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Exploring the Role of Metacognitive Strategies in Research Writing: A Learner-Centered Perspective

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Abstract. This study explores the metacognitive strategies of education students in educational research writing using a learner-centered perspective grounded in Flavell's metacognitive theory (1979) and Zimmerman's self-regulated learning (SRL) model (2000). Employing a qualitative phenomenological design, data were gathered through semi-structured interviews with ten purposely selected fourth-year education students with direct experience in research writing. Reflexive thematic analysis was used to interpret the data. Findings reveal four (4) key themes: education students' perceptions and application of metacognitive strategies in research writing, metacognitive challenges encountered by education students in the planning, execution, and writing stages, learner-centered instructional approaches fostering or hindering the enactment of metacognitive regulation essential to research competence, and education students' reflections and learning Adaptation. Results indicate that while students demonstrate strong conceptual understanding of metacognition, their regulatory practices remain largely reactive rather than proactive, particularly in complex tasks such as synthesis and data analysis. Emotional challenges, peer collaboration, and instructor feedback were also found to significantly shape students' metacognitive engagement. The study concludes that research writing serves as a developmental space for strengthening self-regulated learning, although students require stronger instructional scaffolding to enhance strategic and emotional regulation. The study recommends structured reflection, explicit strategy instruction, and targeted feedback should be integrated to support the transfer of metacognitive skills.

Keywords: metacognitive strategies; self-regulated learning; research writing; learner-centered approach; qualitative phenomenology (SRL)

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1. Introduction

The current trend toward the need for higher-level cognitive skills, self-regulation, and reflection in pre-service teachers in teacher education is highly visible. In preparing future educators to encounter the challenges of the twenty-first century, learners need autonomy, adaptability, and self-regulation in their learning processes. Among the constructs that underpin these competencies, metacognition stands out as particularly essential. Recent studies affirm that metacognitive development significantly enhances self-regulated learning and professional adaptability among pre-service teachers, reinforcing its essential role in preparing future educators (Chen et al., 2024).

Metacognition, most simply defined as knowledge about and control of one's own cognitive processes (Dennis & Somerville, 2023; Flavell, 1979; Stanton et al., 2021;), includes two separate but related aspects: knowledge of cognition—that is knowing how learning happens and which learning strategies tend to work well for a given person in a particular situation—and regulation of cognition—or the ability to plan for and monitor the effectiveness of those strategies while also being able to revise them as necessary based on desired learning outcomes. By emphasizing these interconnected aspects of learning, learners will be able to purposefully work with complex tasks that guide them in achieving academic goals as well as cultivating the attributes and abilities of successful lifelong learners.

Research writing is a vital component of teacher education that demands strong metacognitive competencies. Academic writing requires learners to engage in planning, monitoring, and evaluating their thinking processes, making metacognition central to writing development (Prihandoko et al., 2024; Teng & Ma, 2024). Rather than simply acquiring knowledge, students actively construct, refine, and communicate ideas through a recursive and reflective writing process that supports meaning-making (Riwayatiningih et al., 2024). Metacognitive instruction and feedback further enhance learners' ability to regulate their strategies and improve the quality of their written work (Wang et al., 2025).

In research writing, students must formulate research questions, examine evidence, organize coherent arguments, and evaluate their progress and outcomes. These tasks are cognitively demanding and require strategic planning, continuous monitoring, and reflective assessment. Research also indicates that metacognitive regulation, monitoring, and self-efficacy are positively associated with academic performance, helping learners effectively navigate the challenges of research writing (Xue & Khalid, 2026).

Although research on metacognition is not always situated within academic communication, recent empirical studies show its strong influence on both the cognitive and affective dimensions of learning. Evidence indicates that metacognitive awareness enhances self-efficacy, motivation, and learner independence in complex tasks such as conducting research, while also significantly predicting academic motivation and fostering autonomy and sustained engagement (Kadum & Karpudewan, 2025). Students who engage in metalevel thinking about planning, drafting, and revision are better able to

formulate arguments, refine research questions, and critically evaluate sources (Ontog, 2024; Sasson & Tifferet, 2025). Beyond improving task performance, metacognitive skills also strengthen self-regulation by enabling learners to adjust strategies in response to challenges and new situations. In this way, metacognition bridges cognitive skills and practical research experience, cultivating not only academic achievement but also adaptive and reflective learners.

However, despite its recognized benefits, research writing remains challenging for many education students, who often experience low self-confidence, writing anxiety, and difficulties in expressing ideas clearly and coherently, as well as in organizing content and maintaining logical flow (Patty, 2024). Additional studies report persistent problems in structuring research papers, selecting appropriate topics, and developing coherent arguments, resulting in disjointed and unfocused writing (Alfonso, 2025). Although students may possess theoretical knowledge of research writing, they frequently struggle to apply it in practice, particularly in planning, monitoring, and evaluating their work (Theyel et al., 2019). This gap is important, as existing literature largely establishes positive relationships between metacognition and performance outcomes but provides limited insight into how metacognitive strategies are actually experienced and regulated in authentic research contexts.

Prior studies on metacognition and self-regulated learning (Azevedo, 2020; Cromley & Kunze, 2020; Panadero, 2017) have been largely conceptual or quantitative, with recent work further noting that cognitive, emotional, and procedural processes during research tasks are underexplored (Sun et al., 2024). In response, a learner-centered perspective positions students as active agents in their learning, emphasizing their experiences, decisions, and reflections, and offers a means to better understand how they set goals, monitor progress, and adjust strategies. This approach is particularly valuable in revealing often-hidden metacognitive difficulties—such as managing competing writing demands, applying planning strategies, and detecting reasoning errors—which are not easily captured through standardized assessments, thereby underscoring the importance of learners' voices in understanding research writing processes.

Metacognitive strategies involve planning, monitoring, and evaluating learning processes, including setting goals, organizing ideas, selecting appropriate resources, tracking understanding, and assessing outcomes for improvement (Stanton et al., 2021). In research writing, these strategies require learners to balance strategic planning with flexible responses to emerging challenges. From a learner-centered perspective, the value of metacognition lies not only in the strategies used but also in how and why they are applied within specific contexts.

Understanding these processes is essential for examining the development of metacognitive competence in authentic academic tasks. Insights into students' metacognitive practices can also support curriculum development, instructional design, and scaffolding approaches in teacher education programs. This study aims to analyze the metacognitive strategies of education students in Educational Research writing, focusing on how they develop self-regulation and adapt their approaches to complex writing demands and exploring learners' experiences in planning, monitoring, evaluating, and refining their research writing processes.

Examining learners' beliefs about research strategies provides insight into the motivational and emotional factors that influence engagement, enabling more holistic instructional support. As research literacy and evidence-based practice become increasingly important, pre-service teachers must develop metacognitive competencies that extend beyond completing research requirements to embrace skills applicable in lesson planning, instructional design, and classroom assessment. However, existing studies often emphasize outcomes rather than students' lived experiences during research writing. This study addresses this gap by adopting a learner-centered perspective that prioritizes authentic experiences and explores how students think, plan, monitor, and evaluate their work to inform pedagogical recommendations.

1.1 Theoretical Underpinning

This study integrates Flavell's metacognitive theory (1979) and Zimmerman's self-regulated learning (SRL) model (2000) to examine how metacognitive processes support students in Educational Research writing from a learner-centered perspective. Flavell conceptualizes metacognitive knowledge and regulation, involving planning, monitoring, and evaluating one's cognitive processes, which are essential in organizing and refining research writing tasks (Dennis & Somerville, 2023; Stanton et al., 2021).

In contrast, Zimmerman's SRL model frames learning as a cyclical process of forethought, performance, and self-reflection, aligning with the stages of research writing such as goal setting, drafting, monitoring progress, and revising outputs (Kesuma et al., 2020; Panadero, 2017). Together, these frameworks provide a comprehensive lens for understanding research writing as a dynamic process of cognitive awareness and self-regulation, enabling the study to explore how students not only understand their thinking but also actively apply and adjust strategies while engaging in authentic research tasks.

1.2 Aim of the Study

The study explores how instructional practices support or constrain metacognitive regulation, with the broader goal of generating pedagogical insights that enhance research writing instruction and foster the development of reflective, autonomous learners capable of addressing academic and professional challenges. The research questions investigated in the study are:

1. How do students in education perceive and apply metacognitive strategies in research writing?
2. What metacognitive challenges do education students encounter at the research planning, execution and writing stages?
3. How do learner-centered instructional approaches foster or hinder the enactment of metacognitive regulation essential to research competence?
4. How do education students reflect and adapt their learning while participating in educational research?

2. Methodology

This section describes how the study was conducted, including the participants involved, the procedures followed, the methods used to gather data, and the techniques employed to analyze the findings. These processes were carefully carried out to ensure that the research objectives were effectively addressed.

2.1 Research Design

Given the study's aim to explore how education students perceive, enact, and regulate metacognitive strategies in preparing for educational research writing, a qualitative phenomenological design is most appropriate. This approach captures how students experience reflection, self-regulation, and strategy use in authentic research tasks (Clarke & Braun, 2017), allowing for an in-depth understanding beyond measurement of outcomes. It facilitates the exploration of learners' perspectives on their metacognitive practices, the strategies they employ, and the contextual factors influencing these processes. Accordingly, the study focuses on how students perceive, structure, and manage their thinking while engaging in complex research writing tasks.

2.2 Participants

The participants of this study were education students enrolled in teacher education programs who had completed coursework in educational research. They were selected based on specific criteria, including direct experience in research writing (e.g., proposals, reports, or thesis work), willingness to participate in interviews or reflective activities, current enrollment as fourth-year students, and experience serving as group leaders during the research writing process. A purposive sampling technique was employed to ensure that participants possessed relevant and substantial experience with research writing, thereby enabling rich and meaningful insights into their metacognitive strategies and supporting the overall objectives of the study. Saturation of responses was reached after acquiring data from 10 participants.

2.3 Data Collection Instruments

The study employed semi-structured interviews to gather rich qualitative data on education students' perceptions, experiences, challenges, and reflections regarding metacognitive strategies in educational research writing. An interview guide grounded in metacognitive theory and self-regulated learning frameworks was developed, featuring open-ended questions aligned with the research objectives. Prior to data collection, informed consent was obtained, and participants were assured of confidentiality, anonymity, and voluntary participation. Interviews were conducted either face-to-face or online at convenient times and lasted 30 to 60 minutes. All sessions were audio-recorded with permission, and transcribed verbatim for accurate and systematic analysis.

2.4 Data Analysis

The data were analyzed using reflexive thematic analysis following Braun and Clarke (2019), informed by Flavell's distinction between metacognitive knowledge and regulation and Zimmerman's self-regulated learning model (forethought, performance, and reflection). The analysis began with familiarization, where interview transcripts were repeatedly read to develop an in-depth understanding of participants' experiences. This was followed by initial

coding, where meaningful segments of data were identified and labeled based on students' perceptions, actions, and reflections in research writing.

Codes were then grouped to generate initial themes, which were subsequently reviewed and refined to ensure coherence, distinctiveness, and alignment with the research questions. Each theme was then clearly defined and named to capture its essential meaning in relation to metacognition and research writing. Finally, the themes were interpreted and connected to the guiding theoretical frameworks to provide a richer understanding of how students experience and regulate their research writing processes.

2.5 Ethical Considerations

This study followed key ethical principles in educational research to ensure the protection, dignity, and well-being of all participants, in accordance with the Belmont Report (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979), and the Philippine Data Privacy Act of 2012 (Republic Act No. 10173). Prior to participation, students were fully informed about the study's purpose, procedures, and expected outcomes, and written informed consent was obtained.

Participation was voluntary, and respondents were reminded that they could withdraw at any time without penalty. Confidentiality was strictly maintained through the use of pseudonyms and coded identifiers, with all data securely stored in password-protected files accessible only to the researchers. Interviews were conducted in a respectful and low-stress environment to minimize discomfort. Throughout the study, participants' rights, time, and welfare were prioritized, and findings were reported ethically and transparently using anonymized quotations.

2.6 Trustworthiness and Rigor

To ensure rigor and trustworthiness, this study followed Lincoln and Guba's (1985) criteria: credibility, transferability, dependability, and confirmability. Credibility was strengthened through in-depth interviews and optional reflective activities that allowed participants to fully share their experiences, along with member checking so they could verify and confirm the accuracy of the researcher's interpretations. Transferability was supported by providing a clear description of the research context, participants, and learning environment so readers can judge how the findings may apply to similar teacher education settings.

Dependability was ensured through a clear audit trail that documented every step of data collection, coding, and analysis, as well as peer debriefing with colleagues and advisers to review and refine themes. Confirmability was addressed through researcher reflexivity, where assumptions and possible biases were acknowledged and monitored throughout the study. All data were systematically organized to allow transparency and verification if needed.

3. Results, Findings and Discussion

The present study examined the mediating role of metacognitive strategies in research writing among education students from a learner-centered perspective.

Analysis of participants' narratives generated four themes: (1) perceptions and application of metacognitive strategies in research writing; (2) challenges encountered in planning, execution, and writing; (3) learner-centered instructional practices that facilitate or hinder metacognitive regulation; and (4) students' reflections and learning adaptations. These themes illustrate an iterative cycle through which learners experience, regulate, and refine their thinking during research writing.

Findings indicate that students demonstrate metacognitive awareness and employ strategies for planning, monitoring, and evaluating their work, although full enactment is constrained by challenges across the research process. Instructional practices were also found to either support or limit metacognitive regulation. Despite difficulties, students showed reflective capacity by using feedback and self-evaluation to improve their work. Overall, metacognition emerged as a dynamic process shaped by self-regulation, contextual demands, pedagogical support, and reflective learning.

Table 1: Summary of overarching themes and sub-themes

Overarching Themes	Sub-themes
Education Students' Perceptions and Application of Metacognitive Strategies in Research Writing	<i>Theme 1: Metacognitive strategies are skills used to learn and accomplish tasks effectively.</i> <i>Theme 2: Metacognitive strategies improve self-regulation.</i> <i>Theme 3: Metacognitive strategies enhance awareness and understanding of the research process.</i> <i>Theme 4: Employment of purposeful planning, goal setting, and organizing of ideas.</i> <i>Theme 5: Utilization of checking, monitoring, and evaluation in addressing the logical sequencing of the research paper.</i> <i>Theme 6: Revision and adjustment of approaches when the need arises</i>
Metacognitive challenges encountered by education students in the planning, execution, and writing stages	<i>Theme 1: Difficulty with time management and managing emotions.</i> <i>Theme 2: Difficulty in narrowing research topics and formulating clear research questions.</i> <i>Theme 3: Difficulty in synthesizing and writing scholarly</i>
Learner-centered instructional approaches fostering or hindering the enactment of metacognitive regulation essential to research competence.	<i>Theme 1: Peer review, collaborative discussions, and the instructor's feedback and guidance support the enactment of metacognitive regulation.</i> <i>Theme 2: Provision of a variety of activities and assessments anchored in research supports the enactment of metacognitive regulation.</i> <i>Theme 3: Exercised self-directed learning</i>

	<i>Theme 4: Influence of instructional clarity and academic requirements</i>
Education Students' Reflections and Learning Adaptation	<i>Theme 1: Consistent evaluation of completed works</i> <i>Theme 2: Replan and reorganize strategically</i> <i>Theme 3: Commitment to continued development in the field of research</i>

3.1 Students' Educational Perceptions and Application of Metacognitive Strategies in Research Writing

This represents students' understanding and use of metacognitive strategies in their writing. The strategies were seen as useful for participants to manage their research-related tasks and improve their work, and the experiences show how intentionally they used planning, monitoring, evaluation, and reflection to overcome challenges related to the improvement of their research writing.

3.1.1 Theme 1: Metacognitive strategies are skills used to learn and accomplish tasks effectively

Participants viewed metacognitive strategies as essential tools for regulating cognitive processes, monitoring comprehension, and selecting the right strategies to approach learning tasks. As An et al. (2024) contend, intentional use of such strategies allows learners to take measure of their learning processes, which in turn leads to better achievement. In the context of research writing, metacognitive strategies encourage self-awareness, foster purposeful choices, promote productivity and contribute to successful solutions.

"Metacognitive strategies are the techniques for accomplishing specific tasks." AAC

"It encapsulates one's ability to evaluate how they interact with the knowledge and what works best for them to internalize their learnings effectively." GC

"It helps learners understand better and perform more effectively." TC

3.1.2 Theme 2: Metacognitive strategies improve self-regulation

In the context of research writing, participants viewed metacognitive strategies as essential to self-regulation. Through self-monitoring and reflection, they monitored their understanding, gauged the effectiveness of what they did and adjusted approaches as needed. Consistent with the findings of Sabaliauskas (2025), these strategies promoted increased awareness, supported reflective decision-making, and encouraged perseverance and deeper engagement.

"When working on research writing, I become more conscious of my thought processes by asking myself questions like, 'Do I truly comprehend this concept?', 'Is my reasoning clear?'" MG

"In writing research, I need to research everything to understand every word and method in order to have a deep understanding of our research." MJS

"I kept on doing the same routine until I became aware of how to process my messy ideas. "AJJ

3.1.3 Theme 3: Metacognitive strategies enhance awareness and understanding of the research process

Using metacognitive strategies can bolster learners' understanding and familiarity with the research process. In accordance with Xie (2026), participants used these strategies to intentionally manage their learning activities. Through critical reflection, they identified weaknesses, critically reviewed supporting evidence, and improved their work, nurturing a thorough, reflective and evidence-led approach to research writing.

"I realized that my introduction part sounded like personal opinions and my claims were not supported by evidence. I consciously changed my approach to make our research more evidence based. "AAC

"When writing research, it is more effective to discuss something substantially but briefly. "GC

"When I was writing our research, I noticed that my ideas were not organized and were hard to understand. I rewrote it and first made an outline to organize the information better. "TC

3.1.4 Theme 4: Employment of purposeful planning, goal setting, and organizing of ideas.

Participants practiced metacognitive planning by generating research questions, outlining tasks and schedules, and collecting relevant sources before beginning to write. Their understanding of these deliberate strategies guided their decision-making and kept them focused on research targets. This is consistent with Shen et al.'s (2024) finding that improvement in writing awareness, self-regulatory capacities and research/writing skill was significantly enhanced through deliberate planning, organized structure of resources, and specific goal setting.

"I plan first about the concept of the problem or the structure of the paper, then organize the actions needed in order for me to answer the problem statement. Lastly, monitor the data to be collected." HMB

"For the planning, I will discuss the necessary steps to be taken with my groupmates including making a schedule of the deadlines. We will also distribute work. Then, organizing will include sending the group a Google drive to compile the files." SP

"Planning everything first, I clearly define the research objectives first because they are the basis of every part of the research paper. Everything must be connected to the objectives, from the introduction to conclusions and recommendations. "MJS

3.1.5 Theme 5: Utilization of checking, monitoring, and evaluation in addressing the logical sequencing of the research paper

During the research, participants applied metacognitive regulation by systematically tracking and reviewing their writing over time. Consistent with Teng (2022), Rosdiana et al. (2023) and Li et al. (2026), they reread, evaluated coherence, pointed out aspects that needed to be improved, and requested

feedback if needed. These reflective practices improved the quality of writing, self-regulation and goal setting with respect to research.

"I checked the effectiveness of my strategies by rereading what I had already written. I examined whether my arguments were still clear and whether the flow of ideas remained coherent. Sometimes, I ask someone to read my work and provide suggestions and feedback on whether it was already effective. If they found any parts unclear, that was when I started adjusting and refining my strategies." **VF**

"By checking if the thoughts of the sentences are still connected to one another." **HMB**

"I reread my completed sections of work to assess whether my writing successfully solves the research question." **MG**

3.1.6 Theme 6: Revision and adjustment of approaches when the need arises

Flexibility and adaptive self-regulation were evident when participants adapted strategies and refined approaches in response to the challenges that appear during the research writing process. Consistent with Khalid (2026), they tracked their progress, pinpointed limitations, and revised efforts to keep up with changing needs. These metacognitive behaviors enabled more informed judgment, stable growth, and improved research output.

"There was a time in our data collection that I needed to change my strategy because some of our participants were inconsistent and lacked depth. At first, we chose a participant who was convenient only without thinking about the quality of the answers we gathered." **AAC**

"When we were advised to change our design from qualitative to mixed methods, we needed to revise most of the introduction and methods." **GC**

"There was a time when we planned to interview participants near the university, but they were not available. We had to quickly change our plan and arrange interviews in another place." **TC**

3.2 Metacognitive challenges encountered by education students in the planning, execution, and writing stages

This reflects the metacognitive process students faced during the process of planning, implementation, and writing research. Participants expressed challenges with self-regulation or their ability to regulate their thoughts, monitor and evaluate progress, make decisions, and evaluate work. These experiences highlight the challenges that affect the successful application of metacognitive strategies at each stage of research-writing.

3.2.1 Theme 1: Difficulty with time management and managing emotions

Time management posed real challenges for the participants in managing their learning processes, owing primarily to competing academic pressures operating with short timeframes and accompanying deadlines. These challenges, in common with findings by Wolters and Brady (2021), impaired their ability to strategically plan, monitor progress made toward ongoing goals and regulate the conduct of their learning efforts accurately. Additionally, chronic stress and

overwhelm limit their engagement overall, indicating that effective time management and emotional regulation are crucial in the research writing context.

"I also find it difficult to manage time when deadlines from different subjects overlap." **MG**

"Another challenge I experienced was time management. I found it difficult to juggle different tasks simultaneously and allocate enough time to each responsibility. Managing multiple academic requirements at the same time often became overwhelming, which affected my productivity and required me to develop better planning and prioritization strategies." **VF**

"I also struggle with time management, so it reduces the clarity of the research because of lack of time." **AAC**

3.2.2 Theme 2: Difficulty in narrowing research topics and formulating clear research questions

Participants faced metacognitive challenges in the planning stage; in particular; they experienced difficulties narrowing broad topics into concise and clear ones, developing focused and precise research questions, and choosing sources. Such challenges resonate with the observations of Sasson and Tifferet (2025) regarding researchers' reliance on advanced cognitive processes and metacognitive awareness. Results suggest that effective planning for research is aligned on strong self-regulatory capacities and purposive decision strategies.

"I struggle with narrowing down research topics and formulating clear research questions." **MG**

"I often have difficulties in simplifying my topic into a clear and practical research question." **MJS**

"By narrowing down a broad topic, managing time effectively between reading, writing, and revising, evaluating which sources are most credible and relevant." **JC**

3.2.3 Theme 3: Difficulty in synthesizing and writing scholarly

Some reported having difficulties in academic writing, especially synthesizing sources and adhering to research conventions (referencing styles), analyzing data, interpreting results and elaborating evidence-based conclusions. Consistent with Rosdiana et al. (2023), these challenges are indicative of constraints in self-regulation. The findings indicate that research writing represents metacognitive capabilities that the participants have not yet mastered, as novice researchers.

"I don't know what steps I should take to complete a part because making a thesis in college is really different from when I was in senior high school." **SP**

"I wasn't able to have a better understanding on how to write a good paper. Being unfamiliar with writing, citing other studies from other authors, analyzing data, and writing conclusions is very hard for me." **AJJ**

"Sometimes I think I already understand a method or framework, but when I try to explain it in writing, I realize I am still confused." **MG**

3.3 Learner-centered instructional approaches fostering or hindering the enactment of metacognitive regulation essential to research competence

This investigates the ways in which learner-centered pedagogical practices mediate the use of metacognitive regulation needed for research literacy. Participants described what instructional practices either facilitated or inhibited their ability to plan, monitor, evaluate and adapt learning strategies. Their experiences highlight classroom instruction as a factor in how metacognitive strategies are effectively used in research writing.

3.3.1 Theme 1: Peer review, collaborative discussions, and the instructor's feedback and guidance support the enactment of metacognitive regulation.

Research writing metacognitive regulation practices were found to be supported by learner-centered instructional practices. Collaborative discussions, peer feedback and instructor assessment and guidance are common forms in helping students reflect on their thinking; evaluate strategies; and refine approaches. In line with Wei and Liu (2024), such interactional aspects stimulated self-reflection, helped adapt learning strategies between different contexts of research competence development, as well as contributed to both strategic adaptation in the way that constitutes self-regulated learning.

"Group discussions helped me to develop my metacognitive strategies. I used to compare my strategies to my classmates so that I could plan and organize if my strategies didn't work. As a group, we always share ideas and give feedback to each other. My instructors gave constructive feedback about my research writing which made me more focused and organized."

AAC

"The group discussions and peer reviews also allowed me to reflect on some different perspectives." **MJS**

"By providing detailed feedback on our drafts and encouraging revisions. They also ask reflective questions during consultations, which makes me evaluate my decisions in writing." **MG**

3.3.2 Theme 2: Provision of a variety of activities and assessments anchors in research supports the enactment of metacognitive regulation.

A variety of learning tasks and assessment practices supported participants' growth in research writing. By employing various reflective exercises, selective feedback and basic assessment techniques within their educational research subject, students were able to easily identify their strengths and weaknesses, evaluate their progress successfully and adapt/change their learning plan. Following Parmigiani et al. (2024), these learner-centered approaches allowed for self- assessment and strategic planning to promote self-regulatory behavioral research skills that stemmed from metacognitive awareness.

"The instructors providing us with a variety of activities and assessments helped me develop my metacognitive strategies. Because of this, I have learned what kinds of assessments I excel at and where I need to improve, and in turn, allow me to work on it more until it turns into a strength as well." **GC**

"By giving us tasks, activities, and a lot of exams. I think it helped us to develop or improve metacognitive strategies because we need to find ways to accomplish these tasks while also learning." **SP**

"By requiring reflective activities such as research journals, self-assessments, quiz, performance and feedback based." **JC**

3.3.3 Theme 3: Exercised self-directed learning

Participants started taking ownership of their learning and research tasks, which led to the emergence of self-directed learning. With hindsight and feedback, they gradually became empowered to make deliberate improvements; this is line with Gupta et al. (2024) who found that learner's autonomy and self-regulation led to independence, critical thinking skills in making decisions and establishing habits for life-long learning/learning how to learn/research competence.

"Hands-on learning has made me more reflective about my learning. It developed my sense of accountability and really enhanced my independence." **GC**

"... Because of that I reflect more on my writing and thinking process and try to improve it next time." **AJJ**

"I reflect on my own learning when I receive feedback, I always remember it and make sure to use it in my next task or work." **TC**

3.3.4 Theme 4: Influence of instructional clarity and academic requirements

One consistent reason identified by participants' experiences was due to the clarity of instructions. Vague instructions and uncertain expectations resulted in anxiety and stress, whereby students found it difficult to make plans, monitor progress, and evaluate their work. Consistent with Pérez-Jorge et al. (2025), this, in the context of the study's findings, highlights that explicit instructional support is key to supporting effective research writing and promoting confidence as well as self-regulation.

"Some instructions that were not clear hindered me in regulating my research writing." **AAC**

"When expectations were not clearly explained, I felt uncertain about whether I was on the right track, which affected my confidence and planning." **MG**

"There are also times when I struggle to fully understand the instructions. When the guidelines and expectations are not clearly defined, I tend to feel anxious about my work, questioning whether what I am doing is correct or if my paper is still heading in the right direction." **VF**

3.4 Education Students' Reflections and Learning Adaptation

Capturing education students' reflections on their research-writing experiences and the learning adaptations they made throughout the process, participants described insights gained from challenges and successes, as well as the adjustments they implemented to improve their performance. These reflections illustrate the development and refinement of metacognitive strategies in research writing.

3.4.1 Theme 1: Consistent evaluation of completed works

This illustrates the extent of self-review and reflection employed to manage research writing by the participants. The students reviewed drafts to confirm they were clear, coherent and correlated with their objectives; thereby demonstrating metacognitive knowledge and regulation. Teng and Ma (2024) stressed that monitoring writing strategies can enhance student performance and outcomes in writing.

"I evaluate my paper by reading it again to see if the ideas are clear, understandable, organized, supported by facts, and complete." TC

"After completing our research task, we always reread our paper to check whether we were able to achieve the stated objectives. This step helps us ensure that all required components are addressed and that the overall content remains aligned with the goals of the study." VF

"I used to check my tasks as much as I could." AAC

3.4.2 Theme 2: Replan and reorganize strategically

This emphasizes students' adaptive capacity to replan and reorganize in response to ineffective strategies. Instead of proceeding haphazardly, they assessed challenges and pivoted accordingly; when necessary, they reached out for help. According to Musullulu et al. (2025), cognitive flexibility and regulation predict academic achievement, which demonstrates high metacognition awareness and strategic decision-making.

"If my initial approach is ineffective, I do not solve it right away. Instead, I go back to where I met an error and then make a mental draft on how to solve it. I then consider if the changes wouldn't affect the succeeding parts." GC

"I will evaluate my work and identify the problem. I will also try a different strategy right away, like asking my instructor for clarification or finding more reliable resources." TC

"When I realize that my initial approach is not effective, the first thing I do is pause and reassess what I am doing." AJJ

3.4.3 Theme 3: Commitment to continued development in the field of research

This theme concerns the long-term commitment of the participants to a process of continual refinement that transcends the fulfillment of research endeavors. They viewed growth as a necessity, personally and professionally, and wanted to pursue improvements in reflective capacities and research skills. According to Li (2025), reflective practice is a way of lifelong learning which pushes the student toward professional development and personal responsibility, stimulating motivation for students to become competent teachers in the future.

"I also want to practice deeper reflection after every major research task. As a future teacher, I believe that developing strong metacognitive skills will not only improve my research competence." MG

"In future research writing, I plan to improve my metacognitive regulation by being more in planning, monitoring, and evaluating my work." AJJ

"In the future, I plan to improve my metacognitive regulation by being more intentional in planning and setting clear goals before writing." VF

4. Conclusion

The findings highlight that metacognitive regulation in research writing is a complex and evolving process that extends beyond cognitive skills to include emotional and social dimensions of learning. While students demonstrated a solid understanding of metacognitive concepts, their ability to apply advanced regulatory strategies such as synthesis and data analysis was found to be still developing. This suggests that research writing plays a crucial role in strengthening higher-order self-regulation among learners. The study provides several pedagogical implications. Educators are encouraged to move beyond simply defining metacognition and instead actively model how strategies are used, adapted, and adjusted when challenges arise.

Integrating structured reflection points throughout the writing process can also help students develop continuous self-monitoring rather than reflecting only after task completion. In addition, feedback should be designed as regulatory scaffolding, using clear criteria to help students internalize standards and evaluate their own work more effectively. Supporting emotional regulation is equally important by guiding students to break tasks into simple and easy to understand steps, manage time effectively, and cope with uncertainty during complex research activities.

5. Limitations and Future Implications

This study has a few limitations that are worth acknowledging. The small sample size ($N = 10$) limits the extent to which the results can be generalized, although it allows for a rich and in-depth qualitative analysis of participants' experiences. In addition, the data were based on self-reported accounts, which may not always accurately reflect students' actual metacognitive behaviors during research writing. The participants were also drawn from a single academic setting, which may not fully represent the variety of contexts in which research writing occurs.

Despite these limitations, the study opens important directions for future research. Subsequent studies may consider longitudinal designs to track how metacognitive regulation develops over time, as well as the use of observational or think-aloud methods to capture real-time regulatory processes. Future work could also explore differences between novice and advanced writers in shifting from reactive to proactive strategies, and examine instructional interventions aimed at strengthening the transfer of metacognitive skills across different learning contexts. It could also look into whether specific instructional approaches can help students not just develop metacognitive skills but carry those skills with them across their subjects and writing tasks.

6. Recommendations

The findings of this study underscore the need for more intentional and structured pedagogical support to strengthen students' metacognitive engagement in research writing. Although students generally understand metacognition as "thinking about thinking," their ability to consistently monitor, regulate, and

evaluate their work remains uneven, indicating the need for more structured and experience-based instructional support. Teachers should move beyond definitional explanations and integrate guided reflective prompts, self-assessment checklists, and structured questioning techniques that encourage students to critically examine the clarity, coherence, and progression of their research outputs.

Since students often adjust their strategies only after encountering difficulties, proactive scaffolding is essential through detailed research planning, staged deadlines, outline reviews, and regular consultations during key phases such as problem formulation, literature review, and methodology development. Emotional and motivational barriers, including anxiety, overwhelm, and low confidence, should also be addressed by incorporating time management training, task decomposition strategies, and supportive peer collaboration to sustain engagement. In addition, timely, specific, and dialogic feedback from instructors, alongside peer review activities, can enhance students' regulatory capacity and improve research quality.

Given persistent challenges in research question formulation, literature synthesis, and data analysis, targeted workshops and step-by-step modelling are recommended to build competence and confidence. Finally, institutions should institutionalize reflective practices such as learning journals, progress logs, and research portfolios to support continuous metacognitive growth and foster long-term independent research skills among students.

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