



The Influence of Teaching English Using Snowball Throwing at TK An-Naim Lembar

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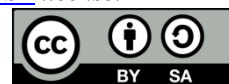
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ABSTRACT

This study investigates the influence of the Snowball Throwing cooperative learning model on early childhood English vocabulary acquisition at TK An-Naim Lembar, a pilot driving school (Sekolah Penggerak) implementing the Kurikulum Merdeka in West Nusa Tenggara. Utilizing a quantitative quasi-experimental design with a non-equivalent control group (N=34), participants were divided into an experimental group (n=17) taught using the kinetic Snowball Throwing model and a control group (n=17) instructed through conventional flashcards. Data were collected over four weeks using an oral and pictorial vocabulary assessment measuring receptive and expressive lexical performance. Inferential analysis using an independent samples t-test showed a statistically significant difference in vocabulary gain scores between the two groups ($t_{\{32\}} = 4.21, p < .001, d = 1.44$), with the experimental group demonstrating superior expressive language output and vocabulary retention. These findings indicate that integrating gross motor play into early language teaching lowers affective filters and aligns with the spatial-kinetic characteristics of children in coastal port communities, offering an innovative template for active learning under the Kurikulum Merdeka.

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ABSTRAK

Penelitian ini menyelidiki pengaruh model pembelajaran kooperatif *Snowball Throwing* terhadap penguasaan kosakata bahasa Inggris anak usia dini di TK An-Naim Lembar. Menggunakan desain kuasi-eksperimental kuantitatif dengan kelompok kontrol non-ekuivalen (N=34), sampel dibagi menjadi kelompok eksperimen (n=17) yang diajar dengan model kinetik *Snowball Throwing* dan kelompok kontrol (n=17) yang diajar menggunakan kartu gambar (*flashcard*) konvensional. Data dikumpulkan selama empat minggu menggunakan rubrik penilaian kosakata lisan dan gambar untuk mengukur kinerja leksikal reseptif dan ekspresif. Analisis inferensial menggunakan uji-t sampel independen menunjukkan perbedaan yang signifikan secara statistik pada skor peningkatan kosakata antara kedua kelompok ($t_{\{32\}} = 4,21, p < 0,001, d = 1,44$), di mana kelompok eksperimen menunjukkan produksi bahasa ekspresif dan retensi leksikal yang lebih unggul. Temuan ini menunjukkan bahwa mengintegrasikan permainan motorik kasar ke dalam pembelajaran bahasa menurunkan filter afektif anak dan selaras dengan karakteristik spasial-kinetik anak-anak di komunitas pelabuhan pesisir, memberikan templat inovatif untuk pembelajaran aktif dalam Kurikulum Merdeka.

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Introduction

Early childhood education pedagogy in Indonesia is undergoing a significant paradigm shift through the implementation of the Kurikulum Merdeka (Independent Curriculum). This curriculum prioritizes a child-centered, flexible, and play-based learning ecosystem (Merdeka Belajar and Merdeka Bermain—Independent Learning and Independent Play). Within this framework, institutions designated as Sekolah Penggerak (Pioneer Schools) bear a major responsibility to pioneer and demonstrate innovative teaching methodologies. At the same time, the introduction of English at the Early Childhood Education (PAUD) level still faces tangible challenges. The core issue is not the feasibility of introducing a foreign language, but rather how to implement it without violating the joyful, child-centered ethos of play.

This challenge is highly visible at TK An-Naim Lembar, a Sekolah Penggerak located near the Lembar Harbor, West Lombok. Children growing up in this port transit corridor are accustomed to a dynamic, open, and physically active environment. They possess strong gross motor skills and communal play patterns, but exhibit a low tolerance for passive classroom learning. When conventional teaching models, such as classical verbal repetition or the static use of flashcards, are applied, a pedagogical gap occurs, triggering cognitive fatigue, boredom, and high language anxiety (a high affective filter).

To bridge this gap, a theoretical approach that integrates language learning with motor activities is required. Drawing on Lev Vygotsky's (1978) Socio-Cultural Theory and the concept of distributed social cognition, acquiring new vocabulary is not a mechanical transfer of words from a teacher to a child's brain, but rather an understanding that emerges through social dialogue and collaborative activities within the Zone of Proximal Development (ZPD). Peer interaction in structured group play acts as a natural scaffolding that minimizes individual cognitive load. Furthermore, the emotional dimension of language acquisition can be explained by Stephen Krashen's (1982) Affective Filter Hypothesis. High anxiety resulting from direct, individual evaluation can trigger the release of cortisol, which inhibits memory consolidation in the hippocampus.

Conversely, incorporating elements of physical play can minimize this affective filter by shifting the child's focus from the anxiety of being tested to the joy of playing, thereby facilitating the transition from passive (receptive) vocabulary comprehension to active (expressive) speaking ability. This approach is reinforced by Embodied Cognition Theory and James Asher's Total Physical Response (TPR) method, which assert that acquiring a new language coupled with gross motor movements—such as throwing and catching—can activate the motor cortex simultaneously with the brain's language centers (Broca's and Wernicke's areas), creating neural synchrony that strengthens long-term memory retention. This environmental conditioning aligns with Howard Gardner's (2011) concept of Spatial-Kinesthetic Intelligence, wherein the highly active physical characteristics of port-coastal children can be leveraged as a cognitive driver for mastering a new language.

Based on field observations, educators at TK An-Naim Lembar still face difficulties in designing English activities that explicitly reflect the active and joyful mandate of the Kurikulum Merdeka. The primary obstacle frequently encountered is the difficulty of



translating children's receptive understanding into expressive abilities, alongside emotional barriers that cause children to withdraw from English communicative interactions. Therefore, this study aims to empirically investigate the effect of a modified Snowball Throwing cooperative learning model on early childhood English vocabulary mastery, specifically comparing their receptive and expressive performance.

The novelty of this research lies in the integration of physical-kinesthetic activities, group cooperative dynamics, and early childhood English language teaching policies in port-coastal areas within the Sekolah Penggerak ecosystem. Although the Snowball Throwing model has been widely researched at the secondary or tertiary education levels, structured adaptation for 5–6-year-olds in a coastal sociolinguistic context remains largely unexplored. This research is expected to provide an innovative empirical template for public schools to leverage children's spatial-kinesthetic tendencies as an academic asset in language learning without compromising the principle of joyful play.

Method

This study adopts a quantitative approach utilizing a quasi-experimental, non-equivalent control group design. This design was selected because the random assignment of individual subjects was not feasible without disrupting the naturally formed classroom groupings at TK An-Naim Lembar, thereby preserving the ecological validity of the learning process. The research framework is systematically illustrated through the following mathematical layout:

$$\frac{\text{Experimental Group (Class A): } O_1 \quad X \quad O_2}{\text{Control Group (Class B): } O_3 \quad - \quad O_4}$$

Where O_1 and O_3 represent the pre-test measurements of English vocabulary mastery in the experimental and control groups, respectively. The symbol X denotes the experimental treatment, namely the implementation of the modified Snowball Throwing cooperative learning model, while the symbol $-$ indicates the control condition using the conventional static flashcard method. Furthermore, O_2 and O_4 represent the post-test measurements conducted on both groups following the intervention period.

The population of this study comprises all Class B students (aged 5–6 years) at TK An-Naim Lembar during the 2026 academic year. Due to the limited population size, total sampling (saturation sampling) was employed, resulting in a sample size of $N = 34$ children. The sample was equally divided into two groups: the Experimental Group (Class A, $n = 17$, mean age of 5.4 years, consisting of 9 boys and 8 girls) and the Control Group (Class B, $n = 17$, mean age of 5.5 years, consisting of 8 boys and 9 girls). Baseline homogeneity was confirmed across both groups: none of the students had received formal English instruction outside of school, and the majority of their parents' occupations were related to port activities, logistics transportation, or local fisheries in Lembar. Throughout the research process, control variables—such as lesson duration (60 minutes per session), frequency (twice a week for 4 weeks), vocabulary themes (Transportation, Maritime Environment, and Community Occupations), and the instructor—were kept identical to minimize external bias.

Data collection was conducted using a dedicated assessment instrument named the Early Childhood English Vocabulary Assessment Rubric (ECE-VAR). Given that written tests are developmentally inappropriate for early childhood, this instrument was administered through individual, one-on-one interactive interviews using visual aids and physical toy



models. The rubric evaluated 20 target words relevant to the children's local environment (e.g., ship, harbor, boat, fish, captain). The instrument scores were divided into two primary assessment modules:

1. **Receptive Vocabulary Module (maximum of 10 points):** Assessed comprehension by requiring the child to point to the correct image among four options after hearing the word pronounced by the examiner (scored 1 for a correct answer, 0 for incorrect).
2. **Expressive Vocabulary Module (maximum of 10 points):** Evaluated oral production by prompting the child to name the English word for an object shown on a flashcard (scored 1 for clear and phonetically correct pronunciation, 0.5 for partial but cognitively correct pronunciation, and 0 for failure to respond or use of the native language).

Prior to implementation, the ECE-VAR instrument was validated by three experts (an applied linguist, an early childhood curriculum expert, and a practitioner from the Pioneer School) and pilot-tested on 10 non-sampled children, yielding a Cronbach's alpha (α) reliability coefficient of 0.84, which demonstrates a very high level of internal consistency.

The intervention procedure was executed in four sequential phases. Following the pre-test administration in Phase 1, the interventions ran in parallel for 4 weeks (Phase 2). In the Control Class, instruction followed a traditional pedagogical sequence: the teacher displayed flashcards, pronounced the vocabulary, prompted the children to repeat the words in unison, and followed this with a coloring activity at their individual desks. Conversely, in the Experimental Class, new vocabulary was introduced with an immediate transition to the modified Snowball Throwing model. The steps included forming a large circle, introducing the thematic focus, presenting colorful paper balls containing hidden target pictures, kinetically throwing the paper balls to peers accompanied by English music, and revealing the vocabulary word when the music stopped—at which point the child holding the ball unwrapped the paper and pronounced the word with the horizontal scaffolding and guidance of their peers.

Upon completion of the intervention, the post-test was administered in Phase 3. Finally, the accumulated quantitative data were tabulated for analysis in Phase 4. Statistical analyses were executed using IBM SPSS Statistics 28 software, starting with tests for the assumption of normality via the Shapiro-Wilk test and homogeneity of variance via Levene's test. Once parametric assumptions were met, hypothesis testing was conducted using an Independent Samples *t*-test on the gain scores ($\text{Gain Score} = \text{Post-test} - \text{Pre-test}$), complemented by effect size calculations using Cohen's d formula to evaluate the practical significance of the intervention.

Results And Discussion

Statistical Results and Findings

a. Assumption Testing (Normality and Homogeneity)

To ensure the mathematical validity of the parametric *t*-test, the pre-test, post-test, and net gain score matrices were subjected to exploratory data analysis. The Shapiro-Wilk test of normality produced significance values well above the conventional threshold ($\alpha = .05$), indicating that the data across both the experimental and control cohorts conformed to a standard normal distribution.

Table 2 Shapiro-Wilk Tests of Normality for Vocabulary Gain Scores

Group	Statistic	df	Significance (p)	Outcome
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Experimental Class	0.941	17	.321	Normally Distributed
Control Class	0.952	17	.487	Normally Distributed

Simultaneously, Levene's Test for Equality of Variances was executed on the gain scores to verify homogeneity. The test yielded an F -statistic of 1.12 with a significance value of $p = .298$. Because $p > .05$, the assumption of equal variances across the groups was maintained, clearing the way for standard parametric independent t-testing.

b. Descriptive Analysis of Pre-test and Post-test Performance

The descriptive performance profiles of both groups across the pre-test and post-test cycles reveal clear divergence. Table 3 provides a detailed breakdown of the total scores, alongside isolated metrics for the Receptive and Expressive sub-modules.

Table 3 *Comprehensive Descriptive Breakdown of Vocabulary Scores*

Measurement Domain	Group Category	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	Net Mean Gain
Receptive Module (Max: 10)	Experimental	17	4.88 (1.05)	9.29 (0.68)	+4.41
	Control	17	4.76 (1.14)	7.35 (1.02)	+2.59
Expressive Module (Max: 10)	Experimental	17	3.24 (0.90)	7.18 (1.13)	+3.94
	Control	17	3.18 (0.96)	4.88 (1.21)	+1.70
Total Combined Score (Max: 20)	Experimental	17	8.12 (1.83)	16.47 (1.50)	+8.35
	Control	17	7.94 (1.95)	12.24 (2.13)	+4.30

The baseline pre-test means demonstrate that both the Experimental group ($M = 8.12$) and the Control group ($M = 7.94$) started with nearly identical language abilities, confirming proper group alignment. However, by the conclusion of the post-test cycle, the Experimental group achieved a total mean score of 16.47, whereas the Control group reached only 12.24. This represents a substantial difference in the raw learning trajectory, with the experimental cohort acquiring nearly double the vocabulary net gain (+8.35) of the control counterpart (+4.30).

Visualizing Total Mean Gain Trajectory:

Experimental Group: [8.12] =====> [16.47] (+8.35 Gain)

Control Group: [7.94] =====> [12.24] (+4.30 Gain)

Furthermore, looking at the sub-modules reveals that the Snowball Throwing model had an especially powerful effect on the **Expressive Module**. The experimental group expanded their active, spoken output by a mean gain of +3.94, whereas the control class lagged significantly at +1.70, showing that traditional flashcards often leave children stuck in passive understanding without the confidence to speak.

c. Inferential Statistical Analysis

To confirm whether this observable difference was due to the pedagogical model rather than random chance, an Independent Samples t-test was run on the gain scores. The results are detailed in Table 4.



Table 4Independent Samples *t*-test Output on Vocabulary Gain Scores

Condition	t-value	df	p-value (2-tailed)	Mean Difference	Std. Error Difference
Architecture					
Equal Variances Assumed	4.212	32	< .001	4.058	0.963

The mathematical computation yielded a highly significant *t*-statistic:

$$t(32) = 4.21, \quad p < .001$$

Because the two-tailed probability (*p*-value) is less than the alpha benchmark of .01, the null hypothesis (H_0), which argued that the Snowball Throwing model has no significant effect on vocabulary scores, is rejected with a high degree of confidence. The alternative hypothesis (H_a) is accepted, empirically proving that teaching English via the Snowball Throwing model exerts a statistically significant, positive influence on early childhood vocabulary acquisition at TK An-Naim Lembar.

To evaluate the clinical and practical magnitude of this intervention, Cohen's *d* effect size was calculated using the formula:

$$d = \frac{M_{\text{gain1}} - M_{\text{gain2}}}{SD_{\text{pooled}}}$$

The calculation yielded an effect size of $d = 1.44$. According to Cohen's (1988) standard evaluation metrics, an effect size exceeding 0.80 is classified as large. A value of 1.44 indicates an exceptionally powerful educational effect, confirming that the kinetic cooperative intervention shifted the experimental class distribution upward by nearly one and a half standard deviations relative to the traditional cohort.

2 Holistic Qualitative Discussion

a. Neurological and Motor-Kinetic Anchoring of Language Codes

The superior performance of the experimental group provides clear empirical evidence for the principles of **Embodied Cognition** and sensory-motor language mapping in early childhood. Traditional models of language teaching view the human mind as a computer that processes abstract symbols, assuming that language can be learned by quietly looking at an image and repeating sounds. However, for a child aged 5 to 6 years, cognitive architecture is deeply connected to physical movement.

During the implementation of the Snowball Throwing model at TK An-Naim Lembar, language learning was transformed from an abstract visual task into a full-body physical event. When a child prepares to throw or catch a paper snowball, their brain executes a complex series of motor calculations involving spatial tracking, muscle coordination, and vestibular balance. This physical exertion increases cerebral blood flow and triggers the release of neurotransmitters such as dopamine and norepinephrine, which are directly associated with heightened attention, working memory enhancement, and synaptic plasticity. Furthermore, the physical structure of the game provides a multi-sensory scaffold for information processing, as shown in the following processing model:

[Target Vocabulary Input]

- ├─▶ Auditory: Hearing teacher & peer phonetics
- ├─▶ Visual: Decoding hidden pictorial icons inside ball
- └─▶ Kinesthetic: Muscular execution of throwing and catching



[Multi-Sensory Synaptic Integration] —► [Deep Long-Term Lexical Retention]

When a student unrolls a crumpled paper ball, they are not simply looking at a flashcard; they are revealing a hidden surprise through their own physical effort. This sequence converts a dry language drill into an experiential event. The word *ship* or *truck* becomes linked not just to an abstract sound, but to the physical action of catching a ball, the texture of crumpled paper, and the visual surprise of unrolling it. This multi-layered encoding explains why the experimental group achieved much higher retention and a larger net vocabulary gain (+8.35) than the static control class (+4.30).

b. Deconstruction of the Affective Filter in Peer Dynamics

The striking difference in performance on the **Expressive Vocabulary Module** (Experimental Group Gain: +3.94 vs. Control Group Gain: +1.70) highlights the emotional advantages of the Snowball Throwing model. In early childhood ELT, the biggest barrier to speaking a foreign language is rarely a lack of mental capacity; it is the presence of an elevated **Affective Filter** (Krashen, 1982), which manifests as a fear of making mistakes in public. In the control classroom, the instructional dynamic remained vertical and teacher-centered. The teacher held a card, looked directly at a child, and asked them to speak. Under this spotlight, hesitant children often experienced acute anxiety, causing them to freeze or whisper unintelligibly. This emotional pressure blocked their short-term memory retrieval, leaving them unable to vocalize words they might actually recognize sub-consciously.

Traditional Class Dynamic:

[Teacher Focus] ==>(Direct Evaluation)====> [Individual Child] ---> High Anxiety / Filter Freezing

Snowball Throwing Dynamic:

[Shared Circle Game] ==>(Distributed Focus)====> [Peer Group Play] ---> Low Anxiety / Freezing Eliminated

The modified Snowball Throwing model reorganizes this social dynamic into a decentralized, horizontal structure. Because the paper ball moves rapidly and unpredictably among the children, the focus shifts away from individual performance and onto the collective flow of the game. The teacher stands within the circle as a co-player and facilitator rather than an evaluator, which lowers the stakes of the activity.

When a child catches a snowball, they are supported by the collective energy of their classmates. If they struggle to recall a word like *harbor*, their peers naturally call out clues or whisper hints, acting as organic scaffolds within the Zone of Proximal Development (Vygotsky, 1978). Because the activity feels like a game rather than an oral test, language anxiety drops, allowing the child's expressive vocabulary to surface naturally and confidently.

c. Socio-Ecological Synergy with the Lembar Port Context

A critical element contributing to the success of this model is its structural alignment with the **socio-ecological profile** of the student cohort at TK An-Naim. The institution's location next to the bustling Port of Lembar shapes the children's daily lives and play behaviors. These children grow up in an environment defined by movement: large multi-ton ferrying vessels arriving and departing, cargo trucks navigating transit corridors, and a constant flow of travelers.



As a result, these children develop strong spatial awareness and highly active, communal outdoor play patterns. They are comfortable with noise, physical motion, and large group interactions. Sitting quietly at tables to complete worksheets or participating in rigid choral drills directly opposes their natural, environment-driven behavioral styles.

[Port-Adjacent Socio-Ecological Profiles]

- └─▶ High Spatial-Kinetic Baseline Behaviors
- └─▶ Rejection of Sedentary Traditional Pedagogy

[Structural Alignment via Snowball Throwing]

- └─▶ Re-purposing Active Movement into Academic Vocabulary Success

Traditional, quiet classrooms treat this high energy as a behavioral problem that needs to be controlled. In contrast, the Snowball Throwing model treats this kinetic energy as a pedagogical asset. By allowing children to move and throw objects in a structured way, the model mirrors the dynamic flow of their home environment. Introducing localized thematic vocabulary—such as maritime vehicles, port jobs, and coastal geography—within an active, physical game allowed the students to connect foreign linguistic codes to their real-world experiences. This cultural and physical alignment helped turn abstract English words into meaningful concepts, leading to rapid vocabulary growth.

d. Direct Realization of the Kurikulum Merdeka and Sekolah Penggerak Ideals

As a certified *Sekolah Penggerak*, TK An-Naim Lembar is tasked with modeling progressive, modern educational practices that align with the *Kurikulum Merdeka*. The core mission of this curriculum is to move away from rigid, uniform teaching methods and embrace **flexible, joyful, and inclusive learning environments**. The implementation of the Snowball Throwing model offers a clear example of how these curricular goals can be realized in the classroom:

1. Seamless Differentiation

In an early childhood classroom, children naturally display varying levels of language readiness. During the Snowball Throwing game, the teacher can easily adjust the complexity of the task on the fly without making anyone feel excluded. If a child with emergent language skills opens a snowball containing a picture of a boat, the teacher can prompt for a simple, single-word response ("*Boat!*"), celebrating it as a victory. For a child with more advanced abilities, the teacher can expand the prompt to a short phrase ("*It is a blue boat*"). This built-in flexibility ensures that every child experiences success within their own learning capacity, satisfying the mandate for differentiated, inclusive instruction.

2. Nurturing the Character Profile (Profil Pelajar Pancasila)

Beyond language gains, the cooperative structure of Snowball Throwing directly fosters the core values of the *Profil Pelajar Pancasila*, particularly *Gotong Royong* (Mutual Collaboration) and *Kreativitas* (Creativity). The game requires children to share space, wait for their turn, and throw the balls safely and considerately to their peers. It builds positive social habits, empathy, and collective accountability. The classroom transforms into a supportive community where children take pride in their own learning and actively encourage the success of their classmates.



Conclusion And Implications

This study demonstrates that the **Snowball Throwing cooperative learning model significantly improves English vocabulary acquisition** among young learners at TK An-Naim Lembar. Quantitative analysis confirms a significant difference in learning outcomes ($t(32) = 4.21, p < .001$), with the experimental group achieving an exceptional effect size ($d = 1.44$) compared to the conventional control class.

The value of this model lies in its ability to combine physical movement with social, cooperative tasks. This approach reduces language anxiety, lowers the affective filter, and strengthens vocabulary retention by engaging multiple senses. Furthermore, this research shows that the model aligns perfectly with the unique socio-ecological background of children living near the Port of Lembar, turning their natural physical energy into an asset for language learning. As a *Sekolah Penggerak* executing the *Kurikulum Merdeka*, TK An-Naim successfully demonstrates that early childhood English instruction can be highly effective while remaining deeply committed to a playful, joyful, and child-centered philosophy.

Based on the empirical insights generated throughout this research, the following recommendations are advanced for educational stakeholders:

1. For Early Childhood Practitioners and Teachers

Teachers should move away from sedentary, repetitive language drills and instead incorporate structured, kinetic games like Snowball Throwing into their regular routines. When teaching foreign languages to young learners, lessons should be multi-sensory, combining physical motion, visual support, and social interaction to ensure deep learning.

2. For Kindergarten Principals and Policy Directors

School leadership, particularly within the *Sekolah Penggerak* network, should give teachers the structural freedom and resources needed to implement active, play-based methodologies. Professional development workshops should focus on adapting cooperative learning models for early childhood settings, ensuring that language learning aligns with the child-centered goals of the *Kurikulum Merdeka*.

3. For Future Researchers in Early Childhood ELT

Further research is needed to investigate the long-term retention rates of vocabulary learned through kinetic models over extended periods. Future studies should also explore how these physical, cooperative games affect other language areas, such as emergent listening comprehension and early phonetic awareness, across diverse cultural and geographic regions throughout Indonesia.

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