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Improving the Oral Reading Fluency of Grade 11 Students With Reading Difficulties Through Visual– Auditory–Kinesthetic (VAK) and Rhythmic Approaches

Abstract: This study examined two instructional approaches—the visual–auditory–kinesthetic (VAK) approach and the rhythmic approach—as supports for the oral reading fluency (ORF) of Grade 11 students in a public senior high school in El Salvador City, Misamis Oriental, Philippines. Anchored on Paivio's Dual Coding Theory and LaBerge and Samuels' Automaticity Theory, the study asked whether structured, stimulus-rich activities are associated with gains in reading performance. A quasi-experimental pretest–posttest design without a control condition was used; ORF was indexed by word-recognition accuracy on the Philippine Informal Reading Inventory (PHIL-IRI), the Department of Education's standard reading-level measure. Sixty-five students identified through screening as performing below the independent level (instructional or frustration) were assigned to the VAK group (n = 30) or the rhythmic group (n = 35). Both interventions ran for six weeks at three sessions per week. Data were analyzed using descriptive statistics, paired-samples t-tests, and analysis of covariance (ANCOVA). Before the interventions, most participants performed at the instructional level, with several at the frustration level; afterward, the majority in both groups reached the independent level, none remained at the frustration level, and group means moved into the independent band. Paired-samples t-tests revealed significant pre–post gains within each group (VAK: $t = -10.08$, $p < .01$, $d = 1.84$; rhythmic: $t = -11.82$, $p < .01$, $d = 2.00$), and ANCOVA showed no statistically significant difference between groups, $F(1, 62) = 0.068$, $p = .795$, partial $\eta^2 = .001$. These within-group effect sizes are large but should be read cautiously: in a single-group design, maturation, repeated testing, and regression to the mean cannot be ruled out, so the interventions cannot be credited as the sole cause of the gains. The non-significant between-group result indicates no detectable difference rather than confirmed equivalence, especially because posttest scores approached the ceiling of the accuracy measure. Within these limits, both approaches were associated with meaningful improvement in word-recognition accuracy and offer teachers low-cost, classroom-feasible strategies that merit confirmation in controlled studies measuring rate and prosody.

Keywords: *oral reading fluency, multisensory approach, VAK model, rhythmic approach, reading intervention, PHIL-IRI*

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AI Declaration: *This study used artificial intelligence tools to assist in preparing this article. Specifically, an AI assistant (Claude) was used to condense the full thesis manuscript into a reduced journal-article format and to assist with language clarity and tone, under human supervision and editing. The author reviewed and edited all outputs to maintain academic rigor and integrity.*

Data Availability Statement: *The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request. Requests for access will be evaluated in accordance with ethical guidelines and data privacy policies.*

Introduction

Oral reading fluency holds the key to transforming how learners comprehend, interpret, and engage with the world around them. Yet reading proficiency remains a pressing national concern in the Philippines. The country scored lowest in reading among surveyed economies in the 2018 Programme for International Student Assessment, with roughly one in four students struggling with basic reading tasks (CNN Philippines Staff, 2019). According to the Organisation for Economic Co-operation and Development (OECD,

2023), the Philippines recorded the highest percentage of socioeconomically disadvantaged students with low reading performance among the countries surveyed. National education leaders have likewise identified reading as among the most critical learning gaps confronting basic education (GOV.PH, 2022).

Fluency differentiates skilled readers from those who struggle (Rasinski, 2014). It is a multidimensional ability comprising accuracy, rate, and prosody that allows readers to decode words rapidly and accurately, freeing cognitive resources for comprehension (Krach et al., 2016). The challenge has intensified in the wake of COVID-19 school closures, which were associated with marked declines in oral reading fluency among learners (Ardington et al., 2021; Starling-Alves et al., 2023). Because need-based instruction can positively influence reading achievement across diverse school types and socioeconomic contexts in the Philippines (Haw et al., 2021), interventions designed to strengthen Grade 11 students' oral reading fluency are both timely and necessary.

This study implemented two approaches. The first, the multisensory or visual–auditory–kinesthetic (VAK) approach, has proven effective for teaching reading skills, including to learners with special needs (Wulandari & Mumpuniarti, 2019; Zairin & Nordin, 2023). Operationalized here through choral reading, interactive games, and color-coded text, the VAK approach promotes literacy through diverse sensory experiences. The second, the rhythmic approach, draws on evidence that rhythm-based interventions improve reading ability by strengthening phonological awareness and timing (Cancer et al., 2022; Sousa et al., 2022; Zanto et al., 2024). It was operationalized through rap or spoken word, music-related activities, and rhythmic chanting. The purpose of the study was to address poor reading competence among Grade 11 learners by increasing oral reading fluency through VAK and rhythmic treatments, contributing to the development of classroom-ready teaching strategies.

Theoretical framework. The study is anchored on two complementary theories. Dual Coding Theory (Paivio, 2006) posits that learning is more effective when information is processed through both verbal (auditory) and non-verbal (visual and kinesthetic) channels; integrating multiple sensory modalities strengthens cognitive associations and improves retention and comprehension (Andrä et al., 2020; Wallace et al., 2020). The present use of the VAK label refers to multisensory encoding—engaging visual, auditory, and kinesthetic channels together—and not to the contested learning-styles claim that instruction should be matched to a learner's preferred modality, for which evidence is weak (Magulod, 2019). Automaticity Theory (LaBerge & Samuels, 1974) emphasizes the role of automatic word recognition: fluent readers process words effortlessly, freeing attention for comprehension (Ozernov-Palchik et al., 2022). The rhythmic approach aligns with this theory by promoting structured repetition, timing, and pacing that help learners internalize word structures and shift from effortful decoding to fluent reading (Whitney & Ackerman, 2022; Zanto et al., 2024).

Statement of the problem. The study examined the effectiveness of the VAK and rhythmic approaches in enhancing the oral reading fluency of Grade 11 students, addressing three questions: (1) What is the level of the participants' oral reading fluency before and after the interventions? (2) Do the groups' oral reading fluency levels significantly differ before and after the interventions? (3) Do the two groups' oral reading fluency increments significantly differ? Two null hypotheses were tested at the .01 level: (Ho1) there is no significant difference in the groups' oral reading fluency before and after the interventions; and (Ho2) there is no significant difference in the oral reading fluency increments of the two groups.

Review of Related Literature

Oral reading fluency (ORF) is an integrative function of decoding and comprehension and an important predictor of reading success (Dimzon & Pascual, 2023; Martins & Capellini, 2019). Reading proficiency is a major concern among Filipino learners; in PISA 2018, the Philippines ranked at the bottom in reading, with about 80% of students unable to reach the lowest proficiency benchmark (Bernardo et al., 2021). The pandemic compounded these difficulties, with reading achievement declining by roughly one-third of a school year of learning (Engzell et al., 2021). Prosody is strongly associated with ORF, and structured, performance-based strategies such as Reader's Theatre and repeated reading reliably improve fluency (Lin & Tseng, 2023; Prameswari & Akhiriyah, 2023; Wui & Aziz, 2022).

The VAK (multisensory) approach. The VAK model accounts for diverse cognitive preferences and promotes engagement, motivation, and retention through visual, auditory, and kinesthetic input. Choral reading improves fluency, comprehension, and engagement (Hudson et al., 2020; Kelzang, 2024; Zimmermann et al., 2019); interactive and gamified tasks increase motivation and support struggling readers (Cardoso et al., 2022; Ronimus et al., 2019); and color-coded text aids word recognition, segmentation, and comprehension, reducing visual stress and improving speed and accuracy among struggling readers and learners with dyslexia (Alkhudairy & Shamlan, 2022; Burns, 2024; Metsala & David, 2021). While learning-styles matching is debated (Magulod, 2019), these specific multisensory techniques are independently supported by fluency research (Stevens et al., 2021; Tarjiah et al., 2023).

The rhythmic approach. Rhythm supports reading by engaging the temporal processing systems involved in language. Digital rhythm training improves fluency by synchronizing rhythmic cues with

neural firing, strengthening phonological awareness and working memory (Sousa et al., 2022; Zanto et al., 2024), and rhythmic reading training has improved fluency and comprehension among at-risk readers (Cancer et al., 2022). Rap and spoken word reinforce prosody, pacing, and word recognition (Romig & Jetton, 2023; Whitney & Ackerman, 2022); music-related activities integrate rhythm and melody with text, improving phonological awareness, attention, and working memory (Reifinger, 2019; Schellenberg et al., 2023); and rhythmic chanting builds automatic word recognition and pronunciation (Beaumont, 2022; Eghbaria-Ghanamah et al., 2020). Musical rhythm ability correlates with phonological awareness and predicts reading development, particularly in at-risk learners (Politimou et al., 2019; Swaminathan & Schellenberg, 2020); reviews caution that fluency instruction is most effective when it combines repetition, structure, and engagement (Steinle et al., 2021).

Methods

The study employed a quasi-experimental pretest–posttest design with two intervention groups and no control condition. Quasi-experimental designs are useful for studying interventions in authentic, non-randomized educational settings (Mahant & Hall, 2021); however, without a business-as-usual comparison group, the design supports description of change over time rather than firm causal attribution. The design allowed the two approaches to be compared with each other under real classroom conditions while pre- and posttest performance was tracked within each group.

Participants and sampling. Participants were Grade 11 senior high school students enrolled in the Humanities and Social Sciences (HUMSS) strand in a public school in El Salvador City, Misamis Oriental. Students were identified through initial PHIL-IRI screening as performing below the independent fluency level—that is, at the instructional or frustration level; here, "reading difficulties" refers to this below-independent status rather than to clinically diagnosed disability. A total of 65 students participated. Intact class sections were assigned to the two conditions, and a stratified procedure based on pretest performance was used to approximate baseline equivalence; the available sections produced groups of unequal size (VAK, n = 30; rhythmic, n = 35). Because assignment was not randomized at the individual level, the groups are treated as non-equivalent in the analysis.

Instrument. The study used the Philippine Informal Reading Inventory (PHIL-IRI) Graded Passages (Department of Education, 2018), a standardized instrument for evaluating reading performance in terms of miscues, reading rate, and comprehension. The passages span readability levels from Grade 2 to Grade 7 and provide parallel forms suitable for pretest and posttest administration at equivalent difficulty. The PHIL-IRI selections were revalidated to ensure correct reading levels for each grade, supporting the instrument's validity and reliability.

Scoring procedure. Reading level was determined from word-recognition accuracy: the percentage of major miscues was computed and subtracted from 100% (Cabalo & Cabalo, 2019). Following PHIL-IRI criteria, scores of 97–100% indicate the independent level, 90–96% the instructional level, and 89% and below the frustration level. The PHIL-IRI accuracy-based level is the Department of Education's nationally mandated classification of learners' oral reading performance and served as the study's primary outcome accordingly. Reading rate and prosody capture complementary dimensions of fluency that this level does not separately quantify; they are treated here as directions for future work rather than as outcomes of the present study.

Data gathering and ethics. Ethics clearance was secured from the Lourdes College Research Ethics Committee, and permission was obtained from the Department of Education and the school administration. Informed consent from parents or guardians and assent from students were obtained, and confidentiality and anonymity were maintained throughout. After the intervention, a parallel form of the PHIL-IRI was administered to minimize practice effects, and participants were assured that their performance would not affect their academic standing.

Implementation of the interventions. Both interventions were delivered over six weeks at three sessions per week (18 sessions), each session featuring one activity. In the VAK group, sessions rotated through choral reading, interactive games, and color-coded text. In the rhythmic group, sessions rotated through rap or spoken word, music-related activities, and rhythmic chanting. Holding dosage and structure constant across groups supports a fair comparison; it does not, however, isolate the contribution of any single activity within a bundle, nor separate the effect of the approaches from the additional reading time both groups received. Treatment-fidelity data were not collected.

Data analysis. Descriptive statistics characterized participants' fluency levels before and after the interventions. A paired-samples t-test evaluated within-group pre–post differences. Analysis of covariance (ANCOVA), with pretest scores as the covariate, compared posttest accuracy between groups while adjusting for baseline differences. Cohen's d and partial η^2 were reported as effect-size indices. Because the groups were not individually randomized and differed slightly at pretest, the ANCOVA is interpreted with caution: applying ANCOVA to non-equivalent intact groups can bias the adjusted comparison, and its assumptions (notably homogeneity of regression slopes) should be verified.

Results

Table 1 presents the distribution of participants' oral reading fluency levels before and after the interventions for both groups. Before the interventions, most participants performed at the instructional level (66.67% in the VAK group; 77.14% in the rhythmic group), with a small proportion at the frustration level. After the interventions, the majority reached the independent level (76.67% and 68.57%), no participant remained at the frustration level, and group means rose from 93.41 to 98.34 (VAK) and from 92.78 to 97.95 (rhythmic), with reduced standard deviations indicating more consistent performance.

Table 1 *Frequency, Percentage, and Mean Distribution of Participants' Oral Reading Fluency Before and After the Interventions*

Range	Interpretation	VAK Pretest f (%)	VAK Posttest f (%)	Rhythmic Pretest f (%)	Rhythmic Posttest f (%)
97–100	Independent	7 (23.33)	23 (76.67)	4 (11.43)	24 (68.57)
90–96	Instructional	20 (66.67)	7 (23.33)	27 (77.14)	11 (31.43)
89 & below	Frustration	3 (10.00)	0 (0.00)	4 (11.43)	0 (0.00)
Total		**30 (100)**	**30 (100)**	**35 (100)**	**35 (100)**
Mean		**93.41**	**98.34**	**92.78**	**97.95**
Interpretation		**Instructional**	**Independent**	**Instructional**	**Independent**
SD		**3.66**	**2.31**	**3.33**	**2.31**

Note. *f = frequency; SD = standard deviation. Percentages are shown in parentheses.*

In summary, the group means for word-recognition accuracy moved from the instructional band before the interventions to the independent band afterward. Most learners who began requiring guided support ended the program reading in the independent range, and none remained at the frustration level, although roughly one quarter to one third stayed at the instructional level. Because the PHIL-IRI level reflects the national, accuracy-based classification of reading performance, this shift describes learners' movement across the Department of Education's reading-level categories.

Table 2 reports the paired-samples t-test comparing pretest and posttest accuracy within each group. Both groups showed statistically significant gains. In the VAK group, the mean rose from 93.41 (instructional) to 98.34 (independent), $t = -10.08$, $p < .01$, $d = 1.84$. In the rhythmic group, the mean rose from 92.78 to 97.95, $t = -11.82$, $p < .01$, $d = 2.00$. The first null hypothesis was therefore rejected. As detailed below, this within-group result documents change over time and does not, on its own, establish that the interventions caused it.

Table 2 *Paired-Samples t-Test for Pretest and Posttest Scores in the VAK and Rhythmic Approaches*

Group	Test	M	Interpretation	SD	t	p	Cohen's d
VAK (n = 30)	Pretest	93.41	Instructional	3.66	–10.08*	.000	1.84
	Posttest	98.34	Independent	2.31			
Rhythmic (n = 35)	Pretest	92.78	Instructional	3.33	–11.82*	.000	2.00
	Posttest	97.95	Independent	2.31			

Note. *M = mean; SD = standard deviation; Cohen's d = effect size. *Significant at the .01 level (two-tailed).*

These within-group gains warrant a cautious reading. Because the design includes no control condition and participants were selected for low pretest performance, maturation, repeated testing, ordinary instruction over the six weeks, and regression to the mean are all plausible contributors. The large effect sizes—within-subject values, and therefore inflated relative to between-group benchmarks—are best understood as upper-bound estimates that likely overstate the unique impact of the interventions. With that caveat, the direction of change is consistent with the literature on multisensory and rhythm-based fluency instruction (Hudson et al., 2020; Sousa et al., 2022; Stevens et al., 2021); because reading rate was not measured, the automaticity mechanism is inferred rather than directly tested.

Table 3 presents the ANCOVA comparing posttest accuracy between groups with pretest scores as the covariate. After adjusting for baseline differences, the two groups did not differ significantly, $F(1, 62) = 0.068$, $p = .795$, partial $\eta^2 = .001$, and the second null hypothesis was retained. Two caveats temper this result. First, posttest scores approached the ceiling of the accuracy measure (means of 98.34 and 97.95 against a maximum of 100), and standard deviations contracted, which limits sensitivity to a genuine group difference. Second, a non-significant ANCOVA indicates no detectable difference, not statistical equivalence; establishing equivalence would require a pre-specified equivalence test and an a priori power analysis, neither of which the present design included.

Table 3 *ANCOVA Summary for Posttest Scores With Pretest Scores as Covariate*

Group	Test	M	Interpretation	SD	F(1, 62)	p	η^2p
VAK (n = 30)	Pretest	93.41	Instructional	3.66	0.068	.795	.001
	Posttest	98.34	Independent	2.31			
Rhythmic (n = 35)	Pretest	92.78	Instructional	3.33			
	Posttest	97.95	Independent	2.31			

Note. *M = mean; SD = standard deviation; η^2p = partial eta squared (effect size).*

Discussion

The results yield three findings. First, in both groups the average word-recognition accuracy moved from the instructional band to the independent band; most learners reached the independent level, and none remained at the frustration level after six weeks. Second, both groups showed statistically significant, large within-group accuracy gains. Third, once baseline differences were adjusted, no significant difference emerged between the two approaches. These findings describe change that accompanied the interventions; given the single-group design, they do not establish that the interventions caused the change, and the between-group result should be read as no detectable difference rather than as proof of equivalence.

Interpreted within these limits, the outcomes are encouraging and extend fluency research to the senior high school level, a population often overlooked in studies that concentrate on elementary readers. The direction of the VAK gains is consistent with multisensory and Orton-Gillingham–informed evidence (Stevens et al., 2021; Tarjiah et al., 2023), and the rhythmic gains echo rhythm-based training research (Cancer et al., 2022; Zanto et al., 2024). The absence of a detectable difference between approaches is at least compatible with teachers selecting either approach—or blending the two—according to learner needs, resources, and context, a flexibility consistent with calls for multi-component fluency instruction (Steinle et al., 2021). That practical reading, however, awaits confirmation from designs able to support causal and equivalence claims.

Limitations. Several limitations bound these conclusions. The most consequential is the absence of a business-as-usual control group: with intact, non-randomized groups and participants selected for low pretest performance, maturation, repeated testing, ordinary instruction, and regression to the mean cannot be separated from any effect of the interventions, so the large within-group effect sizes likely overstate their true impact. Oral reading fluency was indexed by PHIL-IRI word-recognition accuracy—the Department of Education's standard reading-level classification—so the outcome reflects accuracy-based reading level rather than the full multidimensional construct; reading rate and prosody could enrich future studies. The accuracy measure is bounded at 100%, and posttest means near that ceiling restrict variance; administering Grade 2–7 passages to Grade 11 students may itself contribute to ceiling effects. Each approach bundles three activities and the conditions share an oral-repetition core, leaving a time-on-task confound; inter-rater reliability, scorer blinding, and treatment fidelity were not formally established; and the six-week, single-school, single-strand scope limits retention evidence and generalizability.

Conclusion

Over the six-week period, students in both the VAK and rhythmic groups improved in word-recognition accuracy, with most reaching the independent level, group means moving into the independent band, and none remaining at the frustration level. The within-group gains were statistically significant and large, although the single-group design means they cannot be attributed to the interventions alone. No detectable difference emerged between the two approaches—a result consistent with, but not sufficient to establish, their comparable value. Read with these limitations in mind, the findings suggest that structured, engaging, low-cost fluency activities are promising additions to senior high school reading instruction and align with the encoding and automaticity mechanisms described by Dual Coding Theory and Automaticity Theory. They are best regarded as a basis for controlled, adequately powered studies—measuring accuracy, rate, and prosody—rather than as definitive evidence of effectiveness.

Recommendations. Students may engage regularly in VAK or rhythmic reading activities and in expressive, repeated reading to reinforce accuracy and confidence; teachers and reading coordinators may integrate VAK and rhythmic components into daily oral-reading routines; school administrators may support professional development in these techniques and embed structured oral reading in school reading programs; and curriculum developers and policymakers may incorporate evidence-based fluency interventions into literacy frameworks. Researchers may prioritize controlled designs with a business-as-usual group, adequate a priori power, and outcomes capturing accuracy, rate, and prosody; where the goal is to show two approaches are interchangeable, formal equivalence testing against a pre-specified margin is needed, alongside delayed posttests, larger and more diverse samples, hybrid VAK–rhythmic models, and reporting of inter-rater reliability and treatment fidelity.

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