
| RESEARCH ARTICLE

Improving EFL Reading Comprehension through Critical Thinking in the Conflict-Affected Darfur, Sudan

Dhahawi Garri ¹ and Dalil Ahmed Ediam ²

¹ Associate professor of linguistics, Department of English, University of Nyala, Sudan

² Assistant Professor of EFL, Department of English, University of Nyala, Sudan

Corresponding Author: Dhahawi Garri, **E-mail:** dhahias@gmail.com

| ABSTRACT

Using a quasi-experimental design, this study explored how critical thinking-based (CTB) instruction can effectively improve high school EFL learners' higher-order reading comprehension (RC) skills, particularly among learners in the resource-constrained and conflict-affected educational settings in South Darfur State, Sudan. The study sample comprised 100 EFL learners who were purposively selected and evenly divided into two groups, a control group and an experimental group. Both groups received identical pretests to assess their baseline RC skills and posttests to assess their progress after a six-month intervention, during which the experimental group received CTB instruction while the control group received traditional RC instruction. Focus group discussions and classroom observation were also conducted to triangulate the findings obtained from the experimental group's posttest. Regarding the improvement in RC skills, the findings indicated that learners who received CTB instruction relationally outperformed their counterparts, suggesting that this approach can be effective in other under-resourced, conflict-affected environments or, by extension, educationally marginalized ones. The findings also suggest that CTB instruction is a cost-effective, adaptable, and practical approach to improving higher-order RC skills among EFL learners disadvantaged by environments similar to those the learners in the present study experience. Accordingly, the findings offer useful pedagogical approaches and informed insights for policymakers and teachers to consider.

| KEYWORDS

EFL instruction, critical thinking, reading comprehension, conflict-affected

| ARTICLE INFORMATION

ACCEPTED: 30 July 2026

PUBLISHED: 10 September 2026

DOI: 10.32996/jeltal.2026.8.9.12

1. Introduction

In the field of English as a Foreign Language (EFL) instruction, integration of higher-order cognitive skills in classroom activities is a fundamental endeavor for improving learners' overall reading comprehension (RC) skills. Among approaches aimed at improving RC skills, critical thinking-based (CTB) instruction has widely received attention as an enabler of more active engagement with written texts, notably by Aloqaili (2012), Koda (2005), Ghabanchi & Behrooznia (2014), Grabe (2009), Moghadam et al. (2023), Mohammadi et al. (2023), and Pujayanti et al. (2016). Such an approach advocates for shifting from traditional RC approaches focusing on passive and receptive comprehension to active, productive, analytic, and evaluative practices because, as Cox (1991, 133) emphasizes, "Reading is much more than decoding black marks upon a page; it is a quest for meaning and one that requires the reader to be an active participant."

While a large body of relevant research has substantially advanced the effectiveness of integrating CTB instruction to enhance high school EFL learners' RC skills, particularly among university learners, its potential contribution to maximally utilizing instructional aids in conflict-ridden and resource-limited educational contexts among high school EFL learners has remained a yet-to-study field of inquiry. Comparatively, researchers have focused comparatively less on how CTB instruction can enhance higher-order RC skills among EFL high school learners in such settings. Additionally, although a large body of literature and

empirical studies around the globe found CTB instruction is highly effective in developing EFL learners' reading skills, studies in conflict-affected countries are unmistakably scarce. In Africa, a continent that has been plagued by prolonged inter- and intra-state wars for decades, for example, and to the best of the present researcher's knowledge, only two studies emerged relevant, one by Rouijel et al. (2019) in Morocco and another by Yusuf and Idoghor (2020) in Nigeria, both investigating the effect of instruction in CT on learners' higher-order RC skills.

In an attempt to fill such a gap, this study was conducted in Nyala town, the capital of South Darfur State in Sudan, located at the heart of the greater Darfur region in the westernmost part of the country. Since 2003, the region has become a microcosm of Africa in terms of inherently devastating conflicts that have consequentially created, among others, deplorable learning environments due to destruction of schools, displacement of teachers, and collapse of education institutions. Only recently, faltering initiatives have been introduced to restart schools, though they are challenged by seemingly irreversible conflict drivers in the short term. It is under such settings that this study was conducted, with the findings suggesting they are conflict-specific and the first of their kind in the relevant broad field of inquiry.

Most importantly, much of the substantial contribution of this study emerges from the type of findings related to the context in which it was conducted. The broader previous research reviewed in this study was conducted to explore effective approaches for better integration of CTB instruction into classroom RC activities in relatively conventional educational settings, mostly targeting university-level learners, and all were conducted in environments conducive to normal instruction. However, this study has focused on high school EFL learners studying in conflict-affected, resource-constrained settings. Therefore, the consistency of findings the study has reached suggests that the effectiveness of CTB instruction is not necessarily dependent on technologically sophisticated or well-resourced classrooms. That is, the findings of this study pragmatically differ from those reached by all relevant studies in that the present study was conducted in instructional contexts where access to teaching materials was extremely limited except for a textbook. Accordingly, the findings are expected not only to contribute to the ongoing discussions on exploring effective approaches in improving EFL learners' RC skills but also to question why teachers might need to consider the integration of CTB instruction for improving EFL learners' RC skills in education settings characterized by limited instruction resources. Additionally, curriculum designers and EFL learning and teaching policymakers can find useful the pedagogical implications the study has provided for advancing evidence-based practices for how CT strategies hone EFL learners' higher-order CR skills.

2. What makes the present research different?

Although most empirical studies, such as Dewi et al. (2025), Nguyen and Nguyen (2023), Rashid and Hashim (2008), and Agustina and Ro'isatin (2024), confirm that RC can be improved by CTB instruction, they are largely conducted in classroom environments characterized by sufficient instructional support and learning and teaching environments conducive to achievement. None of them directly stated it had examined how CTB interventions can promote RC in resource-constrained settings characterized by limited teaching aids, overcrowded classrooms, or inadequate teacher preparation.

Secondly, most studies, such as Khathayut and Walker-Gleaves (2025), Wang (2025), and Agustina and Ro'isatin (2024), only to name a few, focused on university-level EFL learners, producing abundant findings in many countries across the globe. This study provided unique findings squarely situating CTB instruction as a cost-effective approach in conflict-affected environments where relevant studies in RC instruction in high schools are scarce.

Thirdly, most studies provide solid conceptual foundations for integrating CT into EFL learning approaches to improve RC using quantitative data. However, none of the studies reviewed have applied mixed qualitative (observation and learner perception questionnaire) and quantitative (pre- and posttests) tools for triangulation purposes.

Most importantly, the present study offers an answer to a seemingly instructional paradox: how can CTB instruction improve EFL learners' RC skills in resource-limited and conflict-affected areas differently from the one that is improved in normal instruction/learning settings? Based on the present researchers' extensive teaching experience in EFL teaching at tertiary and secondary levels, it can be argued that reading is the most suitable skill—among listening, speaking, and writing—that EFL learners can satisfactorily benefit from when they are instructed through CTB in a resource-limited environment. This is so because reading instruction does not need, unlike the other skills, sophisticated aids that were either unavailable for or unfordable to the subjects of this study. A teacher may essentially need only one physical aid—a single passage selected from a textbook and possibly a chalkboard—yet the instructional output can be equal to that achieved when abundant aids are utilized.

3. Study background

3.1. Theoretical framework and literature review

Critical thinking (CT) is generally conceptualized as a cognitive process involving the analysis, synthesis, and evaluation of information to guide beliefs and actions (Facione, 1990; Paul & Elder, 2014; Brookfield, 2012; Halpern, 2014 & 1998). It has also

been posited that CT fosters both domain-general and domain-specific competencies, through which cognitive skills are transferred to knowledge and wider life contexts (Indrašienė et al., 2019).

In education, the relationship between CT and RC is especially crucial for EFL, as RC is an interactive process through which learners would construct meaning by integrating textual information with prior knowledge and cognitive strategies (Grabe, 2009; Koda, 2005). This relationship is particularly indicative because EFL learners often face difficulties while negotiating between linguistic forms and the conceptual meanings conveyed in texts, giving rise to their need for integrating CT strategies to promote higher-order comprehension skills such as evaluating arguments, inferring meaning, and interpreting surface and underlying meanings (Ennis, 2011; Anderson, 1984; Anderson et al., 2001; Grabe & Stoller, 2011; Halpern, 2014; Wallace, 2003).

3.2. Origins and development of CT

Critical thinking was first coined by Dewey (1933), who referred to it as "reflective thinking," thus laying the basis for contemporary educational and cognitive psychology. According to him, "reflective thinking" is an "active, persistent, and careful consideration of beliefs or knowledge in light of the grounds that support them and the conclusions to which they lead" (p. 9). The concept of reflective thinking was later developed into CT in contemporary literature, referring to individuals' ability to question and evaluate phenomena rather than merely accept information.

From a cognitive and psychological perspective, CT involves skills that support decision-making and problem-solving. Reflecting on such aims, Facione (1990) proposed six core CT skills relevant to cognitive perspectives: evaluation, explanation, inference, interpretation, analysis, and self-regulation. He further elaborated on individual dispositions that facilitate such elements of CT, including open-mindedness, inquisitiveness, and intellectual honesty. Anderson & Krathwohl (2001) also provided a revised Bloom's taxonomy, which also looks similar to those of Facione's, for the application of EFL reading that contains six cognitive levels: *remember* and *understand*, generally corresponding to lower-order CT skills; and *apply*, *analyze*, *evaluate*, and *create*, which correspond to higher-order CT skills.

In addition, CT was further reconceptualized by Halpern (2014), who argued that it is an intentional use of cognitive skills that increases the probability of achieving desired outcomes. This new concept makes CT, as Indrašienė et al. (2019) argued, transferable across domains requiring employment of higher-order skills. Similarly, Ennis (2011, p. 1) defined CT as "reasonable and reflective thinking focused on deciding what to believe or do," a definition that speaks to that of Paul and Elder (2014), who contextualized CT as a self-directed and systematic thinking process guided by universally common intellectual criteria, including seeking accuracy, relevance, and depth of information.

3.3. CT as an educational tool

Within educational research over the recent years, CT has been constituted in the constructive learning literature in education research. The theories thereof focus on prioritizing active knowledge construction over mechanic or passive knowledge construction. It is argued that learners can, by applying CT skills, best establish meaning by interacting with their environment and engaging in realistic learning assignments, suggesting that CT can offer wider tasks that go beyond its abstract characteristics to real practices that are informed by experiences and cumulative knowledge, including benefiting from instances that trigger questioning, dialoguing, and analytical engagement with others (Fosnot, 2013; Jonassen, 2000; Halpern, 2014; Brookfield, 2012).

Additionally, according to Ennis (2011) and Facione (1990), CT attracts scholars in tertiary education as a contemporary educational need, for learners at such a level often have already developed quite a substantial deal of independent learning and reflective thinking and distanced themselves from learning by rote and memorization.

3.4. RC and CT in EFL pedagogy

Integration of CT into improving learner RC skills has recently gained momentum in EFL learning as CR particularly goes beyond grammatical competence and vocabulary augmentation to more complex cognitive-based knowledge that enhances analysis, interpretation of implicit meanings, and effortless identification of intended assumptions, which requires manipulation of different cognitive processes and activation of background knowledge (Ennis, 2011; Halpern, 2014; Grabe, 2009; Koda, 2005).

In contexts of EFL teaching approaches, CT is integrated into classroom approaches by encouraging learners to probe deeper into texts to understand the underlying textual assumptions, argumentative threads, and ideological backgrounds within the written texts. In this approach, Wallace (2003) argues that EFL learners are required to not only stop at the literal meaning of a text but also ask questions about the intentions of the text writer, evaluate the validity of textual arguments, and recognize the social and ideological background of comprehension texts. The ultimate goal is to enable learners to master the core CT skills, including self-regulation, interpretation, analysis, evaluation, inference, and explanation.

However, some studies argued that the direct effect of CTB as an instrument on improving RC is either improperly established (Alogaili, 2012) because the link is found to be statistically insignificant (Dewi et al., 2025; Sahiruddin et al., 2022) or because the relationship between CBT and RC has more to do with implicit and higher-order comprehension than with explicit and literal comprehension (Heidari, 2020).

3.5. Schema theory as a foundation for CTB RC instruction

The schema theory was coined by Bartlett (1932), postulating that human memory and comprehension are not only passive processes for storing information but also active processors of reconstruction based on previously organized knowledge. The schema theory is also grounded in the premise that understanding a text depends largely on the activation of background knowledge related to the studied text so that learners can link new information to background cognitive information.

Later schema theory proponents such as Rumelhart (1980) and Anderson (1984) advocated that comprehension and learning are facilitated by the interaction between received information and existing cognitive structures. Accordingly, the schema is considered the core component of cognitive processes that inform the interpretation and organization of new information, with prior knowledge being an important factor in facilitating memory.

3.6. Relevant case studies

A considerable body of studies has been conducted to demonstrate how CTB instruction can promote higher-order reading comprehension (RC) skills. Although the intervention across such studies varied methodologically, from applying pre- and posttests (Ghabanchi and Behrooznia, 2014; Nguyen and Nguyen, 2023; Ruiz de Zarobe & Gutierrez, 2024; Yusuf & Idoghor, 2020); directed reading thinking activity (Rashid and Hashim, 2008); case-based learning (Agustina & Ro'isatin, 2024); interactive cognitive processes (Grabe, 2009; Koda, 2005; Rouijel et al., 2019; Wang, 2025); mixed-methods (Mohammadi et al., 2023; Pujayanti et al., 2026); to theoretical and synthetic studies (Grabe, 2009; Koda, 2005), the findings and underlying pedagogical principles consistently and reliably remained similar. That is, learners who received CT integrated into teaching RC were found to outperform in active engagement with texts, analysis of textual information, evaluating evidence, making predictions, and reaching arguments while making interpretations.

For example, Yusuf & Idoghor (2020) and Rouijel et al. (2019), the only two relevant studies identified in North Africa, found that integration of CT skills into RC instruction significantly improved, respectively, students' reading performance and their higher-order RC skills. While the findings of the former study suggested that teaching reading through CT questions can encourage learners to engage in purposeful, creative, and thought-provoking RC skills, the experiment-grounded findings of the latter study suggest that higher-order RC skills are not only teachable through explicit CTB instruction but also concluded that improvement of higher-order skills may not necessarily depend on learners' lower-order skills.

In their interview-based explanatory study, Mohammadi et al. (2023) also found that, when self-regulated learning is applied, CT and RC skills are closely interconnected, rather than functioning as independent skills. Their Partial Least Squares Structural Equation Modeling analysis suggested that self-regulated learners may achieve better comprehension partly because their cognitive learning strategies enable them to analyze, evaluate, and interpret textual information more critically by better planning for their reading, monitoring comprehension, identifying difficulties, and evaluating their understanding.

Findings triangulated by tests, questionnaires, and interviews suggest that structured questioning prior to RC enhanced learners' higher-order skills (Nguyen and Nguyen, 2023) and that directed thinking activities improved learners' ability to evaluate assumptions, reasoned interpretations, and prediction of implicit or unstated meanings (Rashid and Hashim, 2008; Wang, 2025). Likewise, Agustina and Ro'isatin (2024) reported that, when case-based learning was embedded in CTB, it significantly enhanced RC skills, particularly reading fluency and learning of new vocabulary and grammar knowledge. These studies, collectively, lend support to the assertions of Paul & Elder (2014) that CT is a crucial technique for effective RC, as it allows learners to think systematically, including interpretation, self-regulation, evaluation, and critical analysis.

From a theoretical perspective, Halpern (1998), Grabe (2009), and Koda (2005) provide an insightful interpretation of why CTB instruction often improves RC and offers a robust conceptual framework through which CT can facilitate the improvement of RC. Halpern particularly offers a model of CT, defining it as a transferable set of cognitive skills rather than a domain-specific ability, with four interconnected components: provision of sufficient thinking skills, readiness to engage in reflective thinking, enough structured input, and presence of metacognitive monitoring that enables learners to evaluate their own reasoning activities. The components in Halpern's (1998) framework align with successful reading strategies identified in some empirical studies: prediction and verification in DRTA (Rashid & Hashim, 2008), questioning before reading (Nguyen & Nguyen, 2023), and case-based discussions (Agustina & Ro'isatin, 2024), all requiring learners to monitor RC, evaluate evidence in texts, and manage their CT.

Other relevant studies also pointed out the importance of designing reading instruction such that learners' cognitive requirements are honed while they are engaged in higher-order thinking skills. Drawing on cognitive load theory, Paas et al.

(2003) argued that instructional techniques such as pre-arranged examples, prompted instruction, and progression from simple to more complex tasks can enhance learning efficiency by eliminating unnecessary cognitive load. This approach is found to be effective in empirical studies on CTB instruction, for example, by Ghabanchi & Behrooznia (2014), who found that using brainstorming as a pre-reading strategy greatly improved learners' RC and CT abilities. Their findings also suggest that activating learners' prior knowledge (schema) before reading facilitates deeper cognitive engagement with texts. Similarly, Moghadam et al. (2023) found that a structured CT intervention significantly enhanced learners' CT and RC skills, with the experimental group outperforming the control group. Such findings were replicated by Pujayanti et al. (2026), who found that integrating CT skills into problem-based learning aids facilitated greater improvements in EFL learners' RC and linguistic awareness than non-problem-based learning instruction. Together, the findings reached by these studies suggest that effective CTB instruction of RC does not merely rely on exposing learners to difficult cognitive tasks but on carefully designed and logically sequenced activities that activate prior knowledge and build cognitive engagement.

However, the quasi-consensual agreement on the benefits of integrating CTB instruction into RC, together with quite reasonable literature, reveals that empirical evidence indicates that the positive relationship between RC and CTB instruction is not always straightforward to define, indicating the existence of some contextual and methodological differences that call for further investigation. For example, Dewi et al. (2025) found in their study no direct significant correlation between learners' ability to improve in RC when they are taught through CTB. They suggested that it is necessary to account for other unseen contextual variables such as learners' insufficient linguistic competence and limited opportunities to practice CT skills that might hinder them from successfully employing CT skills during reading activities.

Additionally, literature shows inherent challenges that might limit learners' engagement with critical RC. Khathayut and Walker-Gleaves (2025) found that EFL learners tend to rely heavily on lower-order strategies rather than on higher-order skills due to poor vocabulary that leads to difficulties in understanding complex texts. In line with such arguments, Dewi et al. (2025) found that linguistic competence is a prerequisite for effective critical engagement with RC.

4. Methodology

4.1. The sample

Due to the ongoing conflict and the collateral damage to education infrastructure throughout Darfur, Sudan, the exact size of the study population has become unknown, though it was estimated, according to the local official records as of 2023, to be 36,700 students distributed in 21 local administrative units. The sample of this study was 100 high school students learning EFL who were studying in Nyala city and were preparing for pre-university exams in the 2026/7 academic year. They were purposively selected and divided into two classrooms, 50 students in each. Both shared common characteristics in terms of age (all were between 16 and 17 years old) and academic levels (by the time the study was conducted, the learners had completed seven years studying EFL) and had been taught by traditional RC instruction approaches in almost identical educational environments.

As it has been the case across all of Sudan, English lessons were limited to only a forty-minute lesson day, five lessons a week, with no or extremely limited exposure to practicing English outside school. That is, their English practice is limited to only 3.3 hours a week (classroom time). This situation is further exacerbated by the ongoing conflict as, by the time this study was started, the subjects had lost access to schools for two and a half years. Such similarities ensured that both groups were nearly similar in their RC skills prior to the intervention.

4.2. The tools

Three tools, one quantitative (pre- and posttests) and two qualitative (classroom observation and learner attitude questionnaire), were employed. The pretests, which were developed and administered to both groups following the test format prescribed by teacher guidebooks. In terms of validity, the pretests generally measured lower-order skills, which made their validity very limited. Nevertheless, the present researchers opted to use the same format in the pretests, as the purpose was to understand the subjects' baseline performance. The test comprised 11 questions divided into three parts: four multiple-choice questions requiring identification of one answer to be directly spotted from the text, three questions with three underlined pronouns whose referents were to be identified by inference, and four questions requiring search for explicit information from the text. All answers were required to be written. The maximum marks of both tests were 20 points.

The classroom observation rubric (Table 1) contains ten statements. The researchers developed it based on the higher-order RC skills proposed by (Facione, 1990; Grabe, 2009; Koda, 2005). The rubric was designed with the aim of quantifying learner performance while being instructed as it appeared by the end of the first three weeks compared to the performance by the end of the intervention.

The learner perception questionnaire (Table 2) was administered in five focus group discussions (FGDs), all held at the end of the intervention. It focused on the experimental group's perceptions of whether they had felt improvement, compared to when they were taught by traditional RC techniques, in their overall attitudes toward CTB instruction.

Table 1. Observation rubric for assessing learners' RC skill development.

No	Observed skills	By the end of the first 3 weeks				By the end of the intervention			
		beginning	Developing	Proficient	Advanced	beginning	Developing	Proficient	Advanced
1	Students can actively ask new questions from the text.								√
2	Students can critically think through reasoning.	√						√	
3	Student can accurately identify the central idea of each paragraph and the whole text.	√						√	
4	Students literally understand specific information.		√						√
5	Students can infer unsated meanings of words to understand well.		√					√	
6	For analysis and evaluation, students can identify claims, evidence, and examples from texts while answering questions.	√							√
7	For evidence-based reasoning, students can answer questions with supported evidence.	√							√
8	Students can actively engage in comprehension reading discussions.	√							√
9	For self-regulation, students identify their errors while reading and correct them accordingly.		√					√	
10	For assessing fluency, students can read the text without difficulties.	√						√	

The learner perception questionnaire contains eight questions. The researchers developed it such that learners could self-evaluate how CTB instruction helped them develop their RC skills, compared to that they used to.

Table 2. The learner perception questionnaire

Questions
1. Do you think using critical thinking is better than the traditional method to understand reading texts? Why or why not?
2. Please explain how has critical thinking helped you understand difficult texts or passages?
3. Has critical thinking helped you understand meanings that are not directly stated in the text? How?
4. Do you feel more comfortable or engaged in reading when the teacher asked to think critically? Why?
5. Explain how using critical thinking has made you more confident when answering reading comprehension questions? If not, why?
6. When you do not understand a text, how does critical thinking help you solve the problem?
7. How often do you ask or not ask more questions about a text when you use critical thinking? What kind of questions do you ask?
8. Do you think learning reading supported by critical thinking strategies is better than traditional methods? Why/why not?

4.3. The intervention process

The instruction varied between the two groups in two specific ways. The experimental group was exposed to a treatment instruction that focused on the development of learner-centered CTB RC skills by explicitly integrating higher-order CT strategies into the instruction. At the beginning, the subjects were familiarized with CTB instruction routines, including teacher/learner roles, modalities of engagement with texts, grouping or seating structures, types of skills needed to be focused on for improvement, and time spent on each activity (see Table 3 for detailed procedures). It is noteworthy that the activities listed in this table were adapted and organized following those originally proposed by Facione (1990), Grabe (2009), and Wallace (2003) as RC higher-order skills that CTB instruction can improve. However, the control group was exposed to traditional teacher-centered RC instruction, with the focus on model reading, introduction of new words and their meanings, extensive silent and loud reading with immediate teacher intervention for pronunciation corrections, and asking for explicit evidence for comprehension questions at the end of each lesson. It is noteworthy that the only instruction aid available and extensively used during the whole intervention period was the backboard. The time allocated to each activity for both groups was calculated based on the time spent on each activity in the first week, then it was recalculated when the time spent later on each type of activity became consistently stable. However, when and where instruction inputs were reduced, the learners were engaged in other activities for longer times.

Prior to the intervention, learners were sufficiently familiarized with classroom routines and instructor/learner roles. Particularly, the experimental group was introduced to how they would be exposed to RC activities differently by briefly explaining to them CT skills related to RC and activities, providing some model questions and answers, and explaining what benefits they would expect to receive. Although both groups were administered the same pretests, which focused on assessing their baseline lower-order RC skills, the posttests differed, as, for the experimental group, some of their parts were designed to assess the group's higher-order skills. To eliminate classroom anxiety and other psychological tensions associated with tests and social desirability bias while being interviewed, the learners were assured that the answers and responses would not have any adverse consequences to their final school scores.

Table 3. Critical thinking instruction activities (adapted from Facione, 1990; Grabe, 2009; Wallace, 2003; Anderson & Krathwohl (2001); reordered by AI.

Stage	CTB inputs	Teacher's role	Learners' activities	Target RC/CT skills	Example of teacher hints	Time
Schema activation	Introduction to the reading text	Provides minimum background (schema) and hints thinking.	Recall their knowledge about the text	Activating schema, predicting, reflecting, questioning.	What do you already know about this topic?	5 minutes
Pre-reading: Prediction	Encouraging predictions from the title, headings, pictures, etc.	Prompts learners without giving answers	Predict content and justify predictions	Prediction, inference, reasoning	What do you think the text will discuss? Why?	8 minutes
Initial reading	Learners read independently for general meaning	Facilitates, minimum pronunciation correction, with a model reading	Identify topics, main ideas, and important information	Literal comprehension, identifying main ideas	What is the paragraph (x) mainly about?	12 minutes
Questioning	Encouraging learners to generate their own questions about the text	Divide class into groups, provide models for higher-order.	Ask "why," "how," and "what if" questions	Inquiry, questioning, deeper comprehension	What question would you ask the writer?	10 minutes

Information analysis	Breaking the text into ideas, arguments, claims, and supporting details	Guides analysis by probing questions: which one are for main ideas, arguments, or supporting evidence	Identify and distinguish main ideas, claims, reasons, supporting evidence, and examples in the text.	Text analysis, differentiation, listing of ideas, arguments, claims, and supporting evidence.	What claims, arguments, supporting evidence, and ideas are the writer making?	8 minutes
Inferencing	Asking learners to extract implicit meanings, or statements	Provides clues rather than answers	Infer word meaning, writer intentions, and conclusions	Inference, interpretation contextual meaning	What can you infer from this evidence? How did you know that?	7 minutes
Evidence identification	Requiring textual evidence for answers	Directly questions unsupported answers	Locate and cite information supporting interpretations	Evidence-based comprehension, justification	What evidence supports your answer?	6 minutes
Evaluation	Examining the reliability and strength of ideas or arguments	Encourages providing alternative or additional evidence or viewpoints	State their claims, arguments, evidence, and conclusions	Evaluation, judgment, critical reading, reflection	Is the writer's argument convincing? Why? Why not?	6 minutes
Discussion	Asking to compare interpretations and defend arguments	Facilitates rather than dominates discussion	Discuss, disagree, explain, defend, and interpretations	Reasoning, communication, perspective-taking	Do you agree with your classmate's interpretation? Why?	6 minutes
Synthesis	Asking to connect information across paragraphs or parts of the text	Helps learners to link ideas, arguments, or evidence across text	Link ideas, arguments, or evidence for overall understanding.	Synthesis, integration, summary, and drawing conclusions	How do these ideas fit together? What is the logical order of the ideas?	7 minutes
Application	Asking to relate textual ideas to everyday new contexts	Introduces experiences learners might have come across	Apply information to situations and experiences they know or experienced.	Knowledge transference, application, or problem-solving	How could this idea apply to you or your workplace?	6 minutes
Reflection	Requiring to evaluate their comprehension and reasoning.	Divides class into groups, encourages asking self-monitoring.	Identify and correct errors, and reconsider answers,	Metacognition, self-regulation, self-correction	Has there been any errors that you have recognized?	7 min.

It is noteworthy that the present researchers developed and applied two qualitative tools to the experimental group: an observation rubric (Table 1), which applied and marked once by the end of the first three weeks and again by the end of the last three-week intervention phase, and a semi-structured eight-item attitude questionnaire (Table 2). The actual number of questions was larger because participants' answers often produced probing questions. The observation, on the other hand, focused on the overall level of subjects' skills while being engaged in comprehension texts, with the "beginning" level defined as subjects who could not use higher-order skills themselves; "developing" as partially demonstrating them, often with teacher

support; “proficient” as learners moving toward independent learning; and “advanced” as they consistently and dependently demonstrating higher-order RC skills.

The overall intervention continued for six weeks, with a 90-minute instruction a day with a ten-minute break for five days a week. In total, each group was exposed to twelve context-specific RC passages prescribed in textbooks developed by the Sudanese Ministry of Education. One of the present authors, with an experience of teaching EFL to high school learners for fifteen years, taught both groups.

4.4. Data collection and analysis

The data collection continued from the day following the administration of the pretests until the posttests were given, marking the end of the intervention. The quantitative data (means, standard deviations, and *d*-effects) for the pre- and posttests were calculated by AI and verified by applying relevant Excel formulas to obtain inferential statistics. Qualitative data collected via the observed performance were written immediately after each lesson, whereas the data collected via the questionnaire were recorded, later transcribed, and categorized into the CT parameters tested, and both types of data were finally analyzed thematically.

5. Data analysis and discussion of findings

5.1. Data analysis

The independent-samples *t*-test was applied to see how much or less the two groups differed in pretests and posttests (Table 4). Both tests had a maximum score of 20 points. The quantitative analysis of the pretest mean scores and standard deviations (SDs) for both groups show nearly comparable gains before the intervention. The experimental group's pretest scores were $M = 8.84$ out of 20 scores and $SD = 2.06$, whereas the control group's scores were $M = 8.50$ and $SD = 2.53$, indicating that there was an insignificant difference between the two groups' means and SDs. This finding suggests that both groups started at nearly the same levels of RC. The posttest means of the two groups suggest a significant difference, with the mean score of the control group increasing from 8.50 to 10.14, a gain of 1.64 points higher than the pretest scores, whereas the experimental group's mean score increased from 8.84 to 11.52, with a gain of 2.68 points, almost twice higher than the control group's gain.

According to the guidelines of the Sudan Ministry of Education, the pass mark in all types of English tests is 40%, in this case 8 out of 20 points of any total scores. This parameter provides a clear understanding of how much both groups performed. The posttest scores of the control group demonstrate an achievement of 50.7%, barely exceeding the stipulated pass mark by 9.3%. However, the experimental group's achievement was 57.6%, exceeding the pass mark by 17.6%, indicating that its average performance was appreciably above the minimum passing level. As we shall see in the “Discussion of findings” section below, this seemingly insignificant improvement could be interpreted differently.

Table 4: Mean, SD, and independent-samples *t*-test results

	Control group				Experimental group			
	Mean	SD	Cohen's <i>d</i> -effect	T-test results	Mean	SD	Cohen's <i>d</i> -effect	T-test analysis
Pretests	8.50	2.53	-	-	8.84	2.06	-	-
Posttest	10.14	2.68	0.63	$t(98) = -0.74$, $p = .464$	11.52	2.14	1.28	$t(98) = -2.85$, $p = .005$

The posttest SD of the experimental group ($SD = 2.14$) was lower than that of the control group ($SD = 2.68$). The experimental group, therefore, achieved a substantially greater improvement, 38.8% higher than the control group's. To determine the substantial significance of this difference, Cohen's (1988) *d* effect size (which considers $d = 0.20$ as a small, 0.50 as a medium, and 0.80 as a significant effect) was applied as well to both groups' posttest scores. The rationale behind ignoring the calculation of pretest *d*-effect emanates from the fact that the intended parameters to interpret the influence of CTB instruction were focused on the end achievement, not the initial one. The *d*-effect analysis revealed that the control group achieved a slightly upper-medium improvement in RC ($d = 0.63$). The experimental group, to the contrary, gained twice as much as that of the control group ($d = 1.28$).

Additionally, the independent-samples *t*-test statistics ($t(98) = -0.736$, $p = .464$)—where t = the *t*-test statistic, 98 = the degree of freedom, and p = the probability value associated with the test—showed no statistically significant difference between the groups in pretest scores. Since $p = .464$, which is $> .05$ (0.05 being a decisive value above which the assessed parameter is interpreted as insignificant), the difference between the two groups at pretest was not statistically significant, again suggesting that there was no evidence supporting the existence of a meaningful difference in their initial RC skills. However, after the six-

week treatment, the independent t-test results produced statistically significant readings for the experimental group, with statistics showing $t(98) = -2.85$, $p = .005$, the p-value being below the conventional significance level of 0.05, suggesting that the experimental group significantly outperformed the control group in the posttest.

For triangulation purposes, the above quantitative data were corroborated by those drawn from qualitative data, in this case, the teacher observation rubric (Table 2) and learners' perception feedback (Table 3), which were found to be consistent with the quantitative findings in several ways. By converting the observed reading proficiency behaviors contained in the checklist into numerical values—"Beginning" = 1, "Developing" = 2, "Proficient" = 3, and "Advanced" = 4—the mean rate obtained for the first three weeks of CTB instruction was 1.30, suggesting that the subjects' CR skills were still rudimentary. Their performance at this period fluctuated from mostly "Beginning" to barely "Developing" levels. By the end of the second three weeks, however, the performance of many of them had progressed, equally oscillating between "Proficient" and "Advanced" levels, with an increase in mean rating from 1.30 to 2.90, over twice higher than that of the first three weeks', suggesting a substantial improvement in engagement with higher-order CR skills.

The learner perception FGDs, which were administered towards the end of the intervention, also indicated similar achievements in higher-order RC skills as those produced by the checklist rubric. The findings from learner perceptions also corroborate those found by the tests and observation rubric. For example, an informant reported that "using critical thinking enables me to gather relevant information," while another indicated that CT had enabled him "... to analyze ideas and information included in texts." Similarly, another respondent stated she had found CT useful because it helped her, "... to draw conclusions by knowing [identifying] relevant evidence." Correspondingly, a sizeable number of responses revealed that CT helped learners understand implicit information in texts by contemplating and inferring the meaning of difficult words and expressions, and that, as another participant noted, "It [CTB instruction] helped much to widen my imagination and how to differentiate between claims, arguments, and supporting evidence."

5.2. Discussion of findings

The findings of the present study offer substantial evidence that CTB instruction significantly contributes to the improvement of RC skill among high school EFL learners, particularly those studying in a conflict-affected and resource-constrained educational setting. In addition, the convergence of the test results, observations, and learner feedback strengthens, as Cohen et al. (2018) maintain, the triangulated interpretation of the findings.

The low standard deviation observed in the experimental group posttest ($SD = 2.14$, compared to the control group's $SD = 2.68$) indicates that the intervention yielded more consistent learning outcomes across the experimental group. Though Cohen et al. (2018) maintain that the lowest dispersion in SD among a group (<1.0) is interpreted as proving a consistent learning indicator and the highest dispersion (>3.0) as an inconsistent learning indicator, the very fact that the experimental group demonstrated more homogenous learning characteristics substantiates the positive effect in improving CR performance resulting from CTB instruction. The t-test analysis of posttests also confirmed the difference in improvement, with the experimental group showing $t(98) = -2.85$ and $p = .005$ and the control group showing $t(98) = -0.74$, $p = .464$ (the p-value for the former group being below the conventional significance level of 0.05), suggesting that the experimental group significantly outperformed the control group in the posttest. The analysis of posttest d-effect also provided a significant treatment-induced change. The d effect size produced by the analysis is $d = 0.63$ for the control group, which is interpreted as a moderate effect, whereas the experimental group's effect size stood at $d = 1.28$, which is interpreted as large as twice the control group's, suggesting that the recorded improvement was not a mere chance-based numerical change in mean scores but a substantive change resulting from the CTB intervention.

Similarly, findings of the classroom observation demonstrated an improved performance among the experimental group. Their performance by the end of the first three weeks, with a mean score of 1.30 out of 4, fluctuated from mostly "Beginning" to barely "Developing" levels. This low score increased to 2.90 by the end of the intervention, over twice higher than that of the first three weeks', suggesting a substantial shift in observable reading behavior in their engagement with higher-order CR skills. Again, responses of the participants support the effect of CTB instruction in improving CR skills, as almost all informants confirmed their ability to negotiate higher-order RC skills easier toward the end of the interventions. In this regard, some participants stated, "I am now able to ask more questions about a text," "...[I'm] more comfortable when my teacher or colleagues ask to use [apply] critical thinking ways [techniques]," and "... [I'm] now more confident when answering reading comprehension questions than before."

Combined together, the findings suggest that the experimental group outperformed the control group, corroborating the theoretical background underscoring that reading RC is not a sheer process of linguistic decoding; rather, it is an active cognitive process in which readers can improve their higher-order RC skills by making inferences, analyzing information, evaluating textual evidence, activating prior knowledge, and constructing meaning (Grabe, 2009; Koda, 2005; Rumelhart, 1980).

Additionally, the findings of this study are consistent with the broader theoretical literature on the effect of CTB instruction in improving RC skills, in particular those skills Paul and Elder (2014) identify: relevance, evaluation of evidence, systematic reasoning characterized by accuracy, and depth, together with Facione's (1990) argument that analysis, interpretation, evaluation, explanation, inference, and self-regulation act as central components of CT. The substantial gains the experimental group achieved could be interpreted by their sustained exposure to instructional activities requiring them to engage with higher-order RC strategies.

Moreover, the findings of this study align with previous empirical studies reporting positive relationships between CTB instruction and RC. The CTB instruction and pre-reading brainstorming improved learners' ability to negotiate profound meanings, analyze information, and evaluate arguments (Nguyen and Nguyen, 2023). Likewise, guided RC activities were found to improve learners' abilities in predicting, verifying, and reasoning about textual information (Rashid and Hashim, 2008). The results are also in line with those of Agustina and Ro'isatin (2024), who found that CTB instruction improved not only analytical reasoning texts but also reading fluency, vocabulary, and grammatical knowledge.

Generally, the improvement in RC skills could also be interpreted according to the schema theory, which offers a relevant theoretical explanation for the gains observed in the experimental group. RC is an interaction process between new textual information and the existing cognitive structures of the readers (Rumelhart, 1980; Anderson, 1984). In the present study, the experimental group was introduced to and familiarized with relevant textual schemata before undertaking any RC activity so they could approach texts with an established conceptual framework whereby new information could broadly be interpreted, questioned, and evaluated. Such progress aligns with Facione's (1990) CT dimensions of interpretation, analysis, inference, evaluation, and self-regulation. The classroom observation findings also resonate with those of Wallace (2003), who defined critical reading as an effective mechanism that moves learners beyond literal textual meaning to the deep purposes of a text, and with Halpern (1998, 2014), who conceptualizes CT as involving transferable cognitive skills combined with metacognitive monitoring.

The progress among the experimental group also suggests that learners increasingly moved from basic engagement with texts toward more active higher-order reading skills. In addition, learners' statements that, rather than depending on teacher correction, they were capable of monitoring their comprehension and adjusting their reading strategies when difficulties arose align with Facione's (1990) findings, which take self-regulation as an essential CT skill that might explain the observed improvements in RC and fluency. The experimental group's statements demonstrated that the intervention must have activated their cognition, which supports Facione's (1990) and Halpern's (2014) propositions that such CTB instruction triggers learners' willingness to engage in reflective thought and readiness to apply thinking strategies.

Finally, the findings of this study should be read with caution and interpreted relationally together with the findings of other studies reporting more nuanced relationships between CT and RC. For instance, Dewi et al. (2025) found no significant correlation between learners' CT skills and RC achievement. Instead, they argued that other factors such as low linguistic competence and limited opportunities to practice CT strategies in RC may restrict the learners' ability to employ higher-order thinking. Likewise, the overuse of lower-order strategies, instead of higher-order skills, by EFL learners may impede the development of CT strategies (Khathayut & Walker-Gleaves, 2025).

5.3. Generalizability of findings and pedagogical implications

The findings of this study speak to those found in different regions and contexts across the globe, for example, in Iran (Ghabanchi & Behrooznia, 2014; Moghadam, 2023), Spain (Ruiz de Zarobe & Gutierrez, 2024), Indonesia (Pujayanti, 2026), Nigeria (Yusuf & Idoghor, 2020), Morocco (Rouijel et al., 2019), the United States (Block, 1993), and in Vietnam (Nguyen & Nguyen, 2023). Across these different geographical regions characterized by normal educational environments, the findings consistently demonstrated that CTB instruction enhanced RC skills. As the above studies were conducted in educational settings short of material resources or conflict-induced shortcomings, the similarity between the findings of the present study and those of the previous studies suggests that the improvement observed in the present study might not necessarily be attributed to resource-constrained and conflict-affected pedagogical settings but rather to the type of intervention itself. Accordingly, the distinctive contribution of the present study is to show that RC skills benefited from CTB instruction and may prove attainable even under severe conflict-related and resource constraints, thereby extending the relevance of CTB instruction to other educationally marginalized and resource-limited settings.

The findings further suggest that effective CTB instruction may be pedagogically effective even without necessarily being scaffolded by sophisticated technological aids. By extension, the findings suggest such an approach could potentially be applicable to remote and rural schools, overcrowded classrooms, displacement settings, refugee settlements, or similar contexts in which standard instruction/learning aids are limited.

Moreover, the present study's improvement in RC skills might not be generalized across contexts similar to the one in which the study was conducted for some sound reasons. First, the specific differences in posttest means, *d*-effect sizes, and progress from "beginning/developing" to "proficient/advanced" among the experimental group are characteristics of this particular intervention. Second, benefits of CTB instruction might also depend on learners' linguistic proficiency, instructional quality, duration of intervention, and sustained practice of higher-order approaches. For example, Pujayanti (2026) found that learners' previous knowledge about CT did not automatically help them improve their skills without intensive guidance. Finally, while the effectiveness of CTB instruction in improving RC skills of questioning, inference, evaluation, identifying arguments and responses, reflection, self-evaluation, and learner engagement could be generalized across diverse EFL/ESL contexts, the volume, magnitude, and speed of such improvement would be context-specific.

6. Conclusion

The mixed-method approach the study adopted produced quantitative data supported by qualitative data obtained by the intervention-long classroom observations and learner-perception feedback. The triangulated evidence corroborated that the systematic and sustained integration of CT strategies into RC instruction facilitated deeper engagement with texts and scaffolded the subjects' skills in concluding inferences, analyzing information, interpreting hidden meanings, evaluating text-contained evidence, constructing logical responses, and negotiating established arguments.

The findings offer evidence-based conclusions that CTB instruction can significantly improve EFL learners' higher-order RC skills. While the pretest results established the baseline RC attainment level comparability of the experimental and control groups, the posttest scores demonstrated substantially greater gains among subjects who had received CTB instruction following the six-week treatment period.

More significantly, the findings offer an instructional approach that goes beyond the pedagogical relevance of conventional well-resourced educational settings of CTB instruction by demonstrating its cost-effectiveness and practicality in a conflict-affected and profoundly resource-limited EFL setting. Therefore, the findings indicate that effective CTB instruction of RC need not depend solely on advanced technologies or carefully developed instructional aids or teachers who receive advanced training in RC instruction. That is, modest or minimum aids, a textbook only in the case of this study, can successfully create a vibrant classroom environment that could be as equally productive as a well-prepared classroom.

The findings of this study could be generalized in learning contexts characterized by disadvantages similar to this study's. They also highlight the need for curriculum developers, EFL teachers, and education policymakers to consider CTB instruction as an integral part and parcel in the ongoing pedagogical debates toward designing context-based instruction tools.

7. Statements and Declarations

- This research received no external funding.
- The authors declare no conflict of interest.
- The Authors acknowledge that the following parts/sections of the article were done with the assistance of AI:
 - Calculation of quantitative data means (M), standard deviations (SD), t-tests, and Cohen's (2088) d-effect analysis. These were also verified by applying relevant Excel formulas.
 - CTB instruction of reading comprehension (RC) activities in Table 3, which were adapted, to fit the present study's objectives, following the critical higher-order skills proposed by (Facione, 1990; Grabe, 2009; Wallace, 2003) and were logically reordered by AI assistance.
 - Organization of references according the APA 7th edition style.
 - Grammar and spelling.

References

- [1]. Agustina, L., & Ro'isatin, U. A. (2024). The efficacy of case-based learning model integrated with critical thinking skills to improve EFL learners' reading comprehension. *Journal of Languages and Language Teaching*, 12(3), 1443–1454. <https://doi.org/10.33394/joltt.v12i3.11619>
- [2]. Alogaili, A. S. (2012). The relationship between reading comprehension and critical thinking: A theoretical study. *Journal of King Saud University—Languages and Translation*, 24(1), 35–41. <https://doi.org/10.1016/j.jksult.2011.01.001>
- [3]. Anderson, L. W., & Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.
- [4]. Anderson, R. C. (1984). Role of the reader's schema in comprehension, learning, and memory. In R. C. Anderson, J. Osborn, & R. J. Tierney (Eds.), *Learning to read in American schools: Basal readers and content texts* (pp. 243–257). Lawrence Erlbaum Associates.
- [5]. Moghadam, Z., Narafshan, M. H., & Tajadini, M. (2023). The effect of implementing a critical thinking intervention program on English language learners' critical thinking, reading comprehension, and classroom climate. *Asian-Pacific Journal of Second and Foreign Language Education*, 8, Article 15. <https://doi.org/10.1186/s40862-023-00188-3>

- [6]. Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge University Press.
- [7]. Block, C. C. (1993). Strategy instruction in a literature-based reading program. *The Elementary School Journal*, 94(2), 139–151. <https://doi.org/10.1086/461756>
- [8]. Brookfield, S. D. (2012). *Teaching for critical thinking: Tools and techniques to help students question their assumptions*. Jossey-Bass.
- [9]. Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.
- [10]. Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge. <https://doi.org/10.4324/9781315456539>
- [11]. Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. D. C. Heath.
- [12]. Dewi, S. K., Ningsih, N. A., & Kurniawan, A. (2025). The relationship between EFL students' critical thinking and their reading comprehension. *Papanda Journal of English Education*, 4(1), 28–37. <https://doi.org/10.56916/pjee.v4i1.1992>
- [13]. Ennis, R. H. (2011). *The nature of critical thinking: An outline of critical thinking dispositions and abilities*. University of Illinois.
- [14]. Facione, P. A. (1990). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction (The Delphi Report)*. California Academic Press.
- [15]. Fosnot, C. T., & Perry, R. S. (2013). Constructivism: A psychological theory of learning. In C. T. Fosnot (Ed.), *Constructivism: Theory, perspectives, and practice* (2nd ed., pp. 8–38). Teachers College Press.
- [16]. Ghabanchi, Z., & Behrooznia, S. (2014). The impact of brainstorming on reading comprehension and critical thinking ability of EFL learners. *Procedia - Social and Behavioral Sciences*, 98, 513–521. <https://doi.org/10.1016/j.sbspro.2014.03.447>
- [17]. Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. Cambridge University Press.
- [18]. Grabe, W., & Stoller, F. L. (2011). *Teaching and researching reading* (2nd ed.). Routledge.
- [19]. Halpern, D. F. (1998). Teaching critical thinking for transfer across domains: Dispositions, skills, structure training, and metacognitive monitoring. *American Psychologist*, 53(4), 449–455. <https://doi.org/10.1037/0003-066X.53.4.449>
- [20]. Halpern, D. F. (2014). *Thought and knowledge: An introduction to critical thinking* (5th ed.). Psychology Press.
- [21]. Heidari, K. (2020). Critical thinking and EFL learners' performance on textually-explicit, textually-implicit, and script-based reading items. *Thinking Skills and Creativity*, 37, Article 100703. <https://doi.org/10.1016/j.tsc.2020.100703>
- [22]. Indrašienė, V., Jegelevičienė, V., Railienė, A., Sadauskas, J., & Žibėnienė, G. (2019). Critical thinking and its importance in education: Some insights. In V. Indrašienė, V. Jegelevičienė, A. Railienė, J. Sadauskas, & G. Žibėnienė (Eds.), *Critical thinking in higher education and labour market: Theoretical perspectives and empirical insights*. Peter Lang.
- [23]. Jonassen, D. H. (2000). *Computers as mindtools for schools: Engaging critical thinking* (2nd ed.). Prentice Hall.
- [24]. Khathayut, P., & Walker-Gleaves, C. (2025). An exploration of EFL students' perceptions of English critical reading: A case of Thai undergraduate students in Songkhla Province. *LEARN Journal: Language Education and Acquisition Research Network*, 18(2), 183–211. <https://doi.org/10.70730/MRTQ9889>
- [25]. Koda, K. (2005). *Insights into second language reading: A cross-linguistic approach*. Cambridge University Press.
- [26]. Mohammadi, R. R., Saeidi, M., & Abdollahi, A. (2023). Modelling the interrelationships among self-regulated learning components, critical thinking and reading comprehension by PLS-SEM: A mixed methods study. *System*, 117, 103120. <https://doi.org/10.1016/j.system.2023.103120>
- [27]. Nguyen, T., & Nguyen, H. (2023). The effects of questioning as pre-reading activity on EFL grade 12 students' critical thinking in reading classes in Kien Giang, Vietnam. *European Journal of English Language Teaching*, 8(4), 88–110. <https://doi.org/10.46827/ejel.v8i4.4999>
- [28]. Paas, F., Tuovinen, J. E., Tabbers, H., & Van Gerven, P. W. M. (2003). Cognitive load measurement as a means to advance cognitive load theory. *Educational Psychologist*, 38(1), 63–71. https://doi.org/10.1207/S15326985EP3801_8
- [29]. Paul, R., & Elder, L. (2014). *Critical thinking: Tools for taking charge of your learning and your life* (3rd ed.). Pearson.
- [30]. Pujayanti, K. A., Haerazi, H., & Rahman, A. (2026). The PBL materials integrated with critical thinking skills in improving EFL learners' reading comprehension and linguistic awareness. *English Learning Innovation*, 7(1), 244–257. <https://doi.org/10.22219/englie.v7i1.42110>
- [31]. Rashid, R., & Hashim, R. A. (2008). The effect of Directed Reading Thinking Activity (DRTA) on students' reading comprehension and critical thinking skills. *Asian EFL Journal*, 10(2), 1–16.
- [32]. Rouijel, E. H., Bouziane, A., & Zohri, A. (2019). The effect of explicit instruction in critical thinking on higher-order thinking skills in reading comprehension: An experimental study. *European Journal of English Language Teaching*, 5(1), 114–126. <https://doi.org/10.5281/zenodo.3382955>
- [33]. Rumelhart, D. E. (1980). Schemata: The building blocks of cognition. In R. J. Spiro, B. C. Bruce, & W. F. Brewer (Eds.), *Theoretical issues in reading comprehension: Perspectives from cognitive psychology, linguistics, artificial intelligence, and education* (pp. 33–58). Lawrence Erlbaum Associates.
- [34]. Ruiz de Zarobe, Y., & Gutierrez, A. (2024). Teaching critical reading in the classroom: A comparison of CLIL and EFL across contexts. *Vigo International Journal of Applied Linguistics*, 21. <https://doi.org/10.35869/vial.v0i21.4658>
- [35]. Sahiruddin, S., Junining, E., Ubaidillah, M. F., & Len, M. C. (2022). Does reading correlate with students' critical thinking? A bridge to literacy practices. In *Proceedings of the International Conference on Madrasah Reform 2021 (ICMR 2021)* (pp. 367–373). Atlantis Press. <https://doi.org/10.2991/assehr.k.220104.054>
- [36]. Wallace, C. (2003). *Critical reading in language education*. Palgrave Macmillan.
- [37]. Wang, S. (2025). A case study of critical thinking education for undergraduate students in China. *International Journal of Technology-Enhanced Education*, 4(1), 1–20. <https://doi.org/10.4018/IJTEE.390132>
- [38]. Yusuf, H. O., & Idoghor, U. (2020). Effect of teaching critical thinking skills on students' performance in reading comprehension in junior secondary schools in Kaduna, Nigeria. *European Journal of Education Studies*, 7(1). <https://doi.org/10.46827/ejes.v0i0.2975>