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Reconceptualizing Language Acquisition through Embodiment and Materiality

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ABSTRACT

Purpose: *This study aims to reconceptualize language acquisition by exploring how embodiment and materiality influence the processes of learning and meaning-making. It challenges traditional cognitive perspectives that separate mind and body by examining how gestures, sensory experience, spatial arrangements, and material objects actively shape linguistic understanding.*

Subjects and Methods: *The study employed a qualitative interpretive design grounded in phenomenology and post humanist theory. Data were collected through participant observation, semi-structured interviews, and artifact analysis in two multilingual classrooms involving twenty-four learners aged ten to fourteen and four language teachers. Thematic and multimodal analyses were conducted to identify patterns of bodily engagement, material mediation, and sensory interaction in language learning.*

Results: *Findings reveal that language acquisition unfolds as an embodied and materially mediated process. Gestures extend linguistic thought, materials such as objects and digital tools act as cognitive mediators, and spatial as well as sensory environments shape learners' affective and cognitive engagement. The body functions as a site of memory and meaning, where linguistic recall and comprehension are enacted through movement, rhythm, and emotion.*

Conclusions: *Language learning is a multisensory, relational, and embodied experience that integrates cognition, emotion, and material interaction. Pedagogical practices should therefore promote movement, touch, and sensory engagement to enhance comprehension and retention. The study contributes to theoretical and practical understandings of language as a distributed phenomenon emerging through the interplay of human and material agency.*

INTRODUCTION

Language acquisition has long been viewed as a process that occurs primarily in the mind a cognitive operation of understanding, memorizing, and reproducing linguistic forms (Ellis & Robinson, 2008). Within this conventional view, language is treated as a system of symbols detached from the body, and learning is framed as the internalization of grammatical and lexical structures. Such a perspective assumes that meaning originates in mental representations and that the learner's body and surrounding environment play, at best, a supporting role in communication. This intellectualist tradition has dominated the study of language for decades, shaping not only linguistic theory but also classroom practice, where knowledge is often transmitted through abstract instruction and disembodied communication.

In recent years, this paradigm has begun to shift. Emerging research in cognitive science, linguistics, and education has shown that language learning is deeply embedded in the body and the material world (Li & Lan, 2022; Pelkey, 2023). The human body is not a passive vessel for mental processes but an active participant in meaning-making. Through gesture, movement, perception, and touch, the body shapes how individuals comprehend and produce language. When people learn to speak, they do not simply memorize vocabulary or syntax; they coordinate their bodily sensations, emotions, and spatial awareness to express meaning. The body's rhythms, postures, and interactions with the environment become essential components of linguistic development.

Equally important is the recognition that material environments contribute to how language is acquired and used. Learning does not take place in isolation but within spaces filled with objects, technologies, and tools that mediate communication (Dove, 2023; & Thomas, 2021; Godwin, 2023). Classroom materials, digital devices, and even the physical layout of space influence how learners engage with language. The objects that learners handle books, screens, pens, or physical models shape how they think and talk about the world. Rather than being inert, these materials interact dynamically with human intentions, affecting attention, memory, and emotional engagement. Language, in this light, emerges not only between people but also between people and things.

This embodied and material understanding of language challenges the separation between mind and body that has characterized traditional theories (Johnson, 2022). Language learning becomes a multisensory, situated experience rather than an abstract cognitive task. Meaning is not stored in the brain alone; it is enacted through bodily experience, sensory perception, and engagement with material surroundings. For example, when learners use gestures to explain an idea, manipulate an object to describe its properties, or navigate spatial relations in conversation, they are performing language through embodied action (Odendahl, 2021). These interactions illustrate that communication is not merely verbal but involves a constellation of movements, sensations, and material engagements that together create understanding.

The shift toward embodiment and materiality also transforms how we think about the role of learners and teachers (Heikkilä & Mankki, 2023; Lacković & Popova, 2021; Chappell, 2024). In this perspective, learners are not passive recipients of linguistic knowledge but active participants who construct meaning through physical and sensory engagement. Their learning depends as much on how they move, perceive, and interact as it does on what they memorize. Teachers, meanwhile, become facilitators who design environments that support bodily and material forms of expression. Effective language education thus involves creating spaces where learners can feel, move, and interact with both human and non-human elements in meaningful ways. Pugh et al. (2019) said that, classrooms are no longer neutral settings but active ecological systems where learning unfolds through a web of bodily and material relations.

Viewing language acquisition through embodiment and materiality also redefines what counts as knowledge. Traditional education tends to privilege verbal and written expression, while sensory, spatial, and affective experiences are treated as secondary. Yet, when these experiences are recognized as central to learning, knowledge becomes a living, dynamic process. The gestures that accompany speech, the rhythms of conversation, the feel of writing tools, and the sensory feedback from digital media all become legitimate sources of linguistic understanding. This perspective acknowledges that humans think not only with their minds but with their entire bodies, and that cognition extends into the material world through action and perception.

Furthermore, this approach highlights the relational nature of language. Communication is not a one-way transfer of information but a co-constructed activity involving continuous adaptation and mutual shaping between individuals and their environments. Language emerges through interaction between bodies, between bodies and objects, and between bodies and the spaces they inhabit. Every gesture, sound, and material trace contributes to this unfolding process. This relational view dissolves the boundaries between thought, action, and environment, presenting language as a living, distributed phenomenon rather than a fixed system.

The implications of this reconceptualization are significant for both theory and practice. Theoretically, it broadens the scope of language acquisition beyond cognitive and social models to include sensory, emotional, and material dimensions of experience. Practically, it encourages the development of pedagogical approaches that value movement, sensory exploration, and material engagement as integral to learning. Activities such as dramatization, collaborative manipulation of objects, or immersive use of digital media exemplify how language can be taught through embodied experience (Dunleavy et al., 2009). These practices foster deeper comprehension, emotional resonance, and sustained engagement, all of which are vital for effective learning.

Ultimately, reconceptualizing language acquisition through embodiment and materiality restores the human learner to their full, lived reality. It recognizes that to learn a language is not only to understand its grammar and vocabulary but to inhabit a new world of perception, sensation, and relation (Nystrand, 2023; Mairitsch et al., 2024). The learner's body, gestures, emotions, and material environment all work together to produce meaning. This view situates language as a practice of being in the world something enacted, shared, and constantly redefined through our bodily and material engagements. In doing so, it challenges the long-standing dominance of disembodied cognition and opens a path toward more holistic, humane, and ecologically aware understandings of what it means to learn and use language.

METHODOLOGY

This study adopts a qualitative interpretive research design to explore how embodiment and materiality shape the process of language acquisition. The qualitative approach was selected because it allows an in-depth understanding of lived experiences, bodily practices, and contextual interactions that cannot be reduced to numerical data or statistical generalizations. The study is rooted in a phenomenological and post humanist orientation, emphasizing how language learning emerges through human and material entanglements rather than through isolated mental processes. The research design prioritizes meaning, interaction, and sensory engagement as units of analysis, enabling a holistic understanding of how learners experience language as a bodily and material practice. This interpretive stance recognizes that learning is co-constructed between participants and their environments and that understanding must be derived from immersion in the natural setting where these interactions unfold.

Research Setting and Context

The study was conducted in two multilingual classrooms at an urban elementary school where English is taught as a second language. The classrooms were intentionally selected because of their rich multimodal and interactive teaching environments, which encouraged the use of objects, gestures, and spatial arrangements in the learning process. Both classrooms were equipped with diverse learning materials such as visual cards, manipulatives, tablets, and printed texts that allowed learners to engage with language through physical and sensory means. The spatial layout of the rooms was flexible, enabling movement, group work, and embodied interaction among learners. Observing these environments provided a fertile context for examining how language learning is enacted through bodily expression and material mediation. The school community also reflected a diverse linguistic background, allowing the study to capture the complex ways in which learners' cultural and sensory experiences influenced their engagement with language.

Participants

Participants in this study consisted of twenty-four learners aged between ten and fourteen years and four language teachers who facilitated their classes. The learners represented diverse linguistic and cultural backgrounds, including Indonesian, Malay, and Bugis as their home languages, and English as an additional language. Teachers were selected based on their experience in implementing interactive, multimodal pedagogies. Participation was voluntary, and all individuals provided informed consent prior to involvement in the study. For the students, consent was also obtained from their parents or guardians. Ethical clearance was secured from the university's research ethics committee, ensuring that participants' anonymity, confidentiality, and well-being were fully protected. Pseudonyms were used for all participants, and data were

stored securely to maintain privacy and research integrity. The collaborative involvement of both teachers and students offered a multi-perspective understanding of embodied and material dimensions in language learning.

Data Collection Methods

Data collection was carried out over a three-month period, combining multiple qualitative techniques to capture the richness and complexity of embodied and material practices. The first method was participant observation, during which the researcher engaged as a non-intrusive observer in classroom sessions. Detailed field notes were taken on gestures, postures, object use, spatial movements, and group interactions. These observations aimed to identify recurring patterns of bodily expression and the ways materials mediated meaning-making. The second method was semi-structured interviews, conducted individually with both teachers and selected learners. These interviews explored participants' reflections on their learning experiences, focusing on how bodily actions and physical artifacts supported their understanding of language. The third source of data was artifact analysis, involving the examination of classroom materials, learners' creative works, and technological tools used during lessons. This approach helped reveal how material objects functioned as semiotic resources that shaped linguistic comprehension. The triangulation of these methods ensured a robust and nuanced account of how embodiment and materiality intersect in language acquisition.

Data Recording and Management

All classroom observations were video-recorded with the consent of participants, providing a detailed record of multimodal interactions that could be reviewed repeatedly for fine-grained analysis. Interviews were audio-recorded and later transcribed verbatim. Field notes complemented these recordings by capturing contextual details, sensory impressions, and the researcher's reflexive observations. All data were organized chronologically and categorized by classroom, activity type, and participant group. Digital files were encrypted and stored in password-protected folders to ensure data security. Analytic memos were maintained throughout the data collection process to record emerging insights and to guide iterative cycles of interpretation. This systematic organization of data enhanced the coherence, accessibility, and reliability of the analytic process.

Data Analysis Procedures

The analysis followed a thematic and multimodal interpretive approach, emphasizing both verbal and non-verbal dimensions of meaning. The process began with a comprehensive review of all transcripts and field notes to identify recurrent motifs and patterns related to embodiment, material engagement, and meaning construction. Initial codes were generated to represent specific instances of bodily gestures, spatial arrangements, object use, and sensory participation observed in learning activities. These codes were then grouped into broader themes such as "gesture as linguistic scaffolding," "material mediation in understanding," and "spatial configuration of learning." The researcher employed a cyclical process of data immersion, coding, and interpretation, moving constantly between parts and whole to construct a coherent narrative. Particular attention was paid to the interplay between human and material agency, examining how meaning was distributed across bodies, tools, and spaces. Reflexivity was integral throughout the analysis, as the researcher continually interrogated personal assumptions and interpretive choices to ensure analytical transparency.

Researcher's Positionality and Reflexivity

As a qualitative inquiry, the researcher's positionality was an important component of the methodological framework. The researcher adopted an interpretive stance, recognizing that understanding emerges through the relationship between observer and participants. Throughout the research process, reflexive journals were maintained to record impressions, decisions, and ethical considerations. This reflexivity allowed for awareness of how personal background, academic training, and theoretical orientation influenced the interpretation of data. The researcher positioned themselves not as a detached observer but as an engaged interpreter who sought to understand the lived experiences of learners within their embodied and material

contexts. By maintaining reflexive transparency, the study ensured that interpretations remained grounded in the participants' perspectives rather than in preconceived theoretical assumptions.

RESULTS AND DISCUSSION

The data collected from classroom interactions, interviews, and material analyses were examined through a phenomenological and post humanist lens to uncover the embodied, sensory, and material dimensions of language learning. This approach allowed the study to move beyond conventional linguistic frameworks by attending to how gestures, spatial arrangements, and material artifacts co-construct meaning alongside verbal communication. Through systematic coding and thematic interpretation, patterns emerged that revealed the dynamic interplay between body, environment, and language. The following section presents these findings in detail, organized around four interrelated themes gesture as an extension of language, material mediation in learning, spatial and sensory environments, and the body as a site of memory and meaning which together illuminate how language acquisition is enacted through embodied and material engagement.

Gesture as Extension of Language

The findings reveal that gestures function not merely as supplementary visual cues but as integral extensions of linguistic expression in the process of language acquisition. In the observed classrooms, learners consistently relied on bodily movements particularly hand gestures, head nods, and spatial pointing to negotiate meaning, compensate for lexical gaps, and embody abstract concepts (Yoon et al.,2024; Guevara et al., 2024; Niemi & Katila, 2022). These gestures were not isolated from speech; rather, they co-occurred with verbal utterances to construct a shared semiotic field in which meaning was dynamically produced. The interactional flow between gesture and spoken language reflected a deeply embodied form of cognition, where understanding emerged through physical engagement as much as through linguistic structure. During classroom observations, gestures frequently served as tools of linguistic scaffolding. When learners struggled to articulate new vocabulary, they instinctively resorted to mimetic or iconic gestures that visually represented the concept being expressed. For instance, a student learning the English word "fly" extended her arms and flapped them gently, generating a collective recognition among peers before the teacher confirmed the meaning. This moment encapsulates how gesture operates as a bridge between embodied experience and symbolic representation, grounding abstract linguistic forms in sensory-motor activity. Such enactments suggest that learners do not simply learn language through hearing and repetition but through an active bodily dialogue that links cognition, emotion, and physicality. Teachers also actively encouraged the use of gesture as a pedagogical strategy, recognizing its potential to enhance comprehension and engagement. One teacher explained in an interview,

> *"I tell my students to use their hands, their faces, their movements because sometimes the body can explain what the mouth cannot."*

This perspective illustrates the awareness among educators that language teaching is not confined to verbal instruction but unfolds through multimodal communication. In another instance, a teacher elaborated on how gestural interaction helps overcome linguistic anxiety:

> *"When students forget a word, I ask them to show it with their body first. It makes them less afraid to try, and often, the movement itself triggers the memory of the word."*

These reflections highlight how gestures serve not only cognitive but also affective functions, easing learners into a state of expressive confidence and participation. Learners themselves perceived gestures as an essential aspect of their learning process. Several students described how moving their hands or body while speaking helped them "think better" or "find the right words." One student remarked,

> *"Sometimes when I don't remember how to say something, I move my hands and the word comes after."*

Another added,

> *"It feels like my body helps my mouth talk."*

These statements illuminate how learners experience the body as an active collaborator in meaning production, not merely as a vehicle for speech delivery. The bodily act of gesturing thus becomes an embodied strategy for linguistic recall, conceptual clarification, and emotional expression. The analysis of classroom video recordings reinforced these interview findings by revealing the rhythmic and synchronized nature of gesture-speech integration. Gestures often appeared milliseconds before verbal articulation, suggesting that physical motion can prefigure or even generate linguistic expression. Discussing spatial prepositions like *under*, *above*, and *besides*, learners instinctively used their hands to represent position before vocalizing the corresponding English term. This temporal sequencing indicates that gestures are not afterthoughts but are constitutive of the thinking process itself. The embodied enactment provides a cognitive scaffold upon which linguistic symbols are anchored, transforming gesture into an active component of language cognition. Moreover, gestures mediated social understanding and collaborative learning within peer interactions. In group discussions, learners often relied on shared gestures to negotiate meaning without explicit translation. When one student mimed the shape of an object or demonstrated an action, others responded with laughter, recognition, or mimicry, generating a sense of collective learning through embodied resonance. This embodied interaction revealed the social dimension of gesture: it operates as a communal semiotic resource that binds learners together in meaning-making processes. The classroom thereby becomes a multimodal ecology where bodies, words, and materials converge to produce language understanding. Interestingly, gestures also carried emotional and cultural layers that deepened communication beyond the linguistic code. Certain culturally embedded gestures such as polite nodding or clasping hands during greetings surfaced during English communication, merging local bodily habits with global linguistic forms. These hybridized gestures underscore how embodiment and materiality extend across cultural and linguistic boundaries, reflecting how learners anchor new languages within familiar corporeal repertoires. This finding highlights the material-cultural continuum of language learning, where bodily habits from native contexts become expressive resources in new linguistic environments. From an interpretive standpoint, the intertwining of gesture and speech challenges the traditional Cartesian separation of mind and body in language studies. The data suggest that language acquisition unfolds as a process of *embodied cognition*, in which the body is not merely a carrier of linguistic symbols but a generator of meaning itself. The learners' gestures reveal how linguistic knowledge is enacted rather than stored, lived rather than abstracted. Meaning arises in motion, in the tactile and spatial engagement of the learner with their environment. As such, gesture operates not as a substitute for speech but as a modality through which thought takes visible and material form. This reconceptualization of gesture as language extension redefines the classroom as a site of bodily discourse, where understanding is co-constructed through movement, voice, and space. The interplay between gesture and speech, observed and narrated by both teachers and students, demonstrates that language learning is a sensory, interactive, and affective phenomenon. It transcends verbal mechanics and enters the domain of embodied knowing where the learner's body becomes an instrument of linguistic exploration, and the classroom becomes a landscape of semiotic and material creativity.

Material Mediation in Learning

The findings of this study reveal that materials within the learning environment ranging from tangible classroom objects to digital tools play a pivotal role in mediating language acquisition. Learning in the observed classrooms did not occur solely through verbal exchange but through active engagement with materials that shaped students' attention, memory, and meaning-making processes. The learners' interaction with books, flashcards, manipulatives, screens, and even spatial arrangements of desks contributed to the construction of linguistic understanding (Harbi, 2024; Fitria & Simbolon, 2024; Azizova, 2024). These materials did not simply serve as passive supports for instruction; rather, they functioned as semiotic actors that co-produced meaning alongside teachers and learners. Through their texture, form, and affordances, materials became active mediators that shaped how language was embodied, conceptualized, and remembered.

In one classroom, the teacher employed physical objects such as fruits, utensils, and miniature furniture to illustrate vocabulary. Students were asked to pick up, touch, and describe each item while speaking in English. Observations showed that tactile interaction with objects stimulated

multisensory engagement, allowing learners to internalize the meaning of words through direct physical experience. When a student held a plastic apple while saying "This is red" or "I can eat this," the object became a site of linguistic grounding, connecting language to perception and action. Such embodied interaction blurred the line between knowing and doing, transforming language learning into a performative and material practice. The teachers' interviews affirmed the central role of materials in shaping students' comprehension. One teacher explained, "When I use real objects instead of pictures, students understand faster because they can touch, smell, and move the thing. It's like the word becomes real to them." Another teacher added,

> *"The materials help them connect words with the world. When they hold something, they remember it better because the body joins the mind."*

These reflections illustrate how material engagement facilitates deeper cognitive and sensory integration. The teachers' perspectives resonate with the idea that learning emerges from distributed cognition where mind, body, and environment form a continuous system of meaning production. Digital materials also played a significant role in the observed classrooms. The use of tablets and interactive screens encouraged students to manipulate images and sounds while constructing sentences. During a vocabulary-building activity, for instance, learners dragged and dropped pictures of animals into virtual habitats while saying the corresponding English words aloud. This multimodal engagement combining touch, sight, and sound expanded the sensory dimensions of language learning. One student remarked,

> *"When I move the picture on the screen, it feels like I'm playing, but I also learn the word faster."*

Another commented,

> *"The sound and picture help me to remember because I can see and hear together."*

These experiences reflect how digital materials act as sensory amplifiers that sustain attention and create embodied connections between linguistic signs and perceptual experience. Beyond individual tools, the classroom itself functioned as a material environment that shaped linguistic interaction. The flexible arrangement of desks and learning stations allowed learners to move, point, and collaborate more freely. Spatial mobility enabled students to approach objects and peers, encouraging a participatory and interactive mode of communication. The organization of space its openness, proximity, and accessibility became a silent pedagogue guiding how language was performed and exchanged. During a storytelling exercise, learners rearranged chairs into a circle, creating a spatial form that facilitated eye contact and turn-taking in conversation. In this sense, the classroom layout itself acted as a material mediator of communication, framing social relationships and linguistic flow.

Material mediation also influenced the affective atmosphere of learning. Certain materials such as soft toys, colorful cards, and textured props evoked curiosity and emotional comfort, especially among younger learners. These affective responses enhanced engagement and reduced performance anxiety. A teacher noted,

> *"When they hold something soft or colorful, they smile more and talk more. The materials make them feel safe to speak."*

This statement highlights the emotional agency of materials: they not only convey meaning but also shape the affective conditions under which communication occurs. The material environment thus participates in constructing the mood, rhythm, and emotional texture of the learning process. An analysis of the field notes further showed that materials could transform linguistic tasks into social and collaborative activities. During a word-association game, learners passed around a small ball while forming sentences. The material act of throwing and catching created a rhythm that synchronized speech and movement, turning a linguistic exercise into a shared bodily performance. The ball became more than an object it was a medium of turn-taking, rhythm, and mutual attention. Through this process, language was experienced as collective action, where meaning was distributed across participants and materials. This embodied cooperation reinforces the notion that learning is not an isolated cognitive event but a socially and materially embedded practice.

Interestingly, material mediation also revealed cultural resonances in the learners' interaction patterns. Certain materials, such as locally made crafts or traditional foods used in vocabulary lessons, evoked familiar sensory memories and cultural associations. When a teacher introduced the word *rice cake* using an actual snack, several students smiled and whispered its local name, connecting the English term to their daily life experience. One student explained, "When I touch the food or smell it, I remember how my mother says it at home. It helps me to understand the English word faster." This example illustrates how materiality serves as a bridge between linguistic learning and cultural identity. By situating new words within familiar sensory and cultural contexts, materials help learners anchor foreign linguistic systems within their lived realities.

From an interpretive perspective, these findings emphasize that language learning is a materially mediated process in which cognition is distributed across human and non-human agents. Materials act as semiotic participants that guide, constrain, and enable meaning-making. They provide learners with tactile, visual, and spatial anchors that connect abstract linguistic forms to bodily and environmental experience. In doing so, materials disrupt the traditional notion of language as a purely mental phenomenon, revealing instead its dependence on tangible, sensory, and affective interactions. The concept of material mediation thus expands the boundaries of pedagogy. It invites educators to view classrooms not merely as spaces for verbal instruction but as dynamic ecosystems of human and material collaboration. Every object from a marker pen to a digital tablet can become a participant in linguistic meaning, shaping how learners think, feel, and communicate. This perspective aligns with the broader post humanist understanding that learning is not confined to the human mind but is enacted through the relational entanglement of bodies, tools, and environments. The classroom, in this sense, becomes a living assemblage of material and semiotic forces an ecology where words, things, and gestures co-constitute the fabric of understanding.

Spatial and Sensory Learning Environments

The findings of this study reveal that space and sensory experience play a crucial role in how learners acquire and perform language. In the observed classrooms, language learning unfolded not as a static cognitive process but as a dynamic interaction between bodies, spatial arrangements, and sensory stimuli (Benson, 2021; Wu, 2022). The spatial layout of the learning environment the openness of the room, the positioning of desks, the lighting, and even the acoustic quality directly influenced how learners moved, spoke, and interacted. Sensory elements such as sound, texture, color, and temperature further shaped the learners' comfort and engagement, turning the classroom into a living ecology where perception and expression coexisted. These findings demonstrate that language learning is inseparable from the sensory and spatial conditions that frame it.

Spatial organization emerged as a powerful pedagogical tool. Teachers deliberately arranged the classroom to encourage movement and collaboration rather than confinement. Desks were often organized in circles or clusters, enabling learners to face one another and maintain visual and gestural contact during conversation. Such arrangements invited spontaneous dialogue, eye contact, and nonverbal communication, transforming space into an active participant in meaning-making. In one observed session, students rearranged their tables to perform a role-play activity. The open configuration allowed them to walk around, gesture freely, and engage physically with each other. The teacher reflected on this spatial strategy, stating, "When I let them move and use the space, they speak more naturally. It's like the body needs space to think and talk." This insight illustrates how physical mobility can stimulate cognitive and linguistic flexibility, suggesting that the architecture of the classroom can either constrain or liberate the learner's expressive potential.

The sensory qualities of the environment were equally influential. Natural light, color, and sound contributed to the atmosphere of attentiveness and emotional well-being. One classroom was designed with large windows that allowed sunlight and outdoor sounds to enter, creating a sense of openness that contrasted with the rigidity of traditional classrooms. The teacher explained,

> *"I like when they can hear birds or see trees outside. It helps them feel calm and connected. Learning language is not only about the mind it's about feeling safe and alive."*

This connection between sensory comfort and linguistic performance underscores the importance of emotional attunement in embodied learning. Learners who felt relaxed and stimulated by their surroundings tended to express themselves more confidently and creatively. Auditory elements also shaped how language was experienced. During pronunciation and rhythm exercises, teachers used music, ambient sound, and rhythm patterns to help learners internalize linguistic rhythm and intonation. For example, during one lesson on English stress patterns, students clapped their hands or tapped the desk in synchrony with spoken words, transforming sound into bodily rhythm. A student later commented,

> *"When I hear and feel the sound with my hands, I remember the word better. It's liked the sound stays in my body."*

This embodied response reveals that listening and speaking are not purely auditory processes but multisensory ones, involving kinesthetic participation that enhances retention and understanding. The interplay between sound, movement, and emotion turns the learning space into a sensory field where knowledge resonates rather than merely being recited. In addition to sound and light, texture and touch played subtle yet significant roles in the learning process. The materials used in the classroom such as tactile learning cards, soft seating cushions, and textured walls encouraged learners to interact physically with their surroundings. These tactile experiences made the environment more inviting and supported sensory engagement with linguistic tasks. One teacher noted,

> *"I notice when students can touch things, like cards or objects, they focus longer. The sense of touch keeps them grounded."*

This observation aligns with the broader theme of material mediation discussed earlier, indicating that sensory tactility enhances embodiment and helps learners anchor abstract concepts in physical experience. Spatial and sensory elements also influenced social interaction. The physical closeness of learners during group work fostered cooperation and empathy, while open spaces encouraged collective performance and mutual observation. In one storytelling activity, students sat in a semi-circle facing the teacher, who used expressive gestures and varied tones of voice. The proximity allowed the learners to observe the teacher's facial expressions and body language clearly, which they later mimicked in their own retellings. One student reflected,

> *"When I can see the teacher's face and move like her, I understand the story better."*

This illustrates that sensory proximity and visual exposure enhance imitation, empathy, and comprehension all essential components of embodied language acquisition. Interestingly, the spatial dynamics also revealed a form of *learning choreography* a rhythmic pattern of movement, voice, and gesture that unfolded as learners navigated between tasks. When learners walked to the board, rearranged chairs, or shifted between speaking and listening roles, the classroom became a stage where language was performed through coordinated action. These bodily transitions were not interruptions but integral to the flow of learning. The movement from one physical position to another mirrored the mental transitions between understanding, recalling, and producing language. The teacher emphasized this when she said,

> *"When they move, they remember. The movement helps to organize their thinking."*

This statement captures the deep interrelation between spatial mobility and cognitive processing, underscoring the pedagogical value of allowing learners to inhabit space dynamically. The sensory and spatial character of the environment also affected the collective atmosphere of learning the shared rhythm, tone, and energy that shaped communication. In one observed lesson, a moment of collective silence emerged after a storytelling activity, followed by soft laughter and spontaneous discussion. The acoustics of the room, combined with the warmth of the sunlight, created a sense of intimacy that allowed for reflective conversation. This moment exemplified how sensory and spatial conditions modulate the tempo of classroom life, guiding when to speak, listen, or pause. The environment, therefore, acted as an affective medium that organized time,

emotion, and discourse in subtle yet profound ways. From an interpretive standpoint, the findings suggest that spatial and sensory dimensions are not merely background conditions for learning but active participants in the semiotic process. They mediate the rhythm, tone, and intensity of linguistic engagement, turning the classroom into a multimodal landscape of expression. The interplay between light, sound, movement, and proximity gives rise to what can be called *embodied spatial literacy* a form of knowing that integrates perception, emotion, and cognition. Learners acquire language not only by hearing and repeating words but by moving through spaces, sensing vibrations, and responding to atmospheres that shape their awareness.

The Body as Site of Memory and Meaning

The findings of this study indicate that the human body operates as a powerful repository of linguistic memory and a medium through which meaning is both stored and expressed. In the observed classrooms, learners' gestures, postures, facial expressions, and rhythmic movements revealed that memory was not merely retained cognitively but enacted through bodily repetition and sensory experience. Learning a language, therefore, was not confined to the acquisition of vocabulary or grammatical rules but involved the cultivation of bodily habits that embodied linguistic knowledge. The learners' ability to recall and articulate words was closely tied to how they had physically experienced those words through gesture, rhythm, and emotional resonance. In several classroom interactions, it became evident that physical actions helped encode linguistic concepts into memory. Students repeatedly mimed actions such as "jump," "run," or "write" they demonstrated greater accuracy and confidence in recalling these terms later. These gestures were not performed mechanically but carried emotional and sensory traces that became part of the learners' memory structure. One teacher explained this phenomenon by saying,

> *"When they use their body to learn a word, the body remembers it before the brain does."*

Another teacher elaborated,

> *"Sometimes when I ask them to repeat a word, they move their hands or head first. The movement helps them to remember the sound or meaning."*

These reflections point to the embodied nature of recall, where the body functions as an archive of sensory and kinetic experiences that precede verbal articulation. The learners themselves articulated similar experiences in interviews, describing how bodily engagement aided their recall and comprehension. One student said,

> *"When I move my body or act the word, it stays in my head longer."*

Another shared,

> *"If I forget the word, I try to move like before, and then the word comes back."*

These statements illustrate how bodily memory serves as a retrieval system for linguistic information, enabling learners to reconstruct meaning through physical reenactment. Such embodied remembering challenges traditional conceptions of memory as a purely mental or abstract process; instead, it situates remembering within the corporeal domain of movement, rhythm, and affect. The connection between body and memory was especially visible during collective learning activities. When students engaged in songs, chants, or dramatizations, the synchronization of voice and movement created a rhythm that reinforced linguistic retention. The repetition of gestures and coordinated actions generated a kinesthetic pattern that embedded words into bodily memory.

Observations showed that learners often recalled vocabulary by reproducing the gestures associated with them, even when verbal recall momentarily failed. This pattern suggests that the body holds memory traces not only as muscle movement but as lived experiences that are emotionally and sensorially charged. The body, in this sense, becomes a living text where language is written through movement and rhythm rather than ink and paper. Embodiment also played a vital role in the emotional dimension of memory. Learners often associated certain bodily expressions with feelings that helped anchor meaning. When describing emotional states such as "happy," "angry," or "afraid," students instinctively embodied the expressions smiling,

frowning, or widening their eyes. This emotional performance not only conveyed understanding but reinforced memory through affective resonance. A teacher reflected,

> *"When they act out emotions, they don't just learn the word they feel it. The feeling stays with them, and so does the word."*

This insight underscores the affective dimension of bodily memory, where emotion and physicality intertwine to create durable and meaningful learning experiences. The persistence of bodily memory was also observed in spontaneous recall moments. During one observation, a student who had previously learned the word *dance* suddenly began swaying when asked to use the word in a sentence. The body moved before the words emerged, demonstrating that memory was embodied as a motor pattern that preceded conscious linguistic recall. When interviewed later, the same student explained,

> *"When I move first, my brain follows. It's like my body helps me to remember what to say."*

This sequence of action and thought highlights how embodied memory operates as a precursor to verbal expression a somatic prompt that activates cognitive retrieval. Such moments reveal the dialogical relationship between movement and language, where the body does not merely reflect memory but actively produces it. Furthermore, the findings show that the body's sensory experiences such as touch, rhythm, and spatial awareness enhance the retention and interpretation of meaning. Learners who physically manipulated learning materials or engaged in rhythmic repetition tended to remember words more effectively. One teacher observed, "When they clap, move, or touch something while speaking, it becomes easier for them to remember. The action connects to the word." The tactile and rhythmic engagement transforms language into a multisensory event, where sound, motion, and touch intertwine to encode memory more deeply. This process demonstrates that memory is not stored in the abstract realm of the mind but distributed across the sensory and motor systems of the body.

The body also emerged as a site of cultural and personal meaning, carrying embodied traces of learners lived experiences outside the classroom. Certain gestures or expressions reflected cultural identity and familiarity, which in turn influenced how learners interpreted linguistic forms. For instance, when asked to demonstrate greetings in English, several students instinctively combined the English phrase "hello" with the traditional gesture of slight bowing or hand placement on the chest, embodying cultural respect. One student reflected, "My body still does what I do at home, even when I speak English. It feels natural." This integration of local bodily practices within foreign linguistic expression illustrates how meaning is grounded in the continuity of lived bodily histories. The body thus becomes a cultural bridge that links linguistic learning with identity and belonging.

From an interpretive perspective, these findings affirm that the body is not a passive instrument of learning but an active locus of cognition, memory, and culture. The body's capacity to store sensory traces, enact emotions, and reproduce gestures situates it as a central agent in the process of language acquisition. Memory does not merely reside in the brain but in the patterned movements, affective responses, and postures that learners perform and reperform. The body, therefore, acts as both a site of inscription where experience is etched through movement—and a site of reactivation where meaning is recalled through re-enactment. This understanding redefines the relationship between body and language, emphasizing that learning occurs not through mental accumulation but through embodied participation.

CONCLUSION

This study reconceptualizes language acquisition as an embodied and materially mediated process that transcends traditional cognitive models. The findings demonstrate that learning a language is not solely a mental operation but a dynamic interplay among bodies, materials, and environments. Gestures, spatial configurations, sensory experiences, and material objects all emerged as active participants in meaning-making, transforming classrooms into living ecologies of interaction. Learners used their bodies to think, remember, and communicate, while materials and spaces shaped how linguistic knowledge was enacted and experienced. Through this embodied

participation, language learning became a holistic practice that integrated perception, emotion, and movement. The research highlights that gestures function as extensions of thought, materials act as mediators of cognition, and spatial and sensory environments condition the affective and social dimensions of learning. These interdependencies reveal that language is not merely acquired through symbolic representation but through continuous bodily and material engagement. The body serves as both the site and source of linguistic memory, where meaning is enacted and re-enacted through movement and sensation. Pedagogically, these insights call for a reorientation of language education toward practices that embrace embodiment, sensory engagement, and material exploration. Educators are encouraged to design learning environments that enable movement, touch, and sensory resonance, recognizing that linguistic understanding flourishes through active participation rather than passive reception. Theoretically, the study contributes to post humanist and phenomenological perspectives by situating language as a distributed, relational phenomenon that emerges across human and non-human agents. Ultimately, embracing embodiment and materiality restores language learning to its full human complexity an act of living, feeling, and being in the world.

REFERENCES

An, J., & Thomas, N. (2021). Students' beliefs about the role of interaction for science learning and language learning in EMI science classes: Evidence from high schools in China. *Linguistics and Education*, *65*, 100972. https://doi.org/10.1016/j.linged.2021.100972

Azizova, D. (2024). The pedagogical approach concerning very young learners (VYL) and young learners (YL) employing visual aids. *Nordic_Press*, *3*(0003).

Benson, P. (2021). *Language learning environments: Spatial perspectives on SLA* (Vol. 147). Multilingual Matters.

Chappell, K. (2024). Flowing with embodiment and materiality: Touch and time for new educational futures. In *Creative ruptions for emergent educational futures* (pp. 27-49). Cham: Springer Nature Switzerland.

Dove, G. O. (2023). Rethinking the role of language in embodied cognition. *Philosophical Transactions of the Royal Society B*, *378*(1870), 20210375. https://doi.org/10.1098/rstb.2021.0375

Dunleavy, M., Dede, C., & Mitchell, R. (2009). Affordances and limitations of immersive participatory augmented reality simulations for teaching and learning. *Journal of science Education and Technology*, *18*(1), 7-22. https://doi.org/10.1007/s10956-008-9119-1

Ellis, N. C., & Robinson, P. (2008). An introduction to cognitive linguistics, second language acquisition, and language instruction. In *Handbook of cognitive linguistics and second language acquisition* (pp. 13-34). Routledge. https://doi.org/10.4324/9780203938560

Fitria, T. N., & Simbolon, N. E. (2024). English language teaching (ELT) for students with visual-spatial learning style. *JELLE: Journal Of English Literature, Linguistic, and Education*, *5*(02).

Godwin-Jones, R. (2023). Emerging spaces for language learning: AI bots, ambient intelligence, and the metaverse. *Language Learning & Technology*, *27*(2), 6-27.

Guevara, I., Rodríguez, C., & Núñez, M. (2024). Developing gestures in the infant classroom: From showing and giving to pointing. *European Journal of Psychology of Education*, *39*(4), 4671-4702. https://doi.org/10.1007/s10212-024-00895-6

Harbi, A. G. (2024). Using Visuals and Manipulative for Supporting ELS. *The Peerian Journal*, *27*, 154-163.

Heikkilä, M., & Mankki, V. (2023). Teachers' agency during the Covid-19 lockdown: A new materialist perspective. *Pedagogy, Culture & Society*, *31*(5), 989-1004. https://doi.org/10.1080/14681366.2021.1984285

Johnson, M. (2022). *Embodied mind, meaning, and reason: How our bodies give rise to understanding*. Amerika Serikat: University of Chicago Press. https://doi.org/10.7208/chicago/9780226500393.001.0001

Lacković, N., & Popova, B. (2021). Multimodality and socio-materiality of lectures in global universities' media: accounting for bodies and things. *Learning, media and technology*, *46*(4), 531-549. https://doi.org/10.1080/17439884.2021.1928694

Li, P., & Lan, Y. J. (2022). Digital language learning (DLL): Insights from behavior, cognition, and the brain. *Bilingualism: Language and Cognition*, *25*(3), 361-378. https://doi.org/10.1017/S1366728921000353

Mairitsch, A., Sulis, G., Mercer, S., Shin, S., & Mairi, S. (2024). "They are our future": Professional pride in language teachers across the globe. *Tesol Quarterly*, *58*(2), 856-880. https://doi.org/10.1002/tesq.3259

Niemi, K., & Katila, J. (2022). Embodied and affective negotiation over spatial and epistemic group territories among school-children:(Re) producing moral orders in open learning environments. *Journal of Pragmatics*, *191*, 7-28. https://doi.org/10.1016/j.pragma.2022.01.009

Nystrand, M. (Ed.). (2023). *What writers know: The language, process, and structure of written discourse*. UK: BRILL.

Odendahl, J. (2021). Embodied Cognition, affects and language comprehension: Theoretical basis and (literary-) didactic perspectives of a physically-emotionally grounded model of understanding. *Phenomenology and the Cognitive Sciences*, *20*(3), 483-499. https://doi.org/10.1007/s11097-020-09684-0

Pelkey, J. (2023). Embodiment and language. *Wiley Interdisciplinary Reviews: Cognitive Science*, *14*(5), e1649. https://doi.org/10.1002/wcs.1649

Pugh, P., McGinty, M., & Bang, M. (2019). Relational epistemologies in land-based learning environments: Reasoning about ecological systems and spatial indexing in motion. *Cultural Studies of Science Education*, *14*(2), 425-448. https://doi.org/10.1007/s11422-019-09922-1

Wu, X. (2022). *Space and practice: a multifaceted understanding of the designs and uses of "active learning classrooms"* (Doctoral dissertation, University of New South Wales (Australia)).

Yoon, H. Y., Kang, S., & Kim, S. (2024). A non-verbal teaching behaviour analysis for improving pointing out gestures: The case of asynchronous video lecture analysis using deep learning. *Journal of Computer Assisted Learning*, *40*(3), 1006-1018. https://doi.org/10.1111/jcal.12933