

I-ROLE 2023

International Conference of Research on Language Education

**ENHANCING READING COMPREHENSION VIA
METACOGNITIVE STRATEGY INSTRUCTION IN A CHINESE
EFL CLASSROOM**

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Abstract

China published the Guidelines on College English Teaching (GCET) in 2020, calling for delivering high-quality education for EFL (English as a Foreign Language) learners. The inundation of information has prompted a growing demand for advanced reading skills. Therefore, conventional English reading instruction has been realigned by incorporating methods that trigger higher-order thinking operations, such as Metacognitive Strategy Instruction (MetaSI) in reading classrooms. The main aim of the quasi-experimental study was to enhance EFL learners' reading comprehension abilities via MetaSI. The study was set in a public university in Hunan Province and involved a total of 60 EFL learners in two intact reading classrooms. The data were gleaned from pre-post tests and semi-structured interviews. The findings revealed that the MetaSI programme produced statistically significant improvements in participants' posttest scores. Interestingly, learners with medium and limited reading proficiency recorded the biggest improvement. It was corroborated during interview sessions as it helped instill positive reading attitudes, and the majority found it helpful in enhancing their reading skills. The study affirms the rationale for incorporating metacognitive strategies in EFL reading classrooms.

2672-815X © 2023 Published by European Publisher.

Keywords: Metacognitive strategy instruction, reading comprehension skills, perceptions, reading comprehension performance

1. Introduction

Education is the pathway to economic opportunity and upward mobility in today's knowledge-driven and technology-driven world. For this, "Quality Education for all" listed as part of the "Sustainable Development Goals" in UNESCO's 2030 Agenda, is intended to equip the youth with the skills and capabilities they need to reach their potential. Correspondingly, the Guidelines on College English Teaching (GCET) in China emphasize that improving high-quality English education is the core task of higher education. It has been observed that college English tends to be treated as a supporting subject in Chinese tertiary institutions and not given as much prominence as other subjects. As a country that has become one of the world's largest economies and the biggest exporter in 2023, Chinese students need to be equipped with well-developed English skills to remain competitive for the country to continue to enjoy strong economic growth and strengthen its position in the world's economy.

Anderson (2003) asserts that reading is one of the most crucial skills for EFL trainees in their academic engagement. Eskey (2005) concurs, arguing that reading skills in English are more crucial than other language skills to enable students to access and process the enormous amount of information produced daily in different fields. Hence, reading tends to be prioritized over other language skills in EFL learning contexts (Floris & Divina, 2015). Despite the acknowledged importance of reading, there exists a phenomenon of high investment but low efficiency among Chinese reading learners (Yang, 2002). Many hours and resources have been invested in developing advanced reading skills in students, but the returns have not been as promising as expected.

A possible reason for this phenomenon could be attributed to the prevailing misconception of reading comprehension among students in China, who tend to perceive reading as an extension of lexical and grammatical language activities. Many, however, fail to see reading as engagement, requiring active meaning construction. The ability to read meaningfully is developed over time, with experience and exposure to the language. Reading develops cognitive and interactive perspectives of language learners as they need to engage and process the information contained in the text. Readers decode the text using their perceptual and psycholinguistic backgrounds, filling in the gaps in their knowledge of the subject matter, making sense of it, and drawing inferences from what they read (Anastasiou & Griva, 2009). This information processing is complex and requires higher-order thinking operations, which is the core of the Metacognition.

1.1. Metacognition

Metacognition has been defined by many researchers, such as Brown (1987) and Flavell (1976). Although these definitions are varied in the ways they are described, they can be generalized as knowledge about cognition and regulation of cognition.

Knowledge about cognition refers to knowledge about one's cognitive resources and how the demands of learning situations are compatible with one's resources (Bromeley & Tan, 2006). This awareness is influenced by three variables. Specifically, readers generally think about what they know about the reading passage (person), what they are going to read (task), and how to meet the demands of

reading tasks according to their available resources (strategy). Effective application is inseparable from cognitive regulation since strategies are consciously engaged in activities.

Regulation of cognition refers to using self-regulatory strategies to ensure successful task completion. It is characterized by where one's declarative knowledge is utilized when the reader detects the gap between his understanding and the text's demands. This awareness drives the reader to refill the comprehension gap with appropriate strategies according to the given situation (conditional knowledge). To this end, the knowledge of strategy execution (procedural knowledge) is displayed. In brief, it includes strategic formulation and implementation of strategies, which is also the core value of metacognitive strategies.

In accordance with O'Malley and Chamot (1990), metacognitive strategies are higher-order executive skills that utilize knowledge of cognitive processes to regulate one's learning. In reading activities, metacognitive strategies and available metacognitive knowledge are facilitated by metacognitive regulation for students to manage their reading more effectively to improve their reading performance (Dabarera et al., 2014).

1.2. Metacognitive Strategy Instruction (MetaSI) for EFL Learners' Reading Comprehension

MetaSI in reading is an instructional procedure that develops students' mastery of metacognitive knowledge and strategies (Goh & Vandergrift, 2021). Extensive research has documented that MetaSI can develop learners' awareness and ability to plan their reading journey, regulate their reading processes through facilitating information processing and managing reading obstacles by applying appropriate strategies, and self-appraise their reading outcomes. In acknowledgment of its significance, Mokhtari and Reichard (2002) has suggested that more investigations should be performed on different target groups with different language proficiency levels, and in different learning contexts, for deeper insights into metacognitive strategy usage.

In response to this call, studies have been conducted globally and uncovered the positive causal relationship between metacognitive strategy usage and reading performance (O'Malley & Chamot, 1990; Sheorey & Mokhtari, 2001; Shih & Huang, 2018). Much foreign research has also confirmed the facilitative effects of various MetaSI programmes on EFL learners' reading performance, self-perceived usage of metacognitive reading strategies, metacognitive awareness of reading strategies and reading behaviors (Dabarera et al., 2014; Diaz, 2015; Estacio, 2013; Seifoori, 2018). However, some studies have yielded different findings, like those conducted by such researchers as Mehrdad et al. (2012), Korotaeva (2012), and Pammu et al. (2014), who did not find a statistically significant effect from metacognitive strategy instruction on EFL learners' reading comprehension performance. These mixed findings imply that the investigations about the instruction of metacognitive reading strategies are still at an exploratory stage, and more empirical studies need to be done. Compared with full-fledged foreign research on MetaSI training, related research in Chinese reading classrooms seems to be insufficient and exploratory (Chen, 2016; Liu, 2004; Luo et al., 2013). Therefore, it is necessary to conduct further empirical studies and examine the effectiveness of using metacognitive strategy instruction on EFL learners' reading comprehension skills in Chinese learning contexts. For this purpose, three research questions were formulated:

- i. Will the MetaSI programme significantly improve reading comprehension performance among high, medium, and low reading proficiency learners compared to the control group?
- ii. Is there a significant difference between the groups using MetaSI and traditional instruction in EFL learners' reading comprehension performance?
- iii. What are Chinese EFL learners' perceptions of the MetaSI programme?

2. Research Methods

The study utilized a quasi-experimental research design with two intact groups, the Experimental Group (EG) obtaining MetaSI and the Control Group (CG) receiving Traditional Instruction (TI). Both groups received two weekly 90-minute classes for two months. A reading pretest was administered before the intervention to determine the participants' reading proficiency levels. After the intervention, two groups were administered the post-test. Besides, six EG students (two from each proficiency level) were interviewed using a semi-structured interview protocol. The quantitative and qualitative data were analyzed to answer the research questions.

A total of 60 first-year students from two classes at a public university were selected for the study. Students who had taken a pretest were divided into three levels according to their pretest scores, shown in Table 1.

Table 1. Reading Proficiency in Groups Before the MetaSI Programme

Reading Proficiency Levels	Division Criteria (Scores)	Experimental Group (Number)	Control Group (Number)
High Proficiency Reader (HPR)	$S \geq 80$	3	2
Medium Proficiency Reader (MPR)	$60 \leq S < 80$	19	23
Limited Proficiency Reader (LPR)	$S < 60$	8	5

The study administered the Reading Comprehension Test (RCT), compiled from College English Test Band 4 (CET-4), a nationwide English examination for university non-English majors, to the 60 participants to test their English proficiency. The selected passages were validated by three experienced reading lecturers. The multiple-choice questions in the test were analyzed according to Bloom's taxonomy of the cognitive domains and arranged in ascending order according to cognitive skill demands, with low-order thinking skills (LOTS: knowledge, comprehension, application) at the lower tiers to higher-order thinking skills (HOTS: analysis, synthesis, evaluation) at the upper tiers. The analysis found that 45% of the questions were classified as LOTS, while 55% tested HOTS.

Semi-structured interviews were executed with six learners belonging to the three proficiency levels for insights into these participants' attitudes towards using MetaSI, their perceptions, and the impact of MetaSI on their reading. All interviews were audio-taped with the interviewees' permission and transcribed verbatim to facilitate thematic analysis.

MetaSI in the study aimed to teach learners to employ metacognitive strategies to develop their reading skills. Its theoretical underpinnings relate to O'Malley and Chamot's concepts, and the instruction focused on only four strategies: planning, selective attention, monitoring, and evaluating. The EG received

the intervention within the Metacognitive Reading Strategy Instruction Model adapted from Oxford's eight-step sequence (1990), O'Malley and Chamot's CALLA (1990) and Wilhelm's (2001) six steps. The instructional model includes five sequential steps (Table 2). The fourth stage has another six embedded recursive stages (Table 3).

Table 2. Five Sequential Stages

Strategy Selection According to Learners' Needs	<ul style="list-style-type: none"> The researcher selected required strategies in accordance with corresponding regulation of <i>China Standards of English</i>.
Integration of Strategy Instruction with Reading Programme	<ul style="list-style-type: none"> MetaSI was integrated into the regular English reading classrooms.
Consideration of Learners' Motivation	<ul style="list-style-type: none"> Intrinsic motivation was bolstered through instructors' explicit encouragement and feedback while extrinsic motivation was reinforced through extra benefits such as credits.
Implementation of Strategy Instruction	<ul style="list-style-type: none"> Instruction of single strategy in reading classes (Table 3).
Evaluation of Strategy Instruction	<ul style="list-style-type: none"> Formative and summative evaluation of the MetaSI programme.

Table 3. Six Recursive Stages

Orientation Stage	<ul style="list-style-type: none"> A series of set induction and quick glance activities were to activate the participants' background knowledge and to remove dyslexia respectively.
Input Stage	<ul style="list-style-type: none"> Selected strategies and skills are demonstrated and modeled explicitly and interactively with detailed explanation of what the strategy is and how to implement the strategy, along with rationale for why to choose it.
Guided Practice Stage	<ul style="list-style-type: none"> Suggested collaborative practice to work on assigned reading tasks with assistance of instructors' scaffolding.
Independent Practice Stage	<ul style="list-style-type: none"> It was to consolidate the strategy use by students' finishing reading tasks individually.
Evaluation Stage	<ul style="list-style-type: none"> Learners were led to evaluate their application of the designated strategies and the usefulness of each in enhancing comprehension and developing skills through some activities such as lecture wrap-ups and KWL charts.
Expansion Stage	<ul style="list-style-type: none"> Learners were assigned extracurriculum activities to practice learned strategies and skills.

3. Results

The findings are reported based on the analysis of the reading comprehension tests followed by the semi-structured interviews.

3.1. Quantitative Results

Before proceeding into further statistical analysis, Kolmogorov-Smirnov and Shapiro-Wilk for a test of normality were conducted on the pretest scores in both groups (Table 4). The results showed that scores were normally distributed with p values greater than .05 (0.777 and 0.847, respectively).

Table 4. Tests of Normality of Groups' Pretest Scores

	Treatment	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Pretest Scores	MetaSI	.102	30	.200	.978	30	.777
	TI	.107	30	.200	.981	30	.847

The pretest scores in groups were then compared through the test of homogeneity of variances in One-Way ANOVA (Table 5). The observed differences did not reach a significant level, as shown by the p-value of more than .05 ($p=.707$). Thus it was safe to confirm the initial homogeneity of the groups in terms of their reading proficiency abilities before undergoing the intervention.

Table 5. One-way ANOVA for Groups' Pretest Scores

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9.600	1	9.600	.142	.707
Within Groups	3912.333	58	67.454		
Total	3921.933	59			

The first question asked whether the MetaSI would significantly improve reading performance among high, medium, and low-proficiency learners compared to the control group. The research question was addressed through descriptive statistics and paired samples T-test.

Table 6 shows an increase in the number of learners who reached a higher level of reading proficiency. Specifically, nine rose to higher proficiency levels after the MetaSI and two after TI. In comparison, there was a drop in the number of lower proficiency readers, 4 MPR and 5 LPR in the EG and 2 LPR in the CG.

Furthermore, scores on the mean differences of pre-posttest scores showed an overall improvement in mean scores across the three reading proficiency levels in the groups. Specifically, the greatest improvement in the EG was seen in the MPR (MD=4.64), followed by LPR (MD=4) and HPR (MD=3.28). The greatest increase in CG was seen in the LPR (MD=2.00), followed by HPR (MD=1.00) and MPR (MD=4.052).

Table 6. Descriptive Statistics of Pre-Posttest Scores for MetaSI and Control Group

Treatment		Pretest Scores			Post Scores		
		Mean	N (%)	SD	Mean	N (%)	SD
MetaSI (EG)	High	81.50	3(10%)	0.71	84.78	12(40%)	2.59
	Medium	68.25	19(63%)	4.35	72.89	15(50%)	4.83
	Low	54.00	8(27%)	4.90	58	3(10%)	1.00
	Total	65.33	30	8.81	74.97	30	8.83
TI (CG)	High	81.00	2(6%)	0	82.00	4(13%)	1.41
	Medium	67.39	23(77%)	4.57	67.01	23(77%)	5.79
	Low	55.80	5(17%)	3.11	57.80	3(10%)	2.59
	Total	66.37	30	7.21	67.17	30	7.56

Subsequently, a paired-sample T-test was done to determine whether the improvements to the reading proficiency levels were statistically significant in the groups. As displayed in Table 7, the magnitude of the differences in EG learners' mean scores of pre-posttest was statistically significant ($p=.000$; $p<.05$). Likewise, the differences in the improvements of three reading proficiency levels in the EG were also statistically significant ($p=.000$; $p<.05$). On the contrary, in CG, there were no statistically significant improvements in their pre-posttest scores ($p=.110$; $p>.05$) and reading proficiency levels ($p=1.00$; $p>.05$)

Table 7. A Paired-Sample T-Test for Pre-and-Posttest Scores and Levels

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Post-Pre Scores (EG)	9.63	4.16	.76	8.08	11.19	12.7	29	.000
Post-Pre Levels (EG)	-.40	.498	.091	-.586	-.214	-4.4	29	.000
Post-Pre Scores (CG)	.800	2.66	.485	-.192	1.79	1.7	29	.110
Post-Pre Levels (CG)	.000	.371	.068	-.139	.139	.00	29	1.00

The second question examined the comparative effects of the MetaSI programme on participants' reading performance. Descriptive statistics, independent samples T-test, and covariance analysis were conducted to answer this question.

The mean scores of the pretest for the EG (65.33) and CG (66.37) were about the same before the treatment, which was the opposite after the intervention. The post-test mean scores increased to 74.97 for MetaSI and 67.17 for TI, with a mean score improvement of 9.64 and 0.8, respectively (see Table 6), indicating that the MetaSI resulted in a greater improvement in learners' reading performance. The independent-sample T-test was subsequently run to confirm whether there was a statistically significant difference in the post-test scores due to MetaSI.

As illustrated in Table 8, there was a statistically significant difference in the post-test scores between the groups, with $p=.000$, two-tailed; the magnitude of the differences in the mean scores ($MD=8.2$, 95% CI: from 3.81 to 12.59) was large.

Table 8. An Independent-sample T-Test for Groups' Post-test Scores

		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Post-Test Scores	Equal Variances Assumed	1.46	.23	3.7	58	.00	8.2	2.19	3.81	12.6
	Equal Variances not Assumed			3.7	55.6	.00	8.2	2.19	3.81	12.6

Table 9 shows the results of covariance with pretest scores as a covariate, posttest scores as the dependent variable, and intervention (MetaSI) as the independent variable. After controlling for the initial differences in reading proficiency levels, the differences in posttest mean scores for the groups were statistically significant ($p=.000$; $p<0.05$), indicating that MetaSI in EG resulted in significant variance in the posttest scores compared with CG.

Table 9. Reading Post-test Scores as a Dependent Variable with Pretest Score as a Covariate

Source	df	Mean Square	F	Sig.
Corrected Model	2	2246.275	184.710	.000
Intercept	1	72.007	5.921	.018
Pretest Scores	1	3483.949	286.483	.000
Treatment	1	1199.918	98.668	.000
Error	57	12.161		
Total	60			
Corrected Total	59			

3.2. Qualitative Results

The study analyzed the qualitative data through NVivo (version 12) to explore participants' perceptions of the MetaSI programme. The thematic method by Braun and Clarke (2006) extracted three themes: improved reading skills, perceived reading improvement, and positive reading attitudes.

i. Improved Reading Skills

Reading skills are automatic reactions to decode texts with speed, efficiency, and fluency. The MetaSI is commendable for its enhancement of students' reading skills, as reported by several participants during their interview sessions with the researcher.

LPR (1): *“Nowadays, I try to predict what a passage is about according to its title.”*

LPR (2): *“I have learned to relate what I read with myself or the outside world.”*

MPR (1): *“To have an overall grasp of the text, I will ‘skim’ it for a bigger picture first, after which I will ‘scan’ any selected portions of the text for further details.”*

MPR (2): *“I pay careful attention to text organization and connectives.”*

HPR (1): *“When my reading goes smoothly, I can quickly understand the text. However, when I encounter difficulties, I slow down and think of appropriate strategies to deal with those ‘problematic’ portions.”*

HPR (2): *“I learned to think of the authors’ opinions critically rather than accept them blindly.”*

These statements indicate that students have improved their reading skills to varying degrees, demonstrating that MetaSI is a powerful way to develop learners' reading skills and, in turn, improve reading performance.

ii. Perceived Reading Improvements

Reading comprehension is the incontrovertible objective of reading instruction and is at the very center of the act of reading (Durkin, 1993). According to thematic analysis, the most obvious one was improved reading comprehension, which can be exemplified as follows:

LPR (1): *“I am so happy to be able to complete my reading and understand what the text says.”*

MPR (1): *“Normally, I could only get a surface understanding of a given passage, but now I can roughly comprehend the gist of the text.”*

Another perceived improvement is closely related to respondents’ lexical knowledge. They disclosed that their vocabulary expanded, and their lexical retrieval speed was quickened, in line with Wang’s (2013) report on incidental vocabulary acquisition. Sample comments are as follows:

LPR(2): *“I can pick up new words faster. My vocabulary has expanded through my reading.”*

MPR(2): *“I used to relate one meaning to one English word. But now I have learned that a word can have multiple nuances and meanings in different contexts.”*

HPR(1): *“My vocabulary is quite large now... I respond quicker to words and their meaning. It is like my brain can source for the word more quickly.”*

Moreover, respondents alluded to their improved reading speed, which is of great help in attempting to read effectively. The excerpts are as follows:

LPR (1): *“I used to read a passage word by word, which is time-consuming. But now I am trained to complete my reading within a very short period.”*

HPR (2): *“I can finish reading CET-4 passages within 30 minutes now. Previously, it was almost impossible for me to read at that pace.”*

iii. Positive Reading Attitudes

Students’ emotional reactions to reading are prominent elements for successful reading. Attitudes toward reading cause the learner to approach or sidestep a reading situation (Alexander & Filler, 1976). Contrary to previous accounts of reading seen as laborious and unpleasant experiences, positive reading attitudes emerged as an important theme, and reading has become an important source of enjoyment, motivation, and confidence to carry out even more reading activities.

LPR(1): *“I begin to enjoy the pleasure of reading. Recently, our teacher showed us how to do readings and arranged different activities for us to practice.”*

LPR(2): *“I always stumbled over new words in my reading in the past. However, now I’ve learned to read confidently even though I may not understand every new word in the text.”*

MPR(1): *“I used to read to ‘get familiar’ with English, but now I am communicating with the author.”*

MPR(2): *“I was lazy and impatient and rarely completed my reading. But now I can keep reading until I get the main idea of the text.”*

HPR(1): *“From the recent classes, I have learned that reading in English is not only for obtaining higher scores but for real learning. Following the teacher closely, I now have my own reading routines in reading. I can master my own reading now.”*

These interviewees developed positive attitudes to English reading as captured in their accounts, revealing their reading pleasure and intrinsic motivation, cultivation of self-confidence, and self-efficacy. Not only that, some learners also began to envisage reading as a meaning-building process. Such changes help students realize their roles and responsibilities in reading learning, which, in turn, helps them achieve better reading performance.

4. Discussion

The quantitative data have illustrated that MetaSI can make statistically significant improvements in post-test scores of students at different levels of reading proficiency in EG.

Specifically, MPR in the EG improved the most, followed by LPR and HPR. The possible reasons are that the bottom-up processing abilities of MPR are more developed and skilled than those of LPR. However, their top-down capabilities, especially self-regulatory strategy use, are less proficient than the HPR. However, the MetaSI provides an avenue to develop their abilities and experience the benefits of the intervention.

While for the LPR, their reading comprehension usually fails at the beginning as they are still at the bottom-up stage. Their reading employs localized and disconnected information processing. This deficiency makes it harder for them to develop higher-order thinking skills. However, the explicit and informed MetaSI makes the strategy usage visible and relatable, at least at levels sufficient for them to make meaningful progress.

The possible reason for the slightest improvement in HPR is that these students have already developed bottom-up and top-down processing skills. MetaSI may even interfere with their spontaneous execution of adequate metacognitive skills (Veenman, 2013). Thus, significant improvement was lower compared with other groups.

The effectiveness of MetaSI can be explained from the perspective of Input Processing Instruction (IPI). This theory assumes the existence of default processing strategies that function automatically upon receiving and processing the input. MetaSI helps learners to surmount these default processing tendencies by prioritizing their attention resources while attending to different stimuli in the input. Therefore, MetaSI is a promising alternative to traditional reading instruction, which emphasizes the tedious drilling of language knowledge, featuring exam-centered and teacher-centered teaching and learning activities.

In addition, the effectiveness of MetaSI can also be inferred from the qualitative data findings. The thematic analysis revealed that well-developed reading skills are shown not only by using various individual metacognitive strategies but also by orchestrating these strategies. When these strategies are used, students can display improved reading skills. Further, perceived reading improvement is embodied in improved comprehension, enlarged vocabulary, and improved reading speed. These precursors to

successful reading comprehension are indicative of the effectiveness of MetaSI. Besides, positive reading attitudes can intensify students' willingness to embark on reading activities and facilitate cultivating good reading habits, including self-confidence and self-efficacy.

These themes are consistent with Baker's statements (2017) that reading comprehension depends on the successful coordination of multiple cognitive and linguistic factors, including executive functions, code-based skills such as word identification, and internal factors such as motivation and perceived competence. The findings of this study have provided much support for using MetaSI to develop higher-order thinking skills, which are the goals of quality education providers.

5. Conclusion

Despite the limitations of a small sample size and a small number of research instruments, the study has demonstrated that MetaSI could be an effective tool to exploit in the classroom to develop English reading comprehension skills, as it has been shown to be more effective than traditional instructional methods (control group) often adopted in Chinese EFL reading classrooms.

Even though the incorporation of metacognition in language teaching is not new, metacognitive strategies have not been widely adopted in reading instruction (Dignath-van Ewijk et al., 2013) in China. The incorporation of metacognitive strategies in English classrooms in China might be challenging, but it could be done with systematic planning. In this respect, long-term measures such as teachers' education programs aiming to hone strategic teaching of English reading comprehension could be implemented. Chinese teachers may be exposed to concepts such as readers' cognition and metacognition and customized instruction on explicit comprehension strategies. MetaSI builds on these concepts, which could facilitate the adoption of MetaSI. In addition, the Ministry of Education could incorporate metacognition in English curriculum guidelines, standards, and basal series at the policy level.

To conclude, this study on the effectiveness of MetaSI on English reading comprehension could provide some directions for stakeholders to consider. The exploratory value of metacognitive strategy instruction warrants the attention of educators and researchers working on improving English reading comprehension among Chinese EFL learners. The study has also affirmed the rationale for incorporating metacognitive strategies in EFL classrooms to achieve goals articulated in the GCET (2020), China, to deliver quality education for all.

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