

Critical Thinking as a Predictor of Reading Comprehension Skills

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Abstract – The study explores the relationship between critical thinking and reading comprehension among lower-secondary school students in Slovakia. The theoretical basis suggests that both competencies are closely interconnected and play a crucial role in academic achievement, particularly in language learning contexts. Based on this theoretical assumption, the present research adopts a quantitative correlational design to examine whether students' critical thinking abilities are associated with their reading comprehension performance. The findings from using a critical thinking questionnaire and a reading comprehension test indicate a meaningful positive relationship between critical thinking and reading comprehension ($r = 0.40$, $p = .002$), suggesting that students who demonstrate stronger critical thinking skills tend to achieve better results in reading tasks. The study thus contributes to the growing evidence supporting the integration of higher-order thinking skills into language instruction. It provides empirical support for curricular approaches that align reading with critical literacy development.

Keywords – Critical thinking, reading comprehension, lower-secondary education.

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1. Introduction

This section outlines the theoretical background and educational relevance of critical thinking and reading comprehension as key competencies in contemporary education. It reviews current international research addressing the relationship between these constructs and situates the present study within the context of lower-secondary education in Slovakia.

The 21st-century education emphasizes higher-order thinking skills, among which **critical thinking (CT)** and **reading comprehension (RC)** are essential. These cognitive competencies are recognized not only as autonomous units but as interdependent factors that support learners' academic performance and personal development [1], [2]. In educational contexts, the development of these skills contributes to forming critical, reflective, and literate individuals capable of navigating a complex and information-rich world [3], [4]. The stage of early adolescence provides a critical opportunity for instruction to develop learners' autonomy and to support the development of *complementary skills*. For this research, the term '*complementary skills*' is defined as a broader set of cognitive and academic abilities, as well as language skills, that are either supported by or developed alongside CT and RC. They include metacognitive awareness, inference-making, analytical reasoning, effective communication, problem-solving abilities, and media literacy that, along with other language skills (listening, speaking, and writing), may also benefit from a learning environment where critical thinking is integrated into instruction. Although RC is the primary construct under investigation, it is essential to realize that these related skills also benefit from instructional practices that emphasize critical engagement with texts. In speaking, critical instruction can help students articulate their viewpoints more effectively, argue for their beliefs, and engage in meaningful conversations.

Critical listening can help learners identify biases, misleading, and false information while analyzing, judging, and forming their opinions. The interpretation of critical writing is reflected in scholarly work requiring analysis of information from different viewpoints and offering original views based on the presented evidence.

A growing body of international research has confirmed a strong theoretical and empirical link between critical thinking (CT) and reading comprehension (RC). Many authors see these two constructs as mutually reinforcing, especially within educational contexts. Some researchers [5] believe that teaching metacognitive strategies, such as self-monitoring and reflective questioning, enhances both critical thinking and reading comprehension in university students. The ARDESOS-DIAPROVE program demonstrates that instruction targeting CT enhances text interpretation and problem-solving. Furthermore, CT-based intervention (based on Bloom's taxonomy) significantly improved EFL learners reading comprehension scores and attitudes toward classroom learning [6]. It is highlighted that recent trends in CT research [4] increasingly link it to academic literacy and that CT is often taught alongside RC in integrative curricula, for example, to detect fake news on social media. The Slovak school curriculum has also aligned with European Union frameworks that emphasize *transversal competencies*. Transversal competencies are a term used to describe broad-based skills, including critical and analytical thinking [7]. Therefore, Slovak education provides a valuable platform for further developing these skills. However, studies on practical integration and the impact of CT on RC within Slovak lower secondary school contexts remain limited.

This developmental stage (typically learners aged 13–15) marks a critical transition in cognitive development, from concrete to more abstract reasoning [8], thus, it is suggested to be an ideal period for introducing interventions that link CT and RC. This research seeks to fill in this gap by examining whether students with stronger critical thinking abilities also exhibit better reading comprehension, and how both skills co-develop in formal instruction, particularly in the Slovak lower-secondary school educational context.

2. Critical Thinking

The section presents a theoretical overview of critical thinking in educational theory. It synthesizes major conceptual definitions and pedagogical approaches relevant to the development of critical thinking in school contexts, with particular focus on language education and contemporary digital challenges.

Critical thinking has long been one of the central concepts in educational theory. According to some experts [2], it refers to reasonable and reflective thinking focused on deciding what to believe or how to act in particular situations. This view positions CT not only as a cognitive function but also as a dispositional construct. Critical thinking classification [2] encompasses skills (e.g., analysis, evaluation, inference) and dispositions (e.g., open-mindedness, fair-mindedness), both of which are essential for practical critical thinking. Building upon this, CT is defined [1] as self-regulatory judgment which contains interpretation, analysis, evaluation, and inference. Therefore, the emotional-attitudinal domain is added [2] by describing an ideal critical thinker as inquisitive, open-minded, and committed to reason. Other theoretical frameworks developed [9], embed CT in questioning, analyzing, evaluating, and synthesizing. This makes CT a dynamic and learnable skill, which is particularly suitable for school settings. The infusion model (embedding CT into content instruction), as discussed by others [6], has proven effective in foreign language and literacy instruction, which might also benefit lower secondary school learners. This approach suggests that the more thinking instruction is integrated into content, the more students will engage with the content of their studies.

In educational research, it is essential to focus on language teaching methodologies that influence students' learning outcomes and intellectual development. According to some scholars [10], the roots of critical thinking can be traced back to early Western philosophy, particularly to Socrates, who emphasized the value of questioning assumptions and seeking understanding through dialogue, even with children. He introduced a still up-to-date pedagogical approach known as the Socratic method or Socratic questioning. Building on this, a great potential might be observed in using scaffolding techniques to effectively integrate CT into the lesson content. For example, thinking maps go beyond simple questioning strategies, such as Socratic questioning, by offering a direct platform to use the vocabulary of the thinking skill and provide the key organizing questions for that particular skill [11]. A crucial aspect of critical thinking is the ability to distinguish between facts and fiction. In this matter, graphic organizers, which can take the form of a chart, web, diagram, matrix, or chain map, are visual tools that help students and teachers organize information in a meaningful way, displaying the relationships among facts and fiction. By doing so, they enable learners to distinguish and connect concepts in a meaningful way.

Additionally, the current educational context offers new opportunities for developing critical skills through digital tools.

It also is argued [12] for balanced and thoughtful integration of digital materials with traditional methods. Digital methods such as video, AI-generated stories, and interactive platforms offer new and exciting ways to deepen understanding and evaluation of the content; however, the stability and structure of traditional methods remain essential. In the SCELTE forum conference 2025 in Stará Lesná, Slovakia, the growing need for critical ignoring as a vital competence in the digital age (among others) was discussed. It was highlighted that in an environment oversaturated with distracting, low-quality and harmful content, learners must be equipped not only with skills for critical thinking but also with cognitive and behavioural strategies for selectively ignoring irrelevant or manipulative information. Critical ignoring targets three main types of problematic online content: distracting and low-quality information, false or misleading claims, and content produced by trolls. Each of them requires specific strategies. For instance, self-nudging techniques such as setting time limits, removing tempting stimuli from one's environment, or avoiding the use of digital distractions as internal rewards aim to support better self-control and reduce screen time. In the case of misinformation, lateral reading encourages users to verify sources through external searches, compare claims across multiple outlets, and exercise caution when clicking on links. The strategy of minimizing online harm was also introduced. The 'do not feed the trolls' technique advises users to avoid interacting with malicious actors and instead block or report them, which might also be helpful for educational instruction practices.

Although critical thinking is formally embedded in many national curricula, its practical implementation in lower-secondary school education varies widely. In some classrooms, memorization takes precedence over analytical reflection. While innovative methods, such as project-based learning and guided discussions, have been introduced to foster deeper reasoning, their effectiveness largely depends on teacher preparedness and access to resources. It is precisely the teacher who bears the most significant responsibility for setting the tone in the classroom. The role of the teacher is highlighted in the instruction itself, which, through metacognitive stimulation, may support a reflective approach among learners.

On the other hand, the encouragement of superficial information processing directly leads to a lowered capacity for deep comprehension, critical evaluation, and independent reasoning, ultimately resulting in intellectual stagnation among learners. The discrepancy in students' critical thinking abilities is evident, as while some learners demonstrate proficiency in analyzing and evaluating content, others require targeted support and instruction [13], [14], [15], [16].

Nevertheless, in this new era, the need for a critical approach remains fundamental. Learners must acquire both a theoretical understanding and a practical grasp to navigate the current information landscape effectively.

3. Reading Comprehension

In this section reading comprehension as a complex cognitive and metacognitive process is examined. Special attention is given to the role of strategic reading instruction and its relationship to the development of higher-order thinking skills in teaching English as a foreign language (EFL) contexts.

It is essential to realize that reading comprehension (RC) is not a passive decoding process but an active construction of meaning, grounded in the interaction between the reader's prior knowledge, the textual material, and contextual variables [17]. According to Schema Theory, readers actively interpret information by connecting it with pre-existing cognitive frameworks. In other theories, such as the Construction-Integration Model [17], two stages are outlined: (1) Constructing a mental representation of the text and (2) Integrating that with world knowledge for comprehension. Nevertheless, RC is a metacognitive process that requires awareness, monitoring, and control [8]. Readers must decode symbols, recognize syntax and structure, identify key ideas, infer meaning, evaluate arguments, and relate content to context, all of which overlap significantly with CT abilities [5]. The PISA assessment framework [18] further supports this view by defining reading literacy as the understanding, use, evaluation, reflection on, and engagement with texts, which aligns with contemporary models that view reading as a critical and evaluative activity. This process depends on numerous factors, including language proficiency, education level, and background knowledge [8].

Teacher training for EFL environments emphasizes the importance of teaching learners not only how to read but also how to think while reading, particularly through explicit instruction in reading strategies and reflective practices [8]. This argument has been proven by recent research. For example, some researchers [19] demonstrated that the implementation of Self-Regulated Strategy Development (SRS) significantly improved students' reading comprehension and self-efficacy. As a result, the use of structured, metacognitive strategies empowered learners to monitor their understanding, make inferences, analyze and engage more deeply with texts. The impact of translation was also investigated [20] as a pre-reading activity and found that providing learners with translated versions of texts in their first language enhanced comprehension levels.

Therefore, activating background knowledge and reducing linguistic barriers before engaging with an English text can facilitate more effective meaning-making processes, which is also an essential step in developing reading comprehension for EFL learners.

Another study [21] focused on interactional competence during reading lessons. The findings emphasized that peer collaboration, questioning, and discussion contributed to a more profound comprehension that extended beyond surface-level understanding, encouraging learners to engage in dialogue about texts, which promoted mainly interpretative skills and perspective-taking. Across this vast literary review, a common sign emerges: successful reading comprehension instruction involves cognitive and linguistic components, as well as the development of strategic approaches to reading, which actively promote evaluative and analytical thinking. Therefore, when reading comprehension is taught as a reflective and socially engaged activity, it becomes more than just a literacy skill. It transforms into a foundation for higher-order thinking. In this way, reading comprehension and critical thinking are interconnected because the ability to understand a text in depth lays the groundwork for questioning its assumptions. Reading should therefore not be seen only as a means of acquiring information, but as a cognitive gateway to developing critical minds assessing the provided information. As mentioned earlier, a growing body of research underscores the theoretical and empirical link between CT and RC [5], [6]. In the context of lower secondary school education, where young adolescents currently face enormous information overload, the tendency towards impulsivity and impatience is primarily manifested. The world of digital technologies results in a shortened attention span and an inability to stick to one activity. As a result, the need to promote educational settings where critical thinking is developed naturally yet intentionally is stronger than ever.

4. Methodology

The methodological framework of the study is outlined in the following section. The research aims and hypotheses, the characteristics of the research sample, the instruments used for data collection are described, and the procedures applied during the research process are presented.

4.1. Research Aim

This subsection defines the primary aim of the study and specifies the research objectives.

Critical thinking (CT) and reading comprehension (RC) are key competencies for students in lower-secondary school education, primarily due to the rapidly changing educational demands and the development of digital technologies and artificial intelligence. However, the interconnection between these two constructs remains underexplored, especially in the context of Slovak education. This study aims to investigate the relationship between students' ability to comprehend texts and their development of critical thinking, particularly in the lower-secondary school educational context in Slovakia. To achieve this goal, a quantitative, correlational research design was employed. The primary aim of this research has been to examine whether there is a statistically significant correlation between students' critical thinking skills and their reading comprehension. To achieve this aim, the study pursues the following sub-goals:

- To provide an overview on current theoretical and empirical research on the cognitive and pedagogical links between CT and RC, with particular attention to EFL and educational contexts,
- To identify validated tools for assessing both critical thinking and reading comprehension, to administer them to the research sample, to calculate the descriptive statistics and to statistically analyze the relationship between the two constructs,
- To interpret the research findings in terms of their educational significance and suggest implications for classroom practice aimed at developing critical reading and reflective thinking.

4.2. Research Hypotheses

Based on the stated research aim, the hypotheses are formulated here to be statistically tested. The following hypotheses have been set:

H₀: *There is no statistically significant relationship between reading comprehension and critical thinking.*

H₁: *There is a statistically significant positive relationship between reading comprehension and critical thinking.*

4.3. Research Sample

The characteristics of the research sample and the criteria used for participant selection are described in this subsection.

The research sample consisted of 56 students from Beethovenova lower-secondary school in Nitra, Slovakia. Participants were selected using convenience sampling, while ensuring homogeneity in terms of age, language proficiency, and academic performance. The aim was to establish comparable baseline conditions for the correlational analysis. The sample included students from three classes. Two of the classes were seventh-grade groups, consisting of 19 and 17 students (a total of 36), aged between 12 - 13 years, except two students aged 14. The third class was an eighth-grade group of 20 students, predominantly aged 13–14, with one student aged 15. The participants included 25 boys and 11 girls in the seventh grade, and 8 boys and 12 girls in the eighth grade.

All students, except one who reported Hungarian as their mother tongue, were native speakers of Slovak language. All participants were classified at the A2.1 level of language proficiency according to the Common European Framework of Reference for Languages (CEFR), which ensured consistency in their linguistic competence. The mental and academic development of the students was also relatively uniform. Their performance in core language subjects, particularly Slovak and English, was comparable. In both subjects, students within each class had similar grades. Approximately half of the participants achieved identical grades in both Slovak and English, while the other half showed only minor differences of one or two grade levels. This analysis suggests that the sample was sufficiently homogeneous to examine the relationship between reading comprehension and critical thinking.

4.4. Research Instruments

This subsection presents the research instruments employed to measure critical thinking and reading comprehension. The research methods and instruments have been selected based on the aforementioned characteristics of the study, and their use is described throughout the research process.

4.4.1. Critical Thinking Questionnaire

The description of the Critical Thinking Questionnaire used in the study, including its adaptation process and psychometric properties is provided here. The Critical Thinking Questionnaire used in this study was adapted from Honey's original instrument, which consists of 30 items assessed on a five-point Likert scale (1 = never, 5 = always).

The original tool, validated for adults, was adapted linguistically and contextually to suit lower-secondary school students. The adaptation followed methodological principles [22], including simplification of language, adjustment of items to the cognitive level of young adolescents, and careful restructuring to maintain thematic and logical coherence.

The final adapted version of the critical thinking questionnaire used in this study has been validated in a separate preparatory research [23]. The validation study confirmed the instrument's construct and content validity. It demonstrated high internal consistency (Cronbach's $\alpha = .81$). The questionnaire assesses learners' disposition toward critical thinking across various dimensions, including interpretation, evaluation, and inference, using a 5-point Likert scale in 10 questions.

4.4.2. Reading Comprehension Test

The structure, content, and assessment focus of the reading comprehension test administered to the research sample follows in this part.

The Reading Comprehension Test was drawn from standardized, CEFR-aligned materials at level A2.1, appropriate for the research sample. The test consisted of four parts:

1. Table completion based on notices and short messages, targeting the identification of details.
2. Cloze questions based on a biographical text, assessing literal understanding.
3. True/false evaluation based on a short article about desk organization, targeting inferential comprehension and information filtering.
4. Gap-fill in narrative sentences, which involved vocabulary, grammar, and contextual reasoning.

The test aimed to measure core literacy skills, including identifying main ideas, deducing meaning from context, interpreting explicit/implicit information, and applying grammatical rules in practice. The tasks also encouraged elements of creative and critical reading. The test was administered under timed conditions and reviewed beforehand by two experienced language educators to ensure age appropriateness and alignment with curricular standards. The items were scored dichotomously (correct/incorrect), and each participant received a total score representing their overall reading comprehension performance (a total of 30).

4.5. Procedures

This subsection explains the procedures implemented during data collection, including administration conditions and ethical considerations.

All instruments were administered during regular class time, in the classroom where English lessons usually take place. Although the students' English teachers expressed a willingness to support the research, their presence was not required; therefore, only the researcher was present during data collection. Before data collection, the researcher introduced the study's purpose to the students and informed them that their responses would remain completely anonymous. Students were encouraged to respond honestly and were assured that their answers would not affect their grades or classroom standing in any way. The Critical Thinking Questionnaire required approximately 15 minutes to complete, while the Reading Comprehension Test took around 30 minutes. This allowed the entire session to be conducted within a single 45-minute lesson. The majority of the students finished even before the time limit. Both instruments were delivered in paper form, and students completed them independently in a quiet classroom setting under the researcher's supervision. After that, all responses were collected and anonymized before further statistical analysis.

5. Results

The results of the statistical analyses conducted to examine the relationship between critical thinking and reading comprehension are presented in this section. It includes descriptive statistics, correlation analysis, and graphical representation of the findings.

The analysis began with the calculation of descriptive statistics to gain insight into the overall distribution and variability of the observed scores for both reading comprehension and critical thinking. As shown in Table 1, the reading comprehension scores of the 59 participants provided a mean of 19.58 (SD = 4.22), with a minimum value of 7 and a maximum of 25. The distribution was moderately negatively skewed (skewness = -1.19) and exhibited kurtosis of 1.02, indicating a concentration of scores above the mean. The median was 21, with the range spanning from 18 (25th percentile) to 23 (75th percentile). Critical thinking scores, on the other hand, demonstrated a higher overall mean of 30.71 (SD = 6.29), with a minimum score of 16 and a maximum of 46. The distribution was approximately symmetrical, as indicated by a skewness value of 0.15 and a kurtosis of 0.22. The median was 30, and the range was from 27 to 35, showing a relatively even spread of values. These descriptive results supported the assumption of approximate normality for both variables, justifying the use of Pearson's correlation coefficient.

Table 1. Descriptive statistics

	Reading Comprehension	Critical Thinking
Count	59	59
Mean	19,576	30,712
Standard deviation	4,223	6,294
Minimum	7	16
25th Percentile	18	27
Median	21	30
75th Percentile	23	35
Maximum	25	46
Skewness	-1,190	0,152
Kurtosis	1,017	-0,221

Afterwards, the Pearson's correlation coefficient was calculated to explore the potential linear relationship between reading comprehension and critical thinking. The results, shown in Table 2, indicated a moderate and statistically significant positive correlation, $r(57) = 0.40$, $p = .002$. This suggests that participants with higher reading comprehension scores were generally more likely to score higher on measures of critical thinking.

Table 2. Calculation of Pearson's correlation coefficient

Statistic	Value
Pearson's r	0,399
Pearson p-value	0,002

To support the statistical results, a graph illustrating the relationship between the two variables (Figure 1) is included. Each point on the graph represents one student, with their reading comprehension score on the x-axis and their critical thinking score on the y-axis. A straight trend line to the plot is demonstrated, along with the equation and R^2 value (0.16), indicating that approximately 16% of the variation in critical thinking scores can be attributed to reading comprehension. The way the points cluster around the upward-sloping line suggests a moderate positive relationship between the two skills.

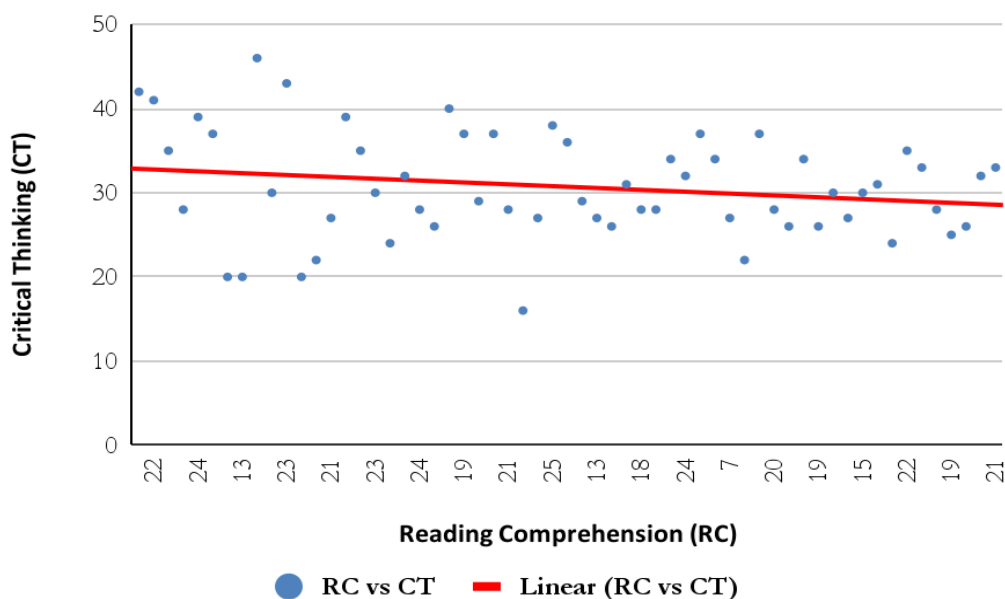


Figure 1. Correlation RC vs CT

6. Discussion

The section interprets the findings of the study in relation to the research aims and hypotheses. The results are discussed in the context of existing international research.

The present study sought to investigate the relationship between reading comprehension and critical thinking among lower-secondary school students in Slovakia. The research has been driven by the belief that both abilities are essential for learners to navigate today's educational demands, especially in English as a Foreign Language (EFL) settings, where students must engage not only with language but also with the text content. There is a strong emphasis on reflective reading and analytical thinking in international curricula; however, limited research within the Slovak lower-secondary school educational system results in a lack of effective strategies for developing both competencies simultaneously. The study aimed to determine whether students who better understand what they read also tend to think more critically about the texts they read.

The findings confirmed this assumption. A statistically significant moderate positive correlation was observed between reading comprehension and critical thinking ($r = 0.40$, $p = 0.002$), supporting the research hypothesis (H_1). In other words, students who scored higher on reading comprehension tasks also tended to perform better on tasks that required them to critically evaluate the content. The null hypothesis (H_0) was therefore rejected. These results are consistent with previous international research. For example, students who regularly used critical reading strategies tended to understand texts more deeply [24].

Furthermore, some researchers [24] reported that learners, who showed greater metacognitive engagement while reading, performed better on comprehension tasks. Although these studies were conducted in university-level EFL contexts, the present study extends the discussion to younger learners, suggesting that the connection between comprehension and critical thinking is already evident at the lower-secondary level and deserves more attention in their development.

The findings also highlight the need for reading instruction to go beyond basic comprehension and language mechanics. Instead, teachers should encourage students to question the information they encounter, as this skill is helpful for their future real-life situations. In today's information-rich world, it is essential to equip students with the skills to evaluate the credibility and reliability of the information they encounter. This could involve incorporating tasks that prompt students to distinguish between facts and fiction, form arguments based on their knowledge and information from the texts, and draw appropriate conclusions. Such approaches may be particularly valuable in EFL classrooms, where instructional focus is often limited to grammar and vocabulary, especially in Slovakia.

At the same time, several limitations must be acknowledged. The study employed a correlational design, meaning it can only identify relationships, not causation. While reading comprehension and critical thinking were linked, it cannot be determined whether one causes the other, or whether a third factor is influencing both. The sample was also limited to schools in one region of Slovakia, which may limit the applicability of the findings.

In addition, although the instruments used were validated, students' familiarity with test formats or their motivation during assessment may have affected the results.

Future research should replicate these findings with a broader and more diverse student population. Longitudinal or intervention-based studies could also shed light on whether improving one skill can actively support the development of the other. Finally, qualitative methods, including classroom observations or student interviews, could offer valuable insight into how these skills are practiced and supported in real learning environments.

7. Conclusion

The final section summarizes the main findings of the study and highlights their pedagogical significance. It also outlines practical implications for lower-secondary language education and ideas for future research.

In conclusion, this study provides valuable insights into the growing discussion about the connection between reading comprehension and critical thinking. The identification of a moderate, statistically significant link among Slovak lower-secondary school students highlights the need for pedagogical approaches that encourage reflective reading from an early age, which may provide a foundation for developing higher-order thinking skills. For example, incorporating graphic organizers like thinking maps and concept charts helps distinguish between facts and interpretations, as well as identify key ideas. Metacognitive approaches, such as Self-Regulated Strategy Development (SRSD), have also shown promise in helping students monitor their understanding and engage more actively with texts. The teacher's role is highlighted when they use digital tools, such as videos, to provide students with new ways to explore and assess content, especially when paired with strategies like lateral reading or self-nudging to support critical media literacy. Moreover, guided discussions, peer collaboration, and structured reading strategies enable teachers to help students view reading not just as a means of absorbing information, but also as a space for interpretation and questioning. In this way, reading becomes a gateway to independence and critical thought, which is essential in this information-rich era that is frequently filled with biases.

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