

Exploring High School English Reading Teaching from the Perspective of Metacognitive Theory: Taking *How Life Began on the Earth* as an Example

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Abstract: Amid globalization, English reading competency emerges as a core educational priority, with Metacognitive Theory serving as a pivotal framework for enhancing reading autonomy. Current high school English reading instruction confronts challenges including monotonous pedagogical approaches and deficient student metacognitive awareness. Adopting a Metacognitive Theory lens, this study investigates the practical application of Metacognitive Strategies through a case analysis of *How Life Began on the Earth*, designing teaching stages encompassing planning, monitoring, and regulation. Findings demonstrate that integrating Metacognitive Theory into reading instruction significantly elevates students' reading depth, critical thinking quality, and autonomous learning capability, thereby providing both theoretical support and actionable pathways for advancing high school English reading pedagogy.

Keywords: Metacognitive Theory, High School English Reading, Teaching Strategies.

1. Introduction

The English Curriculum Standards for Senior High Schools (2017 Edition) and Compulsory Education (2022 Edition) prioritize Metacognitive Strategies as core to English education competencies, defining metacognition as cognitive re-examination/reflection-foundational for strategy regulation (Wei Youqiang, 2025). Metacognitive Theory emphasizes monitoring-regulating-evaluating cognitive processes; strategies like prediction/summarization enhance reading depth/efficiency and improve comprehension/self-efficacy (Zhao Yuzhen, 2011). Yet current high school English reading teaching faces monotonous methods and weak student metacognitive awareness, constraining active information processing. Integrating this theory aligns with curriculum mandates and offers a pathway to capability enhancement. From a Metacognitive Theory lens, this study provides teachers with scientific pedagogical guidance: theoretically, it enriches research on Metacognitive Strategies application in high school English reading; practically, via a *How Life Began on the Earth* case analysis, it offers operational strategies (e.g., pre-reading prediction, in-reading monitoring, post-reading reflection) and teaching reflection methods, emphasizing student subjectivity and strategy optimization (Shang Haojing, 2024)-critical for transitioning from "knowledge transmission" to "ability cultivation" in teaching.

2. Theoretical Overview

2.1. Interpretation: Metacognitive Strategies

Flavell (1976) defined metacognition as "an individual's ability to recognize and regulate their own cognitive processes," with Metacognitive Strategies serving as its operational embodiment to manage cognitive activities. O'Malley & Chamot (1990) classified these strategies into planning, monitoring, and evaluation, providing a

foundational framework for teaching application. Li Na (2023) emphasized their role as "managerial measures in English teaching" to improve reading efficiency, highlighting the need for teachers to guide students in applying metacognitive knowledge to grasp knowledge points and develop problem-solving abilities.

2.2. Reflection and Application in English Discipline

Metacognitive Strategies are pivotal for enhancing English reading efficiency, supported by extensive research. Foreign studies, such as Brown (1987) who summarized six types of strategies, and Juhkam Maris et al. (2023) who explored cognitive-metacognitive mechanisms, have validated their effectiveness. Jiraporn Noipa & Pilanut Phusawisot (2024) further confirmed this through EFL engineering student experiments. Domestic research, including Fang Ling (2019) on timely reading process monitoring, Zhou Weili (2015) on rational learning method guidance, Chen Shiyao (2024) on integrated teaching-learning-evaluation activities (e.g., mind maps for self-assessment, debates for knowledge internalization), and Wang Jin (2015) on metacognitive knowledge-experience-monitoring, provides practical pathways for implementation. Collectively, these studies offer theoretical support and practical references for applying Metacognitive Strategies in English reading teaching, enhancing students' reading depth and autonomous learning capabilities.

3. Current Status and Issues in High School English Reading

3.1. Textbook Level: Fragmented Metacognitive Guidance

High school English textbooks and supplementary materials lack systematic support for metacognition-enabled reading. Pre-reading activities prioritize interest stimulation

and prediction but omit goal setting/strategy planning; during-reading tasks offer linguistic assistance without strategy prompts (e.g., skimming) or monitoring guidance; post-reading focuses on text review without structured reflection paths. Teacher's books provide principled suggestions but lack operational plans, while exercise books prioritize language consolidation over metacognitive training, and courseware emphasizes presentation without metacognitive activity design.

3.2. Teacher Level: Polarized Metacognitive Cognition and Practice

Teachers exhibit significant differences in applying Metacognitive Theory. Cognitively, some deeply integrate it into reading instruction, while most either equate it with general strategies or deem it impractical, focusing on language instruction. Practically, a few establish mature strategy training systems, while most remain at initial stages—sporadically mentioning strategies without systematic integration or superficially explaining methods without contextual practice, hindering student internalization.

3.3. Student Level: Hierarchical Differences and Lag in Metacognitive Abilities

Students show significant hierarchical differences and overall lag in metacognitive abilities (knowledge reserve, experience, monitoring). Knowledge-wise, some master text strategies, while most rely on mechanical reading, with external factors amplifying differences. Experience-wise, appropriate texts generate positive experiences, while disconnected texts induce negative ones. Monitoring-wise, few dynamically adjust strategies; most lack monitoring, struggle to detect comprehension deviations, and lack adjustment means, leading to development bottlenecks. As Jiang Min (2025) noted, Metacognitive Strategies help transition from "knowing what" to "knowing why," establishing reflective habits and compensating for ability shortcomings through systematic planning, monitoring, and regulation. This study uses *How Life Began on the Earth* to dissect Metacognitive Theory application steps and present its teaching implementation path.

4. Teaching Practice of English Reading from the Perspective of Metacognitive Theory: A Case Study of *How Life Began on the Earth*

Combining the "integration of teaching, learning, and evaluation" requirement in the English Curriculum Standards for Compulsory Education (2022 Edition), Metacognitive Theory guides students to actively monitor and regulate cognitive processes, addressing "passive reception and insufficient depth" in traditional English reading teaching. This case study exemplifies a three-stage framework—pre-class planning, in-class monitoring, post-class regulation—to construct a "self-planning-dynamic monitoring-optimization" reading cognitive model.

4.1. Pre-class Planning Stage: Anchoring Goals and Paving the Way for Reading

Pre-class planning serves as the foundational phase for efficient reading by integrating metacognitive guidance to clarify directions, activate knowledge, predict content, and

develop strategies, thereby avoiding blind reading. This stage is structured into four interconnected steps, each combining theoretical guidance with classroom practice to ensure depth and applicability:

4.1.1. Clarifying Reading Goals

Metacognitive guidance focuses on core questions (e.g., "Is the primary goal to understand the process of life origin, master scientific terminology, or analyze the author's logical structure?") to cultivate "goal-oriented" reading consciousness. Classroom practice involves distributing a pre-class questionnaire with options such as "obtaining the main idea of life origin," "learning Earth history terms (e.g., Big Bang)," and "sorting the text timeline." Teachers tally results, guide students to compare class goals, reflect on personal goal rationality (e.g., "Excessive focus on term memorization may neglect the text's logical chain"), and finalize personalized priorities.

4.1.2. Activating Background Knowledge

Metacognitive guidance encourages students to connect existing knowledge (e.g., "How does prior knowledge of Earth's formation aid in understanding the new text?") to bridge old and new knowledge. Classroom practice provides a mind map template with keywords like "Big Bang, Earth's early state, primitive life" and blank nodes for logical relationships. Students supplement content in groups, present ideas (e.g., "The high-temperature early Earth enabled atmospheric formation"), and teachers correct for accuracy and relevance.

4.1.3. Predicting Content

Metacognitive guidance prompts prediction using clues (title, illustrations, keywords) to stimulate motivation and focus. Classroom practice assigns data cards with "text title, nebulae/primitive ocean images, keywords (oxygen/dinosaurs)" for group prediction (e.g., "The text may discuss Earth's formation followed by life's ocean-to-land evolution") with basis recording. Teachers summarize predictions and refine key questions (e.g., "Is dinosaur extinction linked to mammalian rise?") for in-class verification.

4.1.4. Formulating Reading Strategies

Metacognitive guidance emphasizes strategy-goal matching (e.g., "For logic sorting, use skimming + causal marking") to develop adaptive habits. Classroom practice distributes a "Reading Strategy Handbook" detailing skimming, scanning, and contextual guessing with examples. Teachers demonstrate application (e.g., "Scan for time words like '4.5 billion years ago' to outline the timeline"), and students select ≥ 2 strategies, document steps (e.g., "Goal: logic sorting; Strategy: skimming topic sentences + marking connectives"), with teacher guidance on adaptability.

4.2. In-class Monitoring Stage: Dynamic Tracking and Ensuring Understanding Quality

In-class monitoring, as the core link of reading comprehension, integrates metacognitive guidance to promote real-time understanding testing, key information marking, text logic sorting, and cognitive bias correction via peer communication, ensuring alignment with reading goals. This stage comprises four interconnected steps:

4.2.1. Self-Questioning and Answering

Metacognitive guidance focuses on real-time self-check

questions (e.g., "Can I answer 'What happened 4.5 billion years ago?' or 'Why is water essential for life?'"") to identify comprehension gaps. Classroom practice distributes guiding questions, with students marking unsolved problems (e.g., "What does 'chain reaction' mean?") and teachers reminding self-check every 5 minutes to avoid blind thorough reading.

4.2.2. Marking Key Points and Difficulties

Metacognitive guidance emphasizes precise marking of core concepts (e.g., "Big Bang") or difficult sentences using methods (e.g., highlighters/symbols) to aid review. Classroom practice provides colored highlighters (yellow/key points, red/difficulties) and symbols, with students marking notes (e.g., "Yellow: dinosaur extinction-key event") and

group exchange to solve difficulties (e.g., "Excess CO₂ causes greenhouse effect").

4.2.3. Summarizing Paragraph Meanings

Metacognitive guidance promotes logic sorting by summarizing paragraph main ideas in own words and covering author's intent (e.g., "Comparing Earth/Mars water to highlight water's importance"). Classroom practice uses a "Paragraph-Main Idea-Reflection-Strategy" table, with students filling tables post-reading, teacher projecting typical examples for class evaluation (e.g., "Did you miss 'water after cooling' in Earth's formation stages?") to optimize logic. As show in Table 1.

Table 1. Paragraph Structure Diagram

Paragraph Number	Summary of Paragraph Main Idea (Integrated with the Text's Logical Chain)	Guidance and Reflection on Metacognitive Strategies	Tips on Cognitive Strategies (Text-Related Points)
1	Cosmic "Big Bang": Matter scattered, and atomic aggregation formed stars and other celestial bodies.	How to confirm that the "Big Bang" is the core? Will omitting "atomic aggregation" affect the logic of cosmic formation?	Focus on "however" to distinguish between "unknowns" and "recognized theories".
2	Three stages of Earth's formation: dust cloud → solid sphere → emergence of atmosphere and water.	How to screen the key nodes of "dust → solid → water"? Will ignoring "violent" affect the understanding of the cause of atmosphere formation?	Circle "after that" to construct the event sequence.
3	Role of water: dissolving harmful gases → triggering chain reactions → supporting life.	Why does the author compare Earth and Mars? How to verify the causal relationship between "chain reactions" and life?	Use "unlike" to analyze the role of comparative argumentation.
4	Timeline of life evolution: marine plants → fish → terrestrial organisms → mammals (the extinction of dinosaurs promoted the rise of mammals).	Did you notice the implicit causality between "increased oxygen → fish evolution"? What will be missing if the connection between dinosaur extinction and mammals is omitted?	Use "first→next" to sort out the evolutionary context.
5	Impact of human activities: excessive CO ₂ emissions → greenhouse effect threatening life.	How to infer the connection between "too much CO ₂ " and "life continuation"? How do words like "thus" help understand causality?	Combine "2.6 million years ago → present" to analyze the span of impact.

4.2.4. Peer Communication and Discussion

Metacognitive guidance encourages mutual verification of understanding and rational analysis of differences (e.g., finding text evidence). Classroom practice assigns group tasks (e.g., "Dinosaur extinction causes"), with students sharing views, teachers guiding (e.g., "What text evidence supports 'asteroid impact'?") and class summarizing common cognitive issues.

4.3. Post-class Regulation Stage: Optimizing Strategies and Deepening Cognitive Levels

Post-class regulation, as a key phase for improving reading ability, integrates metacognitive guidance to drive students to solve remaining problems, optimize strategies, expand cognitive boundaries, and reflect to form transferable reading experience. This stage comprises three interconnected steps:

4.3.1. Solving Marked Problems

Metacognitive guidance focuses on independent exploration methods (e.g., context combination, dictionary consultation) to cultivate problem-solving ability. Classroom practice provides a resource package (online dictionaries, grammar guides, context clues), with students choosing methods to overcome difficulties (e.g., understanding "chain reaction" via context) and reflecting on method applicability (e.g., "Is contextual guessing applicable to other scientific texts?").

4.3.2. Adjusting Reading Strategies

Metacognitive guidance encourages strategy iteration (e.g., replacing skimming with skimming + scanning) and effect evaluation. Classroom practice involves reviewing planning-stage strategies, writing adjustment directions (e.g., "Skimming missed time points; change to skimming topic sentences + scanning time words"), testing with new texts, and group exchange to form a closed loop.

4.3.3. In-depth Exploration and Expansion

Metacognitive guidance promotes deep exploration (e.g., comparing life origin theories) and critical thinking. Classroom practice assigns group tasks (e.g., researching different theories), with students collecting information from libraries/websites, analyzing views/evidence/shortcomings (e.g., "Creationism vs. chemical evolution"), presenting results via bulletin boards/PPTs, and class discussion. Teachers guide reflection on evidence screening and bias avoidance.

4.4. Practice Summary

The application of Metacognitive Theory in teaching *How Life Began on the Earth*, structured around the "planning-monitoring-regulation" logical mainline, achieves three core values through metacognitive guidance across each stage:

Cognitive Visualization: By clarifying students' reading goals, strategy selection, and comprehension difficulties, it resolves the traditional teaching dilemma of "students not knowing how to learn and teachers not knowing how to guide."

Strategy Transfer: Through the "practice-reflection-optimization" cycle, students master transferable reading methods (e.g., goal setting, problem-solving, strategy adjustment) beyond mere text knowledge acquisition.

Literacy Implementation: In-depth exploration and critical thinking foster core English literacy, including scientific rationality in cultural awareness and logical analysis in thinking quality, preparing students for complex text reading.

5. Discussion and Reflection

5.1. Textbook Perspective

Senior high school English textbooks, as core teaching carriers, exhibit metacognitive design gaps: strategies like "prediction" lack explicit definitions and operational guidance, leading to blind application; post-reading reflection focuses on content comprehension but neglects metacognitive elements such as "strategy effectiveness self-assessment" and "cognitive obstacle analysis." To optimize, textbooks should integrate explicit metacognitive scaffolding: add "Strategy Prompt Boxes" beside texts (e.g., "Scan time words to sort scientific logic of *How Life Began on the Earth*") and include "Cognitive Reflection Pages" per unit with "Strategy Application Records" and "Bias Improvement Forms," transforming textbooks from knowledge carriers to cognitive

development scaffolds.

5.2. Teacher Perspective

Teachers' metacognitive teaching efficacy depends on theoretical cognition and practice translation. Current issues include: blurred theoretical boundaries (e.g., confusing cognitive and metacognitive strategies) and fragmented strategy application (e.g., missing in-class monitoring and post-reading reflection). Solutions require a "theoretical cognition-strategy modeling-classroom practice" training system: clarify Metacognitive Theory and curriculum standards via workshops; develop tools like "Strategy Selection Mind Maps" and "Monitoring Question Matrixes"; and refine teaching models through "demonstration class observation-lesson polishing-reflection logs" to avoid fragmented activities.

5.3. Student Perspective

Students' metacognitive competence shows stratification: few independently set goals, adjust strategies, and reflect; most remain passive-reading word-by-word, skipping difficulties, and focusing on exercise completion without cognitive review. Training should adopt a "goal visualization-strategy instrumentalization-reflection structuring" path: use "Reading Goal Contracts" to specify core/sub-goals; provide "Strategy Kits" (e.g., skimming flowcharts, guessing clue tables); and design "Cognitive Diary Templates" to guide systematic reflection, enabling a shift from passive reception to active construction.

6. Conclusion

Metacognitive Theory reshapes high school English reading teaching via the "planning-monitoring-regulation" framework, driving a cognitive shift from passive reception to active construction. This transforms fragmented reading into systematic cognitive training, fostering deep logical analysis through explicit process visualization.

For students, it enhances scientific text comprehension and intrinsic interest while cultivating core literacy (information integration, critical thinking, autonomous learning). For teachers, it optimizes teaching design from fragmented transmission to structured cultivation, improving efficiency and cognitive resonance through strategy co-creation.

Though not exhaustive across all text types or student backgrounds, the theory's core value lies in making cognitive processes explicit and controllable-enabling personalized teaching and self-directed exploration. Aligned with the educational ideal of "teaching for autonomy", it serves as a cognitive navigator for efficient text exploration, a whetstone for higher-order thinking, and nurturing soil for lifelong learning-essential for sustainable cognitive foundations in new-era talents.

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