

KINESTHETIC LEARNING STRATEGIES AND VOCABULARY RETENTION: A STUDY OF RURAL UPPER PRIMARY ESL PUPILS

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Abstract. Vocabulary acquisition and retention are still concerning issues for many ESL pupils, especially in rural primary schools. This is due to the passive learning strategies that can lead to disengagement and lack of retention. Upon this problem, a quantitative study, specifically a quasi-experimental one-group pretest-posttest design, has been conducted to examine the effects of kinesthetic strategies on vocabulary retention among 13 eleven years old rural upper primary ESL pupils. Besides, this study was implemented to evaluate the use of the strategies that are beneficial to the learning process. The intervention involved the association of physical movement with the meanings of words to aid better cognitive processing and memory recall. Results indicated strong evidence supporting the efficacy of kinesthetics strategies with a significant increase in vocabulary retention with a post-test score of 85% higher than the pre-test baseline. A structured observation checklist was used to illustrate a corresponding increase in both response time and pupils' engagement. Most notably, the remedial group experienced the greatest improvement, transitioning from low participation to high participation during lessons. Ultimately, the findings of this study indicate that kinesthetic strategies can be an effective, inclusive, engaging and cost-efficient learning experience than can improve pupils' English language performance in rural areas.

Keywords: *kinesthetic strategies, vocabulary retention, ESL, primary education, upper primary pupils*

Introduction

Vocabulary mastery has been widely acknowledged as one of the foundation components of second language acquisition. The transition from passive memorization to active pupil-centered learning is becoming a growing trend globally in the area of English as a Second Language (ESL). Research in modern pedagogy has shown that learning is most successful when it engages multiple senses and that one such method of increasing active learning is through the integration of physical movement with the acquisition of new vocabulary. Kinesthetic Learning utilizes movement to engage the learner cognitively with new words. It is based upon the Theory of Total Physical Response (TPR) developed by Asher in 1969. TPR stated that the brain will retain information better when it is paired with motor action (Asher, 1969). In Malaysia, the Ministry of Education has promoted the concept of PAK-21 or 21st Century Learning and encouraged teachers to employ innovative teaching methodologies to enhance English proficiency among their pupils. However, there is a “facility gap” between the schools in urban and rural areas. In some rural schools, pupils have limited access to English outside of the classroom. Hence, these pupils typically exhibit lower motivation to learn English and poor retention of vocabulary. As a result, they may find traditional methods like chalk and talk boring and ineffective. Therefore, it is crucial to implement some suitable and engaging methodology to assist these pupils in developing their English vocabulary. Kinesthetic strategies provide a potential way to bridge this gap and

make the learning process both tangible and enjoyable for young learners. This is due to the fact that physical action has been shown to give a positive result in increasing vocabulary retention. Furthermore, recent evidence suggests that incorporating kinesthetic activities into language teaching and learning is highly beneficial for improving pupils' comprehension and memorisation of language words or components, compared to the conventional practices (Simamora et al., 2025).

Despite increased attention on active learning methodologies, many ESL classrooms in rural Malaysia continue to rely heavily on passive learning methodologies. Pupils are often required to memorize word lists with little contextual or physical interaction with the new vocabulary, which results in rapid forgetting—a condition commonly referred to as the "forgetting curve." The inability to develop solid vocabulary among upper primary pupils prevents them from advancing in reading and writing. This address these challenges, this study was guided by the two objectives: (1) To determine the effect of kinesthetic strategies on vocabulary retention among upper primary pupils. (2) To evaluate how kinesthetic strategies assist pupils in learning English vocabulary. The findings of this study have implications for a number of stakeholder groups. For ESL teachers, especially those working in rural settings, this study demonstrates that costly resources are not required to increase learning, rather, the creative use of physical space and movement can be very effective. For pupils, the study develops a low anxiety learning environment where learning is experienced as fun and playful and this is essential for developing self-confidence in a second language. For educational researchers, this study contributes a localized understanding of how kinesthetic strategies operate in a small-scale, high-attention, rural classroom setting. Despite these potential contributions, the scope of this study is limited to the 13 upper primary pupils of one specific rural school. The intervention is limited to vocabulary retention and does not include assessment of grammatical accuracy or speaking fluency. Additionally, due to the relatively small sample size ($N = 13$), generalizability of the results to the larger Malaysian pupils population is not possible. The study also has limitations regarding its time frame of intervention and focus. Specifically, the study is limited to a short-term intervention and assesses the effects of the intervention on the participants' immediate and short-term retention of vocabulary rather than assessing the long-term effects of the intervention on language development.

Hence, there are several significant gaps in the current literature. There is numerous research that focuses on the specific population of upper primary pupils in rural Malaysian primary schools. While much of the existing research has centered on either early childhood learners or university level learners, there is a significant gap in the intermediate-primary years where vocabulary development is becoming increasingly abstract and complex. Most importantly, there is very little documented research that investigates the role of physical play in facilitating the transition from word-to-picture matching to the more challenging task of constructing sentences amongst rural pupils. This study fills all of these gaps by using a quasi-experimental design with a small, focused group of 13 participants that allows for a detailed and intense examination of the effects of the intervention. By examining the 13 rural pupils in this study, the results of this study provide a localized and empirical basis for the use of kinesthetic strategies as a viable and effective pedagogical tool for teaching ESL in the Malaysian classroom.

Literature review

Retention of vocabulary for ESL pupils

Vocabulary retention can be defined as the process of encoding, storing and eventually retrieving of linguistic information. In the area of Second Language Acquisition (SLA), retention is divided into two main components, which are receptive and productive retention. Receptive retention is the learner's ability to recognize a word when they have seen or heard it. Productive retention is a more complicated process of utilising that word correctly. A common issue with vocabulary acquisition is the "forgetting curve". For many learners, this is the result of the failure to reinforce the material learned through meaningful engagement. Rote memorization techniques fail for many ESL upper primary pupils. This is due to the fact that they are unable to view vocabulary as a functional tool rather than an abstract list of items. The authors also cite recent studies conducted who mentioned that acquiring vocabulary does not a singular event but rather a gradual process of developing depth, from simply know a word's form to recognizing and using its grammatical function. Vocabulary retention rates are significantly increased when pupils are actively engaged in the learning process rather than passively receiving information. Overall, current research supports that retention can be significantly improved when words are related to tangible experiences, thus creating more impactful effects for the pupils.

ESL pupils in rural areas of Malaysia

ESL pupils in rural settings face several challenges that can affect their vocabulary development. Besides not having the opportunity to practice their English when they are outside of their school, these rural pupils also frequently attend schools that do not have the same technological resources as those located in urban settings. Accordingly, the teacher's selection of pedagogy is the primary determining factor of success for many rural pupils due to the limitations of technology and other resources. Kinesthetic strategies are particularly well-suited for rural pupils, since they do not require costly materials or technology. Instead, these strategies rely on the natural energy of the pupils to create an "English-only" zone. Recent research on rural education has found that many rural pupils believe that English is a "hard" or "foreign" subject. Furthermore, for rural pupils, hands-on learning helps to connect the pupils' everyday experiences with the English language classroom and makes the language more accessible for the pupils. By making the language physical, kinesthetic strategies assist rural pupils in overcoming the linguistic barriers and help them gain the confidence in learning a more complex part of the language.

Total physical response

Total Physical Response (TPR) theory developed by Asher (1969) is one of the most popular theories when it comes to movement-based strategy in learning. TPR highlights that language learning should mirror the manner in which children learn their native languages. In the context of primary school settings, children learn language through a cycle of "commands" and "physical responses". This strategy allows pupils to demonstrate an understanding of the language before they speak the language themselves, thus reducing the amount of classroom anxiety (Asher, 1969). Today, however, TPR is not simply about following commands, but rather it is a method for establishing a non-threatening learning environment where pupils can concentrate on learning and decoding the meaning of the words without concerns of making mistakes. As indicated, TPR is still a foundational method of teaching young learners since it

corresponds to the developmental stage of young learners who will first develop their physical before the linguistics. TPR is effective for young learners since it enables them to understand the meaning of words immediately through action. This direct link between physical movement and comprehension helps bypass the need for translation, thus allowing pupils to learn and memorise vocabulary more naturally and rapidly.

Embodied cognition theory

This study is additionally substantiated by the Theory of Embodied Cognition, which states that cognitive processes are not confined to the brain but are heavily influenced by the learner's bodily interactions with the environment (Glenberg, 2015). According to this theory, the way humans think is influenced by our physical experiences and the motor systems we use to interact with the world around us. In an ESL context, this implies that when a learner physically mimics the meaning of a word, the neural circuits will be activated. As a result, this process will enable both the linguistic label and the physical response at the same time. This simultaneous activation creates a stronger and "embodied" memory trace that is easier to recall. Accordingly, recent neuroscience research indicates that embodied learning activates the motor cortex and provides an additional layer of brain activity that supports vocabulary retention and limits the rate of decline of linguistic information.

Constructivist theory

The final theoretical framework supporting this study is the Constructivist Theory. The Constructivist Theory proposes that pupils develop knowledge through direct experience and social interaction rather than through the reception of information (Vygotsky, 1978). From a constructivist viewpoint, kinesthetic learning strategies enable pupils to "construct" their own understanding of vocabulary through physical experience of the word. This is especially important when considering the Zone of Proximal Development (ZPD). In the context of learning in school, ZPD is applied when the teacher provides physical scaffolding, like gestures and movements, as to assist pupils in attaining a deeper level of understanding. When pupils use kinesthetic strategies, they are not simply receiving definitions of words. In fact, these pupils will physically test the boundaries of word meanings through experimentation, trial, and error. This active construction of meaning ensures that the vocabulary is incorporated into the pupil's personal knowledge base, leading to better retention. As stated, the pursuit of meaning is the ultimate objective of learning, and the use of physical movement can assist in this pursuit by making the learning experience more personally relevant.

Materials and Methods

Research design

This study employs a quantitative research approach, which is the most appropriate method for measuring changes in vocabulary retention through numerical data and identifying objective patterns in pupil behavior. By focusing on quantifiable outcomes, the researcher can provide empirical evidence regarding the impact of the intervention on the pupils' language development, a process that ensures the findings are grounded in objective measurement rather than subjective interpretation (Salkind and Frey, 2023).

The specific design chosen for this study is a quasi-experimental design, specifically the one-group pretest-posttest design. This design involves a single group of participants who are measured on a specific dependent variable (vocabulary retention) before the implementation of a treatment and again after the treatment has been completed. According to Fraenkel et al. (2023), the one-group pretest-posttest design is particularly useful in educational settings for determining the effectiveness of a new instructional strategy by observing the change in performance from baseline to completion. The choice of a one-group pretest-posttest design is justified by several practical and academic factors. Firstly, this design is highly effective for a small sample size of 13 pupils (N=13) in a rural school setting where establishing a separate control group is not feasible due to the limited number of pupils in the grade level. Creswell and Creswell (2023) suggest that quasi-experimental designs are the "gold standard" for research in existing classrooms where random assignment is not possible. Secondly, it aligns directly with the first research objective, as it allows for a clear comparison between "before" and "after" retention levels to determine the effectiveness of the kinesthetic strategies. Furthermore, as the researcher is also the classroom teacher, this design facilitates a "practitioner-researcher" model which allows for the seamless integration of the intervention into the existing school timetable without disrupting the natural learning environment (Mertler, 2024). By using the same group as their own baseline, the researcher can more accurately monitor the mean gain in scores and observe the behavioral transitions that occur during the three-week intervention period.

Participants and sampling

The population for this study consists of upper primary pupils within a rural primary school context in Malaysia. Thirteen pupils (N=13) studying English as a Second Language were recruited for this study. Although the study only involves 13 pupils, this small group was chosen on purpose to allow for a more detailed and hands-on teaching approach. In classroom research, working with a smaller group helps the teacher-researcher collect "high-density" data, such as small changes in pupil behavior and individual progress, which might be missed in a larger study (Mertler, 2024). As noted by Cohen et al. (2007), smaller sample sizes are justifiable in educational research when the study involves an intensive intervention or "case-study-like" quantitative analysis that prioritizes depth of data over broad generalizability. This study employs a purposive sampling technique. This non-probability sampling method was chosen because it allows the researcher to select a group that specifically meets the criteria needed to answer the research objectives. As stated by Creswell and Creswell (2023), purposive sampling is essential when the investigator needs to select individuals or sites that can best inform the researcher's understanding of the specific phenomenon being studied. Besides, only children aged 11 years were included in the study. The primary inclusion criteria for these participants were their enrollment in a rural school where English exposure is limited and their identified need for improved vocabulary retention strategies. No specific exclusion criteria were applied other than the requirement that participants must be present for both the pre-test and post-test sessions to ensure the validity of the paired samples analysis, a standard requirement for maintaining internal validity in pretest-posttest designs (Fraenkel et al., 2023).

However, the small sample of the participants does have certain constraints to the study's scope. A primary limitation of this research is the limited generalizability. As the study utilized a purposive sampling technique involving only 13 pupils from a single

rural Malaysian primary school, the findings may not represent the broader population of ESL learners in urban settings or different geographical regions (Creswell and Creswell, 2023). Furthermore, the role of the researcher as the classroom teacher may introduce "researcher bias," although strict observation protocols were used in this study. Despite these limitations, the study offers contextual transferability, providing valuable insights and a pedagogical framework that may be adapted by other practitioners in similar rural settings where the resources are limited (Patton, 2024). Besides, there were several ethical considerations that were strictly maintained to protect the rights and well-being of the participants. First, formal permission was obtained from the school headmaster to conduct the intervention during school hours. Second, although the participants are minors, the researcher provided a clear, age-appropriate briefing regarding the activities to ensure their willing participation. Third, as to guarantee anonymity and confidentiality, no real names are used in the data analysis or the final report. Instead, pupils are referred to using coded identifiers such as "Pupil 1" through "Pupil 13." This process of de-identification is crucial for protecting the privacy of participants in small-group research (Mertens, 2024). Furthermore, all data collected, including test scores and observation checklists, are kept securely and used solely for the purposes of this academic research.

Research instruments

Two primary instruments were utilized to collect data for this study: a Pre-test and Post-test and an Observation Checklist. These tools were selected to provide a comprehensive view of both the pupils' academic performance and their behavioral engagement during the intervention.

Pre-test and post-test

The primary instrument in this study is the pre- and post-tests. The test items were developed to assess 20 nouns selected from the A1 vocabulary list of the latest Common European Framework of Reference for Languages, CEFR-aligned DSKP (National Curriculum Standards). These curriculum-aligned items ensure that the instrument maintains content validity, as the materials are appropriate for the pupils' developmental stage and the official learning standards (Fraenkel et al., 2023). Although these nouns had been previously introduced to the pupils, the instrument was designed to evaluate whether pupils had successfully moved this knowledge into long-term retention. The 20 words included in this test are trousers, scarf, uniform, mosque, market, station, bathroom, field, bridge, storm, cousin, medicine, neighbour, lake, forest, beach, mountain, ticket, airport, fridge. The test was divided into two sections. Part 1 consisted of 20 matching items where participants were required to match nouns with the pictures. This part is specifically used to measure pupils' receptive retention. Part 2 consisted of 20 fill-in-the-blank items, requiring pupils to use the noun correctly within a sentence context. This part of is used to measure productive retention. This dual approach is supported by Nation (2022), who argues that a comprehensive vocabulary assessment must distinguish between the ability to recognize a word (receptive) and the ability to produce it in context (productive). Besides, the instrument was adapted from standard school-based assessments to ensure contextual relevance for rural pupils. To establish the instrument's quality, content validity was first confirmed through expert judgment. Two senior practitioners verified that the items accurately represented the intended

construct and A1 proficiency level as per the national standards (Fraenkel et al., 2023; Salkind and Frey, 2023). Reliability was further ensured through a standardised scoring process and inter-rater consistency. In this case, the researcher and a senior colleague cross-checking marked scripts to achieve an agreement (Salkind and Frey, 2023). Identical items were also being used for both the pre-test and post-test as to maintain test-retest consistency. However the sequence of questions was randomized for the final assessment as a methodological control to reduce "testing effects" or "practice effects" (Creswell and Creswell, 2023). This randomisation ensured that the significant improvements observed across all proficiency levels which are advanced, intermediate, and remedial, reflected genuine vocabulary retention rather than mere memorization of the test layout (Creswell and Creswell, 2023).

Observation checklist

The second instrument was an Observation Checklist used to evaluate behavioral transitions during the activities. Five indicators, adapted from Communicative Orientation of Language Teaching Observation Scheme (COLT), Classroom Observation Protocol for Undergraduate STEM (COPUS) by Smith et al. (2013) and Tellier (2008), assessed the pupils' recall speed, accuracy, and physical engagement. Using adapted, validated frameworks ensures that the observation criteria are grounded in recognized pedagogical standards (Mertler, 2024). 5-point Likert scale was being used to record the performance of each participant across those five indicators. According to Patton (2024), structured observation is an essential tool in educational interventions as it captures nuances of pupil behavior, such as hesitation or enthusiasm that numerical test scores alone cannot detect. The scale ranged from 1 (Never) to 5 (Always). The items needed the observer to rate on how frequent the pupils demonstrated the target behaviors, such as identifying words quickly without hesitation. This instrument would provide the necessary data to evaluate Objective 2. Methodological triangulation was also being used to cross-reference the observational scores with the test results, ensuring that the findings were consistent across different data collection methods. The cross-referencing of these observational scores with test results provides the "triangulation" necessary to ensure that the findings are consistent across different modes of data collection (Cohen et al., 2007).

Data collection procedure

In this study, the collection of the data will take place in the course of three weeks with the purpose of ensuring the systematic application of the kinesthetic strategies. In accordance with Mertler (2024) the structured time line is important in research to ensure that the intervention is systematically implemented and that the pupil's transition in performance can be thoroughly documented.

Timing of data collection

Data collection occurred at three different points in time to enable an overall evaluation of vocabulary retention: (1) Pre-intervention: On the first day of week 1 the pretest was administered to determine the initial level of knowledge of the 20 target nouns among the pupils. Baseline testing is a very important aspect of quasi-experimental design as it permits the researcher to measure exactly what has been contributed to the pupil by the intervention (Fraenkel et al., 2023). (2) During the

Interventions: Continuous behavioral data was collected throughout the three-week intervention period using an observation checklist. The researcher observed and documented the pupil's responses to each of the three kinesthetic activities to evaluate the rate of increase and accuracy of the pupils' recall. Creswell and Creswell (2023) state that the continuous documentation of the process during the intervention phase gives the researcher a "process-oriented" view of learning which illustrates how the pupils respond to the methodology in a dynamic manner. (3) **Post-Interventions:** The final point for data collection was on the final day of week 3 and included administering a posttest to determine the amount of vocabulary retained by the pupils after completing all of the activities. The three-week time frame is considered adequate for small-scale classroom interventions focused on short-term retention and the transitioning of pupils' engagement (Cohen et al., 2007). The implementation of the study followed a four-step chronological process.

Step 1: Introduction and baseline testing

The study began with a general introductory session where the teacher introduced 20 target English vocabulary words using pictures and simple explanations. Pupils received short handouts with the twenty vocabulary words as a reference. After the introductory presentation, the Pre-test was administered. Pupils were instructed to answer twenty multiple-choice matching items and twenty fill-in-the-blank questions within thirty minutes.

Step 2: Phase one intervention (Word Hop-Charade Game)

During the first week of the intervention, the "Word Hop-Charade Game" was conducted on the school field. Pupils had to perform physical charades that demonstrated the definition of a vocabulary word and then run or "hop" to the word inside the hula hoops when the other pupils shouted it out. The researcher utilized the observation check list to assess the accuracy of pupils' physical demonstrations during the activity.

Step 3: Phase two intervention (Vocabulary Relay)

During the second week, the "Vocabulary Relay" was conducted indoors. With a three-checkpoint system, pupils physically walked or run from station to station to select pictures and attach them to the correct word. The objective of this activity was to reinforce the pupils' associations of word-pictures. The researcher then recorded observations regarding the pupils' speed and ability to match words and pictures to meaning without hesitation.

Step 4: Phase three intervention and final evaluation (Ball Scoring Game)

In the final week, the "Word Target" and "Ball Scoring Game" was implemented as a competition between the pupils. These pupils were being divided into two groups. When pupils correctly responded to vocabulary questions, they would gain points. They then could shoot a ball and receive extra points. After the last activity, the Post-test was administered. The post-test consisted of the same 40 item assessment given during the pre-test, but with a randomised order to ensure that the results are genuine.

Data analysis

Data collected from the pre-test, post-test, and observation checklists were analysed using a combination of descriptive and inferential statistics. This quantitative approach was chosen to provide a clear, numerical representation of the impact of kinesthetic strategies on vocabulary retention and pupil behavior. To address the first research objective, comparisons between the pre-test and post-test scores were made using paired samples t-test. This inferential statistical test was utilized to determine if the mean difference between the baseline scores and the final scores was statistically significant ($p < 0.05$). All test data were then processed using SPSS. SPSS would facilitate the calculation of the mean gain and the standard deviation for the 13 participants. Furthermore, the analysis consisted of 2 parts which are Part 1, receptive matching, and Part 2, productive fill-in-the-blanks. These data would help in identifying which specific level of vocabulary mastery showed the most substantial improvement. To address the second research objective, the data from the observation checklists were analyzed using descriptive statistics. The responses from the Likert-Scale were recorded, and a mean score for each of the five behavioral indicators was calculated. To evaluate the assistance provided by the strategies over time, a longitudinal trend analysis was conducted by comparing the mean scores across the three different kinesthetic activities. Finally, methodological triangulation was performed by cross-referencing the statistical test results with the observational trends. This ensured that the findings regarding vocabulary retention were supported by the observed behavioral changes in the pupils.

Results and Discussion

Effects of kinesthetic strategies on vocabulary retention

A comparison between the pre-test and post-test scores of the 13 participants has been done to determine the effect of kinesthetic strategies on vocabulary retention. The findings indicate that the kinesthetic intervention led to a statistically significant improvement in vocabulary retention across all proficiency levels.

Overall performance and statistical significance

The overall performance of the pupils showed a consistent upward trend. *Table 1* summarizes the total scores and the mean gain for each participant. As illustrated in *Table 1*, every pupil recorded an improvement. A notable relationship is observed in the remedial group, where pupils such as P13 and P02 demonstrated the highest numerical gains (+18 marks). To verify the significance of these improvements, a paired-samples t-test was conducted using SPSS, as shown in *Table 2*. The results in *Table 2* reveal that the improvement was statistically significant ($p < 0.001$). This confirms that the kinesthetic strategies effectively enhanced the pupils' ability to retain the target vocabulary.

Table 1. Pre-test and post-test total scores (N=13).

Pupil ID	Proficiency	Pre-Test (/40)	Post-Test (/40)	Score Gain
P08	Advanced	34	40	+6
P06	Advanced	31	39	+8
P03	Advanced	31	38	+7
P10	Intermediate	23	35	+12

P12	Intermediate	21	33	+12
P01	Intermediate	14	30	+16
P05	Intermediate	14	29	+15
P09	Remedial	9	26	+17
P13	Remedial	8	26	+18
P02	Remedial	6	24	+18
P04	Remedial	6	24	+18
P11	Remedial	6	21	+15
P07	Remedial	5	20	+15

Table 2. Paired samples T-test results for pre-test and post-test.

Test	Mean	Standard Deviation	t-value	p-value (2-tailed)
Pre-test	16.00	10.763	-11.489	< 0.001
Post-test	29.62	6.850		

Comparative analysis of receptive and productive retention

To further evaluate the impact of the intervention, the scores were broken down into Part 1 (Receptive: Word-Picture Matching) and Part 2 (Productive: Fill-in-the-blanks). This analysis aims to see if the strategies supported different levels of vocabulary mastery. The data in *Table 3* shows a consistent improvement across both test components. The mean gain for Part 1 (Receptive) was +6.69, while the mean gain for Part 2 (Productive) was +7.00. Although the difference in gain between the two parts is small, the results indicate that the kinesthetic strategies did support both recognition and production of vocabulary. This suggests that the intervention was effective not only in helping pupils identify words but also in assisting them with the more difficult task of word retrieval. For the 6 remedial participants, who initially struggled with the productive task, the improvement in Part 2 implies that the physical activities provided a useful mnemonic aid that facilitated their ability to recall and spell the target nouns.

Table 3. Comparison of mean score: Part 1 vs part 2 (N=13).

Component	Pre-Test Mean	Post-Test Mean	Mean gain
Part 1 (Receptive)	9.85	16.54	+6.69
Part 2 (Productive)	6.08	13.08	+7.00

Evaluation of kinesthetic strategies in assisting vocabulary learning

To interpret the mean scores from the observation checklists, the following scale was applied: 1.00–1.80 (Very Low), 1.81–2.60 (Low), 2.61–3.40 (Moderate), 3.41–4.20 (High), and 4.21–5.00 (Very High).

Longitudinal trend of pupil engagement

Table 4 illustrates the progression of engagement for all 13 pupils, categorized by their initial proficiency levels. This longitudinal view shows how the "assistance" of the strategy manifested over the three-week intervention. The data in *Table 4* reveals a clear engagement improvement across all levels. Notably, the Remedial group showed the most significant transformation, moving from Low (1.83) to High (3.80) engagement. This suggests that the kinesthetic approach assists by lowering the affective filter for lower-proficiency pupils, thus allowing them to eventually match the high engagement levels of their peers.

Table 4. Progression of mean observation scores by pupil category (N=13).

Pupil's Category	A1M	Int	A2M	Int	A3M	Int
Advanced (n=3)	4.40	Very High	4.73	Very High	4.93	Very High
Intermediate (n=4)	3.15	Moderate	3.70	High	4.15	High
Remedial (n=6)	1.83	Low	2.73	Moderate	3.80	High
Total Class Mean	2.84	Moderate	3.49	High	4.16	High

Note: A1M=Activity 1 Mean; A2M=Activity 2 Mean; A3M=Activity 3 Mean; Int=Interpretation.

Analysis of behavioural indicators

Table 5 breaks down the specific behaviors that enabled this growth. Comparing the baseline (Activity 1) to the final achievement (Activity 3) highlights the areas where the kinesthetic strategy provided the most effective assistance. Although all indicators showed the final result of "High" or "Very High", Indicators 1, 2, and 4 show the most significant shift from "Low" baselines. Indicator 2 (Speed of Response) demonstrated the highest growth (+2.16), shifting from Low to Very High. This proves that the strategy assisted by automating recall, which is the physical urgency of the games, forced pupils to retrieve nouns instinctively rather than relying on slow mental translation. On the other hand, Indicator 1 (Correct Recall) moved from Low to Very High (+1.69). The physical action as the pupils identified the words during the activities, acted as a mnemonic anchor, which assist pupils in accurately linking visual cues to English nouns. Indicator 4 (Memory Retention) improved from Low to High (+1.54). This suggests that the multisensory nature of the strategy combining movement with visual and auditory input created a stronger memory trace, assisting in moving vocabulary into long-term retention. In summary, the transition of key behavioral indicators from Low to Very High proves that kinesthetic strategies assist learning by optimizing the cognitive retrieval process. The data suggests that as physical responses became more fluid, the mental effort required for vocabulary recall decreased, facilitating a more efficient learning process for all pupils, regardless of their initial proficiency level.

Table 5. Comparison of behavioural indicators with descriptive interpretation.

Behavioral indicator	A1M	Int	A3M	Int	Mean Growth
Correct recall	2.54	Low	4.23	Very High	+1.69
Speed of response	2.15	Low	4.31	Very High	+2.16
Accuracy in matching	3.08	Moderate	4.54	Very High	+1.46
Memory retention	2.38	Low	3.92	High	+1.54
Improvement in accuracy	3.07	Moderate	4.23	Very High	+1.16

Note: A1M=Activity 1 Mean; A3M=Activity 3 Mean; Int=Interpretation.

Methodological triangulation of findings

In order to provide an indication of both the validity and reliability of this research, methodological triangulation was used by cross-checking the results from the pre- and post-tests to the patterns seen on the behavioral checklists. Thus, it is confirmed that the increase in the test scores was as a result of the 'assistance' being provided through the use of kinesthetic strategy (Table 6). The triangulation reveals a direct correlation between physical behavior and cognitive performance. (1) Hesitation to Intuitive: The transition of Indicator 2 (Speed) from "Low" to "Very High" explains the pupils' ability and capacity to do well in the Post-test under time constraints. This occurred as a result of the kinesthetic method assisting them to rapidly convert slow, thoughtful, mental

transference into fast, intuitive recall. (2) Multisensory Anchoring: The high accuracy in Post-test Part 1 (Matching) is supported by the "Very High" scores in Indicator 3 (Matching Accuracy). This proves that the activity of physically moving towards a target while simultaneously processing the words provides the pupil with the "assistance" required to successfully transfer vocabulary from their short term to their long term memory. (3) Inclusivity in Learning: Although advanced learners demonstrated continued success, the remedial group required the most "help". The longitudinal growth in engagement for the remedial learners (from "Low" to "High" as noted in *Table 4*) allowed them to feel psychologically safe, which enabled the remedial learners to achieve the significant test gains recorded.

Table 6. Triangulation of test performance (RO1) and behavioral observations (RO2).

Primary Data (RO1: Test Results)	Supporting Evidence (RO2: Observations)	Synthesis of Findings
Significant Mean Gain: Post-test scores increased from 16.00 to 29.62.	Indicator 1 & 4: Shifted from Low to Very High recall and memory retention.	The statistical gain in the tests is corroborated by the observed shift in memory retention, proving that kinesthetic repetition successfully "anchored" the vocabulary.
Productive Recall (Part 2): Mean gain of +7.00 marks in fill-in-the-blanks.	Indicator 2 (Speed): Highest growth (+2.16) moving from Low to Very High.	The high performance in written recall matches the observed automation of speed. As physical recall became instinctive, mental retrieval for writing became more efficient.
Closing the Achievement Gap: Remedial pupils showed the highest mark improvement.	Table 4 Trend: Remedial group moved from Low (1.83) to High (3.80) engagement.	The rise in test marks among weaker pupils is explained by the steady growth in their engagement levels, proving the strategy assists by lowering the affective filter.

This section will examine the quantitative data from the study's findings through the lens of existing educational literature and theory (educational research) and explore why kinesthetic strategies were successful in the rural ESL classroom and how they may be useful for ESL teaching in rural areas. This section will synthesize the statistical gain made by the pupils with the changes in pupil behavior resulting from the use of the kinesthetic strategy. The analysis is structured to provide a cohesive narrative that connects the observed results to the principles of multisensory learning and child development. The findings of this study provide robust evidence for the effectiveness of kinesthetic strategies in the ESL classroom, primarily through a significant improvement in vocabulary retention. As the post-test scores improved by 85% over the pre-test baseline, together with a significant mean gain of 13.62 and a $p < 0.001$ value, proves that kinesthetic strategies are highly effective for improving the memory of the 11-year-old rural upper primary ESL pupils. This quantitative growth was mirrored by structured observations which identified that the pedagogical assistance provided by these strategies is rooted in the automation of recall and the creation of mnemonic anchors. Additionally, the growth in the speed of response suggests that physical movement can assist in shortening the cognitive distance between seeing a word and understanding its meaning, thus effectively moving vocabulary into the pupils' active lexicon. These results are consistent with the study, who found that kinesthetic strategies are effective in lowering the "Affective Filter" and "classroom anxiety" for Malaysian ESL pupils. Furthermore, this research also expands those findings by adding the dimension of retrieval speed. Motor-sensory enactment significantly improves word recognition through the activation of the motor cortex. This suggests that physical urgency within a game context is a critical factor in automating memory. This concept is supported, who found that active physical involvement accelerates the transition from passive to active vocabulary recall (Hattie and Donoghue, 2024)."

The significant improvement in scores, where the post-test mean rose from 16.00 to 29.62, aligns closely with the principles of Total Physical Response (TPR). This finding suggests that language learning is most effective when coordinated with physical movement (Asher, 2012). In this study, the assistance provided was crucial in the psychological readiness of the pupils. This can be seen through their confidence and fluency as they shifted from a Moderate (3.07) to a Very High (4.23) level. This data supports Lightbown and Spada (2021) as well as Krashen (1982) theory observation whereby kinesthetic games distract pupils from the fear of making mistakes. As pupils physically 'Word Hopped' or 'Scored a Ball,' they created a physical map of the English nouns, mirroring the synchronisation of body and mind, as what has been described in similar study. This physical mapping process aligns with Scrivener (2020) recent research that highlights the motor-sensory engagement acts as a cognitive anchor is not just a coincidence in ensuring that new lexical items. Instead, it is physically 'rooted' in the learner's experience. For the remedial group, the longitudinal growth in engagement suggests that TPR acts as a powerful equaliser, allowing struggling pupils to demonstrate comprehension through action rather than being overwhelmed by immediate written or spoken demands (Richards and Rodgers, 2024). These findings also strongly support Embodied Cognition Theory, which posits that language retrieval is deeply rooted in the body's interactions with the world (Glenberg, 2010). The improvement in response speed suggests that the physical "race" involved in the Vocabulary Relay created a motor-memory link. According to Barsalou (2020), when language is learned through action, the brain "simulates" that movement during later recall, thus allowing pupils to bypass slow mental translation. Besides, the strategy created a more durable memory trace By engaging the motor cortex alongside visual and auditory systems. This embodiment is particularly crucial for the remedial group. This is due to the fact that when their engagement increased, their bodies acted as a scaffold, providing a physical reference point that made abstract nouns more concrete and easier to store in long-term memory (Shapiro, 2019).

Furthermore, the steady improvement in the total class mean aligns with the Zone of Proximal Development (ZPD), where learners are active creators of knowledge through social interaction (Vygotsky, 1978). The progression from individual tasks to team-based competitions provided a social scaffold where support is gradually removed as the learner gains mastery (Mercer et al., 2019; Bruner, 1966). The success of the Ball Scoring Game highlights the importance of social nature in knowledge construction, forcing pupils to negotiate meaning and use vocabulary in real-time (Piaget, 1952). Ultimately, these strategies served as a bridge within the pupils' ZPD, shifting them from assisted learning to independent learning, which is the ultimate goal of constructivist teaching (Lantolf et al., 2024). This shift confirms that physical scaffolding allows learners to internalize linguistic knowledge, facilitating a transition toward self-regulated lexical uses. As for practitioners, this implies that vocabulary instruction should move beyond the textbook, offering a low-cost and high-impact method for differentiated instruction that helps pupils bypass the "translation block" (Thornbury, 2022). Despite these positive outcomes, this study is limited due its small sample size of 13 pupils, which prevents the wide generalization of results to all primary learners. Additionally, because the post-test was conducted immediately following the intervention, the long-term decay of vocabulary retention remains unexamined (Fraenkel et al., 2023). The localized context of the purposive sample shows that these findings are context-specific to rural settings and may not represent

urban ESL environments (Creswell and Creswell, 2023). Future researchers are encouraged to conduct larger-scale studies and incorporate a delayed post-test to measure the true permanence of kinesthetic strategies in assisting pupils' vocabulary retention. Exploring the effectiveness of movement on different types of linguistic data could also provide a broader understanding of how embodiment assists learning. In conclusion, this study confirms that kinesthetic strategies are an intervention that improves retention and strengthens memory traces, fostering an inclusive environment that benefits pupils of all proficiency levels.

Conclusion

This study confirms that kinesthetic strategies are impactful for supporting and enhancing vocabulary retention among upper primary ESL pupils. This is proven by the 85% improvement in post-test scores ($p < 0.001$) and a significant mean gain of 13.62 marks. By addressing the research objectives quantitatively, the findings reveal that physical movement facilitates linguistic acquisition and vocabulary retention by automating recall and reducing the affective filter. This effect is particularly seen among remedial learners who showed a remarkable transition from low to high engagement levels. This research also provides theoretical support for the Principles of Total Physical Response (TPR) and Embodied Cognition as it has proven that motor-sensory activity is a necessary mnemonic anchor to facilitate language retention. Besides, these results provide a practical, inclusive, low-cost pedagogical framework for teachers to go beyond the traditional rote memorization techniques. Implementing kinesthetics strategies can create a dynamic environment that allows pupils to internalize language through purposeful action. Despite these positive outcomes, the study does have several limitations. The small sample size ($N=13$) and specific rural context prevents the generalization of results to the larger Malaysian primary population. Additionally, since a delayed posttest was not conducted, it is unclear if the vocabulary learned through the study will be retained in the long term. Future research should attempt to address these gaps and limitations by conducting larger-scale studies across diverse school settings and environments, as well as including delayed assessments to measure memory decay over time. Furthermore, investigating the impact of movement on more complex aspects of language, such as abstract verbs, would also contribute towards a better understanding on the effectiveness of the kinesthetic strategies in English learning . Ultimately, the current study provides evidence that there needs to be a greater emphasis placed on bridging the connection between physical movement and cognitive processing to create an effective and inclusive ESL learning experience.

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Conflict of interest

The authors confirm that there is no conflict of interest involved with any parties in this research study.

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