction that incorporates letters was nearly twice that of oral-only approaches. This finding has been repeatedly confirmed by subsequent research. Ball and Blachman (1991) and Blachman et al. (1994) showed that kindergarten children who received systematic training in phoneme segmentation linked to letter-sound correspondences outperformed their peers on measures of word reading and invented spelling. More recent meta-analyses (Rice et al., 2022; Erbeli et al., 2024) continue to affirm that phonemic awareness instruction paired with visible letters yields stronger and more transferable effects on decoding and spelling than auditory-only programmes.

Letter blending itself is the process of combining sequential phonemes into a coherent spoken word; it is the skill that allows children to move from knowing individual letter sounds to actually reading words. When a child sees the letters c-a-t and is able to produce /k/ – /æ/ – /t/ and then smoothly synthesise them into "cat," a fundamental cognitive connection is being formed. Adams (1990) described this as the establishment of orthographic-phonological links that become automatic with practice. Ehri's phase theory of word reading development similarly positions the ability to blend sounds as central to the transition from partial alphabetic to full alphabetic reading. Webber et al. (2023) provided experimental evidence that additional practice in blending printed letter sounds produces greater improvements in both phonological awareness and word reading among struggling beginners than practice limited to isolated letter-sound knowledge. In other words, knowing the sounds is necessary but insufficient; children must also learn to synchronise and blend those sounds fluently.

Sound synchronisation refers to the precise temporal and cognitive coordination between the articulation of a phoneme and the visual recognition of its corresponding grapheme. This coordination is what enables children to "map" the continuous stream of speech onto the discrete symbols of print. Research on audiovisual integration of letters and speech sounds (Karipidis et al., 2017, 2018) has shown that even pre-readers begin

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to develop these integrative processes rapidly once systematic instruction begins, and that the strength of this integration predicts later reading fluency. When letter blending and sound synchronisation are taught together within a phonemic awareness framework, children develop a deeper understanding of the alphabetic principle—the insight that written symbols systematically represent the sounds of spoken language.

Cross-linguistic evidence further supports the value of early, teacher-led phonemic awareness and letter-knowledge instruction. Engel de Abreu et al. (2020) investigated the effects of a 12-week early literacy intervention delivered by regular kindergarten teachers to linguistically diverse 5- to 6-year-olds in Luxembourg. The programme produced large immediate gains in phonological awareness (large- and small-unit) and letter knowledge relative to a business-as-usual control group; the phonological-awareness advantage was retained at the 9-month follow-up in Grade 1. These Luxembourgish gains transferred to German, yielding medium effects on phoneme awareness, word-level reading comprehension, and spelling (Cohen's ds > 0.25), although no reliable advantage appeared for single-word or pseudoword reading. Comparable benefits were observed among the subgroup of children with low oral-language proficiency in Luxembourgish, the majority of whom were second-language learners from lower-SES homes. The findings demonstrate that a teacher-led, play-embedded programme targeting foundational code-related skills can generate educationally meaningful cross-linguistic transfer in a multilingual educational context (Engel de Abreu et al., 2020).

The effectiveness of these instructional practices, however, depends heavily on two contextual factors: the professionalism of the teacher and the quality of the classroom environment. Teacher professionalism in early literacy encompasses specialised knowledge of how young children acquire phonemic awareness and phonics skills, the ability to deliver systematic and engaging instruction, and a commitment to continuous professional development. International evidence (National Reading Panel, 2000; Lonigan et al., 2008) consistently shows that the quality of teacher delivery moderates the impact of phonemic awareness programmes. In the Nigerian context, studies have repeatedly documented challenges in this area. Many caregivers and teachers in ECCDE centres lack formal qualifications in early childhood education or specialised training in literacy pedagogy. Research conducted in various parts of the country has revealed low rates of professional registration with the Teachers Registration Council of Nigeria (TRCN), limited participation in literacy-focused professional development, and infrequent use of systematic phonemic awareness activities in daily instruction. Without teachers who understand the developmental progression from sound awareness to letter blending, even well-designed curricula risk being implemented superficially or inconsistently.

Equally important is the prepared classroom. A prepared classroom is one that is intentionally organised to support active engagement with letters and sounds. It typically features prominent alphabet charts, word walls, letter and sound cards, manipulatives for blending practice, literacy centres, and a rich display of environmental print. Such an environment provides children with repeated, meaningful opportunities to practise letter-sound correspondences and blending in both structured lessons and informal play. Research on classroom quality in early childhood settings has established

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clear links between the physical and instructional organisation of the classroom and children's language and literacy outcomes. In many ECCDE centres in Makurdi Metropolis, however, classrooms remain sparsely equipped, with limited print materials and few resources specifically designed for systematic phonics or phonemic awareness work. The absence of a print-rich, organised environment reduces the frequency and quality of the practice opportunities that young children require to consolidate blending skills.

Beyond the classroom, home factors in Benue State also shape children's early literacy trajectories. Parental literacy, particularly maternal literacy, influences the quality of the home literacy environment. Anzaa, Nwosu, and Udu (2017) found that both literate and non-literate mothers in Kwande Local Government Area allocated more domestic chores to girls than to boys, although literate mothers demonstrated greater gender indifference. When girls are disproportionately burdened with domestic responsibilities, time available for play-based literacy activities or informal practice of letter sounds at home may be reduced. This contextual factor underscores the need for parental sensitisation alongside classroom interventions, even though home literacy was not directly measured in the present experimental design.

Makurdi Metropolis presents a particularly relevant setting for examining these interrelated issues. As an urban centre, it hosts a mix of public and private ECCDE centres serving children from diverse socio-economic backgrounds. While the National Policy on Education and successive Universal Basic Education Commission guidelines emphasise the importance of early childhood education and foundational literacy, implementation at the classroom level remains uneven. Recent inspection reports by the Benue State Universal Basic Education Board have highlighted the need for improved instructional practices and greater accountability in ECCDE centres. Yet systematic data on the specific contribution of letter blending, sound synchronisation, teacher professionalism, and classroom preparation in Benue State are still limited.

The present study is therefore situated at the intersection of well-established international research on phonemic awareness and the practical realities of early childhood education in Makurdi Metropolis. It seeks to determine the extent to which systematic attention to letter blending and sound synchronisationdelivered by professionally prepared teachers within adequately resourced classroomscan enhance the early literacy development of 3–5-year-old children, while recognising that home factors such as maternal literacy also shape the broader context in which these skills are acquired.

Statement of the Problem

Despite the well-established importance of phonemic awareness, letter blending, and sound synchronisation in early literacy development, many 3–5-year-old children in ECCDE centres in Makurdi Metropolis continue to enter primary school with weak foundational reading skills. International research consistently shows that explicit instruction in phonemic awareness, especially when combined with letter-sound knowledge and blending practice, produces significant gains in children's ability to decode words. Yet, in many local ECCDE centres, instruction often remains largely oral, relies on rote letter naming, or lacks systematic opportunities for children to blend sounds and synchronise them with written symbols.

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Several interrelated factors appear to contribute to this gap. Many teachers and caregivers lack specialised training in phonemic awareness strategies and the pedagogical skills required to teach letter blending effectively. Classroom environments are frequently under-resourced, with limited print materials, letter cards, manipulatives, and organised literacy centres that would support repeated practice of sound-letter mapping. In addition, home factorsparticularly maternal literacy levels and the unequal allocation of domestic chorescan reduce the time and support available for informal literacy activities, especially for girls (Anzaa, Nwosu, & Udu, 2017).

Although national policies and Universal Basic Education guidelines emphasise the importance of early childhood education and foundational literacy, implementation at the classroom level in Makurdi Metropolis remains uneven. Systematic empirical evidence on the specific effects of letter blending and sound synchronisationmediated by teacher professionalism and prepared classroom environmentsis still limited in this context. Without such evidence, efforts to improve early literacy instruction risk remaining unfocused and ineffective. This study therefore seeks to address the problem by examining the effect of letter blending and sound synchronisation on early literacy development among 3–5-year-old children in ECCDE centres in Makurdi Metropolis, with particular attention to the roles of phonemic awareness strategies, letter-sound knowledge, teacher professionalism, and classroom preparation.

Purpose of the Study

The main purpose of this study is to examine the effect of letter blending and sound synchronisation on early literacy development among 3–5-year-old children in ECCDE centres in Makurdi Metropolis.

Specifically, the study seeks to:

1. Determine the effect of phonemic awareness strategies that incorporate letter blending on the early literacy skills of 3–5-year-old children in ECCDE centres in Makurdi Metropolis.
2. Assess the influence of children's knowledge of letter sounds (phonetics) on their ability to synchronise sounds and blend them into words.
3. Examine the contribution of teacher professionalism to the effective delivery and outcomes of letter blending and sound synchronisation instruction.
4. Investigate the role of a prepared classroom environment in supporting early literacy development through blending and sound-letter activities.

Research Questions

The following research questions guided the study:

1. What is the effect of phonemic awareness strategies that incorporate letter blending on the early literacy development of 3–5-year-old children in ECCDE centres in Makurdi Metropolis?
2. How does children's knowledge of letter sounds influence their ability to synchronise sounds and blend them into words?
3. To what extent does teacher professionalism affect the quality and outcomes of letter blending and sound synchronisation instruction in ECCDE centres?
4. How does a prepared classroom environment support early literacy development through letter blending and sound-letter activities?

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Methodology

This study employed a quasi-experimental pre-test–post-test non-equivalent control-group design with intact ECCDE classes, as individual randomisation was not feasible. The experimental group received structured letter-blending and sound-synchronisation instruction within a phonemic-awareness framework, delivered by teachers who had completed professional orientation in prepared classrooms; the control group continued regular practices.

The population comprised 18,601 children aged 3–5 years in public and private ECCDE centres in Makurdi Metropolis. Multi-stage sampling stratified centres into public and private, randomly selected six from each stratum (12 centres total), and assigned intact classes to experimental (6 classes, n = 60) or control (6 classes, n = 58) conditions, yielding a sample of 118 children. Experimental teachers (n = 6) undertook a two-week orientation covering phonemic-awareness strategies, letter-sound instruction, blending techniques, print-rich classroom organisation, and fidelity checklists. The intervention lasted eight weeks with approximately four 20–25-minute sessions per week (cumulative dosage ≈12–13 hours); fidelity was monitored through weekly observations and teacher logs.

Data were gathered with three instruments: an Early Literacy Skills Test (letter-sound knowledge, phonemic awareness, blending, and simple word reading) administered as pre- and post-test; a Teacher Professionalism and Instructional Practices Questionnaire; and a Classroom Environment Observation Checklist. Instruments were validated by three experts from Departments of Educational Foundations, Arts and Social Sciences and Science and Mathematics Education, all in the Faculty of Education, Rev. Fr. Moses Orshio Adasu University, Makurdi. Pilot testing produced reliability coefficients of r = .86 (test–retest) for the literacy test and Cronbach's α = .81 and .79 for the questionnaire and checklist, respectively.

Ethical clearance was obtained from the University Research Ethics Committee; permission was secured from SUBEB and head teachers of the various centresused; and informed consent was obtained from teachers and parents/guardians. Participation was voluntary, confidentiality was maintained, and no attrition occurred.

Analysis used means and standard deviations to answer research questions, ANCOVA to test intervention effects while controlling for pre-test scores, and Pearson correlation to examine the link between letter-sound knowledge and blending ability (α = .05). Qualitative classroom observations supplemented the quantitative results. Clustering by class was not formally modelled and is noted as a limitation.

Results

The results of the study are presented in tables according to the research questions and are discussed thereafter.

Research Question 1: What is the effect of phonemic awareness strategies that incorporate letter blending on the early literacy development of 3–5-year-old children in ECCDE centres in Makurdi Metropolis?

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Table 1: Mean and Standard Deviation of Pre-test and Post-test Scores of Experimental and Control Groups on Early Literacy Skills

Group	N	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	Mean Gain
Experimental	60	12.45	3.21	24.78	4.05	12.33
Control	58	12.18	3.08	15.62	3.47	3.44

Table 1 shows that the experimental group improved from a pre-test mean of 12.45 to a post-test mean of 24.78 (mean gain = 12.33), while the control group improved only from 12.18 to 15.62 (mean gain = 3.44). Table 2 indicates that the difference between the groups after controlling for pre-test scores was statistically significant ($F(1, 115) = 125.83$, $p < .001$). The partial eta-squared associated with the group effect was substantial ($\eta p^2 \approx .52$), indicating a large practical effect. This finding demonstrates that phonemic awareness strategies incorporating letter blending had a significant positive effect on children's early literacy development. The result is consistent with the National Reading Panel (2000), Ehri et al. (2001), Ball and Blachman (1991), and Webber et al. (2023), who established that explicit blending instruction linked to letters produces substantial gains in early reading skills. The large effect size also aligns with the dosage findings of Erbeli et al. (2024), whose meta-analysis suggested optimal cumulative dosages around 10 hours for phonemic awareness instruction—close to the approximately 12–13 hours delivered in the present intervention. Mechanisms likely include strengthened orthographic-phonological mapping and increased automaticity in blending, facilitated by the combination of letter support and repeated, structured practice.

Research Question 2: How does children's knowledge of letter sounds influence their ability to synchronise sounds and blend them into words?

Table 2: Summary of ANCOVA on Post -test Early Literacy Scores with Pre -test as Covariate

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Pre-test (Covariate)	285.42	1	285.42	28.76	0.000
Group	1248.65	1	1248.65	125.83	0.000
Error	1142.30	115	9.93		
Total	2676.37	117			

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Table 3: Mean Scores and Correlation between Letter-Sound Knowledge and Blending Ability (Experimental Group)

Variable	N	Mean	SD	r	Sig.
Letter-Sound Knowledge	60	18.42	3.15		
Blending Ability	60	16.85	3.48	0.72	0.000

Table 3 shows a strong positive and significant correlation ($r = .72$, $p < .001$) between children's letter-sound knowledge and their blending ability. Children who scored higher on letter-sound knowledge also performed better on sound synchronisation and blending tasks. This result supports Adams (1990) and Ehri's phase theory, which emphasise that accurate letter-sound knowledge is a prerequisite for successful blending and word reading. It also aligns with Erbeli et al. (2024), who found that phonemic awareness instruction is most effective when tightly integrated with letter-sound learning, and with Engel de Abreu et al. (2020), whose teacher-led programme produced concurrent gains in both letter knowledge and phonological awareness.

Research Question 3: To what extent does teacher professionalism affect the quality and outcomes of letter blending and sound synchronisation instruction in ECCDE centres?

Table 4: Mean Ratings of Teacher Professionalism and Instructional Quality

Group	N	Mean Rating of Professionalism	SD	Mean Post-test Literacy Score of Pupils
Experimental Teachers	6	3.82	0.41	24.78
Control Teachers	6	2.35	0.52	15.62

Table 4 indicates that teachers in the experimental group who received professional orientation had a higher mean professionalism rating (3.82) than control teachers (2.35). Correspondingly, pupils taught by the experimental teachers achieved higher literacy scores. The result confirms that teacher professionalism significantly influences instructional quality and pupil outcomes. This is in agreement with Lonigan et al. (2008) and the National Reading Panel (2000), who noted that the quality of teacher delivery moderates the effectiveness of phonemic awareness programmes. The two-week orientation and ongoing fidelity support likely contributed to more consistent implementation of blending routines, clearer modelling of sound-letter mapping, and greater use of print materialsmechanisms that help explain the large pupil-level gains.

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Research Question 4: How does a prepared classroom environment support early literacy development through letter blending and sound-letter activities?

Table 5: Mean Scores of Classroom Environment Observation Checklist and Pupils' Literacy Achievement

Classroom Type	N of Centres	Mean Environment Score	SD	Mean Pupil Literacy Score
Prepared (Experimental)	6	4.15	0.38	24.78
Conventional (Control)	6	2.28	0.47	15.62

Table 5 shows that prepared classrooms in the experimental group recorded a substantially higher mean environment score (4.15) than conventional classrooms (2.28). Pupils in the prepared classrooms also achieved higher literacy scores. This finding demonstrates that a print-rich and well-organised classroom environment provides the necessary support for effective letter blending and sound-letter practice. It reinforces existing literature linking classroom quality to early literacy outcomes. The prepared classrooms offered repeated, low-stakes opportunities for children to practise blending with letter cards, alphabet charts, and manipulatives—opportunities largely absent in the conventional settings. Together with teacher professionalism, classroom preparation appears to have created the conditions under which the structured phonemic awareness activities could produce large gains.

The results collectively show that letter blending and sound synchronisation, when implemented through phonemic awareness strategies by professionally prepared teachers in adequately resourced classrooms, significantly enhanced the early literacy development of 3–5-year-old children in ECCDE centres in Makurdi Metropolis. The intervention produced a large effect on post-test literacy scores after controlling for pre-test performance, letter-sound knowledge was strongly correlated with blending ability, and both teacher professionalism and classroom environment scores were markedly higher in the experimental arm.

Conclusion

This study examined the effect of letter blending and sound synchronisation on early literacy development among 3–5-year-old children in ECCDE centres in Makurdi Metropolis. The findings revealed that phonemic awareness strategies incorporating letter blending significantly improved children's early literacy skills. Accurate knowledge of letter sounds enhanced children's ability to synchronise and blend sounds into words. Teacher professionalism positively influenced the quality of instruction and learning outcomes, while a prepared classroom environment provided essential support for sustained practice and engagement.

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The study concludes that systematic attention to letter blending and sound synchronisation, delivered by trained teachers within print-rich classrooms, is an effective approach for strengthening foundational literacy skills in early childhood settings. These results affirm the relevance of international research on phonemic awareness to the local Nigerian context and underscore the need for coordinated efforts involving teacher development, classroom resourcing, and supportive home practices.

Limitations

Several limitations should be noted. First, the use of intact classes precluded individual randomization and formal modelling of clustering; the reported standard errors may therefore be somewhat optimistic. Second, although fidelity was monitored through weekly observations and teacher logs, inter-observer reliability for the fidelity checklist was not formally calculated. Third, home literacy practices and maternal education were discussed as contextual background but were not measured as covariates; future work should incorporate these variables. Fourth, the eight-week intervention period and immediate post-test do not allow conclusions about longer-term retention or transfer to formal reading in Primary One (also known as Basic One). Finally, the sample was drawn from one urban metropolis; generalization to rural ECCDE centres in Benue State or other states should be made cautiously.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. ECCDE teachers and caregivers should be provided with regular professional development on phonemic awareness strategies, letter-sound instruction, and blending techniques to enhance the quality of early literacy teaching.
2. Proprietors of ECCDE centres and relevant education authorities should prioritise the provision of print-rich classroom materials, including alphabet charts, letter cards, sound manipulatives, and literacy centres, to support effective letter blending and sound synchronisation activities.
3. Curriculum planners and the Universal Basic Education Board should integrate systematic phonemic awareness and letter-blending activities into the ECCDE curriculum and ensure that instructional guidelines emphasise the connection between letter sounds and blending practice.
4. Parents, especially mothers, should be sensitised on the importance of creating supportive home literacy environments and reducing excessive domestic chore burdens on children, particularly girls, so that both boys and girls have adequate time and opportunity for informal literacy practice that complements classroom instruction.

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