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Multimodal Language Stimulation: Integrating Digital Media into Early Childhood Morning Meeting Routines

Indah Tri Hizriyah[1], Aip Syarifudin[2], Abdul Muiz Rouf[3]
[1,2,3]Universitas Muhammadiyah Cirebon, Indonesia

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ABSTRACT

Early childhood language development requires active dialogic interaction; however, conventional morning meeting routines frequently default to passive, teacher-centered monologues. While digital media provides robust multimodal stimulation, it is rarely integrated directly into face-to-face collaborative routines to overcome expressive language constraints. This study investigates how the systematic integration of interactive digital media into morning meeting routines scaffolds both the receptive and expressive language capacities of young learners. Employing a cyclical practitioner-led action research design, the study involved 17 young learners aged between 5 and 6 years who initially exhibited severe communicative passivity. The intervention utilized interactive presentations, digital word cards, and audiovisual storytelling across two complete instructional cycles. Data were gathered through behavioral observation, dialogue transcription, and performance rubrics validated via inter-rater reliability protocols. Quantitative analysis revealed a significant acceleration in overall language mastery, escalating from a pre-intervention baseline of 41% to an optimal 86.2% by the conclusion of the second cycle. Furthermore, qualitative micro-analysis demonstrated that synchronized visual and auditory cues successfully reduced extraneous cognitive load. This cognitive optimization enabled the children to transition from silent peer mimicry to autonomous sentence construction and coherent narrative expression. By bridging the Cognitive Theory of Multimedia Learning with sociocultural scaffolding principles, this research establishes that digital tools can function as collaborative social glue rather than isolating devices. Ultimately, this instructional framework provides a cost-effective and scalable blueprint for international educators seeking to optimize child-centered communicative agency in resource-constrained environments.

Keywords: Early Childhood Education, Multimodal Language Stimulation, Digital Learning Media, Morning Meeting Routine, Cognitive Scaffolding, Practitioner Inquiry

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Corresponding Author:
Indah Tri Hizriyah
Universitas Muhammadiyah Cirebon, Indonesia
Email: ihizriyah@gmail.com

1. INTRODUCTION

Language development in early childhood represents a foundational cornerstone for cognitive growth, socio-emotional competence, and long-term academic readiness. During the critical developmental window between the ages of 5 and 6 years, children undergo an accelerated phase of linguistic acquisition, transitioning from basic language use toward more advanced receptive and expressive communication competencies, which are predictive of later language and pre-literacy outcomes (Handayani & Permadhy, 2026; McNeill et al., 2025; Vehkavuori et al., 2021). According to global early childhood benchmarks,

learners at this stage are expected to comprehend increasingly complex verbal instructions, construct coherent sequential narratives, articulate their own ideas and opinions, and participate actively in dialogic classroom interactions(Dobinson & Dockrell, 2021; van der Wilt et al., 2022). Consequently, the optimization of early childhood education environments demands highly intentional, systematic, and dynamic verbal stimulation to foster these multi-dimensional language capacities.

In the contemporary educational landscape, language development is increasingly recognized as a fundamentally sociocultural and mediated process. Grounded in Vygotskian theory, language proficiency is co-constructed through authentic social interactions, dialogic practices, and collaborative use of semiotic tools within children's everyday learning environments (Cong-Lem, 2022; Creaghe & Kidd, 2022; Mihai & Classen, 2023). However, the emergence of the 21st-century digital ecosystem has transformed how young learners process information, requiring a shift from traditional monomodal instruction toward comprehensive multimodal learning environments. Recent systematic evidence indicates that digital technologies and technology-rich learning environments significantly support early language and literacy development by providing multimodal cognitive scaffolds that integrate visual, auditory, textual, and interactive elements (Bautista et al., 2024; Figueiredo, 2023; S. Liu et al., 2024; Paul et al., 2023). Multimodal learning environments have been shown to enhance children's attention, strengthen working memory processes, and facilitate deeper story comprehension by integrating complementary visual, auditory, and interactive learning experiences (Kucirkova & Rodriguez-Leon, 2023; J. Li & Deng, 2023). Therefore, modern early childhood frameworks must synthesize organic verbal interaction with interactive digital infrastructure to align with the cognitive processing styles of digital-native learners.

One of the most widely implemented pedagogical strategies to cultivate classroom community and foster daily communication is the morning meeting (or morning circle) routine, which provides structured opportunities for children to engage in social interaction, collaborative dialogue, and active classroom participation (Sembiante et al., 2025). As a structured classroom routine, a morning meeting typically consists of sequential phases including greeting, sharing, group activities, and a morning message that are designed to foster a positive classroom community, strengthen children's sense of belonging, and encourage peer-to-peer verbal interaction and collaborative participation (Cornett & Quinn, 2022). While conventional morning meetings provide a natural context for oral expression, they may become dominated by repetitive, teacher-directed discourse, limiting opportunities for children's active participation, higher-order thinking, and production of extended oral language unless dialogic interaction is intentionally promoted (van der Wilt et al., 2022). This instructional limitation becomes particularly evident in classrooms where children exhibit severe constraints in expressive language, characterized by a reluctance to speak in public, low vocabulary retention, and an inability to articulate coherent personal experiences. To overcome this pedagogical inertia, standard morning routines must be structurally revitalized through the strategic infusion of interactive media.

Despite the growing body of literature documenting the benefits of morning routines and digital learning applications separately, a conceptual and empirical gap remains. Existing studies have largely examined morning meetings as contexts for fostering classroom community, social participation, and socio-emotional development, while research integrating these routines with technology-enhanced language learning remains limited (S. Liu et al., 2024; Sembiante et al., 2025). Conversely, digital learning media has often been investigated as stand-alone software applications or individual digital tools, with many studies examining children's interaction with technology in isolation rather than as part of authentic collaborative learning experiences. Recent evidence suggests that meaningful social collaboration depends on pedagogically integrated and teacher-mediated uses of digital technologies rather than on technology alone (Chu et al., 2024; Disney & Geng, 2022; H. Li et al., 2026; Undheim, 2022). Current research has largely examined multimodal digital artifacts (e.g., digital storytelling applications and interactive media) and dialogic classroom routines as separate pedagogical approaches. Comparatively fewer studies have investigated how interactive presentations, digital word cards, and automated storytelling tools can be structurally integrated into collaborative, face-to-face dialogic routines such as morning meetings to support young children's language development (Flynn, 2024; Shengjergji, 2024; Shengjergji et al., 2025). Consequently, there is a critical shortage of instructional designs that demonstrate how the confluence of social interaction and digital multimodality can systematically scaffold early language skills.

To bridge this specific empirical deficit, this study introduces an innovative instructional framework that embeds digital-based multimodal stimulation into early childhood morning meeting routines. By deploying a cyclical action research paradigm, this study investigates how the systematic integration of interactive audiovisual inputs transforms the dynamics of classroom verbal communication. Specifically, this research aims to analyze the progressive shifts in the receptive and expressive language skills of children, encompassing listening comprehension, instruction tracking, interactive questioning, and narrative coherence. By exploring the intersection of digital media integration and collaborative routines, this study contributes a scalable pedagogical model for international early childhood educators seeking to optimize language acquisition in the digital age.

2. METHOD

2.1. Research Design

This study adopted a practitioner-led action research framework characterized by iterative cycles of planning, action, observation, and reflection to support continuous improvement of educational practice (Coghlan & Holian, 2023). Action research in early childhood settings serves as a rigorous paradigm for instructional innovation, allowing educators to investigate the direct pedagogical impacts of classroom interventions in real time. Rather than treating the classroom as a passive experimental environment, this design facilitates a dynamic, iterative adaptation of the learning ecosystem. To support the multimodal framework of this study, the research was executed over two complete intervention cycles, with each cycle specifically adapted to evaluate how the integration of digital media structurally transforms peer-to-peer and teacher-to-child dialogic patterns.

2.2 Context and Participants

The investigation was conducted at TK Aisyiyah Bustanul Athfal Pilang, West Java, Indonesia, during the 2025/2026 academic year. The participant cohort comprised a purposive sample of 17 young learners, consisting of both boys and girls, enrolled in Group B1 within the 5 to 6 years age bracket. This specific cohort was selected due to observed baseline constraints in expressive language performance during initial screenings, where a majority of the children demonstrated a marked reluctance to engage in spontaneous oral communication, low vocabulary retention, and visible anxiety during public speaking tasks. To ensure ethical standards and minimize practitioner bias, the study was executed collaboratively through a co-participatory arrangement between the primary researcher and the certified classroom teacher, who acted as the co-observer.

2.3 Data Collection Instruments and Trustworthiness

Primary data were gathered through a triad of qualitative and quantitative sources, specifically systematic behavioral observation, digital field documentation, and authentic performance assessments. The core measurement instrument consisted of a multi-dimensional language evaluation rubric adapted from the Indonesian Early Childhood Education Standard (STPPA), which was further cross-referenced with international developmental milestones (Karasik & Robinson, 2022; Nasution, 2022). To ensure construct validity, the instrument underwent rigorous content evaluation by independent early childhood education experts, resulting in a satisfactory Content Validity Index (CVI).

To eliminate subjective observation bias, data collection employed an inter-rater reliability protocol where both the researcher and the classroom teacher independently scored the children's linguistic behaviors during each morning meeting routine. Discrepancies in scoring were resolved through immediate post-session debriefings based on video recorded transcriptions. The consolidated operational assessment framework is presented in Table 1.

Table 1. Consolidated Rubric and Indicators for Assessing Early Childhood Language Development

Domain & Key Indicators	Level	Category	Observable Behavioral Descriptors
1. Receptive Language • Listening to spoken language • Understanding instructions	1	Not Yet Developed (NYD)	The child fails to demonstrate language abilities according to the indicators without intensive teacher assistance. The learner remains silent, exhibits poor comprehension of digital or verbal directions, and fails to respond to communicative cues.
	2	Emerging (EM)	The child exhibits limited linguistic responses, requiring continuous promptings from the instructor. Responses are restricted to monosyllabic words or passive imitation of peer utterances.
2. Expressive Language • Answering questions orally • Expressing independent opinions • Retelling personal experiences	3	Expected Development (ED)	The child independently meets age-appropriate expectations. The learner actively processes verbal instructions, answers contextual inquiries using complete simple sentences, and articulates basic thoughts with minimal teacher scaffolding.

4	Very Well Developed (VWD)	The child demonstrates superior communication capacities, processing instructions rapidly, formulating logical arguments independently, and recounting narrative experiences with high clarity and structural coherence without assistance.

2.4 Intervention Procedure

The action phase was embedded directly within the daily early childhood morning meeting routines, which were explicitly redesigned as multimodal communicative spaces. The structural architecture of each morning session was divided into four sequential phases, which were greeting, sharing, group activities, and morning messages. The integration of digital media was systematically structured across these phases to act as a cognitive scaffold. During the greeting and sharing phases, interactive PowerPoint presentations and dynamic digital word cards were deployed on a smart TV to present vivid visual stimuli, lowering the children's cognitive load and prompting immediate oral articulation. In the group activity phase, automated storytelling systems and digital images were utilized to foster peer-to-peer collaborative dialogues. Finally, the morning message phase integrated short audiovisual videos designed to stimulate reflective listening comprehension and subsequent oral summarization.

2.5 Data Analysis

Data analysis integrated descriptive statistical profiling with qualitative thematic synthesis to capture both numerical progression and narrative transformation. Quantitative progression was tracked by calculating the individual developmental scores and evaluating the macro-level classical mastery percentage across the pre-cycle, Cycle I, and Cycle II stages. The classical mastery metric was computed utilizing the following formula:

$$P = \frac{f}{N} \times 100\%$$

In this equation, P represents the overall percentage of classical mastery, f denotes the absolute frequency of children successfully achieving the Expected Development (ED) or Very Well Developed (VWD) thresholds, and N signifies the total number of participants within the cohort (N = 17). The pedagogical intervention was predefined as successful when the classical mastery threshold reached or exceeded 80% of the total student population. Qualitative data derived from field notes and transcription analysis were inductively coded to contextualize the micro-level interactive shifts stimulated by the multimodal digital artifacts.

3. RESULTS

3.1. Baseline Profile and Pre-Intervention Assessment (Pre-Cycle Data)

Prior to the implementation of the multimodal digital intervention, an initial screening was conducted on November 13, 2025, to establish a diagnostic baseline of the language competencies within the participant cohort. The quantitative assessment revealed a substantial deficit in both receptive and expressive language domains among the seventeen young learners in Group B1. Globally, the classical mastery level reached only 41% during this pre-cycle phase, yielding a cohort mean score of 1.87 out of 4.00, which falls into the Emerging category. The empirical baseline metrics across all five diagnostic indicators are systematically compiled in Table 2, which highlights the pervasive nature of these early linguistic limitations prior to any digital integration.

Table 2. Granular Statistical Breakdown of Baseline Language Competencies (Pre-Cycle Phase)

No	Developmental Language Indicators	Baseline Mastery Percentage	Initial Cohort Category
1	Listening to spoken language	44%	Emerging
2	Understanding simple instructions	41%	Emerging
3	Answering questions orally	38%	Emerging
4	Expressing opinions	35%	Emerging
5	Retelling simple experiences	32%	Emerging
	Overall Cohort Performance	41%	Emerging (Mean Score: 1.87)

As delineated in Table 2, the lowest performance thresholds were concentrated within the expressive language sub-domains, particularly in the capacity of the children to recount personal narratives, which stood at a critical mastery rate of only 32%. Qualitative behavioral field observations corroborated these

statistical deficiencies, revealing a deeply entrenched pattern of communicative passivity throughout standard classroom routines. When presented with un-scaffolded verbal inputs, a significant majority of the children exhibited an immediate tendency to remain silent or completely withdraw from communicative opportunities. Receptive language limitations were manifested as an inability to execute basic verbal commands, with most learners requiring continuous, repetitive teacher promptings before successfully processing instructional directives.

Furthermore, the expressive language vacuum was exacerbated by an overwhelming dependency on teacher-driven modeling and peer imitation. During circle-time interactions, children routinely lacked the confidence to articulate independent thoughts, frequently defaulting to monosyllabic responses or direct vocal mimicry of the utterances made by more expressive peers. The baseline instructional ecosystem was highly teacher-centered, a structural limitation that inadvertently suppressed the linguistic agency of the children and restricted spontaneous verbal production. This structural passivity and lack of expressive confidence are further illustrated in Figure 1, which visually displays the stark concentration of learners within the lower developmental tiers during the initial diagnostic stage.

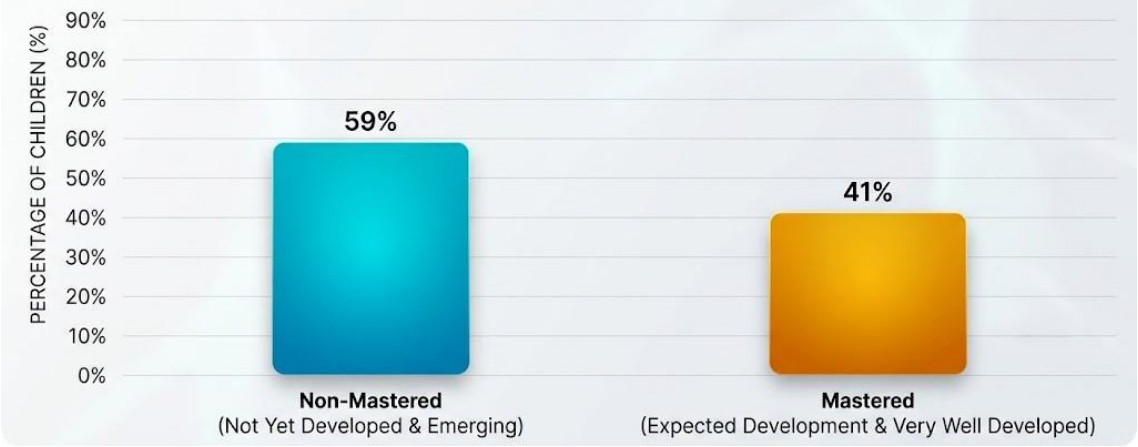

Figure 1. Distribution of Pre-Cycle Language Performance Categories Prior to Multimodal Intervention

The visual data presented in Figure 1 confirm that the overwhelming majority of the participants clustered within the non-mastery levels, consisting of the Not Yet Developed and Emerging categories. Only a marginal fraction of the class achieved the target developmental milestones independently. This stark baseline profile validated the immediate necessity for a structured multimodal intervention, proving that conventional oral exercises were insufficient to stimulate the semantic and narrative scaffolds required for early childhood communicative autonomy.

3.2 Macro-Level Quantitative Progression Across Cycles

To evaluate the overarching efficacy of the integrated digital interventions, a macro-level quantitative analysis was executed across the sequential action research phases. The longitudinal data demonstrated a progressive, statistically significant surge in both cohort mean scores and classical mastery thresholds. Specifically, classical completeness escalated from the baseline profile of 41% in the pre-cycle stage to 61.5% at the culmination of Cycle I, ultimately achieving an optimal rate of 86.2% by the conclusion of Cycle II. This upward trajectory was mirrored in the steady growth of the collective mean score, which shifted from an initial 1.87 to 2.46, and finally to 3.45, indicating a systemic transition from the Emerging tier to the Very Well Developed category.

To guarantee the empirical rigor and trustworthiness of these evaluative metrics, an inter-rater reliability protocol was strictly enforced between the primary researcher and the classroom teacher. The calculation yielded a Cohen's Kappa coefficient (k = 0.84), demonstrating a robust, high-level statistical agreement that effectively eliminated individual observer bias and confirmed the objectivity of the evaluation criteria. The consolidated macro-level longitudinal progress is systematically presented in Table 3.

Table 3. Longitudinal Summary of Collective Language Development Progress Across Action Cycles

Research Phase	Cohort Mean Score	Classical Mastery Percentage	Developmental Category Achievement
Pre-Cycle	1.87	41.0%	Emerging (EM)
Cycle I	2.46	61.5%	Expected Development (ED)
Cycle II	3.45	86.2%	Very Well Developed (VWD)

While the macro metrics in Table 3 validate the uniform success of the instructional framework, a granular trend analysis reveals asymmetrical developmental velocities among the five observed language indicators. This variable trajectory of growth across the pre-cycle, Cycle I, and Cycle II stages is visually modeled in Figure 2. The empirical tracking demonstrates that receptive language capacities, particularly listening to spoken language and understanding simple instructions, experienced the most immediate and rapid acceleration, climbing steeply by the end of Cycle I. Similarly, the capacity for expressing independent opinions exhibited a profound surge, expanding from a baseline of 35% to a final peak of 84% in Cycle II, driven by the immediate psychological stimulation and visual prompts provided by the interactive audiovisual media.

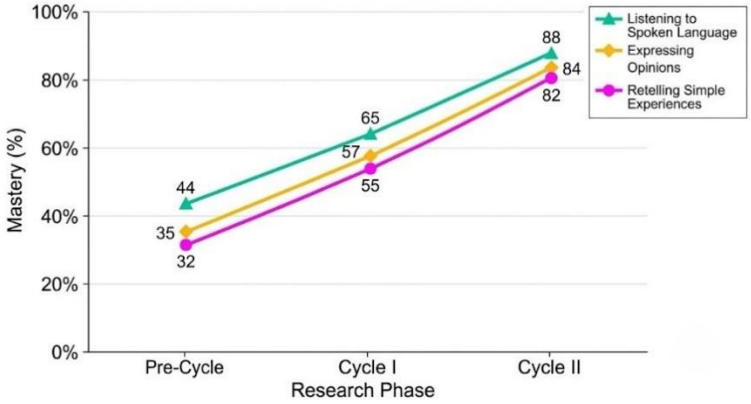

Figure 2. Differential Growth Trajectories of Selected Receptive and Expressive Language Indicators Across Phases

In contrast to the rapid acceleration observed in basic receptive processing and brief opinion formation, higher-order expressive skills required a more protracted developmental window. As illustrated by the chronological trends in Figure 2, the indicator for retelling simple experiences demonstrated the most resistant growth curve, starting at a critical baseline of 32% and ascending moderately to 55% in Cycle I, before securing a final mastery level of 82% in Cycle II.

This specific indicator was the only domain that concluded within the Expected Development tier rather than advancing fully into the Very Well Developed category. This developmental lag occurs because narrative reconstruction demands advanced cognitive sequencing, semantic retrieval, and syntactic cohesion, which are complex linguistic milestones that necessitate sustained multimodal scaffolding over a longer duration to achieve complete communicative autonomy.

3.3 Micro-Level Shifts in Receptive Language Capacities

While the macro-level statistics confirm a definitive upward trajectory in linguistic mastery, a micro-level qualitative analysis is essential to understand the behavioral transformations within the classroom environment. The expansion of receptive language capacities, which specifically encompasses listening comprehension and the tracking of operational instructions, was driven by the cognitive scaffolding provided by the interactive digital media.

In the initial pre-intervention phase, the children routinely exhibited a profound disconnect between hearing a verbal instruction and executing the corresponding action. This processing deficit manifested as a pattern of cognitive inertia, where learners remained stationary, looked at peers for behavioral cues, or required up to four verbal repetitions from the teacher before attempting compliance.

Following the systematic integration of audiovisual storytelling videos and animated prompts via the smart TV, this behavioral pattern underwent a significant shift. The multimodal delivery of information provided simultaneous auditory and visual anchors, which fundamentally accelerated the semantic processing speed of the children. To illustrate this micro-level cognitive transformation, authentic interaction snippets captured during the morning message and sharing routines are presented in Table 4, contrasting the tracking behaviors observed in early Cycle I with the automated autonomy achieved in Cycle II.

Table 4. Qualitative Interaction Snippets Demonstrating Transformations in Receptive Language Capacities

Phase & Context	Instructional Input (Teacher)	Student Behavior and Verbal Output	Receptive Processing Analysis
Cycle I (Early Stage) Theme: My Family	"Look at the smart TV screen. Please point to the	Child S10 remains silent for seven seconds, looks around at peers, and does	Delayed Compliance: The child experiences a high cognitive load when

Media: Static Digital Image	picture of the grandfather and tell me what color his hat is."	not move toward the screen. Teacher repeats: "S10, look at the grandfather on the TV. Go touch the grandfather's hat."	processing abstract verbal directives combined with a static visual. The learner requires three instructional repetitions and visual modeling from the teacher before executing the command.
Cycle II (Advanced Stage) Theme: Community Helpers Media: Interactive Storytelling Video	"Watch the animated story closely. When the fire engine rings its bell, stand up immediately and mimic the steering wheel."	As soon as the audio cue rings on the smart TV, Child S10 and the rest of the cohort stand up instantly, executing the physical motion without looking at the teacher. S10: "Look, the fire is out! Now the driver is turning right!"	Immediate Autonomy: The integration of dynamic auditory cues and real-time animation eliminates processing delays. The child maps the linguistic command onto the dynamic visual sequence instantly, resulting in rapid, autonomous instructional execution.

The qualitative evidence detailed in Table 4 underscores a profound behavioral shift from passive hesitation to instantaneous operational execution. In the Cycle I scenario, the child's receptive apparatus was overwhelmed, requiring the teacher to continually deconstruct and repeat simple directives. Conversely, the Cycle II snippet demonstrates that the interactive storytelling video functioned as an external cognitive accelerator. Because the linguistic instruction was tightly synchronized with immediate sensory feedback from the smart TV, the children no longer needed to expend excessive cognitive energy deciphering the abstract meaning of the words.

This reduction in cognitive friction allowed the children to internalize instructions on the first utterance. Furthermore, as documented in the Cycle II observation in Table 4, this heightened receptive clarity acted as a direct catalyst for spontaneous expressive speech. Once the children fully comprehended the instructional matrix through effective listening, they felt psychologically secure enough to transition immediately into vocalizing independent narrative observations, thereby bridging the gap between passive listening and active verbal engagement.

3.4 Micro-Level Shifts in Expressive Language Capacities

The ultimate benchmark of communicative autonomy in early childhood education lies within the expressive language domain, which requires young learners to actively synthesize internal cognitive concepts into structured vocal outputs. As demonstrated previously by the quantitative trajectories in Figure 2, the cultivation of expressive skills, particularly independent opinion formation and coherent narrative reconstruction, proved to be highly resistant to immediate change. To overcome this syntactic and phonological inertia, the morning meeting routines were enhanced through the deployment of dynamic digital word cards and interactive PowerPoint prompts displayed on the smart TV.

These digital artifacts functioned as real-time grammatical scaffolds, transitioning the children from passive, monosyllabic imitators into active authors of their own ideas. The structural evolution of these expressive capacities is explicitly documented in Table 5, which presents a comparative matrix of dialogue transcriptions tracking the linguistic performance of previously passive learners across the two action research cycles.

Table 5. Comparative Matrix of Student Dialogue Transcriptions Demonstrating Expressive Language Evolution

Target Learner Profile	Cycle I Expressive Performance (Initial Scaffolding)	Cycle II Expressive Performance (Advanced Autonomy)	Syntactic and Narrative Development Analysis
Child S5 Baseline: Emerging (EM) Behavior: Chronic verbal passivity and extreme public speaking anxiety	Context: Sharing routine using a static digital picture of a house. Teacher: "S5, tell the class about your bedroom." S5: "Bed... big."	Context: Interactive morning message routine utilizing dynamic digital word cards on the smart TV. Teacher: "S5, construct a sentence on the TV to	Transition to Syntactic Cohesion: In Cycle I, the child exhibits severe syntactic fragmentation and relies entirely on direct teacher promptings. In Cycle II, the digital word cards

	Teacher: "Can you say it in a full sentence? My bed is..." S5: "My bed... is big." [whispering, immediately looks down]	tell us what a doctor does." S5: [Comes forward, touches the digital cards sequentially] "The doctor helps sick people in the big hospital so they can smile again!" [Spoken clearly with high confidence]	provide a visual sequencing map that reduces phonetic retrieval anxiety, enabling the independent production of a complex compound sentence.
Child B12 Baseline: Not Yet Developed (NYD) Behavior: Total silence, peer mimicry	Context: Group activity phase attempting to retell a simple story. Teacher: "B12, what did the little rabbit do in the video?" B12: [Remains silent for ten seconds, then repeats the exact words of a peer] "Rabbit... run away."	Context: Storytelling routine using interactive PowerPoint animation sequences controlled by the children. Teacher: "B12, click the next slide and tell us what happens to the puppy." B12: "First, the puppy lost his bone under the tree. Then, he looked inside the box and found it. He was very happy!"	Evolution of Narrative Autonomy: The child evolves from complete echolalia and peer dependency in Cycle I to autonomous narrative sequencing in Cycle II. The interactive animation acts as a chronological anchor, enabling the logical articulation of a multi-clause chronological story.

The transcriptions compiled in Table 5 provide empirical proof of a deep linguistic shift, moving away from fragmented utterances toward complex, independent sentence production. During Cycle I, the expressive production of Child S5 was heavily constrained by grammatical uncertainty, requiring the instructor to provide immediate textual frameworks to elicit a basic complete sentence. This limitation was entirely bypassed in Cycle II through the introduction of digital word cards. Because these digital cards transformed abstract syntax into movable visual blocks on the smart TV, the learner could physically manipulate and organize the components of a sentence prior to vocalization. This interactive process neutralized the cognitive fear of sentence construction, allowing the child to articulate a sophisticated compound sentence with high verbal confidence and clear articulation.

Similarly, the narrative evolution of Child B12 highlighted in Table 5 underscores the pedagogical value of integrating technology into the morning routine. The child's early performance was characterized by echolalia, which is the immediate, non-functional mimicry of peer speech caused by a lack of vocabulary and structural understanding. By Cycle II, however, when the child was given physical control over the interactive PowerPoint animation sequences, the digital interface acted as a visual anchor for memory retrieval.

By aligning the progression of the story with the physical act of clicking through the slides, the child successfully organized their thoughts into a coherent chronological structure. This systematic interaction allowed the learner to use sequential adverbs such as first, then, and consequently without teacher intervention. Therefore, the micro-level evidence in Table 5 demonstrates that the combination of interactive digital media and structured morning dialogues successfully unlocks the communicative agency of young learners, transforming passive classroom participants into autonomous and confident communicators.

4. DISCUSSION

4.1. The Cognitive Mechanics of Multimodal Scaffolding

The substantial linguistic growth observed throughout this intervention cannot be attributed merely to the superficial novelty of digital devices in the classroom, but must be systematically understood through the lens of cognitive psychology and multimedia learning architectures. The observed improvements in both receptive and expressive language skills are directly explained by Cognitive Theory of Multimedia Learning, which posits that the human information processing system comprises two separate channels, namely the auditory-verbal channel and the visual-pictorial channel (Mayer, 2024). Traditional early childhood instructions frequently fail because they induce excessive cognitive load, overloading the auditory channel through prolonged, abstract teacher monologues while leaving the visual channel completely underutilized. By restructuring the morning meeting routine to incorporate synchronized digital text, high-fidelity audio, and real-time animations, the instructional design distributed information across complementary verbal and visual processing channels. The integration of interactive PowerPoint presentations, automated storytelling videos, and digital word cards provided immediate visual referents for linguistic input, thereby reducing unnecessary processing demands and minimizing extraneous

cognitive load through well-structured multimedia design (Chen et al., 2023; Skulmowski & Xu, 2022; Trypke et al., 2023).

From a cognitive perspective, reducing extraneous cognitive load frees the limited capacity of learners' working memory, enabling greater cognitive resources to be allocated to meaningful information processing, schema construction, and learning rather than to unnecessary processing demands (Chen et al., 2023; Skulmowski & Xu, 2022; Taylor et al., 2022). Early childhood learners, particularly those aged 5–6 years, have relatively limited working memory capacity and are therefore more susceptible to cognitive overload when presented with complex verbal information that lacks appropriate instructional scaffolding (Cowan, 2022; Superbia-Guimarães & Cowan, 2023; Vernucci et al., 2021). When extraneous cognitive load is minimized through precise multimodal alignment, vital cognitive processing space within the working memory is instantly liberated. In this study, the liberated working memory capacity was strategically repurposed for germane cognitive processing, which is the deep mental effort dedicated to constructing accurate mental schemas and mapping vocabulary onto concrete concepts.

Instead of expending their limited cognitive resources on interpreting abstract auditory instructions, children were able to allocate a greater proportion of their working memory capacity to meaningful language processing. These higher-order cognitive processes included semantic retrieval, syntactic organization, and phonological encoding during oral language production. This interpretation is consistent with the improvements observed in Table 5, where children who had previously demonstrated limited verbal participation began to produce longer utterances, multi-clause sentences, and increasingly independent opinions. Furthermore, the visual-spatial organization provided by the digital word cards and interactive presentation slides functioned as an external cognitive scaffold, enabling children to organize linguistic information visually before expressing it orally.

Consequently, the present findings expand recent evidence indicating that technology-rich learning environments promote children's vocabulary growth and narrative comprehension by integrating multimedia features, interactive digital storybooks, and teacher-supported digital learning experiences (Chu et al., 2024; S. Liu et al., 2024). Building on this evidence, the present study suggests that multimodal stimulation not only facilitates receptive language comprehension but also supports higher-order cognitive processing by optimizing working memory resources, thereby fostering expressive language production and communicative autonomy among young children.

4.2 Social Interaction and Dialogic Agency in Morning Meetings

The observed transition from teacher-led monologues to dialogic peer interaction is consistent with sociocultural perspectives that view language as socially constructed through collaborative interaction and with scaffolding principles that emphasize graduated instructional support during meaningful communication (Cong-Lem, 2022; Mihai & Classen, 2023). From a Vygotskian perspective, higher-order cognitive functions, including language development, emerge through socially mediated interactions and are shaped by culturally derived semiotic systems, collaborative meaning-making, and symbolic tools embedded within children's everyday learning environments (Bao, 2025; Creaghe & Kidd, 2022). In this study, the traditional morning meeting routine, encompassing greeting, sharing, group activities, and morning messages, established a predictable, secure social infrastructure that catalyzed these verbal exchanges. By embedding interactive digital tools into this routine, the digital media functioned not as an isolated distraction, but as a dynamic Brunerian scaffold that adjusted to the emerging zones of proximal development of the children. As demonstrated by the behavioral progressions in Table 4, the initial scaffolding required significant teacher mediation, which was systematically dismantled as the children internalized the multimodal cues and advanced toward complete communicative autonomy.

This pedagogical transition was associated with noticeable changes in classroom interaction, shifting the learning environment from predominantly teacher-centered communication toward more child-centered and dialogic participation. Baseline observations indicated that conventional morning meeting activities were largely characterized by teacher-led explanations, which provided relatively limited opportunities for children to initiate conversations or express their own ideas. Following the introduction of multimodal digital resources, including interactive PowerPoint presentations and customizable digital word cards, classroom interactions became increasingly collaborative and learner-centered. As illustrated in Table 5, these digital resources served as shared visual reference points that supported joint attention and encouraged children to participate more actively in peer and teacher–child dialogue.

Children evolved from passive participants who practiced direct peer mimicry or echolalia into active agents capable of initiating dialogue, formulating independent opinions, and negotiating meaning with peers. This finding aligns with Rönnerman & Nordberg (2026) and Liu et al. (2024), who observed that structured circle activities combined with engaging media significantly enhance speaking confidence and vocabulary production. Ultimately, by integrating technology with social interaction, the morning routine became a powerful dialogic space where children felt psychologically secure enough to exercise their linguistic agency, proving that digital multimodality can reinforce the sociocultural fabric of early childhood classrooms.

4.3 Convergence of Technology and Routine: Novelty and Global Implications

The integration of technology and social routine established in this study offers a compelling counter-narrative to traditional debates within early childhood education literature. Historically, a distinct binary division has characterized empirical inquiries in this domain. On one side of this spectrum, systematic investigations such as those by Liu et al. (2024), Izadpanah (2024), Zhu et al. (2024) and Chu et al. (2024) have thoroughly evaluated the individualistic benefits of digital technologies, focusing heavily on screen-mediated vocabulary acquisition and software-guided literacy progress. On the opposite side, scholars like Rönnerman & Nordberg (2026) and Minerva Toso et al. (2025) have isolated face-to-face circle structures, examining their capacity to support oral development completely devoid of technological intervention. By combining these two previously separate domains, this study establishes its unique novelty, introducing an integrated pedagogical architecture where digital media directly enriches the collaborative, face-to-face dialogic routines of young learners.

The primary theoretical contribution of this research lies in its empirical refutation of the widespread tech-pessimism that frequently dominates early childhood discourses. A prevalent concern in the early childhood literature is that excessive or poorly mediated digital exposure may reduce opportunities for peer interaction and natural communicative exchanges, potentially contributing to less favorable social communication outcomes (Mallawaarachchi et al., 2024; Misirli et al., 2025). However, the data synthesized in this action research paradigm, as illustrated by the substantial classical mastery leaps in Table 3 and the micro-level transformations in Table 4 and Table 5, clearly demonstrate an opposite outcome. When digital tools are structurally embedded within a collaborative morning routine rather than utilized as isolated individual activities, they function as a robust social glue. The interactive digital artifacts on the smart TV provided a shared visual and conceptual anchor, which did not detach children from their surroundings but instead provoked immediate collaborative dialogues and the negotiation of meaning. Thus, technology can effectively amplify organic social interactions when intentionally aligned with interactive group routines.

Furthermore, this study offers critical practical implications for early childhood educators operating within developing countries or resource-constrained settings. Many technology-enhanced interventions reported in the recent literature rely on dedicated digital devices, including tablets, computers, or specialized educational software, which may present implementation and affordability challenges for schools in many low- and middle-income countries (Baek et al., 2023; R. Liu et al., 2023; S. Liu et al., 2024). In contrast, this research proves that a high-impact, scalable model can be achieved utilizing low-cost digital assets that are already accessible to many schools, specifically basic presentation software, digital word cards, and a singular shared display screen. By demonstrating that an interactive display setup can systematically raise classroom language mastery to 86.2 percent, as shown by the progressive growth of individual language indicators in Figure 2 and the overall mastery level in Table 3, this framework offers a highly accessible blueprint for international educators. It provides a strategic method to bridge the digital divide, allowing resource-constrained classrooms to achieve superior linguistic and multimodal literacy outcomes without requiring prohibitive financial investments.

4.4 Methodological Reflexivity, Limitations, and Future Directions

A key aspect of practitioner-led action research is the explicit consideration of methodological strengths and limitations. In this study, the collaboration between the researcher and the classroom teacher enhanced the ecological validity of the intervention by ensuring that the instructional activities were implemented within the children's regular classroom routines. Because the intervention was embedded in the existing morning meeting activities, children participated in familiar learning situations rather than unfamiliar experimental settings. This approach enabled the collection of observational and interactional data under authentic classroom conditions throughout the two action research cycles.

Despite these strengths, several limitations should be considered when interpreting the findings. First, the study involved a relatively small sample consisting of 17 children from a single early childhood education center. Although this context allowed for an in-depth examination of children's language development during the intervention, the findings cannot be readily generalized to other educational settings with different cultural, socioeconomic, or institutional characteristics. Second, the intervention was conducted over only two action research cycles. Consequently, the study captured short-term improvements in children's language performance but did not examine whether these gains were maintained over an extended period.

These limitations provide several directions for future research. To improve the generalizability of the findings, future studies should involve larger samples drawn from multiple schools representing diverse geographical and socioeconomic contexts. In addition, complementary research using quasi-experimental or randomized controlled trial designs would provide stronger evidence regarding the effectiveness of multimodal digital morning meeting interventions. Comparing classrooms implementing digital-supported morning meetings with those using conventional morning meeting practices would also help distinguish the specific contribution of multimodal digital media from children's natural developmental progress.

Future research may also explore the integration of emerging educational technologies into collaborative classroom routines. For example, artificial intelligence–supported learning applications, adaptive digital storytelling systems, and intelligent gamified learning platforms could be incorporated into morning meeting activities to provide more personalized language support while maintaining meaningful face-to-face interaction. Examining how these technologies can complement teacher guidance and peer interaction may contribute to the development of more effective, child-centered language learning environments in early childhood education.

5. CONCLUSION

In conclusion, this action research project successfully demonstrates that the intentional integration of digital-based multimodal stimulation into early childhood morning meeting routines yields a profound acceleration in both receptive and expressive language domains. Prior to the intervention, the student cohort exhibited deep-seated communicative constraints, low instructional tracking speed, and severe public speaking anxiety, culminating in a critical baseline classical mastery of only 41 percent. Following two systematic instructional cycles, this baseline profile was entirely transformed, with overall classical completeness rising exponentially to 86.2 percent. Qualitative observations and dialogue transcriptions corroborate this numerical progress, revealing that young learners successfully shifted from chronic verbal passivity and mechanical peer mimicry to autonomous opinion formation and coherent narrative reconstruction.

The pedagogical efficacy of this framework is fundamentally rooted in its dual-channel design, which strategically aligned with the cognitive architecture of multimedia learning. By synchronizing interactive presentations, automated storytelling videos, and customizable digital word cards on a single smart TV display, the redesigned routine minimized extraneous cognitive load and liberated vital working memory resources for high-order linguistic processing. This cognitive optimization operated in tandem with Vygotskian sociocultural dynamics, wherein the digital media functioned as a flexible Brunerian scaffold that lowered phonetic retrieval anxiety and shifted the locus of classroom control. Consequently, the morning routine evolved from a rigid, teacher-centered monologue into a child-centered dialogic space where children could confidently exercise their communicative agency.

Beyond its immediate institutional context, this study offers a scalable, economically viable model for international educators navigating resource-constrained early childhood settings. By proving that significant linguistic advancements can be achieved without relying on expensive individual tablet devices, this research provides a cost-effective blueprint to bridge the digital divide in developing countries using existing, shared display technologies. While future inquiries must expand this paradigm through multi-centered quasi-experimental designs and adaptive artificial intelligence platforms, the current study stands as a vital empirical contribution. It successfully demonstrates that when digital tools are structurally embedded within face-to-face collaborative routines rather than isolated individual tasks, technology acts as an essential social glue that unlocks the full communicative autonomy of young learners in the digital age.

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