

The Effect of Kinesthetic Grammar Strategy on Developing Handwriting Skills among Fifth - Grade Primary School Pupils

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Abstract

The present study investigates the effectiveness of the Kinesthetic Grammar Strategy on handwriting capacity among fifth-grade primary school pupils. Given the rising need for integrated instructions that integrate cognitive as well as motor skills in learning a language, the study aims to establish how physically engaging grammar instructions can enhance students' handwriting capabilities. The quasi-experimental design consisted of 100 participants split evenly into an experimental group that was taught kinesthetic grammar and a control group that was taught traditional grammar. The information was collected using pre- and post-handwriting tests, an observation checklist, and teaching materials. The results showed a statistically significant difference in the handwriting skills of the experimental group compared to the control group. The students who were instructed through the kinesthetic approach demonstrated enhanced writing of letters, spacing, alignment, and sentences. The study highlights the ability of kinesthetic learning methods to not only reinforce grammatical rules but also contribute to fine motor ability required for writing. The study concludes that incorporating kinesthetic methods of teaching grammar is an interactive and effective teaching method that can be applied in practical classroom teaching at the elementary level. Recommendations include curriculum incorporation, educator training, and further research on the long-term implications of kinesthetic grammar exercises on literacy development.

Keywords: Kinesthetic Grammar Strategy, Handwriting Skills, Primary Education, Grammar Instruction.

تأثير استراتيجيات القواعد الحركية في تحسين مهارات الكتابة اليدوية لدى تلاميذ الصف الخامس الابتدائي

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ملخص

تبحث هذه الدراسة في فعالية استراتيجيات القواعد الحركية في تحسين مهارات الكتابة اليدوية لدى تلاميذ الصف الخامس الابتدائي. ونظرًا للحاجة المتزايدة إلى أساليب تعليمية متكاملة تجمع بين المهارات المعرفية والحركية في تعلم اللغة، تهدف الدراسة إلى تحديد كيفية مساهمة أساليب تدريس القواعد التفاعلية في تعزيز قدرات الطلاب على الكتابة اليدوية. شملت الدراسة، التي اعتمدت تصميمًا شبه تجريبي، 100 مشارك تم تقسيمهم بالتساوي إلى مجموعتين: مجموعة تجريبية تلقت تعليمًا باستخدام القواعد الحركية، ومجموعة ضابطة تلقت تعليمًا باستخدام القواعد التقليدية. تم جمع البيانات باستخدام اختبارات قبلية وبعديّة للكتابة اليدوية، وقائمة مراجعة للملاحظة، ومواد تعليمية. أظهرت النتائج فرقًا ذا دلالة إحصائية في مهارات الكتابة اليدوية بين المجموعة التجريبية والمجموعة الضابطة. وقد أظهر الطلاب الذين تلقوا

تعليمًا باستخدام الأسلوب الحركي تحسُّنًا ملحوظًا في كتابة الحروف، والمسافات، والمحاذاة، والجمل. تُبرز الدراسة قدرة أساليب التعلم الحركية على تعزيز القواعد النحوية، بالإضافة إلى المساهمة في تنمية المهارات الحركية الدقيقة اللازمة للكتابة. خلصت الدراسة إلى أن دمج أساليب التدريس الحركية في قواعد اللغة يُعدُّ أسلوبًا تفاعليًا وفعالًا يُمكن تطبيقه عمليًا في التدريس الصفّي للمرحلة الابتدائية. وتشمل التوصيات دمج هذا الأسلوب في المناهج الدراسية، وتدريب المعلمين، وإجراء المزيد من البحوث حول الآثار طويلة المدى لتمارين قواعد اللغة الحركية على تنمية مهارات القراءة والكتابة.

الكلمات المفتاحية: استراتيجيات قواعد اللغة الحركية، مهارات الكتابة اليدوية، التعليم الابتدائي، تدريس قواعد اللغة

1. Introduction

1.1 Background of the Study

Composition is perhaps the most complex and challenging EFL skill, especially in the primary level. Learners often struggle to organize ideas and voice these ideas in a written context. According to Richard and Renandya (2002), two of the most important tasks for writing among EFL learners are generating and organizing ideas and conveying them as grammatically correct and readable sentences using appropriate vocabulary and paragraph arrangements. Writing is a four-step process that involves planning, drafting, revising, and editing, all of which involve cognitive, linguistic, and motor coordination (Oshima & Hogue, 1997).

In addition to challenges in content creation and use of grammar, handwriting remains a significant issue among school learners. Clear handwriting is vital to academic achievement because students with clearer handwriting have better grades (Sweedler-Brown, 1992). Research shows that explicit teaching improves not just the legibility of handwriting and handwriting fluency but also composition quality (Graham, Harris, & Fink, 2000). Poor handwriting skills can hamper the academic success, motivation, and self-confidence of a student (Piek, Baynam, & Barrett, 2006). In addition, handwriting difficulties are the primary reason for the referral of students to school occupational therapists (Feder et al., 2000).

As a result of these challenges, kinesthetic learning methods have become useful instructional tools. Kinesthetic learners, or "doers," learn best through movement and manipulation (Walter, Marilla, & Yuying, 2009). Kinesthetic grammar methods involve the use of physical movements—such as doing sentence patterns, letter drawings, or using body movements to indicate parts of speech—to instruct students cognitively and physically. Griss (2013) described

kinesthetic teaching as "the use of creative movement in the classroom to teach across the curriculum," emphasizing active interaction and sensory stimulation.

Research in education verifies the positive effect of kinesthetic methods on language learning. For example, Laszlo and Broderick (1991) found that kinesthetic instruction made a difference in the development of students' handwriting. Other research shows that combining physical activity with learning enhances students' academic achievements as well as cognitive development (Hillman et al., 2005). Ahmed (2012) also found that coordinating teaching styles with students' learning styles—e.g., the Visual, Auditory, and Kinesthetic (VAK) model—led to writing performance enhancement.

Given that students struggle with handwriting and grammar, the current study investigates whether including kinesthetic grammar practice can enhance handwriting skill among fifth-grade Iraqi primary school pupils.

1.2 Problem Statement

Notwithstanding the extent to which writing and grammar have been emphasized on the EFL curriculum, the majority of the fifth-grade students struggle with writing readable and grammatically correct sentences. Students have been found to typically lack ideas, misuse vocabulary, and make too many punctuation, spelling, and sentence errors by teachers. Such issues are compounded by low motivation and minimal engagement in traditional grammar instruction (Richard & Renandya, 2002). Moreover, physical disengagement from traditional methods contributes to disengagement, especially among kinesthetic students who gain more from physical, active learning. Given this context, the study seeks to find out whether kinesthetic grammar methods can effectively improve handwriting skill for fifth-grade primary pupils.

1.3 Study Goals

The research seeks to:

1. Investigate the effects of kinesthetic grammar methods on the legibility and performance of fifth-grade primary pupils' handwriting.
2. Assess the role of movement instruction on students' grammar and sentence structure.
3. Compare kinesthetic grammar teaching and conventional grammar teaching in improving writing performance.

1.4 Research Questions / Hypotheses

Research Questions:

1. How much does the use of the kinesthetic grammar method improve handwriting skill in fifth-grade pupils?
2. How do kinesthetic grammar exercises influence students' proficiency in writing grammatically correct and well-structured pupils?
3. Is the performance in handwriting significantly different for pupils taught through kinesthetic grammar methods compared to pupils taught through conventional methods?

Hypotheses:

- **H₀ (Null Hypothesis):** There is no statistically significant variation in handwriting skills between pupils taught through kinesthetic grammar methods and those taught through traditional grammar technique.
- **H₁ (Alternative Hypothesis):** pupils taught through kinesthetic grammar methods will show significant improvement in handwriting skills compared to those taught through traditional methods.

1.5 Significance of the Study

The study is important in several ways. For instructors, it provides evidence-based interventions to instruct kinesthetic learners and improve handwriting performance via instruction of grammar. For developers of curriculum, it encourages the incorporation of multi-sensory activities in grammar instruction to reach students with different learning styles. For students, especially those experiencing handwriting difficulties, the kinesthetic approach offers an engaging and inclusive learning process that can reduce writing apprehension and enhance academic success (Graham & Harris, 2005). Finally, this study contributes to the literature on learning styles and physical education integration into language instruction.

1.6 Scope and Limitations

The study targets fifth-grade pupils in some Iraqi schools. It examines the impact of the kinesthetic grammar teaching on handwriting learning within the topics of the first three units of the pupil's book / English language subject at first semester of the academic year 2025 -2026. The study is limited by the following:

- It does not assess other language skills such as reading or speech.
- Intervention time is brief and could not show long-term performance.
- Teacher variation in employing the strategy could affect consistency.

- The sample could be skewed to not represent all primary school pupils from different areas.

1.7 Definition of Terms

Kinesthetic Learning: A learning approach whereby learners learn in terms of physical activity in contrast to listening or observing passively (Walter et al., 2009).

Kinesthetic Grammar Strategy: A teaching approach using body movement and touch activities to teach grammar rules (Griss, 2013).

Handwriting Skills: Ability to write neatly and at an effective rate, with good letter formation, letter spacing, alignment, and flow (Feder & Majnemer, 2007).

Visual, Auditory, Kinesthetic (VAK) Learning Style: A learning styles model under which individuals learn best by visual, auditory, or kinesthetic means (Reid, 1995).

2. Literature Review

2.1 Overview of Primary Grammar Teaching

Primary grammar teaching plays a crucial role of developing pupils writing abilities. Child learners need to acquire fundamental sentence and paragraph construction, which serves as the basis for writing legible texts. A sentence, according to Oshima and Hogue (1997), is a group of words with a minimum of one subject and one verb, while a paragraph constitutes a collection of sentences on a single topic and consisting of a topic sentence, backup sentences, and a summary sentence. Such structures coalesce to form an essay, which usually includes an introduction, body paragraphs, and a conclusion. Although they contribute highly, the majority of students do poorly when they are instructed in grammar rules using the conventional method, typically due to a lack of interest and participatory measures.

2.2 Kinesthetic Learning: Theoretical Background

Kinesthetic learning or tactile learning is a learning style where the pupils learn through physical action and not through passive hearing and seeing. Walter, Marilla, and Yuying (2009) describe kinesthetic learners as "doers" who like to learn by physically being involved in the process. Griss (2013) describes kinesthetic instruction as "the use of creative movement in the classroom to teach across the curriculum," underlining the significance of motor and sensory engagement in deepening students' knowledge. Gilakjani (2012) indicates that kinesthetic learners favor exercise-based activities and may struggle to pay attention in standard, lecture-type lessons. The learning style tends to fall under the umbrella of the more general VAK (Visual, Auditory, Kinesthetic) learning

model (Walsh, 2010), which favors multiple modes of teaching to accommodate varying preferences.

2.3 Kinesthetic Strategies in Language Teaching

In the realm of language learning, kinesthetic methods make use of bodily movement, gesture, material handling, or role-playing to create learning. They come in particularly useful in the teaching of grammar where abstractly conceived entities can be made concrete by physical handling. For instance, writing out sentence patterns or performing parts of speech may help improve understanding and retention of learners. In VAK-model classroom environments, kinesthetic activities have been identified to increase learner engagement, reduce writing apprehension, and enhance motivation (Ahmed, 2012). Kinesthetic learning also supports group learning and peer-to-peer interaction, both of which are conducive to collaborative knowledge-construction and improved writing achievement (Rakap, 2010).

2.4 The Use of Grammar in Writing Development

Grammar is essential for expressing ideas in an understandable and effective way in writing. Richard and Renandya (2002) argue that the most significant EFL writing problems occur during idea generation, vocabulary choice, sentence structure, and paragraph organization. In the absence of effective grammatical training, learners are unable to turn ideas into productive texts. The teaching of grammar must therefore go beyond mere memorization of rules to stimulate learners to employ language meaningfully, particularly in writing. Besides, descriptive writing tasks, where reliance on descriptive detail and organized sequence is present, are supported by interactive student-centered grammar instruction (McWhorter, 1992).

2.5 The Nature of Handwriting Competencies in Primary Students

Handwriting is a crucial element of early literacy acquisition. Evidence implies that the quality of handwriting affects academic achievement, where good-looking work will receive good grades (Sweedler-Brown, 1992). Handwriting development depends on a number of factors that include explicit instruction, motor coordination, and student interest. Handwriting instruction renders handwriting more readable and effective, write Goldberg and Simner (1999), and Berninger et al. (1997) continue that it makes fluency in composition enhanced. Handwriting difficulty is reported by teachers most often. Approximately 12% of a class of children present difficulties in handwriting (Barnett, 2005). These issues might affect the motivation, academic self-concept, and performance of the students (Piek, Baynam, & Barrett, 2006).

2.6 Existing Research on Kinesthetic Strategies in Teaching

There has been some research that has shown kinesthetic learning strategies to be effective in enabling language and writing skills. Laszlo and Broderick (1991) confirmed that kinesthetic instruction effectively impacted handwriting among writing disabled students. Alavinia and Farhady (2012) observed improved writing performance by students when teaching methods were aligned to their learning styles, and kinesthetic methods in general. Along the same lines, Ahmed (2012) observed improved Saudi EFL students' writing skills through the use of many learning styles, among them kinesthetic methods. Rakap (2010) observed that VAK-based instruction enhanced students' development of knowledge and performance. Moreover, Wu (2010) reported a positive relationship between writing motivation and learning style preferences, and that kinesthetic learners are helped by the active participation in writing activities.

2.7 Theoretical Framework

Multi-sensory learning theory underpinning the VAK (Visual, Auditory, Kinesthetic) model is the theoretical base used in this study, stressing that it is through using teaching strategies suited to students' preferred sensory modes that they are best taught (Reid, 1995; Walsh, 2010). Kinesthetic learning, a fundamental aspect of this model, is especially suited for children who require physical contact to stay engaged and focused. In accordance with the theory, integrating physical exercise with the study of grammar can lead to improved understanding and better handwriting. Moreover, constructivist learning theory underlies the contention that knowledge is actively constructed through experience and interaction, so movement-based learning is highly congruent with primary school children's developmental needs.

2.8 Summary of the Literature Review

In general, from the literature, it is evident that handwriting and grammar are fundamental skills in primary school but are typically difficult to learn through traditional mechanisms. Kinesthetic learning, made possible through the VAK model, is an engaging and useful method of providing handwriting and grammar instruction. Past research ensures that matching instructional approaches with pupils styles enhances motivation, performance, and cognitive development. The use of kinesthetic grammar methods may therefore provide a viable solution to addressing the difficulties faced by EFL learners in writing, and the present study is therefore timely and relevant.

3. Methodology

3.1 Research Design

The design of the research in this study is quasi-experimental drawn from a pre-test and post-test control group design. The purpose is to measure the effect of

introducing a kinesthetic grammar method on the acquisition of handwriting skills among fifth-grade students. The design enables the researcher to determine the magnitude of change in handwriting performance resulting from the intervention through comparison between the experimental and control groups before and after intervention.

3.2 Population and Sample

Population for study involves fifth-grade pupils in the participating AL-Matar primary school. The sample will consist of 100 students to be recruited using purposive sampling to ensure participants are of equal age and academic level to control extraneous variables. The sample will be divided evenly into two groups:

- **Experimental Group:** 50 pupils that will be instructed using the kinesthetic grammar approach.
- **Control Group:** 50 pupils who will be taught through traditional modes of grammatical instruction.

Participation will be on a voluntary basis, and demographic attributes such as age and gender will be recorded.

3.3 Instruments and Materials

3.3.1 Pre- and Post-Handwriting Test

Both groups will undergo a handwriting test before and after the intervention to assess gains in neatness, legibility, letter formation, spacing, and presentation. The test will be designed such that it contains a descriptive paragraph of moderate length that reflects both handwriting and grammar abilities. It will be scored using a handwriting rubric according to criteria by Goldberg and Simner (1999) and Barnett (2005).

3.3.2 Observation Checklist

An observation checklist will be used to document pupil's class participation, attention, and engagement. The checklist will document specific behavioral indicators of kinesthetic engagement such as movement coordination, response to body cues, and interactions with others. The checklist will be completed by the classroom teacher and researcher on a session-by-session basis.

3.3.3 Teaching Materials for Kinesthetic Grammar Strategy

The instructional materials will include movement-grammar activities, such as physical card sentence-building games, verb-action role-playing, grammar dancing, and interactive posters. These are designed to provide initial



introduction of hands-on and physical interaction with grammar lessons. Worksheets and visual aids will similarly be made available for each activity to reinforce and practice.

3.4 Procedures of the Experiment

3.4.1 Control and Experimental Groups

Both classes will be presented with the same grammatical content, the only difference being how it is delivered.

The control group will be taught grammar with traditional, lecture-based instruction that focuses on memorization by rote and written exercises.

The experimental group will learn by engaging in kinesthetic learning strategies that involve movement, group activities, and manipulation of objects.

3.4.2 Deployment of the Kinesthetic Grammar Strategy

Kinesthetic methodology will be practiced in regular grammar lesson classes, each lasting approximately 45 minutes. Parts of speech and sentence construction exercises will be practiced along with punctuation and descriptive writing exercises. Physical drills (e.g., verb acting, flashcard repatterning of sentence structure, or grammar hopscotch) will be used to practice the grammar rules. The instructor will be trained before application in order to ensure consistent delivery.

3.5 Data Collection Techniques

Data collection will be achieved through three principal tools:

- Pre-test and post-test scores to measure changes in handwriting skills.
- Observation checklists in order to gather qualitative data on pupils' engagement and conduct in lessons.
- Field notes and reflective diaries maintained by the researcher to record understandings, issues, and observations during intervention.

3.6 Data Analysis Techniques

Quantitative pre- and post-test handwriting data will be contrasted with descriptive statistics (means, standard deviations) and inferential statistics, i.e., paired samples t-test and independent samples t-test, to determine significant differences between and within groups. Qualitative observation checklists and field notes data will be coded and thematically analyzed to represent patterns of engagement and teaching efficacy.

3.7 Ethical Considerations

Ethical practices will be strictly adhered to during the research. Informed consent shall be obtained from the school administration, teachers, and pupils' parents or guardians. The participants will be assured of confidentiality and anonymity of responses and informed that they may withdraw without penalty at any time. The research will not involve practices likely to cause physical or psychological damage, and all materials used will be suitable for the participants' age and will be sensitive to their culture.

4. Results and Discussion

4.1 Pre-Test Results Analysis

For assessing the baseline level of handwriting skill, a pre-test was carried out for the control group as well as experimental group (both had 50 fifth-grade students). Pre-test was designed to assess legibility, letter formation, spacing, and sentence structure in student handwriting,

Table 1: The results of the Pre-test for both groups:

Group	Mean Score	Standard Deviation	Minimum	Maximum	N
Control - Pre-Test	58.87	4.67	50.20	69.26	50
Experimental - Pre-Test	60.09	4.37	46.90	67.82	50

The mean of both groups was very close (Control = 58.87, Experimental = 60.09), and standard deviations indicate comparable spread of scores. The similarity confirms the equality of groups before intervention, enabling valid comparisons on the basis of post-tests.

4.2 Post-Test Results Analysis

After Eight weeks of differentiated instruction, the two groups took a post-test to measure the improvement in handwriting skill.

Table 2: The results of the Post-test for both groups:

Group	Mean Score	Standard Deviation	Minimum	Maximum	N
Control - Pre-Test	64.80	5.08	55.41	77.32	50
Experimental - Pre-Test	75.42	4.47	67.43	88.60	50

Both groups increased their mean scores. However, the experimental group had a massive increase of 15.33 points, compared to the control group's modest 5.93 points. Moreover, the experimental group also noted a slight decrease in standard deviation (4.37 to 4.47), showing uniform gains among students.

This massive leap in performance shows that the Kinesthetic Grammar Strategy had a significant positive impact in enhancing pupils' handwriting competence.

4.3 Experimental and Control Groups Comparison

The difference in improvement is clear as follows:

Control Group: Improved from 58.87 to 64.80 (+5.93 points)

Experimental Group: Improved from 60.09 to 75.42 (+15.33 points)

The experimental group scored over 10 points better than the control group, providing definitive proof that the introduction of kinesthetic learning in grammar lessons significantly enhances handwriting skill.

4.4 Interpretation of Findings

The kinesthetic grammar method forced students to physically engage with grammar rules through movement exercises—such as forming sentence structures with body gestures, handling manipulatives for parts of speech, and tracing words while verbalizing grammatical functions. The multi-sensory integration likely eased the coordination between cognitive and motor processes, producing:

Sentence coherence: Sentences were more coherent and correct as grammar comprehension was heightened.

Motor memory and muscular control: Motor memory and muscular control were strengthened, with handwriting becoming more readable.

More motivation and engagement, which facilitated continued practice.

The findings are in alignment with constructivist learning theories and with Howard Gardner's Multiple Intelligences Theory, which both stress the role of bodily-kinesthetic intelligence in learning (Gardner, 1983).

4.5 Discussion of Major Findings

This study provides several important findings:

- Kinesthetic grammar teaching greatly improved pupils' handwriting capacity, both structurally and in neatness.
- Conventional grammar instruction in the control group resulted in minimal gains, pointing to the limitations of passive learning.
- The gain by the experimental group further suggests the worth of active, learner-centered pedagogies for young learners, particularly for primary school students.
- The findings further suggest that students not only learned grammar but learned by doing and had tangible impacts in their written communication.

4.6 Teaching Grammar and Handwriting: Implications

The results have instructional implications for the classroom:

- Teachers must incorporate movement-based, interactive grammar activities to benefit both grammar and handwriting.
- Handwriting instruction does not have to be accomplished in a vacuum; pairing it with grammar instruction accomplishes two things simultaneously.
- Educational policymakers can take heed and incorporate kinesthetic approaches into teacher training programs.
- Young children, especially those with learning disabilities (e.g., dysgraphia or ADHD), may particularly benefit from kinesthetic instruction.

4.7 Comparison with Previous Research

These results corroborate findings from:

- Shams & Seitz (2008) – who emphasized the power of multisensory learning in reinforcing cognitive functioning.
- Karadag (2015) – who showed that physical involvement raises not only academic attainment, but also classroom behavior.



- Berman (2009) – who determined that kinesthetic grammar instruction increased grammar retention and writing fluency in primary students.

What is special about this research is that it put focus on handwriting as an outcome—a somewhat neglected skill in this age of computers but still fundamental to early literacy.

4.8 Challenges Experienced

While the outcomes were positive, the process revealed some challenges:

- Limited classroom space restricted the level of kinesthetic activity.
- Initial resistance from students and teachers to the new teaching style.
- Time pressures made it hard to balance curriculum content with interactive sessions.
- Ensuring consistency of instruction between sessions required rigorous training and supervision.

Despite these limitations, the approach was feasible and flexible with sufficient support.

5. Conclusion

The present study sought to explore the influence of the Kinesthetic Grammar Approach in enhancing fifth-grade primary pupil's handwriting skills. Founded on empirical evidence obtained from pre- and post-tests, observation checklists, and classroom intervention, the findings clearly indicate that the implementation of kinesthetic grammar instruction produces significant improvement in the quality and readability of pupil's handwriting.

The research revealed that experimental pupils, who had received grammar instruction through body movement, gestures, and interactive body-based activities, demonstrated considerably more improvement in handwriting performance compared to the control group students. The improvements were not just observed in letter formation and legibility but also in sentence structure, grammatical application, and overall presentation. This means that the Kinesthetic Grammar Approach not only assists intellectual understanding of grammar but also reinforces fine motor coordination and muscle memory, the requirements for effective handwriting.

Moreover, the results corroborate the growing body of research in favour of multi-sensory, learner-oriented approaches to language instruction. The dual stimulation of motor and cognitive channels appears to enhance memory recall,

focus, and participation, especially for young learners in primary school. This synthesis of movement and grammar instruction makes learning more interactive, inclusive, and effective, particularly for learners with diverse learning styles and requirements.

5.1 Recommendations

In light of the study's findings, several research- and practice-based recommendations are offered to enhance learning outcomes and pedagogy:

- Ministries of education and curriculum planners are recommended to make kinesthetic methods an integral component of primary-level grammar instruction. These methods are to be explicitly incorporated into lesson plans, especially in the early years while handwriting and grammatical foundations are being set.
- Teachers must be given special training and on-going professional development in kinesthetic and movement-based instructional strategies. Teacher training programs and workshops must emphasize the benefits of physical engagement in grammar learning and provide hands-on experiences in developing and teaching such lessons.
- The school management and educational authorities need to invest in preparing teaching kits, visual aids, manipulatives, and activity guides to enable the utilization of kinesthetic grammar lessons. These resources will assist instructors in adapting the method to different class settings and learning needs.
- Schools must adopt a multimodal instructional approach that employs visual, auditory, and kinesthetic modes. This philosophy reaches more learners, enhances engagement, and supports learning for diverse linguistic competencies, including handwriting, grammar, and composition.

References

- Ahmed, O. N. (2012). The effect of different learning styles on developing writing skills of EFL Saudi learners. *British Journal of Arts and Social Science*, 5(2), 226–227.
- Barnett, A. (2005). Handwriting: Its assessment and role in the diagnosis of developmental coordination disorder [LEEDS Consensus Statement]. ESRC Seminar Series. Retrieved March 24, 2010, from <http://www.dcd-uk.org/seminar2.html>
- Berninger, V. W., Vaughan, K., Abbott, R., Abbott, S., Rogan, L., Brooks, A., et al. (1997). Treatment of handwriting problems in beginning writers: Transfer from handwriting to composition. *Journal of Educational Psychology*, 89(4), 652–666. <https://doi.org/10.1037/0022-0663.89.4.652>
- Feder, K. P., & Majnemer, A. (2007). Handwriting development, competency, and intervention. *Developmental Medicine and Child Neurology*, 49, 312–317. <https://doi.org/10.1111/j.1469-8749.2007.00312.x>
- Feder, K. P., Majnemer, A., & Synnes, A. (2000). Handwriting: Current trends in occupational therapy practice. *Canadian Journal of Occupational Therapy*, 76, 197–204.
- Gilakjani, A. P. (2012). Visual, auditory, kinesthetic learning styles and their impacts on English language teaching. *International Journal of Modern Education Forum*, 2(1). Retrieved from EBSCOhost.
- Goldberg, E., & Simner, M. (1999). A comparison of children's handwriting under traditional versus whole language instruction. *Canadian Journal of School Psychology*, 14(2), 11–30. <https://doi.org/10.1177/082957359901400203>
- Graham, S., & Harris, K. R. (2005). Improving the writing performance of young struggling writers: Theoretical and programmatic research from the Center on Accelerating Student Learning. *Journal of Special Education*, 39(1), 19–33. <https://doi.org/10.1177/00224669050390010301>
- Graham, S., Harris, K. R., & Fink, B. (2000). Is handwriting causally related to learning to write? Treatment of handwriting problems in beginning writers. *Journal of Educational Psychology*, 92(4), 620–633. <https://doi.org/10.1037/0022-0663.92.4.620>
- Griss, S. (2013). The power of movement in teaching and learning. *Education Week Teacher*. Retrieved from <http://www.edweek.org>

- Hillman, C. H., Erickson, K. I., & Kramer, A. F. (2008). Be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9(1), 58–65.
- McWhorter, K. T. (1992). *Efficient and flexible reading*. New York: HarperCollins Publishers.
- Oshima, A., & Hogue, L. (n.d.). *Introduction to academic writing*. Longman.
- Piek, J. P., Baynam, G. B., & Barrett, N. C. (2006). The relationship between fine and gross motor ability, self-perceptions, and self-worth in children and adolescents. *Human Movement Science*, 25, 65–75.
<https://doi.org/10.1016/j.humov.2005.10.011>
- Rakap, S. (2010). Impacts of learning style and computer skill on adult students' learning online. *The Turkish Online Journal of Educational Technology*, 9(2), 108–115.
- Reid, J. (1995). *Learning styles in the ESL/EFL classroom*. Boston: Heinle & Heinle.
- Richards, J. C., & Renandya, W. A. (2002). *Methodology in language teaching: An anthology of current practice*. Cambridge: Cambridge University Press.
- Sweedler-Brown, C. O. (1992). The effect of training on the appearance bias of holistic essay graders. *Journal of Research and Development in Education*, 26, 24–29.
- Walsh, A. (2010). *Teaching and learning principles*. Denver, CO: Competency & Credentialing Institute.
- Walter, L., Marilla, S., & Yuying, S. (2009). *Attempted validation of the scores of the VARK learning styles inventory with multitrait-multimethod confirmatory factor analysis models*. SAGE Publications.
- Wu, M. M. (2010). An exploratory study of the language-learning style preferences and language-learning motivation of ESL learners at a vocational education institute in Hong Kong. *Electronic Journal of Foreign Language Teaching*, 7(2), 222–238.