

Research Article

Modified collaborative strategic reading with visual support: Experimental evidence from low-proficiency EFL undergraduates

Muhammad Iqbal Ripo Putra¹, I. Nyoman Sudana Degeng², Punaji Setyosari³ and Made Duananda Kartika Degeng⁴

¹State University of Malang, Indonesia (ORCID: [0000-0001-6005-8114](https://orcid.org/0000-0001-6005-8114))

²State University of Malang, Indonesia (ORCID: [0000-0003-4684-552X](https://orcid.org/0000-0003-4684-552X))

³State University of Malang, Indonesia (ORCID: [0000-0003-0187-9785](https://orcid.org/0000-0003-0187-9785))

⁴State University of Malang, Indonesia (ORCID: [0000-0002-6749-6237](https://orcid.org/0000-0002-6749-6237))

English is required in Indonesian higher education, yet foreign language readers find academic texts difficult, and many low-English-proficient students have foreign language anxiety. This study examined the impact of modified collaborative strategic reading integrated with visual-syntactic text formatting on foreign language reading comprehension and reading anxiety among Indonesian university students. Using a non-equivalent control group design, 101 first-year students were assigned to an experimental group receiving the combined intervention or a control group receiving conventional instruction over eight weeks. Data were collected through a standardized reading comprehension test and the Foreign Language Reading Anxiety Scale. Statistical results showed that the experimental group achieved significantly higher reading comprehension scores, with the strongest improvements in identifying main ideas, locating detailed information, interpreting references, and recognizing authorial purpose, and moderate gains in inference and vocabulary. Test result also indicated a significant reduction in reading anxiety for the experimental group. Qualitative findings revealed that collaborative strategy use enhanced comprehension monitoring, awareness of text structure, and learner confidence, while visual-syntactic formatting reduced cognitive load by clarifying complex sentence structures. Overall, the integrated approach effectively supported lower-proficiency English as a Foreign Language readers and provides a scalable model for improving academic literacy in higher education.

Keywords: Foreign language reading anxiety; Low proficiency EFL learners; Modified collaborative strategic reading; Reading comprehension; Visual syntactic text formatting

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1. Introduction

Despite the prominence of English as a Foreign Language [EFL] in Indonesian higher education, persistent difficulties in academic reading comprehension among lower-achieving learners highlight the need for further inquiry by both educational theorists and teaching specialists (Anggraini et al., 2022; Fahmi et al., 2024; Nurisma et al., 2025). While reading in a foreign language offers a critical avenue for linguistic input essential to language acquisition (Chang et al.,

Address of Corresponding Author

Muhammad Iqbal Ripo Putra, Jl. Semarang No. 5, Malang, Jawa Timur, Indonesia.

✉ muhammad.iqbal.2301219@students.um.ac.id

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2020; Hossain, 2024), numerous empirical studies have demonstrated that students who perform below established proficiency benchmarks frequently struggle to construct meaning from texts, thereby limiting their ability to benefit from the linguistic exposure that reading affords (Alharbi, 2021; Mesmer, 2024; Namaziandost et al., 2019; Srisang & Everatt, 2021). In response to these challenges, pedagogical instruction such as *modified collaborative strategic reading* [MCSR], as formulated by Zoghi et al. (2010), has been introduced to strengthen foreign language development through structured strategy-based reading instruction. These instructional procedures facilitate comprehension by promoting deliberate sequencing, inferential clarification, self-regulatory monitoring, and post-reading reflection.

Research findings consistently indicate that both the quality and frequency of strategic engagement contribute significantly to foreign language reading proficiency (Ghavamnia & Kashkouli, 2022; Han, 2021). Moreover, learning strategies are increasingly recognized as multidimensional constructs encompassing cognitive, metacognitive, behavioral, and affective domains. Nonetheless, prior investigations into MCSR have primarily concentrated on cognitive dimensions, with limited inquiry into its potential influence on affective factors such as reading-related anxiety among EFL learners.

Evidence that elevated anxiety undermines reading behaviors and weakens academic self-concept highlights the need for interventions for low-achieving EFL learners that combine cognitive strategy training with affective support. The application of MCSR is theoretically aligned with the cognitive and metacognitive demands of university-level learners, particularly in EFL contexts that emphasize the development of academic literacy. As an adaptation of the original Collaborative Strategic Reading [CSR] model, MCSR integrates cooperative learning with explicit instruction in strategic reading processes such as previewing, generating questions, clarifying information, and summarizing, all of which cultivate higher-order thinking and strategic autonomy.

University students are developmentally positioned to engage in metacognitive regulation and collaborative meaning-making, making MCSR especially suitable for facilitating sustained engagement with academic texts. Complementing this core instructional approach, the present study incorporates Visual-Syntactic Text Formatting [VSTF] as an auxiliary support tool to reduce syntactic complexity by visually structuring sentences into cognitively manageable units. VSTF assists readers in processing syntactically dense materials with less cognitive strain, thereby enhancing textual accessibility without detracting from the strategic focus of MCSR.

While prior studies on MCSR indicated minimal or negligible impacts on reading comprehension (Babapour et al., 2018; Zoghi et al., 2010), later research has demonstrated that VSTF can enhance syntactic parsing and augment reading fluency (Gao et al., 2022; Herbert, 2014; Warschauer et al., 2011). To date, no research has investigated the integrated application of MCSR and VSTF as a cohesive cognitive-affective intervention aimed at improving comprehension while concurrently alleviating Foreign Language Reading Anxiety [FLRA] in low-proficiency EFL university students. The focus on this overlooked juncture represents the primary research gap of the current work.

This research holds dual relevance. Theoretically, it enhances the MCSR framework by incorporating affective and visual scaffolding elements that could address its previous cognitive deficiencies. It provides a viable teaching framework for alleviating ongoing comprehension challenges and reading-related anxiety among underperforming EFL students in higher education environments. On this basis, the current study investigates the extent to which MCSR, supported by VSTF, can create a cognitively accessible and less anxiety-inducing reading environment in which low-achieving EFL university learners are more likely to engage with texts both behaviorally and intellectually, and how reductions in FLRA may correspond to measurable gains in reading comprehension.

1.1. Research Questions

The following questions guide the research:

RQ 1) What is the effect of MCSR with VSTF compared with CSR instruction without modification on the reading comprehension of lower-proficiency EFL learners? Which components of comprehension show the most significant changes as a result of the intervention?

RQ 2) How does MCSR supported by VSTF affect students' self-reported FLRA compared with CSR instruction without modification?

RQ 3) Is there a statistically significant relationship between students' levels of reading anxiety and their performance in English reading comprehension following the intervention?

2. Literature Review

2.1. Comprehension Levels in University Contexts

The level of reading comprehension refers to the type of mental representation constructed by the reader when engaging with written discourse. Empirical research in the field further classifies reading comprehension into hierarchical categories, including literal, inferential, and critical levels. Inferential and evaluative comprehension necessitate that readers expand upon textual meaning, formulate inferences, and undertake semantic rearrangement (Saadatnia et al., 2016, 2017). Nonetheless, research in higher education settings reveals that numerous university students continue to operate at the literal or basic level of textual processing. A study conducted by Kalbfleisch et al. (2021) has revealed that learners at the tertiary level frequently struggle with inferencing and identifying macrostructures, thereby failing to construct coherent situation models. These trends align with studies on first-language academic reading among university demographics. Hall (2015) notes that students often do not possess strong reading competencies such as abstraction, synthesis, and analytical thinking. Deliany and Cahyono (2020) also claimed first-year education students lack strategic awareness and have difficulty in understanding academic materials. This pattern has been supported by Ntereke and Ramoroka (2017), who reported that only 12.4% of learners performed well on reading comprehension tasks, while the majority (34.3%) were found to perform below average.

2.2. Foreign Language Reading Anxiety

FLRA undermines second language reading performance and is negatively associated with comprehension, proficiency, and self-efficacy by disrupting attention and linguistic processing (Dang, 2024; Limeranto & Subekti, 2021). Enhanced L1 literacy and increased L2 proficiency can alleviate its effects, but heightened anxiety frequently foreshadows cognitive distortions during reading (Hwang & Bae, 2022; Mercan et al., 2023). Song's (2018) dual-route model posits that anxiety disrupts both lexical decoding and semantic formation, thereby hindering the process of meaning-making. As a result, FLRA decreases decoding efficiency, strategy use, and inferencing, with its effects differing based on learners' proficiency and literacy background.

Building on Saito et al.'s (1999) seminal work distinguishing FLRA from broader foreign language anxiety, subsequent studies have generated a substantial body of scholarship on this construct. FLRA is defined as apprehension and negative emotional responses that arise during foreign language reading. Because reading is often solitary and silent, it is less observable than other forms of anxiety, yet empirical evidence confirms its adverse cognitive effects on reading tasks (Li et al., 2024). Li (2022) also presented a meta-analysis that revealed that FLRA had a strong inverse relationship with comprehension, and this negative influence was stronger in lower proficiency levels. However, it remains an open question whether and how reducing FLRA can improve comprehension or by what mechanisms such reductions enable performance gains at large amid increasingly strong evidence of the modulatory role of affective states on cognitive control. Additional studies must be conducted to determine if the promotion of a more positive emotional state can reduce FLRA and, consequently, benefit reading comprehension performance.

2.3. Modified Collaborative Strategic Reading

CSR, an intervention developed by Klingner et al. (1998), merges cooperative learning with evidence-based reading comprehension strategies that provide shaped support for students while they read. Its benefits are well-supported in research by studies conducted with students who have difficulty reading, achieve below standard, or are learning English (Bryant et al., 2001; Klingner et al., 1998). An important feature of CSR is that students range in reading ability (Klingner & Vaughn, 1999), consistent with Vygotsky's (1978) sociocultural theory wherein more skilled peers can support the learning of less competent peers. But mixed-ability cooperation also presented challenges, because learners in different academic levels or social statuses might influence the confidence of weaker students. From a sociocultural perspective, even less proficient learners can provide support, while homogeneous groups may encourage fair participation and collective meaning-making (Baker & Clark, 2010; Marnola et al., 2025).

Zoghi et al. (2010) suggest that CSR falls short in higher education because it is dependent on a limited set of maneuvers, including activating prior knowledge, summarizing, and generating questions. Although they promote basic understanding, these strategies may not foster the complex reading abilities necessary for university study, and more comprehensive skills to deal with difficult texts are needed (Fotovatian & Shokrpour, 2007). To address this, CSR was adapted into MCSR, which retains the four core elements of preview, fix-up, get-the-gist, and wrap-up while adding techniques such as recognizing rhetorical patterns (for example, comparisons and cause-and-effect relationships) and identifying discourse markers (for example, examples and additive connectors) (Zoghi et al., 2006). These enhancements, integrated within the fix-up stage, foster deeper comprehension, promote analytical reading, and extend CSR's scope to support university EFL learners in critically evaluating texts and developing independent academic reading habits.

2.4. Visual Syntactic Text Formatting

Being a visual process, VSTF can restructure text according to grammatical hierarchies and can be used to understand syntactically complicated passages. The empirical studies have indicated that both college learners and EFL learners have increased reading efficiency, speed, and comprehension (Gao et al., 2022; Walker et al., 2005; Warschauer et al., 2011). The results suggest that VSTF supports text processing through lessening cognitive strain and rendering grammatical affiliations more unmistakable.

Nevertheless, the benefits of using VSTF as an aid are not equal for all students. Ozaki and Ueda (2020) found that lower-proficiency readers demonstrated larger improvements than higher-proficiency readers, which suggests that VSTF may be especially beneficial for less syntactically developed learners. In addition, students may have an adjustment period when they are first exposed to this visual formatting that temporarily impacts reading rate. Thus, educators integrating VSTF as an adjunct to instruction must take into account learners' profiles and ensure that appropriate instructional scaffolding is provided to ensure that it enhances reading comprehension.

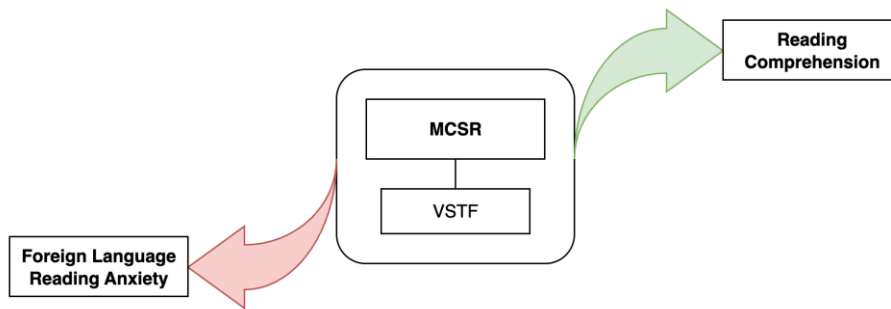
3. Conceptual Framework

Based on sociocultural theory (Vygotsky, 1978) and metacognitive approaches to strategic reading (Hong-Nam & Page, 2014; Teng & Zhang, 2021), this study's conceptual framework combines MCSR and VSTF as complementary teaching tools. MCSR serves as a cognitive and metacognitive framework that enhances comprehension through organized strategies including previewing, clarifying, questioning, and summarizing, thereby prompting learners to actively manage their understanding. Simultaneously, VSTF functions as a visual and emotive scaffold that restructures syntactically intricate phrases into cognitively digestible chunks, alleviating both cognitive load and reading anxiety (Gao et al., 2022; Walker et al., 2005). Figure 1 shows that the two parts are thought to operate together to improve reading comprehension while also FLRA. On the other

hand, higher levels of worry are thought to decrease comprehension performance.

Figure 1

Conceptual Framework of the Study



Within this paradigm, MCSR and VSTF work together to create a learning environment that is supportive of cognitive development and emotional control. MCSR supports metacognition involvement and mutually assisted interpretation, and VSTF supports syntactic accuracy and suppresses emotional barriers. It is expected that the synergistic effect of these constructs will positively result in reading comprehension performance and, at the same time, reduce reading anxiety, therefore, providing a comprehensive teaching paradigm among underperforming EFL university students.

4. Method

4.1. Research Design

This study employed a mixed-methods design, specifically a convergent parallel design (Creswell & Plano Clark, 2018), to obtain a more complete understanding of the impact of MCSR on EFL learners' reading comprehension and reading anxiety. The quantitative and qualitative data in this design were gathered in one research phase, analyzed independently, and then interpreted concurrently in order to triangulate findings. The quantitative part implied a pretest-posttest design to investigate the efficacy of MCSR, and the qualitative part included interviews to understand how students experienced learning.

To reduce the impact of confounding factors and enhance internal validity, several controls were employed. The same instructor taught both experimental and control groups to eliminate the instructor's bias. Both groups followed the same classroom environment, schedule, and length. Content equivalence was assured by using the same reading material for all the subjects from TOEFL-based academic passages. The teacher adhered to a formal lesson plan and was trained in advance of the intervention for instructional fidelity. Furthermore, both cohorts were told of the academic nature of the study but not of experimental treatment differences to minimize expectancy effects. These analyses were intended to adjust for confounds of teacher effect, amount of instructional time, and variety of materials.

4.2. Participants

The study involved 101 first-year undergraduate students (aged 17–19) from a private university in Indonesia. Placement test results classified them into proficiency levels, and four were identified as comprising students with lower English proficiency, according to the university's official placement standards. From these classes, 51 students were assigned to the experimental group and 50 to the control group. All participants had about seven years of prior English instruction, mainly at the secondary level. Their designation as low-proficiency readers provided the basis for inclusion in this intervention. Informed consent was obtained, and participation was voluntary.

4.3. Instruments

4.3.1. Reading Proficiency Measure

Students' English reading proficiency was assessed using the reading section of the TOEFL ITP

(Institutional Testing Program), a standardized test widely adopted in higher education and officially used by the host university for admissions and placement in Indonesia. The section is composed of 50 multiple-choice questions given on a time frame of 50 minutes, which rely on five passages. The skills to be assessed include identifying main ideas, contextual vocabulary, finding details, making one reference, deciding purpose, and making inferences. The passages discuss a wide range of subjects in various fields to achieve validity, thereby minimizing content bias and facilitating generalizability. The choice of the TOEFL ITP is based on its global acceptance as well as how it meets the requirements of the university in assessing academic language proficiency.

4.3.2. Foreign Language Anxiety Scale

FLRA is an emotional factor reflecting learners' feelings toward reading in a non-native language. FLRA as an abstract concept cannot be directly observed; thus, they are to be gauged indirectly by self-report measures. In response to this, Saito et al. (1999) developed the Foreign Language Reading Anxiety Scale [FLRAS], a 20-item questionnaire that would focus on capturing perceptions and emotions of the participants about reading in a foreign language. The FLRAS quantifies three key variables, including perceived text-understanding difficulty, anxiety reactions during the reading process, and perceived reading performance. Those who participated did so through a 5-point Likert scale, which includes "strongly agree" and "strongly disagree". This format allows for a detailed evaluation of students' emotional reactions. Using the FLRAS in this study offers a dependable way to examine how MCSR intervention might influence or reduce anxiety levels during foreign language reading tasks.

4.4. Intervention Procedure

The intervention was implemented over a total period of eight weeks, consisting of one meeting per week, each lasting 110 minutes. To illustrate the sequence, Table 1 outlines the weekly distribution of activities across the three instructional stages: Presentation, Practice, and Production.

Table 1

Sequence of the MCSR with VSTF Intervention Across Eight Meetings

Stage	Student Activities
Presentation (Meetings 1-2)	● Preview text using VSTF cues (syntactic clusters, highlighted verbs). ● Activate prior knowledge and predict text content. ● Practice recognizing text organization (comparison, cause-effect) and discourse markers (examples, additive information).
Practice (Meetings 3-6)	● Work in cooperative groups (5 members) with assigned roles: - Leader: guides strategy sequence. - Monitor: ensures equal participation. - Fix-up Pro: applies fix-up strategies (rereading, context clues, word parts, text structure, connectives). - Encourager: gives feedback and praise. - Reader: reads passages aloud. ● Identify "clicks" (understood) and "clunks" (confusing parts). ● Apply fix-up strategies to clarify clunks. ● Summarize the main idea of each paragraph ("Get the Gist"). ● Generate and discuss comprehension questions.
Production (Meetings 7-8)	● Consolidate comprehension of entire text through: - Peer interviews - Retelling - Pro-con debates. ● Participate in post-production group activities: - Number Heads Together: group discussion to ensure all members can answer review questions. - Send-A-Problem: exchange and answer questions generated by other groups. ● Reflect on reading strategies, use of VSTF, and confidence in comprehension.

In the *presentation stage* (Meetings 1–2), students were introduced to reading strategies using VSTF cues to preview texts, activate prior knowledge, and identify organizational patterns. The *practice stage* (Meetings 3–6) emphasized collaborative learning, where each member assumed specific roles to apply MCSR strategies such as identifying “clicks” and “clunks,” using fix-up strategies, and summarizing key ideas. In the *production stage* (Meetings 7–8), students demonstrated comprehension through peer interviews, retelling, debates, and reflective activities that integrated both strategy use and confidence-building.

4.5. Data Collection and Analysis

4.5.1. Quantitative data analysis

A reading comprehension test was administered to assess students' performance before and after the intervention. The test items were scored dichotomously, with responses categorized as correct (1) or incorrect (0), facilitating the calculation of correction rates for both pretest and posttest outcomes. The internal consistency of the reading comprehension test was also evaluated using Cronbach's alpha, resulting in a reliability coefficient of 0.74. To determine the efficacy of the MCSR intervention, the variation in correction rates was compared across time intervals. Additionally, Analysis of Variance [ANOVA] was employed to examine disparities in FLRAS scores and reading comprehension performance.

Furthermore, Analysis of Covariance [ANCOVA] was conducted with pretest scores as the covariate to control for initial group differences and provide a more precise estimation of the intervention's effects. Prior to conducting inferential analyses, statistical assumption testing was carried out to ensure the appropriateness of parametric procedures. The assumption of normality was examined using the Shapiro–Wilk test, while homogeneity of variance was assessed through the Levene test.

For reading comprehension data, the Shapiro–Wilk test yielded a statistic of 0.984 with $p = .272$ (> 0.05), indicating that the data are normally distributed. The Levene test produced $F(1, 99) = 0.03$ with $p = .855$ ($> .05$), signifying that the variances between groups are homogeneous. Similarly, for reading anxiety data, the Shapiro–Wilk statistic was 0.982 with $p = .182$ ($> .05$), confirming normal distribution, and the Levene test showed $F(1, 99) = 1.92$ with $p = .168$ ($> .05$).

4.5.2. Qualitative data analysis

The qualitative analysis involved transcribing the group interviews verbatim into Indonesian to ensure the authenticity of the participants' perspectives, categorizing responses in line with the thematic structure of the interview protocol, and the transcripts. Responses addressing the same question were grouped to allow comparison across individuals. For reporting, the categorized data were translated into English, which facilitated cross-case analysis and supported the identification of key themes linked to the research objectives.

To have a more in-depth perspective of students' learning experiences, semi-structured interviews were carried out after the post-test. The interviews were conducted in Indonesian to facilitate natural expression and response. The discussion group consisted of 6 students and the duration was approximately 25–30 min in order for small-group interaction to encourage free expression. All interviews were recorded with participants' verbal consent, transcribed verbatim, and thematically analyzed. Participants were each given an individual alphanumeric identifier (e.g., P1F = Participant 1, Female; P3M = Participant 3, Male) to allow for pseudonymization and traceability within analysis. The coded participants (P1F–P5F) mentioned in the presentation of findings were chosen to achieve a maximum variation sample with respect to proficiency level as well as gender stability within the control group. The conversation was driven by a resource-based interview protocol that probed two main domains: (1) students' attitudes towards MCSR as an aid to comprehension and (2) their perceptions of the viability of VSTF as a visual scaffold. Prompts were intended to provoke thoughts about potential ways in which MCSR and VSTF affected reading comprehension processes, the development of strategic awareness, and reading anxiety.

The interview protocol employed was based on resources and consisted of the following: (1) student attitudes toward MCSR as a support for comprehension and (2) students' perception of the usefulness of VSTF as a visual scaffold. Sample questions were 'How did MCSR support you to identify the key points and relevant details in a reading passage?' and 'How did VSTF's use of stacked visual patterns offer support to your comprehension of complex sentences? For the sake of brevity and to refrain from repetition in the main text, we list all interview questions in the appendix, where we also included each item fully for transparency and reproducibility.

5. Results

5.1. The effect of MCSR with VSTF on Reading Comprehension and Its Components

Table 2 summarizes the descriptive statistics for students' reading comprehension performance in both the experimental and control groups at pre-test and post-test stages. This table provides an overview of the central tendency and variability of scores prior to conducting inferential analysis, offering a baseline perspective on group performance before and after the intervention.

Table 2

Descriptive Statistics of Reading Comprehension Scores for Experimental and Control Groups

Descriptives	Pretest		Posttest	
	CG	EG	CG	EG
N	50	51	50	51
Mean	41.6	38.4	47.9	68.1
95% CI mean lower bound	39.5	36.2	45.3	65.7
95% CI mean upper bound	43.8	40.6	50.5	70.5
Median	39.7	38.3	46.8	68.7
Standard deviation	7.57	7.96	9.20	8.57
Minimum	26.5	21.1	29.0	47.0
Maximum	61.2	58.9	64.7	92.6

Note. The CI of the mean assumes sample means follow a t-distribution with N - 1 degrees of freedom.

Before the intervention, the CG had a slightly higher mean score ($M = 41.6$, $SD = 7.57$) compared to the (EG; $M = 38.4$, $SD = 7.96$). However, overlapping 95% confidence intervals indicated that the difference in initial reading ability was not statistically significant. Following the intervention, the EG obtained a substantially higher post-test mean ($M = 68.1$, $SD = 8.57$) than the CG ($M = 47.9$, $SD = 9.20$). The 95% confidence intervals for the two groups no longer overlapped, confirming a statistically reliable difference. Moreover, shifts in the median, minimum, and maximum scores in the experimental group reflected consistent positive effects of the intervention on reading comprehension.

As summarized in Table 3, this analysis examined the effect of the MCSR with VSTF intervention on students' post-test reading comprehension scores, with pre-test results entered as a covariate to account for any initial variations between groups.

Table 3

Reading Comprehension Scores with Pre-Test as Covariate

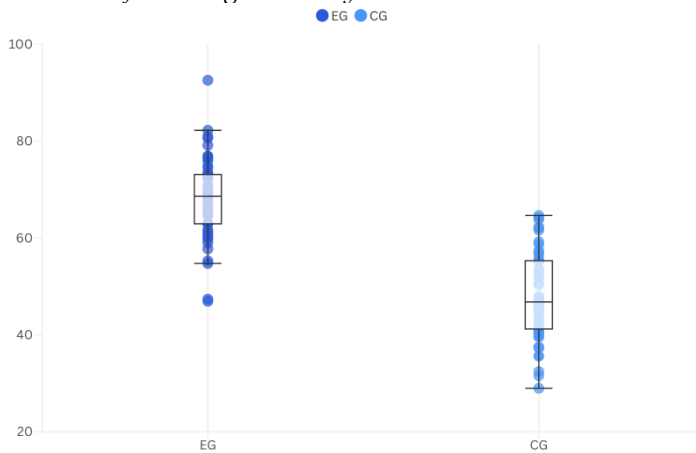
	Sum of Squares	df	Mean Square	F	p
Group	13131	1	13130.5	556	<.001
Pretest	5508	1	5508.0	233	<.001
Residuals	2315	98	23.6		

Analysis was performed using an analysis of covariance adjusting for impact intervention and baseline biases. Pre-test performance had a significantly strong effect on post-test scores, $F(1, 98) = 233.00$, $p < .001$, evidencing the importance of initial ability. Even after controlling for this, the group effect remained significant, $F(1, 98) = 556.00$, $p < .001$, with the experimental group achieving higher post-test scores. The small value of residual SS (2,315) and the large F-values also

demonstrate that the strategic was strong enough to declare intervention had a significantly positive influence on reading comprehension.

Figure 2

Box Plot of Reading Scores by Class



Visualizing Figure 2 graphically illustrates these statistical results, which present the distribution of post-test reading comprehension scores for each group. The median score is higher and the scores are also less variable in the EG, indicating that gains occurred for more participants than those in whom losses occurred, whereas variability is larger and performance lower in the CG. This visual pattern buttresses the ANCOVA findings that students who received the MCSR with VSTF intervention made significantly more gains in reading comprehension than those in traditional instruction.

To further investigate the impact on specific reading comprehension subskills, paired sample *t*-tests were conducted for each question type in the CG and EG, as presented in Table 4.

Table 4

Paired Sample *t*-test Results for Reading Comprehension in Experiment Groups

Question Type	Statistic	df	p	Mean difference	SE difference	95% Confidence Interval	
						Lower	Upper
Main idea	-29.08	50.0	<.001	-6.69	0.230	-7.15	-6.226
Detail info	-24.79	50.0	<.001	-6.65	0.268	-7.19	-6.114
Inference	-6.13	50.0	<.001	-1.40	0.228	-1.86	-0.940
Vocabulary	-7.32	50.0	<.001	-1.58	0.216	-2.01	-1.147
Reference	-23.46	50.0	<.001	-6.73	0.287	-7.31	-6.153
Purpose	-23.13	50.0	<.001	-6.67	0.289	-7.25	-6.095

The paired sample *t*-test results revealed significant changes across all components of reading comprehension in the experimental group following the intervention. The most substantial changes were observed in the components of reference, main idea, purpose, and detail information, with mean score differences ranging from -6.73 to -6.65. The high *t*-statistics (-23.46, -29.08, -23.13, and -24.79), along with narrow 95% confidence intervals that did not cross zero, provide strong evidence of consistent and meaningful effects of the instructional method on student performance in these areas.

The inference and vocabulary components also exhibited statistically significant changes, although with smaller mean differences (-1.40 and -1.58, respectively). The instructional strategy influenced all aspects of reading comprehension, with the most notable effects in helping students identify main ideas, understand detailed information, recognize the author's purpose, and interpret references in the text.

5.2. The impact of MCSR with VSTF on FLRA

Descriptive statistics for participants' FLRA scores are shown in Table 5. To evaluate the impact of the intervention on anxiety levels, a repeated measures ANOVA was performed using scores obtained from the FLRAS across both the experimental and control groups.

Table 5

FLRA Scores from Initial and Endline Surveys

<i>Descriptives</i>	<i>Initial survey</i>		<i>Endline survey</i>	
	CG	EG	CG	EG
N	50	51	50	51
Mean	79.5	80.1	79.3	33.9
95% CI mean lower bound	78.5	79.1	78.2	33.0
95% CI mean upper bound	80.6	81.1	80.4	34.8
Median	79.0	81.0	79.0	34.0
Standard deviation	3.75	3.59	3.90	3.10
Minimum	71	71.0	70	26.0
Maximum	88	86.0	87	41.0

Note. The CI of the mean assumes sample means follow a *t*-distribution with N - 1 degrees of freedom

The CG ($M = 79.5$, $SD = 3.75$) and EG ($M = 80.1$, $SD = 3.59$) performed similarly in the initial survey, as revealed by their overlapping 95% confidence intervals. This establishes that both groups started the training with comparable levels of FLRA. At the endline test, however, the mean score on the FLRA by participants in the experimental group ($M = 33.9$, $SD = 3.10$) was significantly lower than that of their counterparts in CG ($M = 79.3$, $SD = 3.90$), indicating a marked reduction in anxiety by experimental subjects after undergoing treatment. The results would seem to indicate that the use of both strategic reading and visual syntactic support helped comprehension as well as providing a more comfortable and self-assured reading experience for the low-proficiency learners.

Table 6 provides evidence that group differences were statistically verified using Welch's ANOVA, which does not assume equal variances.

Table 6

Comparison of Group Differences Using Welch's ANOVA

<i>Test phase</i>	<i>F</i>	<i>df1</i>	<i>df2</i>	<i>p</i>
Initial survey	0.217	1	98.0	.643
Endline survey	409	1	53.3	<.001

The results revealed no significant difference between conditions at pretest ($F(1, 98) = 0.217$, $p = 0.643$), confirming comparable baseline conditions. There was, however, a highly significant difference at posttest ($F(1, 53.3) = 409$, $p < .001$), indicating that the EG had significantly greater gains in reading comprehension after MCSR with VSTF intervention.

Figure 3 captures the overall reduction in anxiety variance among learners who received the intervention. The median anxiety of the CG was higher and more variable, whereas that of the EG was lower and distributed in a narrow range. This pattern indicates that the intervention worked well to decrease reading anxiety and enhance more consistent emotional responses to reading tasks. The findings from the images complement those of the statistics presented beforehand, corroborating that both structured strategy instruction and visual syntactic support have a positive effect on reducing anxiety for low-proficient EFL learners.

5.3. Relationship between Reading Anxiety and Reading Comprehension

Following the group-level analyses, a Spearman correlation test was conducted to examine the relationship between students' reading comprehension and their FLRA. The results are presented in Table 7.

Figure 3
Box Plot of Reading Scores by Class

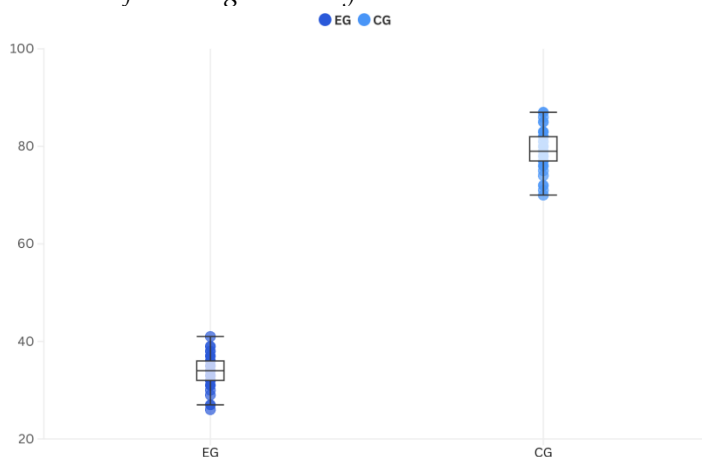


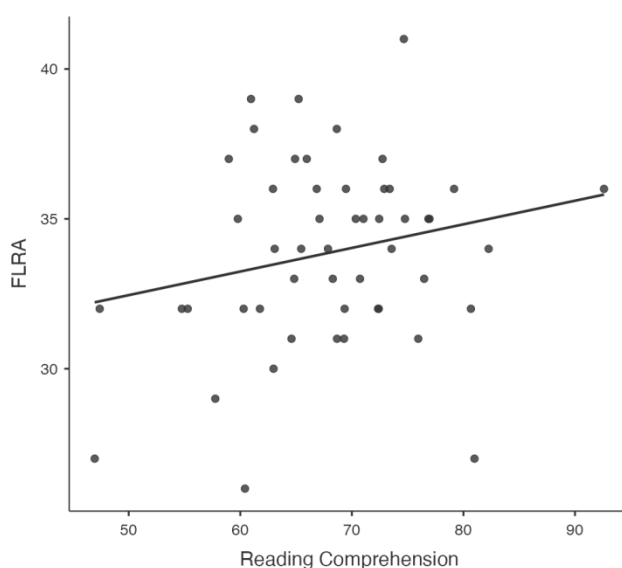
Table 7
Spearman correlation of reading and FLRA test results (N=51)

		Reading Comprehension	FLRA
Reading Comprehension	Spearman's rho	—	0.162
	<i>p</i> -value	—	.257
FLRA	Spearman's rho	0.162	—
	<i>p</i> -value	.257	—

The correlation analysis revealed a weak and statistically non-significant positive association between reading comprehension and FLRA ($p = .162$, $p = .257$, $N = 51$). This pattern suggests that within this cohort, anxiety and comprehension were largely independent constructs. Although minor positive tendencies appeared, they lacked sufficient magnitude to imply a meaningful relationship. The non-significant result implies that higher anxiety did not necessarily correspond with either lower or higher comprehension, reflecting the complexity of affective-cognitive interactions in reading.

To visualize the association between reading performance and anxiety, a scatterplot was generated, as shown in Figure 4, depicting the distribution of students' FLRA and reading comprehension scores.

Figure 4
Scatterplot of FLRA and Reading Comprehension



The points are widely scattered, and the regression line has a very slight upward slope, indicating a weak positive relationship. FLRA scores range from about 27 to 41, and comprehension scores span approximately 48 through the >90 range, suggesting greater variability in reading performance. Unlike previous findings, which showed a strong negative relationship between anxiety and comprehension (Saito et al., 1999), the current findings indicated that anxiety did not impact reading outcomes directly. Learners with high- and low-anxiety levels appear at all levels of comprehension scores, suggesting that performance is relatively sensitive to affective state.

5.4. Post Intervention Interview

The post-intervention interviews revealed that students' engagement with MCSR and VSTF reshaped their cognitive, metacognitive, and affective approaches to reading. Table 8 summarizes the key themes that emerged from the thematic analysis of post-intervention interviews, highlighting students' evolving strategies, awareness of text organization, and emotional responses during the MCSR with VSTF sessions.

Table 8
Summary of Key Themes

<i>Theme</i>	<i>Description</i>	<i>Representative Evidence</i>
Collaborative Comprehension through MCSR	Reading became a shared, interactive process in which group collaboration supported understanding and reduced isolation.	"After learning MCSR, I can discuss everything with my friends... reading together makes it easier to see the meaning." (P1F)
Metacognitive Awareness and Strategy Regulation	Students became aware of their comprehension process, identifying breakdowns ("clunks") and using repair strategies.	"During the Click and Clunk stage, I could tell which parts I really understood and which I did not... I pay more attention now." (P3M)
Understanding Text Organization and Author Intent	Learners recognized rhetorical structures such as comparison or causation and inferred the author's intent.	"I began to notice what caused something or what was being compared... I can predict what might come next." (P2F)
Supportive Role of VSTF in Sentence Processing	The visual segmentation and color cues in VSTF helped students decode long, complex sentences with less cognitive strain.	"The verbs were shown in color, so I immediately knew which actions were important and who performed them." (P1F)
Shift from Word-Level Translation to Contextual Inference	Students transitioned from heavy dictionary reliance to contextual guessing and meaning construction.	"Now I try to guess the meaning from the context first... reading feels more natural now." (P5F)
Reduced Anxiety and Increased Reading Confidence	Participants felt less anxious and more confident when reading, perceiving texts as more approachable.	"Now I'm calmer and more confident... reading has become less stressful, and sometimes I even enjoy it." (P4M)

Students reported that working together in the MCSR group changed how they approached reading. It shifted from a lonely task to a shared process of creating meaning. Many found reading alone often confusing and overwhelming. In contrast, collaborating in a group allowed them to share interpretations, clarify difficult parts, and build their confidence when dealing with more complex texts. One participant noted that reading alone used to leave her feeling lost with long texts. After using MCSR, P1F discovered, "I could discuss the text with my friends, and they helped each other. This made understanding feel less intimidating and more engaging.". This shift from working alone to receiving support from peers encouraged students to tackle longer

academic pieces and use their group as a resource for thinking and emotional support. Another student emphasized how collaboration made her more aware of text structure. P2F said, "I became better at noticing how the parts connect and could follow the organization from the introduction to the conclusion more easily.". She explained how group work enhanced her understanding of how texts flow:

P2F: There is an opening that tells us what the text is about, then some fleshing out that explains it, and lastly a closing that pulls it all together. My group work keeps me within that order. When I teach something to my friends too, that shows how much I have understood it.

These reflections demonstrate how MCSR fostered a more interactive, structured, and socially reinforced reading environment. Rather than encountering difficulties in isolation, students developed enhanced strategic awareness and increased self-assurance through collaborative engagement. This, in turn, facilitated a more persistent and lucid approach to academic texts.

Students also demonstrated a growing awareness of their own reading processes, particularly during the "Click and Clunk" and "Fix-up Pro" stages, which encouraged them to actively monitor their understanding instead of waiting for teacher guidance. These activities helped students recognize when a section of text did not make sense and apply strategies such as rereading, scanning for contextual clues, or discussing uncertainties with peers. One student explained that identifying "clicks" and "clunks" made him more attentive to the parts he understood and those that needed clarification. He noted that he began to look for small words that helped show the meaning instead of overlooking them. To illustrate this development, P3M offered a longer reflection on how collaborative work deepened his engagement with the text:

P3M: We corrected those parts together by rereading them or asking questions until the meaning emerged. At first, I did not always notice where my understanding broke down, but when we talked through the sentences as a group, it became clearer which parts were confusing and why. The process made me think more consciously about how I read and what strategies actually help me move forward.

Another student described how these stages encouraged a shift from avoidance to active problem-solving. P4M shared that he no longer skipped difficult sentences, noting that "I try to notice clues in the sentence or the next one, and it usually helps me understand," which made him feel more confident and in control when reading. This transformation illustrates how the structured routines within MCSR supported greater self-regulation, allowing students to tackle challenging sections rather than bypass them.

Students also showed an expanded awareness of how texts are organized and how authors construct meaning, moving beyond a sentence-by-sentence approach to a broader understanding of discourse structure. They began to notice rhetorical patterns such as comparisons, causal relationships, and the sequencing of ideas, which helped them anticipate how the text would develop and interpret the author's intentions more accurately. One student reflected that she used to read sentence by sentence, but now she actively tracks how information unfolds and uses structural cues to predict what might follow or why certain examples appear. This shift shows her emerging ability to grasp the writer's underlying logic rather than focus solely on individual sentences. As P2F explained, "it is the structure of thought that the writer employs... I can guess at what might be next or why such examples are used".

Another participant noted that collaborative discussion broadened his sensitivity to text organization and authorial intent. He explained that listening to peers helped him recognize the purpose of each part of the text and improved his ability to interpret ideas beyond the surface level. As he elaborated:

P4M: I used to focus only on what the sentence was saying, but in my group, I began to notice why the author said something and how each part of the paragraph was connected. When my friends shared their interpretations, I realized there were ideas I had completely missed. After talking together, I would reread the paragraph, and suddenly the purpose of each section made more

sense to me. It helped me see the whole text more clearly instead of just going sentence by sentence.

Students began to read with greater attention to coherence, organization, and authorial reasoning, indicating the development of more sophisticated comprehension skills.

Students also highlighted the supportive role of VSTF in helping them process long and complex sentences. The visual segmentation, indentation, and color-highlighting features made it easier for them to track clause boundaries, identify verbs, and understand the grammatical relationships among sentence elements. These visual cues reduced the cognitive load typically associated with dense academic text and allowed learners to follow the flow of ideas more confidently. P1F participant explained, "the colored verbs made it really clear... who performed that action, which helped me avoid losing track of the subject in long sentences".

P1F added: Now I can walk through the sentence, and it is not as scary to read. I can also guess the meaning of what is coming next because I perceive the form very clearly. When the sentence is long, the lines guide me step by step, so I do not feel overwhelmed the way I used to.

Another participant described how the segmented layout helped her see where one thought ends and another begins, which sped up comprehension and lessened the mental effort needed to analyze grammar. P2F noted, "identifying these links between clauses made meaning emerge more quickly and allowed me to focus on the ideas rather than struggle with reconstructing the syntax." These accounts show that VSTF not only clarified sentence structure but also eased the cognitive strain often experienced by lower-proficiency readers when navigating complex academic prose.

Another recurring pattern in students' reflections was a clear shift from relying on word-by-word translation to using contextual clues when encountering unfamiliar vocabulary. As students practiced reading without immediately turning to a dictionary, they began to depend more on surrounding sentences, grammatical cues, and the overall message to build meaning. This change helped them maintain the flow of reading and reduced the frustration of constantly stopping to look up unknown words. One participant described how she previously spent so much time "going down an unknown word" that she often lost track of the paragraph's main idea. After the intervention, she reported:

P5F: It actually flows very nicely to read because I am not stopping every time I see a difficult word. I used to open the dictionary so often that I would forget what the paragraph was about. Now I try to understand the meaning from the sentence first, and only when it really does not work do I check the dictionary. It makes reading feel more natural, and I no longer feel like every unfamiliar word is something to fear.

A similar development appeared in the reflections of another participant, who explained that reading whole sentences carefully often revealed the intended meaning without needing translation. P3M remarked that "sometimes I already understand the meaning when I read the whole sentence carefully... I focus on the overall message instead of translating word by word," adding that although he still uses a dictionary occasionally, he now trusts context first and reads for ideas, not individual words. Students were beginning to read with greater fluency and strategic flexibility, shifting their focus from isolated words to broader textual coherence and purpose.

Participants also reported significant emotional gains as they progressed through the program, especially in terms of reduced anxiety and increased confidence when engaging with English texts. Many explained that the combination of MCSR and VSTF provided both cognitive guidance and emotional reassurance, making difficult sentences feel more manageable and unfamiliar vocabulary less daunting. P3M shared that reading once felt overwhelming, saying, "it is now easier to cope with long sentences, and I am less scared of challenging text... I know how to begin and what to do when I do not understand something". He described how this shift helped him approach difficult passages more strategically, giving him clearer steps to follow instead of guessing or withdrawing when comprehension broke down.

Another participant echoed this emotional shift but explained it in more detail during the interview. He described how anxiety used to dominate his reading experiences, especially when he tried to translate English passages alone. In his words:

P4M: Whenever I translated an English passage, I used to be scared because I felt that nothing would come to my mind. I would stare at the words and feel stuck. Now I am cooler and surer of myself. When I come across a tricky word, I think about the job it does in the sentence or consult with my group instead of panicking. Reading feels a little less stressful, and sometimes I even enjoy doing it.

This reflection shows how learning to break down sentences and working with others made reading more bearable and more fun. The intervention not only assisted students understand better, but it also made them more emotionally strong, less anxious, and more in control of their reading.

Based on these emotional outcomes, students' reflections show how they began to mix the thinking and feeling processes they learned during the course of study. The collaborative routines in MCSR contributed to them understanding each other better, controlling their behavior better, and paying more attention to how texts are organized. VSTF's visual assistance facilitated their comprehension of complex sentences. This support made people feel more sure of themselves and made things easier for their minds. These resources helped EFL learners with lower levels of proficiency go beyond just decoding words and become more involved with academic texts on their own.

6. Discussion

The experimental group performed significantly better than the control group in the post-test reading comprehension, confirming the effectiveness of the intervention. This result differs from earlier studies such as Zoghi et al. (2010) and Abbasnezhad and Zoghi (2016), which reported no or limited effects. However, it aligns with Babapour et al. (2018) who found improvement in identifying key information and recognizing text organization. These findings suggest that the success of MCSR depends on several contextual factors, including student proficiency, instructional design, and the integration of scaffolding supports such as VSTF. The results add to the evidence that MCSR can produce strong outcomes when used under supportive conditions, although the short intervention period may have limited progress across some subskills.

Another element that might have influenced the results is the test format. While standardized multiple-choice tests are practical and easy to score, they may not capture the full depth of students' reading strategies. Alderson (2000) and Kobayashi (2002) argue that open-ended tasks, summary writing, and cloze tests provide a clearer picture of comprehension growth. Moreover, test scores alone cannot show the full development of reading ability. Evidence from interviews revealed that students not only achieved higher scores but also gained more confidence and better awareness of text structures. This supports the view that strategy-based instruction develops both cognitive and emotional aspects of reading.

The greatest improvement appeared in reference, main ideas, and author's purpose. The "getting-the-gist" strategy helped learners identify central ideas and main themes more effectively. Better results in reference showed that students could handle pronouns and cohesive markers more accurately, which reduced confusion and improved understanding (Park & Oh, 2018). Gains in recognizing the author's purpose, which is often difficult for EFL learners because it involves combining information from the whole passage, indicate that MCSR, especially when combined with group discussion and wrap-up questioning, supported higher-level processing and synthesis across the text.

In contrast, progress in inference and vocabulary knowledge was smaller. This is consistent with previous research showing that inferential reasoning usually needs more time and exposure to different text types (Grabe, 2009). Vocabulary growth was also limited, but strategies such as word guessing and clarifying helped students partially understand new words from context. Some

participants mentioned that being able to work out word meanings made complex sentences easier to read, suggesting that even small vocabulary gains opened the way to broader comprehension. To address these areas and foster more robust development, future pedagogical designs could strategically incorporate explicit inference-building activities. These might include structured exercises where students are guided through the process of identifying textual clues, connecting them with background knowledge, and formulating reasoned inferences. Furthermore, integrating contextual guessing tasks, where students are encouraged to actively predict and verify word meanings based on surrounding text, could significantly enhance vocabulary acquisition. Short, guided practices, such as sentence-level inference mapping (where students visually chart the connections between clues and conclusions) or collaborative prediction tasks where students work together to anticipate outcomes or meanings, offer promising avenues. Such repeated, targeted exposure not only helps students move beyond a literal interpretation of text but also cultivates deeper vocabulary knowledge through active engagement and reinforcement. These interventions are crucial for equipping learners with the tools necessary to navigate increasingly complex texts and achieve a more profound level of understanding.

These outcomes are closely related to metacognitive development, which refers to the ability to plan, monitor, and evaluate reading strategies. Hong-Nam and Page (2014) note that this kind of awareness strongly affects how learners choose and apply strategies, and Teng and Zhang (2021) found that higher metacognition leads to better comprehension. The strategies emphasized in MCSR, including “get the gist” and “predict and preview,” directly engage these skills. While “get the gist” encourages learners to check understanding and identify main ideas, “predict and preview” activates their prior knowledge and supports inference-making. These results agree with Wang’s (2009) argument that literal comprehension forms the base for more advanced inferential and evaluative reading.

On the other hand, identifying the author’s purpose remained the most difficult task for the experimental group. Because purpose is often implied and requires combining ideas across the whole text, it calls for global understanding that MCSR does not target directly. During the wrap-up stage, students usually made questions about key points or details but rarely considered the writer’s intent. This suggests that additional scaffolding is needed to help learners analyze texts at this more abstract level.

The qualitative findings provided further explanation. Before the program, participants said they relied heavily on dictionaries to understand unknown words, which matched the pre-survey data. This pattern aligns with Xia et al. (2025), who found that anxious readers often focus on surface-level decoding and use fewer metacognitive strategies, a view also supported by Lee et al. (2021). After the program, students reported lower anxiety and greater flexibility in using strategies, reflecting the role of self-efficacy in independent learning. Post-survey data showed a clear drop in FLRA among experimental group participants, consistent with interview reflections. Similarly, Aukerman and Chambers Schuldt (2021) showed that engaged readers use a wider range of strategies, highlighting the connection between engagement, strategy use, and comprehension.

Importantly, this study combined VSTF with MCSR, which strengthened the overall effectiveness of the program. VSTF visually breaks sentences into smaller parts, reducing mental load and improving reading flow. Earlier research has shown that VSTF supports readers by shortening fixation spans and making eye movements smoother, both of which are essential for understanding in EFL settings (Park et al., 2019; Tate et al., 2019). This structure helped students process sentences in manageable chunks, improving both literal and inferential comprehension. Participants in this study reported that VSTF helped them notice verbs more clearly and follow sentence meaning without overusing dictionaries. This supports earlier findings that visual syntactic segmentation directs attention to key grammatical signals. Thus, VSTF worked as a complementary tool to MCSR, making both syntactic and meaning cues more visible and easier to apply.

Beyond comprehension gains, the study also shows that MCSR can reduce reading anxiety among lower-level EFL students. Learners reported more positive self-perceptions after using MCSR and VSTF, supporting Horwitz's (2010) view that self-perception shapes anxiety. Since all participants were lower attainers, group work required shared effort, which promoted equal participation, motivation, and problem-solving. Emotional engagement also increased as learners felt more comfortable working with peers of similar levels. Still, it is crucial to acknowledge the importance of actively ensuring balanced participation within such collaborative groups. To prevent instances of passive involvement and to cultivate a strong sense of accountability among group members, the integration of structured role changes and guided peer feedback mechanisms is highly recommended. This pedagogical strategy aligns seamlessly with Vygotsky's influential socio-cultural theory (1978), which emphasizes that social interaction is fundamental to the development of shared understanding and the effective scaffolding of learning among peers. This finding also resonates powerfully with Pekrun and Linnenbrink-Garcia's (2014) comprehensive work on achievement emotions, which asserts that positive emotional states, such as comfort and confidence, are not merely beneficial but are crucial catalysts for fostering motivation, encouraging active cooperation, and ultimately leading to deeper and more meaningful learning experiences.

Although a decrease in reading anxiety was found, no significant correlation was found to exist for the direct relationship between the reduction of these factors and enhanced reading comprehension either. This interesting result indicates that there may be other strong influential variables, which might be possibly working as a mediator or moderator in the relationship between anxiety and comprehension. Of these factors, metacognitive regulation is identified as an important cognitive process that facilitates the planners of learning to plan, monitor, and evaluate their own reading strategies (Al-khresheh & Al Basheer bin Ali, 2023; Deliany & Cahyono, 2020). Strong metacognitive processes can enable readers to control their cognitive load and modulate the processing of challenging texts in more strategic ways, which may serve as an indirect compensatory process for a direct negative effect of anxiety on comprehension.

In addition, vocabulary knowledge is well recognized as an essential component in the development of reading ability (Hasan & Shabdin, 2017; Ma & Lin, 2015; Masrai, 2019). A strong vocabulary enables readers to decode and make meaning of more words, which can lead to easier comprehension and perhaps help reduce some of the cognitive workload and frustration that leads to anxiety. The existence of these influential variables, metacognitive regulation and vocabulary knowledge, could account for why the direct relationship between anxiety attenuation and comprehension was not statistically significant; they may be serving as mediating factors that moderate or alter the association.

For this investigation, we have examined, it seems that strategy-based scaffolding by MCSR in combination with critical visual support from VSTF worked to synergize. The integrated intervention not only significantly enhanced students' reading comprehension but also reduced their anxiety, thereby highlighting the potential benefits of multifaceted interventions in remediating the multi-dimensional nature of reading problems.

7. Conclusion

This study implemented MCSR together with VSTF among Indonesian university EFL learners who struggle with reading. Although their skills were limited, the method proved both practical and beneficial. Unlike studies that focus only on test results, this research also examined emotional aspects. The findings showed that lower anxiety was linked to higher engagement and better understanding. Interviews revealed that VSTF helped students manage complex sentences by focusing on verbs and clarifying text structure. This visual aid also helped them apply strategies more effectively, rely less on dictionaries, and focus on meaning rather than individual words. Learners said they felt more confident and flexible in reading. However, it is to be noted that the results cannot be generalized, as the research was confined to a single institution and the intervention lasted only four weeks. Limitations such as these may influence the generalizability of

the results, and caution is warranted in extending them to larger populations. The brevity of the intervention and the lack of transcribed peer discourse restricted interpretative options. To conduct future research, the project can be extended, and the interaction between peers can be considered, as well as the involvement of higher- or lower-ability students. MCSR, combined with VSTF, enhances comprehension and reduces reading anxiety by engaging students mentally, emotionally, and socially. It is a feasible solution to assist underperforming university EFL students.

8. Implications

The findings of this study indicate significant implications for EFL instruction in higher education. Integrating MCSR with VSTF provides an effective method to assist low-proficiency students by merging systematic strategy education with visual scaffolding that diminishes syntactic complexity. This dual emphasis enhances understanding and reduces reading anxiety, allowing students to engage with academic literature more confidently. Educators can modify MCSR processes and integrate VSTF into reading resources to offer cognitive and emotional assistance. Integrating technology-based scaffolds into university English curricula may assist in mitigating ongoing reading challenges faced by underprepared students. Teacher education programs must also prepare instructors to implement these evidence-based practices, ensuring they are able to facilitate students' academic literacy development. Future studies should prolong the intervention over extended durations and various proficiency levels to assess its sustainability and wider application.

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Appendix. Interview Questions

1. In what ways did MCSR help you identify the main ideas and supporting details in a reading passage?
2. How did the Click and Clunk process affect the way you noticed what you understood (clicks) and what you found confusing (clunks)?
3. When using Fix-up Pro strategies, how did recognizing organizational patterns (comparison, cause and effect) or discourse markers (examples, additive information) help you understand the text better?
4. Did working in groups influence how you interpret the author's purpose or intent in a passage? If so, how?
5. How did the VSTF help you process long or complex English sentences?
6. Did the visual cues (such as indented structures or colored verbs) make it easier for you to understand sentence meaning? Please explain.
7. How do you feel about using VSTF as a visual scaffold, and does it help reduce your confusion or anxiety when reading English texts?