PRIMARYEDU

Primaryedu: Journal of Elementary Education
Volume 10, Number 1, February 2026

P-ISSN: 2580-9326 | E-ISSN: 2580-7714

Metacognitive Regulation in Primary School Writing: A Comparison of Fourth and Sixth Grade Students in Narrative Writing Tasks

Tofan Stofiana[1*], Andoyo Sastromiharjo[2], Yeti Mulyati[3], Dadang Sunendar[4]

[1,2,3,4] Universitas Pendidikan Indonesia, Indonesia

Article Info

Article history:
Received December 19th, 2025
Revised January 29th, 2026
Accepted February 16th, 2026

Keywords:

Metacognitive Regulation
Writing Instruction
Primary Education
Grade Level Differences
Self Regulated Learning

Abstract

Metacognitive regulation plays a key role in students' writing development through planning, monitoring, and evaluation processes. This study examined differences in metacognitive regulation between fourth-grade and sixth-grade primary school students during narrative writing instruction, focusing on observable writing behaviors. Using a comparative quantitative design, data were collected from 120 students in one public and one private elementary school in Bandung, Indonesia, through an adapted Metacognitive Awareness Inventory measuring regulation of cognition. Descriptive statistics, independent-samples t-tests, and effect size analyses were applied. The findings indicate that fourth-grade students demonstrated moderate levels of metacognitive regulation, with planning as the strongest dimension; however, monitoring coherence and independent revision remained limited. Sixth-grade students showed significantly higher and more balanced regulation across all dimensions, including more consistent monitoring and deliberate revision based on self-evaluation. Grade-level differences were statistically significant with large effect sizes, particularly in monitoring. These results suggest that metacognitive regulation in narrative writing develops progressively across primary grade levels and is reflected in students' writing behaviors. Persistent weaknesses in evaluative regulation highlight the need for process-oriented instruction that explicitly supports planning, monitoring, and evaluation to promote more independent and effective writers in primary education.

Corresponding Author:

Tofan Stofianan
Universitas Pendidikan Indonesia, Indonesia
Email Author: tofanstofiana@upi.edu

INTRODUCTION

Writing in primary education plays a fundamental role in enabling students to express ideas, organize thoughts, and communicate meaning with clarity. Contemporary views increasingly conceptualize writing not as a static end product but as a dynamic and iterative process that unfolds through planning, drafting, and revision. From this perspective, writing development involves more than linguistic accuracy; it reflects students' engagement in meaning construction, idea

organization, and audience awareness. Early writing instruction is therefore pivotal in shaping how learners approach writing as a cognitive and learning-oriented activity rather than a purely mechanical skill.

Building on this process-oriented view, metacognitive regulation provides a powerful conceptual lens for understanding how writing quality develops. Metacognitive regulation refers to learners' ability to plan their actions, monitor their performance, and evaluate outcomes during learning tasks. A growing body of empirical research demonstrates that students who actively regulate these processes while writing tend to produce texts that are more coherent, structured, and purposeful, while also showing stronger control over their learning trajectories (DiCicco et al., 2023; Dowell, 2022; Moreno & Tabullo, 2023). Consequently, both theoretical and empirical studies position metacognitive regulation as a central mechanism underpinning writing quality and the emergence of self-regulated writing expertise (Finn & Arslan, 2024; Negi, 2024; Wirth et al., 2021).

Metacognitive regulation comprises three closely related dimensions that correspond to key stages of the writing process, namely planning, monitoring, and evaluation. Planning involves setting writing goals, selecting strategies, and allocating cognitive resources before or during writing. In primary classrooms, this may include deciding what topic to write about, identifying the main idea of a story, or outlining what will be written first and next. Monitoring refers to the ongoing supervision of comprehension, progress, and strategy effectiveness as writing unfolds. For young writers, monitoring can take the form of checking whether sentences make sense, noticing when ideas go off-topic, or realizing that a part of the story needs further explanation. Evaluation involves judging the quality of the written product in relation to intended goals and reflecting on the effectiveness of strategies used. In classroom practice, this may include rereading a text to see whether the story is clear or whether the ending matches the original intention. This tripartite framework of planning, monitoring, and evaluation has been widely discussed in research on self-regulated learning and metacognitive regulation, particularly in relation to how these processes can be deliberately cultivated to enhance task performance in both classroom and online learning contexts (Wirth et al., 2021).

The broader metacognition literature further emphasizes that metacognitive regulation enables learners to exercise strategic control over their thinking and behavior. In writing contexts, such control supports decisions related to topic selection, idea organization, and revision for coherence and clarity (Finn & Arslan, 2024; Negi, 2024). In primary writing, regulatory processes help students decide what to write, check whether their writing aligns with intended goals, and reflect on the quality of their work after drafting. Through repeated engagement in these regulatory activities, students gradually develop greater awareness of their writing processes and outcomes. As a result, effective metacognitive regulation contributes not only to improvements in the writing process itself but also to the quality of the written product (DiCicco et al., 2023; Moreno & Tabullo, 2023; Wirth et al., 2021).

Writing is a cognitively demanding activity that requires the coordination of working memory, long-term memory, and linguistic processing to transform ideas into written text. Theoretical accounts consistently position memory as a core component of writing, as working memory supports lexical retrieval, sentence construction, and on-the-spot revision, while long-term memory provides knowledge structures that guide idea generation and text organization

(Moreno & Tabullo, 2023). In primary writing instruction, these memory demands are particularly salient because young learners have limited working memory capacity and are still developing stable knowledge schemas for writing. As a result, writing tasks can easily overload cognitive resources unless instructional support helps students manage ideas, language, and task requirements simultaneously.

These cognitive constraints help explain why metacognitive regulation, particularly planning and monitoring, plays a critical role in improving writing quality during the primary school years. Through planning, students externalize ideas and reduce working memory load before drafting. Through monitoring, they learn to check whether sentences make sense and whether ideas remain aligned with intended goals as writing unfolds. Empirical studies show that writers who engage in such regulatory processes are better able to allocate cognitive resources, manage task demands, and coordinate writing activities across planning, drafting, and revision phases (DiCicco et al., 2023; Wirth et al., 2021).

The development of metacognitive regulation in primary education typically follows a gradual trajectory from teacher-directed support toward increasing learner independence. In lower elementary grades, teachers commonly provide explicit prompts, models, and feedback to support planning and monitoring during writing tasks. As students progress through the grades, they become more capable of selecting strategies, monitoring progress, and evaluating their writing with reduced external guidance. This developmental shift reflects broader patterns of self-regulated learning observed across childhood and adolescence (Hodges et al., 2021; Wirth et al., 2021).

Instructional supports, including structured feedback and technology-enhanced learning environments, further facilitate this developmental process by helping students manage cognitive load and reflect on their writing strategies. Research in primary writing contexts indicates that sustained and well-designed instructional scaffolding can strengthen both foundational writing skills and emerging metacognitive regulation, enabling students to carry these regulatory practices into more autonomous writing tasks over time (Dowell, 2022; Hodges et al., 2021; Widodo et al., 2023).

In Indonesia, writing instruction in the early grades is introduced primarily through narrative and personal writing activities that emphasize idea expression, sentence construction, and basic text coherence. Students are commonly asked to write short stories, recount personal experiences, or describe familiar events, with instructional attention focused on generating ideas and organizing them in simple narrative structures. As students progress into upper elementary grades, narrative writing tasks become more demanding, requiring longer texts, clearer organization, improved coherence, and more deliberate revision. Although the genre remains consistent, the complexity of narrative writing increases developmentally in line with grade-level expectations.

Importantly, narrative writing tasks across grade levels are functionally comparable, as students at both levels are required to plan story content, monitor coherence during drafting, and evaluate clarity and completeness after writing. This design allows developmental differences in metacognitive regulation to be examined without confounding effects of genre variation, while still reflecting authentic instructional practices at each grade level.

A comparison between fourth-grade and sixth-grade students therefore offers a focused lens for examining developmental differences in metacognitive regulation during writing. By grade

four, students typically engage in shorter narratives with emerging attention to structure and coherence. By grade six, students are increasingly expected to plan, monitor, and revise longer and more elaborated narratives, placing greater demands on regulatory processes. As cognitive capacity, memory efficiency, and writing experience increase with age, older students are more likely to demonstrate more strategic planning, more consistent monitoring, and more critical evaluation of their written work (Moreno & Tabullo, 2023).

The present study examines metacognitive regulation in primary school writing by comparing fourth-grade and sixth-grade students in Indonesian elementary schools. The study focuses on three dimensions of metacognitive regulation, namely planning, monitoring, and evaluation, as they occur during developmentally appropriate narrative writing tasks. Although the writing genre was consistent across grade levels, the complexity of narrative tasks increased in line with grade-level expectations, with fourth-grade students typically producing shorter narratives emphasizing basic event sequencing, and sixth-grade students composing longer and more elaborated narratives requiring greater coherence and revision. Importantly, the tasks were designed to be functionally comparable, as students at both levels were required to plan story content, monitor coherence during drafting, and evaluate clarity and completeness after writing.

The research aims to quantify and compare students' engagement in these regulatory processes across grade levels, examine whether grade level is associated with differential use of metacognitive strategies, and discuss instructional implications for supporting writing development in Indonesian primary education. By situating its findings within research on metacognition, self-regulated learning, and writing development, the study seeks to contribute evidence that informs developmentally responsive writing instruction and assessment practices in primary schools..

.

METHOD

Research Design

This study adopted a comparative quantitative research design to examine differences in students' metacognitive regulation during writing instruction at the primary school level. The design was selected because it allows the comparison of naturally existing groups without manipulating instructional conditions, making it suitable for educational settings where classroom variables cannot be fully controlled (Cohen et al., 2018).

The analysis combined descriptive and inferential approaches. Descriptive statistics were used to portray students' levels of metacognitive regulation, while inferential analysis was applied to determine whether differences between grade levels were statistically meaningful (Sugiyono, 2021).

Research Setting and Participants

The study was conducted in Indonesian public elementary schools where writing instruction is introduced in the early grades and becomes progressively more structured in upper elementary levels. In the lower grades, writing activities predominantly focus on narrative and personal texts, such as short stories and recounts of familiar experiences, with emphasis on idea expression, sentence construction, and basic coherence. In upper elementary grades, students are increasingly

expected to produce longer and more organized texts, including extended narratives and early expository writing, which place greater demands on planning, monitoring, and revision processes.

Participants consisted of fourth-grade and sixth-grade students, representing two developmental stages within primary education. Fourth-grade students were typically 9–10 years old, while sixth-grade students were generally 11–12 years old. These grade levels were selected to capture differences in writing experience, cognitive capacity, and instructional expectations that may influence the development of metacognitive regulation during writing.

The study examined metacognitive regulation in writing by comparing students' engagement in three regulatory dimensions, namely planning, monitoring, and evaluation, during narrative writing tasks. Narrative writing was selected because it remains a dominant instructional genre across both grade levels, allowing for meaningful comparison within a shared task structure. The analysis aimed to identify whether grade level was associated with differences in the frequency and quality of metacognitive regulatory processes, and to explore implications for instructional support in Indonesian primary writing classrooms.

Research Instrument

Data were collected using an adapted version of the Metacognitive Awareness Inventory (MAI) focusing specifically on the regulation of cognition component. Instrument adaptation was conducted to ensure that the language, content, and response format were appropriate for primary school students and aligned with their cognitive and linguistic development (Cohen et al., 2018).

The adapted instrument consisted of eighteen items distributed across three dimensions of metacognitive regulation, namely planning, monitoring, and evaluation, with six items representing each dimension. Responses were measured using a four-point Likert scale ranging from never (1) to always (4). The maximum possible score for each dimension was 24, resulting in a total maximum score of 72, with higher scores indicating higher levels of metacognitive regulation in writing activities (Sugiyono, 2021).

The indicators used to operationalize each dimension of metacognitive regulation are presented in Table 1.

Table 1. Indicators of the Adapted Metacognitive Regulation Instrument

Dimension	Indicator
Planning	Setting writing goals before starting the task
	Identifying main ideas to be included in the text
	Organizing ideas prior to writing
	Selecting appropriate strategies for writing
	Estimating time and effort needed to complete the task
	Preparing mentally before beginning to write
Monitoring	Checking clarity and meaning of sentences while writing
	Monitoring progress toward intended writing goals
	Detecting difficulties or confusion during writing
	Adjusting strategies when problems arise
	Maintaining focus on the writing task
	Reviewing content while drafting
Evaluation	Reviewing overall quality of the written text
	Assessing achievement of writing goals

	Reflecting on strengths and weaknesses of the text
	Evaluating the effectiveness of strategies used
	Revising the text based on self-assessment
	Reflecting on writing performance for future tasks

The indicators were derived from established models of metacognitive regulation and self-regulated learning, particularly the regulation of cognition component of the Metacognitive Awareness Inventory (Schraw & Dennison, 1994) and the cyclical model of self-regulated learning (Zimmerman, 2002; Zimmerman & Schunk, 2011). The operationalization of planning, monitoring, and evaluation indicators in writing contexts was informed by research on metacognition and self-regulated writing (Wirth et al., 2021; DiCicco et al., 2023). Item wording was adapted to the cognitive and linguistic characteristics of primary school students following standard guidelines for instrument adaptation (Cohen et al., 2018).

Writing Instruction Context

The writing instruction observed in this study focused on narrative writing tasks designed to be developmentally appropriate for each grade level. Students were asked to write a narrative text based on a familiar prompt related to personal or imagined experiences (e.g., “Write a story about an unforgettable experience at school or with your family”). The prompt was intentionally open-ended to allow students to generate ideas freely while still requiring narrative structure, coherence, and goal-directed writing.

The expected length of the narrative differed in accordance with grade-level expectations. Fourth-grade students were instructed to produce a short narrative of approximately one to two paragraphs, emphasizing basic event sequencing and idea expression. Sixth-grade students were expected to write longer narratives of approximately two to three paragraphs, with greater attention to coherence, elaboration, and revision. Although the genre remained the same across grades, this increase in length and structural demand reflected the natural progression of writing complexity in primary education.

To support planning, fourth-grade students were provided with a simple graphic organizer to help them outline the beginning, middle, and end of their stories. In contrast, sixth-grade students were encouraged to plan independently, either mentally or using brief notes, without a structured organizer. This difference was intentional and aligned with instructional practices that gradually shift responsibility for planning from teacher-supported tools to learner-directed strategies as students advance in grade level.

All students completed the narrative writing task individually within a regular classroom session and were given time to plan, draft, and revise their work. The questionnaire measuring metacognitive regulation was administered immediately after the writing task to capture students’ reflections on their planning, monitoring, and evaluation processes while the writing experience was still salient.

Data Collection Procedure

Data collection followed a systematic sequence. The first stage involved adapting the instrument and obtaining feedback from two experts in primary education and language learning to ensure content relevance and clarity. The second stage involved administering the questionnaire after the writing activity, with instructions delivered orally to support students' understanding. The final stage involved coding and summarizing students' responses for each dimension and for the overall metacognitive regulation score.

Such structured procedures are essential for maintaining consistency and accuracy in quantitative educational research (Sugiyono, 2021).

Data Analysis

Data analysis was conducted using descriptive and inferential statistical techniques. Mean scores and percentages were calculated to describe students' levels of metacognitive regulation across dimensions. Differences between fourth grade and sixth grade students were examined using an independent samples t test, as this technique is appropriate for comparing mean scores between two independent groups (Glass & Stanley, 1970).

The magnitude of the observed differences was further examined through effect size analysis using Cohen's d. Effect size interpretation followed commonly accepted criteria, where values around 0.20 indicate a small effect, 0.50 indicate a moderate effect, and values of 0.80 or higher indicate a large effect (Glass & Stanley, 1970).

Ethical Considerations

Ethical principles were applied throughout the research process. Participation was voluntary, and students' identities were kept confidential. Approval to conduct the study was obtained from the participating schools, and all data were used solely for research purposes in accordance with ethical standards in educational research (Cohen et al., 2018).

RESULTS AND DISCUSSION

Results

Metacognitive Regulation of Fourth Grade Students in Writing Instruction

The analysis was conducted on data obtained from 120 students, consisting of 60 fourth-grade students and 60 sixth-grade students from public and private primary schools. The results indicate that fourth-grade students demonstrated a moderate level of metacognitive regulation during writing instruction. This level of regulation was reflected in observable writing behaviors, such as students being able to set basic writing goals and generate ideas before writing, as well as rereading their drafts to check whether sentences made sense. However, these behaviors were often limited to surface-level checks and were not consistently followed by deeper revision or strategic adjustment.

The overall mean score for fourth-grade students was 42.3 out of a maximum score of 72, corresponding to 58.8% of the total score, placing their metacognitive regulation within the moderate category.

Table 2. Metacognitive Regulation Categories by Grade Level

Category	Fourth Grade (n = 60)	%	Sixth Grade (n = 60)	%
Good	12	20%	18	30%
Moderate	26	43%	30	50%
Low	22	37%	12	20%
Total	**60**	**100%**	**60**	**100%**

The combined results indicate a developmental shift in metacognitive regulation across grade levels. Fourth-grade students were predominantly categorized at the moderate level (43%), with a substantial proportion still at the low level (37%). In practical terms, students in the moderate category typically demonstrated partial regulation, such as adding brief details when prompted or checking their work for obvious errors, but showed limited evidence of independent monitoring or evaluative revision. In contrast, sixth-grade students showed a higher concentration in the moderate (50%) and good (30%) categories, alongside a marked reduction in the low category (20%). This pattern suggests increasing regulatory independence with grade level, particularly in students' ability to plan, monitor, and evaluate their writing more consistently.

Metacognitive Regulation of Sixth Grade Students in Writing Instruction

The results reveal a clear and consistent cross-grade pattern in metacognitive regulation, with sixth-grade students demonstrating higher levels of metacognitive regulation than fourth-grade students across all dimensions. This pattern, which is evident in the comparative analysis, reflects a developmental progression in students' capacity to regulate their writing processes as they advance through primary school.

The overall mean score for sixth-grade students reached 52.4 out of 72 (72.8%), placing their metacognitive regulation within the good category. When examined by dimension, planning and monitoring showed consistently strong results, with mean percentages of 78.8% and 72.5%, respectively, both categorized as good. In contrast, the evaluation dimension yielded a lower mean score (67.1%), falling within the moderate category. This finding suggests that while sixth-grade students were generally able to plan their writing and monitor progress during drafting, reflective evaluation and revision skills were still developing at this grade level.

This dimensional profile reinforces the observed cross-grade pattern. Compared to fourth-grade students, sixth-grade students not only achieved higher overall levels of metacognitive regulation but also displayed more stable strengths in planning and monitoring. However, evaluation remained the weakest dimension across both grade levels, indicating that although regulatory independence increases with grade level, higher-order evaluative regulation develops more gradually and continues to require instructional support.

Table 3. Metacognitive Regulation of Sixth Grade Students (N = 60)

Dimension	Maximum Score	Mean	Percentage	Category
Planning	24	18.9	78.8%	Good
Monitoring	24	17.4	72.5%	Good
Evaluation	24	16.1	67.1%	Moderate
Total	**72**	**52.4**	**72.8%**	**Good**

In terms of categorical distribution, most sixth-grade students were classified at the good or very good levels of metacognitive regulation, with only a small proportion remaining at the

moderate or low levels. This distribution further supports the cross-grade pattern identified in the comparative analysis, indicating increased independence in managing writing tasks among older primary students.

Comparison of Metacognitive Regulation Between Grade Levels

A comparison of overall scores revealed a clear difference in metacognitive regulation between grade levels, with sixth-grade students demonstrating higher levels of regulation than fourth-grade students.

Table 4. Comparison of Metacognitive Regulation Scores Between Grade Levels

Grade Level	N	Mean	Standard Deviation
Fourth Grade	60	42.3	6.8
Sixth Grade	60	52.4	7.1

An independent-samples t test indicated that the difference in overall metacognitive regulation between fourth-grade and sixth-grade students was statistically significant ($t = 5.78$, $p < .05$), confirming a robust cross-grade difference in students' ability to regulate their writing processes.

At the behavioral level, lower monitoring scores among fourth-grade students were reflected in limited rereading during drafting and minimal revision beyond correcting obvious errors.

Differences Across Metacognitive Regulation Dimensions

Further analysis examined whether these grade-level differences were consistent across individual dimensions of metacognitive regulation.

Table 5. Comparison of Metacognitive Regulation Dimensions Between Grade Levels

Dimension	Fourth Grade Mean	Sixth Grade Mean	*t*	*p*
Planning	15.8	18.9	4.92	< .05
Monitoring	13.6	17.4	5.11	< .05
Evaluation	12.9	16.1	4.37	< .05

Statistically significant differences were observed across all three dimensions. The largest mean difference occurred in the monitoring dimension, indicating substantial improvement in students' ability to supervise progress and adjust strategies during writing as grade level increased.

Effect Size of Grade-Level Differences

To examine the practical significance of these differences, effect size analyses were conducted.

Table 6. Effect Size of Metacognitive Regulation Differences

Dimension	Cohen's *d*	Effect Size

Planning	0.93	Large
Monitoring	1.07	Large
Evaluation	0.85	Large
Overall Regulation	1.01	Large

The effect size results indicate that the observed grade-level differences were not only statistically significant but also educationally meaningful. The monitoring dimension showed the largest effect size, highlighting pronounced developmental growth in students' capacity to regulate their writing processes.

Taken together, the findings demonstrate a clear cross-grade pattern in metacognitive regulation during writing instruction. Fourth-grade students generally exhibited moderate levels of regulation, with particular weaknesses in monitoring and evaluation. In contrast, sixth-grade students showed higher and more balanced regulation across all dimensions. Despite this developmental progression, evaluation remained the weakest dimension in both groups, suggesting that higher-order reflective regulation develops more gradually and continues to require instructional support across grade levels.

Discussion

Planning development across grade levels

The present findings demonstrate clear grade-related differences in metacognitive regulation during writing instruction, with planning emerging as a relatively strong dimension, particularly among fourth-grade students. At this level, students exhibited moderate overall regulation, characterized by comparatively stronger planning alongside weaker monitoring and evaluation. This pattern indicates that even in the early years of primary education, students begin to engage in goal setting and idea preparation when supported by instructional routines.

This tendency aligns with developmental research suggesting that planning skills tend to emerge earlier than other forms of metacognitive regulation, especially in instructional contexts where teachers provide explicit scaffolding for goal setting, topic selection, and idea generation (Colognesi et al., 2020; Teng & Zhang, 2021). In primary classrooms, such scaffolding supports task initiation and helps reduce cognitive load at the outset of writing, enabling students to focus on content generation even when self-supervisory capacities are still limited.

The stronger planning performance observed among sixth-grade students suggests that planning continues to develop with age and writing experience. At higher grade levels, planning becomes more strategic and increasingly integrated with monitoring and evaluation processes. This shift reflects a gradual movement toward more autonomous and coordinated regulation of writing activities as learners progress through elementary education (Wirth et al., 2021).

Monitoring and evaluation as persistent developmental challenges

In contrast to planning, monitoring and evaluation emerged as more challenging dimensions of metacognitive regulation, particularly for younger students. Fourth-grade students showed noticeable weaknesses in both dimensions, indicating limited capacity to supervise progress during writing and to reflect critically on their work after drafting. These findings suggest that, unlike planning, monitoring and evaluation do not readily develop through task initiation alone and require more advanced regulatory control.

From a writing-specific perspective, lower monitoring performance may reflect students' tendency to prioritize task completion over revision. Younger writers often perceive writing as finished once the story is completed, rather than as a process that requires ongoing supervision and adjustment. In addition, limited understanding of narrative cohesion may constrain effective monitoring, as students may struggle to recognize whether events are logically connected or sufficiently elaborated. Monitoring is further challenged by difficulty detecting inconsistencies in one's own writing, particularly when students lack the cognitive distance needed to adopt a reader's perspective.

Monitoring places substantial demands on sustained attention, self-questioning, and real-time awareness of coherence and goal alignment. As students write, they must detect off-topic ideas, notice gaps in explanation, and adjust strategies accordingly. These processes rely heavily on cognitive maturity and accumulated writing experience, which helps explain why monitoring improved more markedly among sixth-grade students (Choi & Lee, 2023; Teng & Zhang, 2021). The strong gains observed in monitoring across grade levels further support prior research identifying this dimension as a key leverage point in the development of self-regulated writing (Qin et al., 2022; Teng et al., 2022).

Evaluation remained the weakest dimension across both grade levels, even among older students. Evaluative regulation requires reflective judgment against internalized criteria and the ability to revise text purposefully rather than superficially. From the perspective of writing development, evaluation is closely tied to revision at the level of meaning rather than surface correction. Classic models of the writing process emphasize that effective evaluation involves considering audience expectations, clarity of ideas, and textual coherence when rereading drafts (Flower & Hayes, 1981; Faigley & Witte, 1981). However, younger writers often equate evaluation with mechanical editing, such as correcting spelling or punctuation, rather than rethinking content or structure.

This distinction helps explain why evaluative regulation develops more slowly than planning and monitoring and remains challenging even for sixth-grade students. Research on writing instruction suggests that learning to evaluate one's own writing from a reader's perspective requires explicit instructional support, including guided self-assessment, feedback use, and structured revision activities (MacArthur & Graham, 2016). The persistence of evaluative difficulties observed in the present study therefore underscores the need for sustained, process-oriented writing instruction that explicitly targets evaluative regulation, rather than assuming it will develop automatically with increased writing experience.

CONCLUSION

This study shows that metacognitive regulation in writing develops progressively across grade levels in primary education. Clear differences were found between fourth-grade and sixth-grade students, with older students demonstrating higher and more balanced regulation across planning, monitoring, and evaluation. These results indicate that writing regulation strengthens with age and writing experience, reflecting a gradual shift from externally supported regulation toward more autonomous control of the writing process.

Across dimensions, planning emerged as the strongest component among younger students, reflecting the influence of early instructional scaffolding. Monitoring and evaluation developed more slowly and remained challenging, particularly for fourth-grade students. Although sixth-grade students showed clear improvement in monitoring, evaluation remained the weakest dimension across both grade levels. This pattern suggests that writing development progresses from planning-focused regulation toward more balanced regulatory control, while reflective evaluation continues to require instructional support.

From an instructional perspective, the findings highlight the importance of developmentally responsive writing instruction that targets monitoring and evaluation alongside planning. Monitoring appears to be a key leverage point for supporting writing development across age groups, as it links planning and evaluation during writing. Strengthening these regulatory processes through guided self-assessment, feedback, and structured revision activities may foster more independent and effective writing development throughout the primary school years.

REFERENCES

Choi, Y., & Lee, K. (2023). Acceptance phase of metacognition in elementary school Korean language textbooks based on the 2015 revised curriculum. *Journal of Learner Centered Curriculum and Instruction*, 23(11), 233–246. https://doi.org/10.22251/jlcci.2023.23.11.233

Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.

Colognesi, S., Piret, C., Demorsy, S., & Barbier, É. (2020). Teaching writing with or without metacognition: An exploratory study of 11 to 12 year old students writing a book review. *International Electronic Journal of Elementary Education*, 12(5), 459–470. https://doi.org/10.26822/iejee.2020562136

DiCicco, M., Sherry, T., & Butts, J. (2023). Empowering students to cultivate better writers. In *Advances in early childhood and K–12 education* (pp. 183–204). IGI Global. https://doi.org/10.4018/979-8-3693-0543-0.ch010

Dowell, M. (2022). Implementation study of an urban elementary whole faculty professional development to improve writing capacity. In *Professional development and teacher education* (pp. 130–162). IGI Global. https://doi.org/10.4018/978-1-6684-6213-3.ch008

Faigley, L., & Witte, S. (1981). Analyzing revision. *College Composition and Communication, 32*(4), 400–414. https://doi.org/10.2307/356602

Finn, B., & Arslan, B. (2024). Memory and metacognitive processes recruited during educational assessment. In *The Oxford handbook of educational psychology* (pp. 2060–2089). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780190917982.013.71

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365–387. https://doi.org/10.2307/356600

Glass, G. V., & Stanley, J. C. (1970). *Statistical methods in education and psychology*. Prentice Hall.

Hodges, T., Donovan, C., & Coleman, J. (2021). Using technology to teach foundational writing skills in early elementary grades. In *Handbook of research on literacy and digital technology integration in teacher education* (pp. 344–365). IGI Global. https://doi.org/10.4018/978-1-7998-6888-0.ch017

MacArthur, C. A., & Graham, S. (2016). Writing revision. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (2nd ed., pp. 272–285). The Guilford Press.

Moreno, C., & Tabullo, Á. (2023). The fundamental role of memory systems in children's writing skills. In *Advances in cognitive psychology* (Chapter). IntechOpen. https://doi.org/10.5772/intechopen.110470

Negi, S. (2024). The MetaFlex framework: Harnessing metacognition to foster psychological flexibility and growth. In *Metacognition in education* (Chapter). IntechOpen. https://doi.org/10.5772/intechopen.113920

Qin, C., Zhang, R., & Xiao, Y. (2022). A questionnaire based validation of metacognitive strategies in writing and their predictive effects on the writing performance of English as foreign language student writers. *Frontiers in Psychology*, 13, Article 1071907. https://doi.org/10.3389/fpsyg.2022.1071907

Sugiyono. (2021). *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.

Teng, M., & Zhang, L. J. (2021). Development of children's metacognitive knowledge, reading, and writing in English as a foreign language: Evidence from longitudinal data using multilevel models. *British Journal of Educational Psychology*, 91(4), 1202–1230. https://doi.org/10.1111/bjep.12413

Teng, M., Wang, C., & Zhang, L. J. (2022). Assessing self regulatory writing strategies and their predictive effects on young EFL learners' writing performance. *Assessing Writing*, 51, Article 100573. https://doi.org/10.1016/j.asw.2021.100573

Widodo, S., & Aryaningsih, A. (2023). Development of problem based learning modules on the theme of my country's richness to improve learners' writing skills in grade four elementary school. In *Proceedings of the international conference on education* (pp. 471–490). Atlantis Press. https://doi.org/10.2991/978-2-38476-046-6_48

Wirth, K., Nuhfer, E., Watson, R., Fleisher, S., & Bailey, R. (2021). Knowledge surveys: Supporting students along pathways to self directed learning with self assessment. In *Transforming assessment in higher education* (pp. 127–164). AOSIS. https://doi.org/10.4102/aosis.2021.bk279.06