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RELATIONSHIP BETWEEN METACOGNITIVE STRATEGIES ON COGNITIVE COMPONENTS AND RESOURCE MANAGEMENT IN LANGUAGE LEARNING

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Abstract:

The study of learning strategies in language acquisition has gained significant attention, particularly focusing on metacognitive self-regulation, cognitive components, and resource management. These strategies play crucial roles in enhancing language learning outcomes and fostering learner autonomy. This research aims to explore learners' perceptions of their use of these learning strategies and investigate potential relationships among them. A quantitative survey approach was employed, using a structured instrument divided into four sections: demographic profile, metacognitive self-regulation (11 items), cognitive components (19 items), and resource management (11 items). A purposive sample of 421 undergraduate students from Thailand and Vietnam participated in the study. Findings revealed that learners engaged moderately to highly in all three strategy categories, with strong correlations identified between metacognitive, cognitive, and resource management strategies. However, gaps were observed in the use of critical thinking and advanced organizational strategies. The study's implications highlight the need for educators to explicitly teach and foster the use of diverse learning strategies,

particularly metacognitive self-regulation, to enhance language learning outcomes.

Introduction

Background of Study

The study of the relationship between metacognitive strategies, cognitive components, and resource management in language learning is grounded in the recognition that effective language acquisition is significantly influenced by the strategic use of these learning strategies. Metacognitive strategies, have been shown to enhance cognitive engagement and improve language outcomes. These strategies are crucial for self-regulated learning, allowing learners to become more aware of their cognitive processes and to regulate their learning behaviours effectively. (Saks & Leijen, 2018).

Cognitive strategies, on the other hand, directly impact learning outcomes by enabling learners to process and understand new information more efficiently. The integration of cognitive and metacognitive strategies has been found to have a linear relationship with improved language learning outcomes, suggesting that these strategies complement each other in facilitating language acquisition (Saks & Leijen, 2018).

Resource management strategies, which include seeking help, managing the learning environment, and effort management, play a supportive role in the language learning process. These strategies ensure that learners have access to the necessary resources and support systems to optimize their learning experiences. The effective deployment of resource management strategies has been linked to enhanced cognitive and metacognitive strategy use, further underscoring their importance in language learning (Raffi et al, 2023).

This study was carried out to explore the intricate relationship between metacognitive strategies, cognitive components, and resource management in language learning. By investigating how these components interact, the research seeks to provide insights into effective teaching practices for language learners. This understanding is essential for developing instructional methods that not only enhance language proficiency but also help learners to be more aware of their learning processes.

Statement of Problem

In an ideal learning environment, learners are expected to utilize a variety of effective learning strategies, including metacognitive self-regulation, cognitive components, and resource management, to enhance their academic success. These strategies enable learners to plan, monitor, and evaluate their learning processes while efficiently managing resources such as time, effort, and external support. As highlighted by Akamatsu, Nakaya, and Koizumi (2019), metacognitive strategies, particularly when combined with self-efficacy, play a crucial role in determining learning outcomes, underscoring their significance in fostering academic success.

Despite the recognized importance of these strategies, many learners struggle to effectively apply or even recognize them in their educational practices. Specifically, some learners may have limited awareness of metacognitive self-regulation, leading to ineffective planning and self-monitoring. Similarly, cognitive components may be applied inconsistently, resulting in fragmented learning experiences. Additionally, resource management strategies, such as time management and help-seeking, are often underutilized or misapplied, leading to inefficient learning outcomes.

This research seeks to explore learners' perceptions of their use of learning strategies, particularly on metacognitive self-regulation, cognitive components, and resource management. By investigating how learners perceive and apply these strategies, this study aims to identify areas where learners struggle or excel in using these strategies, determine whether a relationship exists among these strategies that could inform instructional practices and provide insights into how educators can design more effective teaching approaches to promote strategic learning behavior.

In line with Rashid, Redzuan, Mustaffa, and Rahmat (2023), further research will extend to university learners in Thailand and Vietnam to examine how perceptions of these strategies vary in language learning. Seng et al. (2023) also suggest that future research should explore the diverse learning strategies used in foreign language acquisition. Addressing this gap, the present study investigates the strategic approaches learners employ in language studies to enhance academic success. Additionally, the study will consider other learning strategies beyond metacognitive self-regulation, cognitive components, and resource management to assess their relevance and impact on language learning.

Objective of the Study and Research Questions
This study aims to examine learners' perceptions on their use of various learning strategies. Specifically, it seeks to address the following research questions;
1. How do learners perceive their use of metacognitive self-regulation?
2. How do learners perceive their use of cognitive components?
3. How do learners perceive their use of resource management?
4. Is there a relationship between all learning strategies?

Literature Review

Theoretical Framework

Metacognitive Self-Regulation
Metacognitive self-regulation is a critical component of effective learning, as it involves learners' awareness and control over their cognitive processes during learning activities. Flavell (1979) defines it as knowledge about one's own learning and how to regulate it. Zimmerman (2002) emphasizes goal setting, strategy use, and reflection as key components. Schunk (2008) highlights the importance of feedback and self-assessment in adapting learning strategies. More recent research (Pintrich, 2000; Veenman et al., 2006) emphasizes the interplay between metacognitive awareness and cognitive strategies, suggesting that successful learners integrate both to optimize their learning. In essence, metacognitive self-regulation empowers learners to take charge of their learning by planning, monitoring, and evaluating their own thinking processes.

Cognitive Components

Cognitive components are essential for understanding how learners process information and construct knowledge. Jean Piaget, a foundational figure in cognitive psychology, posited that knowledge is actively constructed in the mind through experiences, suggesting that learners build on their existing knowledge to understand new concepts (Piaget, 1936). According to cognitive learning theory, as noted by various experts, this process involves several key elements: attention, memory, and problem-solving (Atkinson & Shiffrin, 1968; Baddeley, 1986; Sternberg, 1985).

Baddeley's (1986) working memory model highlights the dynamic nature of short-term memory, emphasizing the role of attention and executive functions in actively processing and manipulating information. Squire (1992) distinguished between declarative memory (explicit knowledge) and procedural memory (implicit knowledge), providing a framework for understanding how different types of information are stored and retrieved. Sternberg's (1985) triarchic theory of intelligence posits that successful intelligence involves not only analytical skills but also creative and practical abilities, all of which rely on a range of cognitive processes.

Cognitive components are essentially intermingled with a series of mental functions. They do not operate in isolation, rather they are engaged in interaction in the dynamic and flexible support of a variety of cognitive activities.

Resource Management

Resource management refers to the effective allocation and utilization of available resources to achieve specific goals. In the context of learning, resources include time, energy, cognitive capacity, and external aids such as study materials, technology, and support from peers or instructors. Pintrich (2000) emphasized the importance of self-regulation in effective resource management, arguing that learners who self-regulate their learning effectively are better equipped to allocate their time and effort, seek out and utilize appropriate resources, and adapt their strategies based on their available resources. Zimmerman (2002) highlighted the role of planning in resource management, stressing the importance of setting realistic goals, developing effective study schedules, and identifying and securing necessary resources before engaging in learning activities.

More recently, Winne and Hadwin (2008) proposed a model that integrates resource management with metacognitive strategies. Their research highlights that learners who effectively monitor their progress are better able to adjust their resource allocation, ensuring alignment with their goals and current learning needs. Effective resource management requires learners to be mindful of their strengths and weaknesses, anticipate potential challenges, and make conscious choices about how to allocate their time and effort to maximize their learning outcomes.

Past Studies on Learning Strategies

Over the past decade, research has increasingly focused on the interplay between metacognitive strategies, cognitive components, and resource management in language learning. Studies have consistently demonstrated strong positive correlations among these elements, underscoring their collective impact on enhancing language acquisition.

A study by Raoofi, S. et al. (2014) explored the vital role of metacognition in enhancing success in learning second and foreign languages. The study used a systematic narrative review methodology to synthesize findings from multiple studies and draw meaningful conclusions about the role of metacognition in second and foreign language learning. The key findings of the study include: 1. Metacognitive training improves language skills. 2. Instruction enhances strategy use, but results vary, especially with control groups. 3. Metacognition strongly predicts success in language tasks. 4. Proficiency, education, learning styles, and first language use impact L2 metacognition, though specific effects are under-researched. 5. Most studies focus on English, highlighting the need for research in other languages. These findings emphasize metacognitive strategies' role in language learning and suggest areas for further study.

Nasab, M. S. B., & Motlagh, S. F. P. (2015) had a study that aimed to investigate the relationship between metacognitive, cognitive, and social/affective strategies with EFL (English as a Foreign Language) learners' reading comprehension. A total of 90 upper-intermediate EFL learners who were at a similar proficiency level participated in the study. The participants were divided into three experimental groups, each receiving instruction on one of the three main learning strategies: metacognitive, cognitive, or social/affective. During the treatment sessions, three comprehensible reading passages appropriate to the participants' proficiency levels were selected from the Longman TOEFL test. The results indicated statistically significant differences among the experimental groups, with metacognitive strategies showing the most positive impact on reading comprehension. The findings were interpreted to highlight the importance of metacognitive awareness in enhancing EFL learners' reading skills.

Zarei, A. A., & Gilanian, M. (2017) investigated the role of language learning strategies in fostering meta-cognitive and motivational self-regulated learning among undergraduate English majors specializing in translation and teaching. The study included 149 participants who completed a series of questionnaires. The instruments used were the Michigan Test of English Language Proficiency (MTELP), the Strategy Inventory for Language Learning (SILL) designed by Oxford (1990), and the Motivated Strategies for Learning Questionnaire (MSLQ) developed by Pintrich et al. (1993). Results revealed that cognitive, meta-cognitive, and compensation strategies were significant predictors of meta-cognitive self-regulated learning, enhancing students' ability to manage and optimize their learning processes. These strategies also influenced motivational components, including task value, control of learning beliefs, and test anxiety. The study highlighted the pivotal role these strategies play in improving learning outcomes.

Min, T. A., et al. (2022) conducted a study to examine the learning strategies employed by students studying Mandarin as a foreign language, particularly focusing on the use of cognitive and metacognitive strategies in an online learning context. Using a quantitative research approach, data were collected through a survey adapted from Wenden & Rubin (1987). A total of 366 students from Universiti Teknologi MARA (UiTM) participated, with responses gathered via Google Forms and analyzed using SPSS version 26. Findings demonstrated that rehearsal strategies, such as memorization and self-practice, were the most commonly used cognitive strategies, whereas critical thinking strategies were the least utilized. Students showed a strong ability to independently address confusion after class. Additionally, strategies for managing the learning environment, such as attending classes regularly and studying in conducive spaces, were prioritized. It was also observed that female learners employed

cognitive and metacognitive strategies more frequently than their male counterparts. Overall, a blend of cognitive, metacognitive, and resource management strategies contributed to enhanced learning outcomes.

Muhammad Syaffiq et al. (2023) had a study aimed at identifying students' perceptions of their deployment of resource management, metacognitive self-regulation, and cognitive strategies in the context of learning foreign languages. The study had a total of 118 students' respondents from a public university in Malaysia and the collected responses were transferred to SPSS. The key findings of the study are: 1. Learners prioritize resource management strategies like seeking help, environmental, and effort management in language learning. 2. Resource management strongly correlates with metacognitive and cognitive strategies, enhancing learning efficiency. 3. Students employ diverse strategies, such as reviewing tough topics and self-assessment, showing metacognitive engagement. 4. Effective management of time, effort, and peer learning significantly impacts language acquisition and academic success. These findings highlight resource management's importance in optimizing language learning and suggest educators focus on cultivating these skills.

A study by Nur Natasha E. A. R. et al. (2024) aimed to explore the perception of learners regarding their use of language learning strategies among undergraduates in Malaysia. The research involved a purposive sample of 167 participants, who were foundation students from a public university in Malaysia. The data analysis method used in the study involved a quantitative approach, utilizing a 5-point Likert scale survey to gather responses from participants. The survey was structured into four sections, focusing on different components of language learning strategies: cognitive components, metacognitive self-regulation, and resource management. This study found that Students actively engage with cognitive, metacognitive self-regulation, and resource management strategies. Positive relationships exist among these strategies, collectively enhancing language learning. Students demonstrate effective resource management, such as seeking peer support and fostering a collaborative learning environment. Despite positive attitudes, students could improve persistence in challenging coursework, with interventions to boost resilience. The findings emphasize tailoring teaching methods to foster independence and lifelong learning for academic success. These insights can guide educators in supporting diverse learning styles and optimizing student outcomes.

Conceptual Framework
Learners rely on a diverse range of strategies to achieve success in their learning endeavors. According to Rahmat (2018), the use of strategies enables learners to manipulate learning materials effectively, thereby facilitating the learning process. Metacognitive strategies, in particular, allow students to reflect on their own thinking processes. These strategies encompass the ability to plan, implement appropriate learning techniques, monitor progress, evaluate outcomes, and make necessary adjustments. Metacognition serves as the foundation for self-regulation, and learners who effectively employ metacognitive strategies can become self-regulated and independent learners.

Figure 1 presents the conceptual framework of this study, which is based on the learning strategies proposed by Wenden and Rubin (1987). The first category, metacognitive self-regulation, involves learners actively planning and managing their learning processes. The second category, cognitive components, consists of sub-strategies such as rehearsal,

organization, elaboration, and critical thinking. Finally, resource management encompasses sub-strategies such as environmental management, effort regulation, and help-seeking.
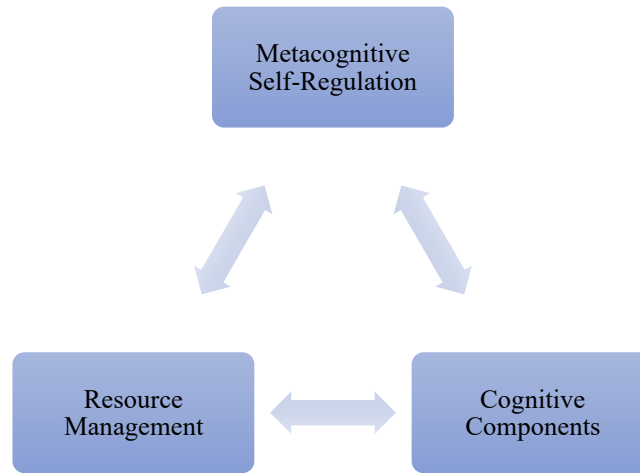

Figure 1: Conceptual Framework of the Study Relationship between Metacognitive Strategies on Cognitive Components and Resource Management in Language Learning

Methodology

This quantitative study was conducted to explore the learning strategies used among undergraduates. A purposive sample of 421 participants, comprising undergraduates from Thailand and Vietnam enrolled in Mandarin and English language programs, responded to the survey. Participants were selected based on voluntary participation, and they consented to complete a questionnaire administered via Google Forms.

The instrument used is a 5 Likert-scale survey and is rooted from Wenden and Rubin (1987) and Pintrich et al. (1991) to identify the variables presented in Table 1. The survey comprises four sections. Section A gathered demographic information. Section B has 19 items assessing cognitive components. Section C has 11 items on metacognitive strategies. Section D has 11 items on resource management.

Table 1 presents the reliability analysis of the survey instrument. The results indicate a Cronbach alpha of .940 for Cognitive Components, .897 for Metacognitive Self-Regulation and .836 for Resource Management. The overall Cronbach alpha of all 41 items is .955; demonstrating strong reliability of the selected instrument. Additionally, further analysis was conducted using SPSS to examine the data and address the research questions of this study.

Table 1: Distribution of Items in the Survey

Section	Strategy (keyword)		Sub-strategy	Number of Items	Total Number of Items	Cronbach Alpha
B	Cognitive components	(a)	Rehearsal	4	19	.940
		(b)	Organization	4		
		(c)	Elaboration	6		
		(d)	Critical Thinking	5		
C	Metacognitive self-regulation				11	.897
D	Resource management	(a)	Environment Management	5	11	.836
		(b)	Effort Management	4		
		(c)	Help-Seeking	2		
					41	.955

Findings

Findings for Demographic Profile
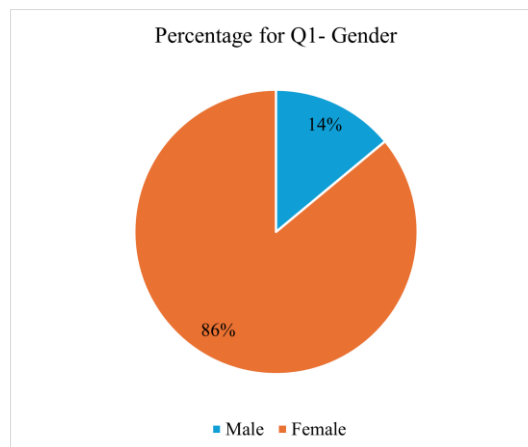
Figure 2: Percentage for Q1- Gender

The data in Figure 2 shows that out of 421 respondents, 14% of them are male students, and 86% of the respondents are female students.
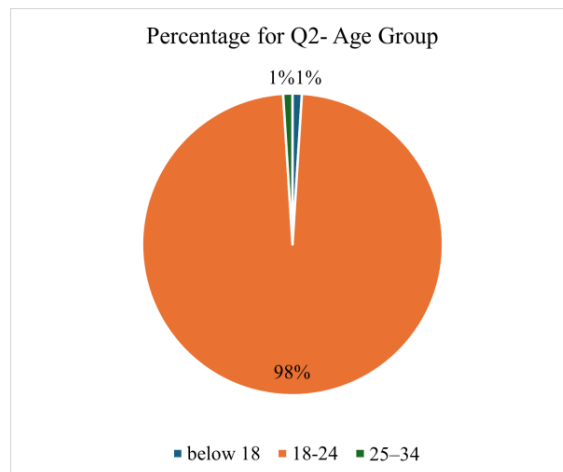
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Figure 3: Percentage for Q2- Age Group

Figure 3 shows that the majority of the respondents are aged between 18 to 24, which makes up to 98%. 1% of the respondents are from the age group below 18, and another 1% of the respondents are from the age group 25 to 34.
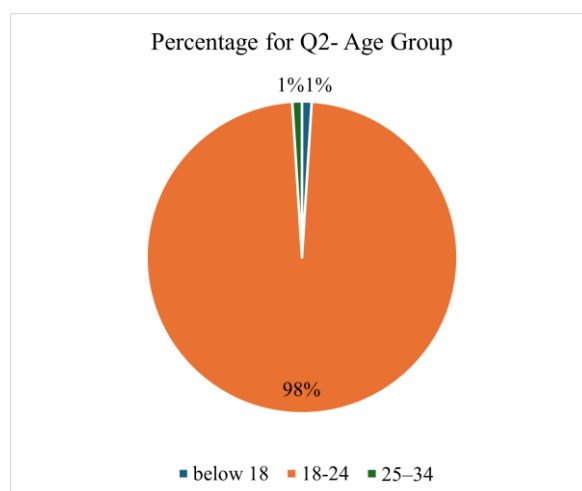

Figure 4: Percentage for Q3- Year of Study

Figure 4 shows that 52% of the respondents are Year 3 students, 31% of the respondents are Year 4 students, while 10% of the respondents are Year 1 students and 7% of the respondents are Year 2 students.
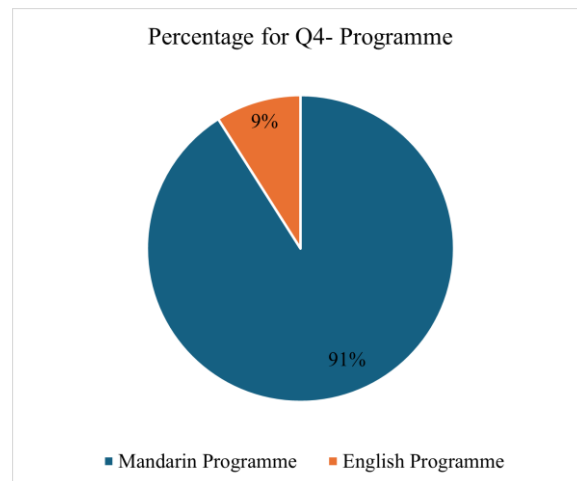
Figure 5: Percentage for Q4- Programme

Figure 5 shows that majority of the respondents, 91% of them are from Mandarin programme, and only 9% of the respondents are from English programme.

Findings for Metacognitive Self-regulation
This section presents data to answer research question 1- How do learners perceive their use of metacognitive self-regulation?
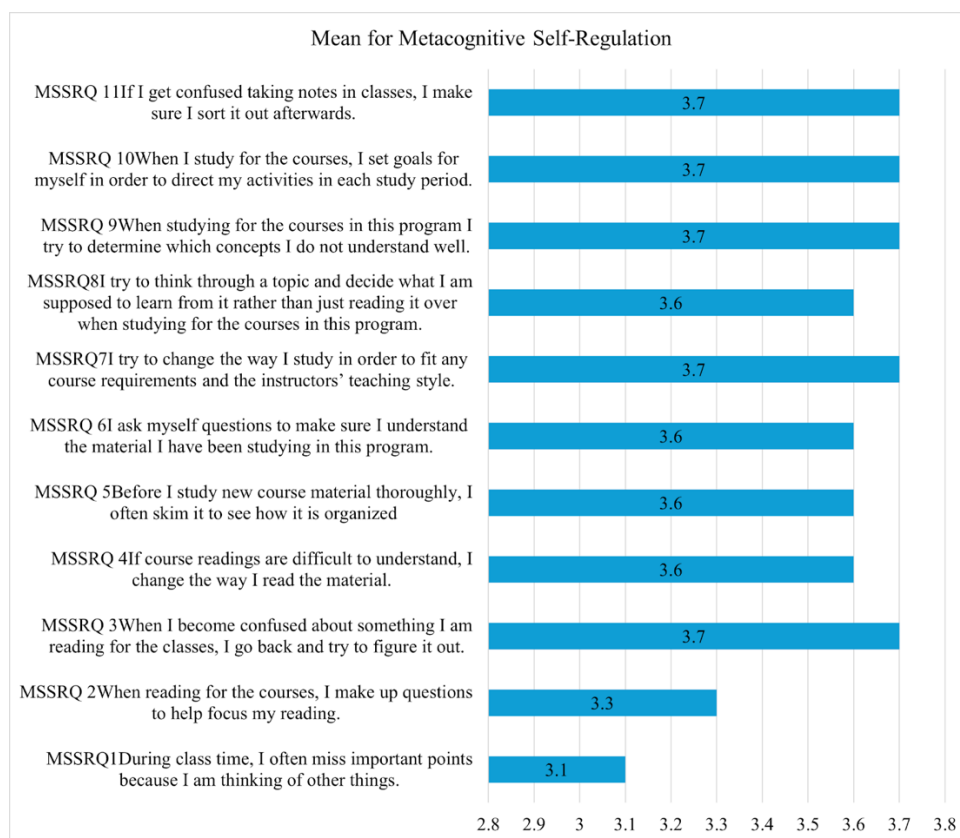

Figure 6: Mean for Metacognitive Self-Regulation

Figure 6 reveals that, among the 11 items of Metacognitive Self-Regulation, MSSRQ3, MSSRQ7, MSSRQ9, MSSRQ10, and MSSRQ11 attained the highest mean score (M = 3.7). These items correspond to practices such as revisiting unclear material (MSSRQ3), adapting study methods to align with course requirements and teaching styles (MSSRQ7), identifying challenging concepts during study (MSSRQ9), setting goals for study sessions (MSSRQ10), and resolving confusion in notes after class (MSSRQ11). Conversely, MSSRQ1 recorded the lowest mean score (M = 3.1), indicating that learners more frequently report missing important points during class due to distractions, relative to other behaviors assessed in this category. This finding further suggests that respondents engage with metacognitive strategies to varying extents.

Findings for Cognitive Components
This section presents data to answer research question 2- How do learners perceive their use of cognitive components?
In the context of this study, this is measured by (i) rehearsal, (ii)organization, (iii) elaboration and (iv) critical thinking.
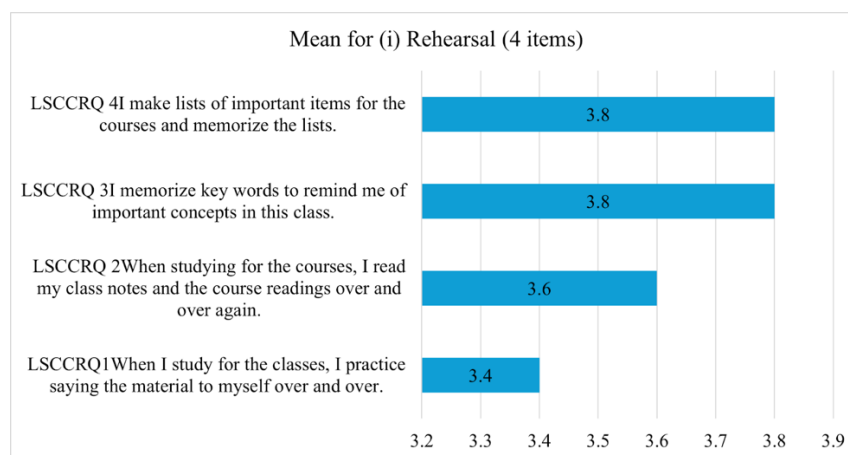

Figure 7: Mean for (i) Rehearsal (4 items)

Figure 7 shows the mean scores for the four rehearsal items. Item LSCCRQ1, which asks about practicing material repeatedly by students themselves, has a mean score of 3.4, suggesting a moderate use of this method. LSCCRQ2, which focuses on rereading class notes and course readings, shows a slightly higher mean score of 3.6, indicating a tendency to use this approach. Items LSCCRQ3 and LSCCRQ4, which involve memorizing keywords and making lists of the important items for memorization, both have the highest mean scores at 3.8. This suggests that students engage more frequently in strategies that involve memorization and organization of important information. Overall, the data reveals that while students apply various rehearsal techniques, there is a stronger reliance on memorization-focused methods.
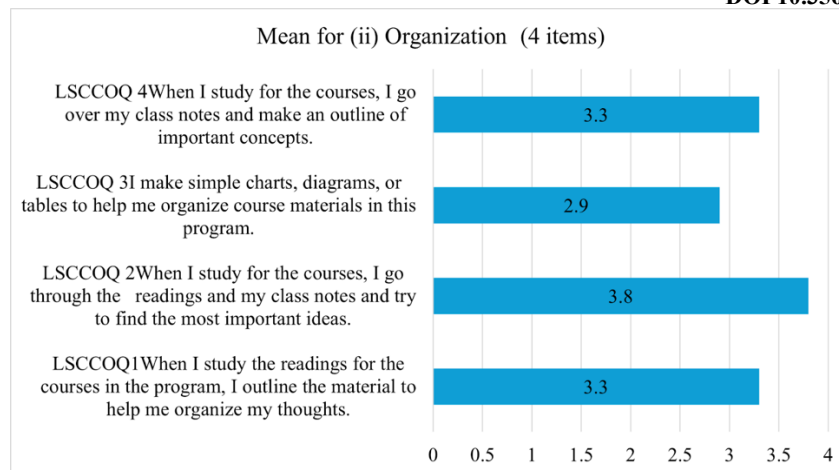
Figure 8: Mean for (ii) Organization (4 items)

From Figure 8, we can see the mean scores for the four organization-related items. The lowest mean score of 2.9 was given to the item LSCCOQ 3, which examines the use of charts, diagrams, or tables for organizing course material. Item LSCCOQ1 which outlines material to help organize thoughts and item LSCCOQ4 which involves creating outlines of important concepts, share the same mean score of 3.3, indicating a moderate use of this strategy. Item LSCCOQ2, identifying the most important ideas in readings and class notes shows a higher mean of 3.8, suggesting that students place a stronger emphasis on this approach. Overall, the data shows that students prioritize identifying key ideas and outlining material, but less use charts and diagrams to organize their study materials.
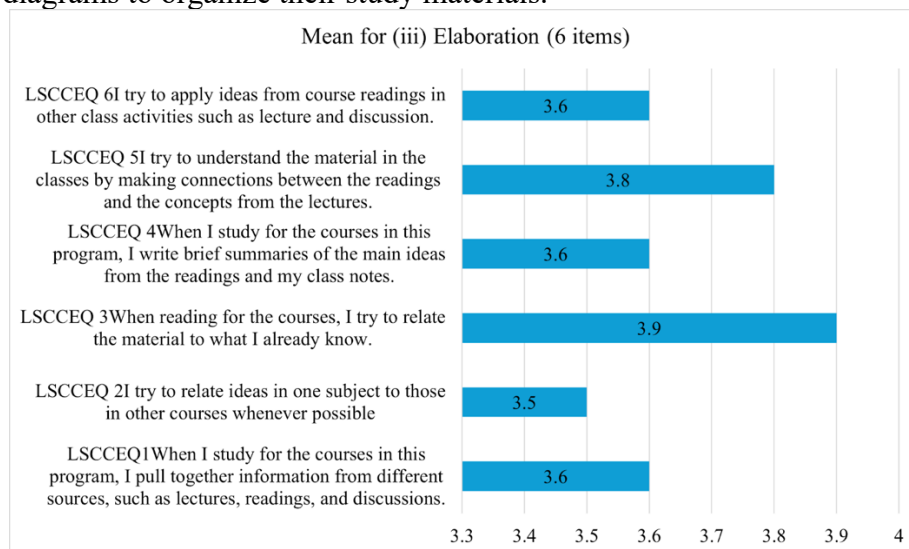

Figure 9: Mean for (iii) Elaboration (6 items)

Figure 9 shows the mean scores for the six items under the elaboration category. The highest mean score of 3.9 corresponds to the item LSCCEQ 3 "When reading for the courses, I try to relate the material to what I already know," indicating that students frequently use prior knowledge to enhance understanding. Similarly, students show a strong inclination (mean of 3.8) toward item LSCCEQ 5 which involves connecting readings to lecture concepts to deepen comprehension. Equal mean scores of 3.6 are given to LSCCEQ 1, LSCCEQ 4, and LSCCEQ 6 for multiple activities, including combining information from different sources, summarizing

main ideas, and applying course readings to class discussions, suggesting consistent engagement in these practices. The item LSCCEQ 2 got the lowest mean score 3.5, reflecting the effort to relate ideas across different subjects, indicating slightly less emphasis on cross-subject connections. Overall, the data suggest a balanced approach to elaboration strategies among students.
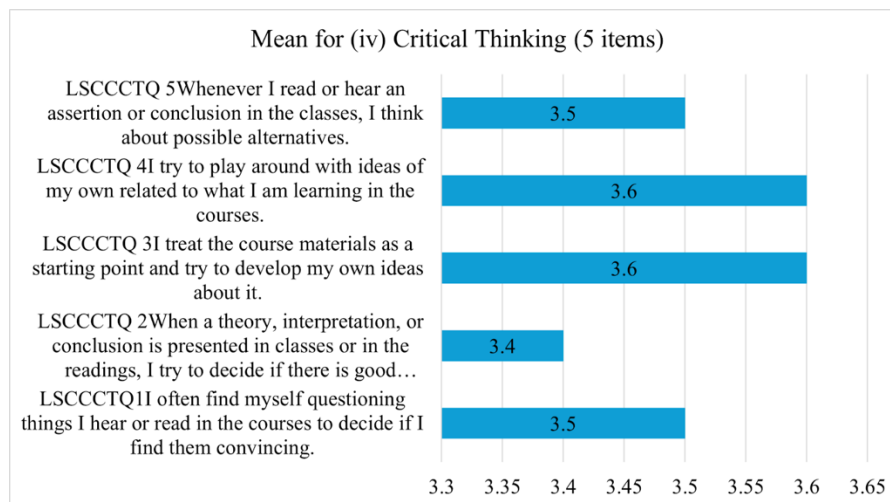

Figure 10: Mean for (iv) Critical Thinking (5 items)

Figure 10 presents the mean scores for five items related to critical thinking among students, highlighting their engagement with course materials. The highest mean score of 3.6 is attributed to LSCCCTQ 3, which indicates that students actively treat course materials as a foundation for developing their own ideas, demonstrating a willingness to engage creatively with the content. Similarly, LSCCCTQ 4 also received a mean score of 3.6, reflecting students' inclination to explore and experiment with their own ideas in relation to what they are learning, which is essential for developing higher-order thinking skills. Mean scores of 3.5 for LSCCCTQ 1 and LSCCCTQ 5 suggest that students frequently question the credibility of information presented in class and consider alternative perspectives on assertions or conclusions. The lowest mean score of 3.4 for LSCCCTQ 2 indicates a slightly lower emphasis on evaluating the supporting evidence behind theories and interpretations discussed in class. These studies suggest that while students are generally engaged in critical thinking practices, there is potential for further development in evaluating evidence and fostering deeper analytical skills through explicit instruction, diverse pedagogical practices, and research engagement.

Findings for Resource Management
This section presents data to answer research question 3- How do learners perceive their use of resource management?

In the context of this study, this is measured by (i) environment management, (ii) effort management and (iii) help-seeking.
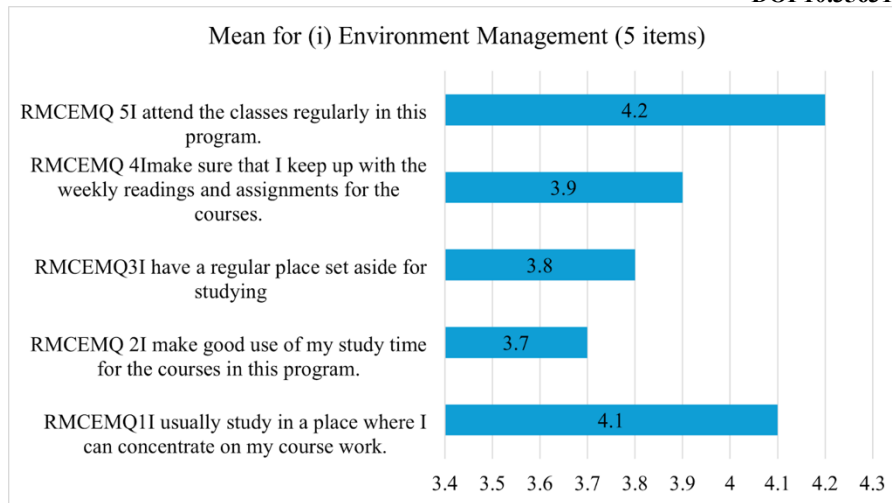
Figure 11: Mean for (i) Environment Management (5 items)

The findings presented in Figure 11 reveal students' perceptions of environment management in their academic pursuits, indicating a generally positive attitude toward their study environments. The highest mean score of 4.2 is attributed to RMCEMQ5, which, for regular class attendance, reflects a strong commitment to participation and engagement in their education. This finding is crucial as regular attendance is often linked to better academic performance and engagement (Astin, 1993; Raffi et al., 2023; Tinto, 1997). Additionally, a mean score of 4.1 for RMCEMQ1 suggests that students typically study in environments conducive to concentration, which is essential for effective learning. The mean score of 3.9 for RMCEMQ4, which pertains to keeping up with weekly readings and assignments, further demonstrates their dedication to academic responsibilities. However, the mean score of 3.8 for RMCEMQ3 indicates that, while many students have designated study areas, there is room for improvement in establishing consistent study habits. The score of 3.7 for RMCEMQ2 suggests challenges in effectively utilizing study time.

Overall, these findings underscore the importance of a supportive learning environment and effective time management strategies in enhancing academic performance, highlighting opportunities for targeted interventions to optimize resource management practices and improve educational outcomes.
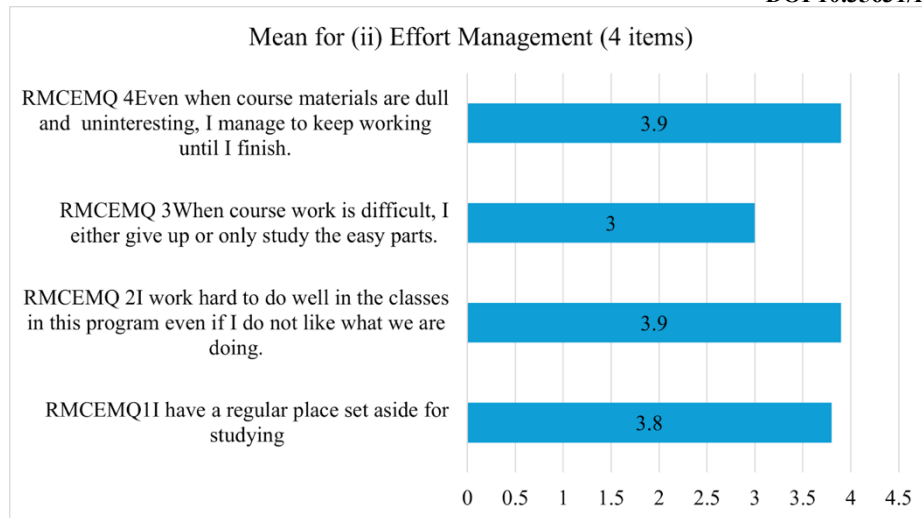
Figure 12: Mean for (ii) Effort Management (4 items)

The data presented in Figure 12 indicate the mean scores for four items related to Effort Management, reflecting students' attitudes and behaviors towards their study habits. The first item, RMCEMQ1, which assesses the establishment of a dedicated study space, received a mean score of 3.8, suggesting that students generally prioritize having a conducive environment for studying. The second item, RMCEMQ2, which evaluates students' commitment to working hard despite disinterest in the course content, scored slightly higher at 3.9, indicating a strong work ethic among participants. However, RMCEMQ3, the third item, reveals a notable challenge; with a mean score of 3.0, it suggests that some students may struggle with perseverance when faced with difficult coursework, often opting to focus only on easier tasks. In contrast, RMCEMQ4, the fourth item, shows resilience, as it also scored 3.9, indicating that students are able to push through even when course materials are perceived as dull. Overall, these mean scores highlight a mix of determination and challenges in effort management among students in this program.
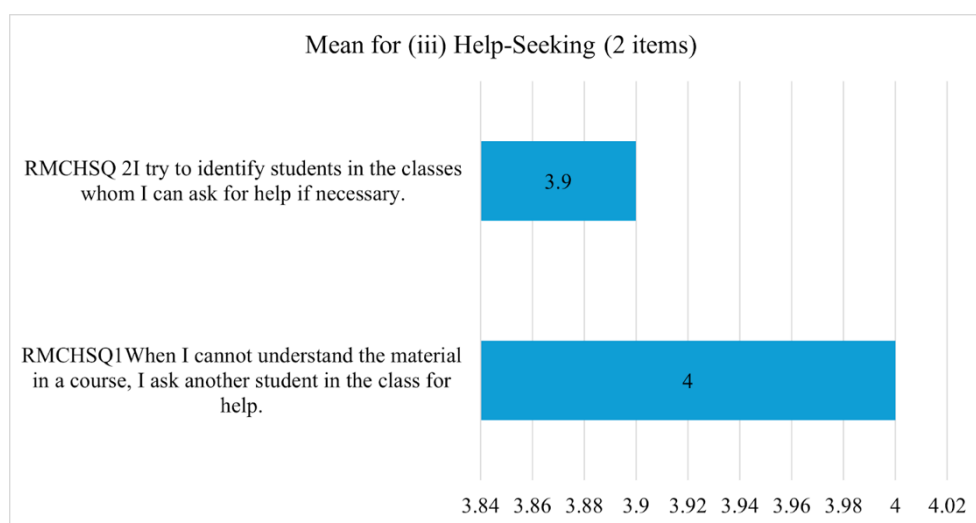

Figure 13: Mean for (iii) Help-Seeking (2 items)

Figure 13 presents the mean scores for two items related to Help-Seeking behaviors among students, highlighting their willingness to seek assistance when faced with academic challenges. The first item, RMCHSQ1, which assesses the tendency to ask classmates for help when struggling with course material, received a high mean score of 4.0. This indicates a strong inclination among students to utilize peer support as a resource for understanding difficult concepts. The second item, RMCHSQ2, which evaluates students' proactive approach to identifying peers for potential assistance, scored slightly lower at 3.9. This suggests that while students are generally open to seeking help, there may be varying degrees of initiative in actively identifying classmates for support. Overall, these scores reflect a positive attitude towards collaboration and the importance of peer networks in enhancing academic success (Raffi et al., 2023; Kumrow, D., 2007).

Findings for Relationship between all learning strategies

This section provides data to address research question 4- Is there a relationship between all learning strategies?

Correlation analyses were conducted using SPSS to examine whether a significant relationship exists among the mean scores of metacognitive, effort regulation, cognitive, social, and affective strategies. The findings are presented separately in Tables 2, 3, and 4.

Table 2: Correlation between Metacognitive Self-Regulation and Cognitive Components

Correlations

		Metacognitive	Cognitive
Metacognitive	Pearson Correlation	1	.801**
	Sig. (2-tailed)		.000
	N	421	421
Cognitive	Pearson Correlation	.801**	1
	Sig. (2-tailed)	.000	
	N	421	421

**. Correlation is significant at the 0.01 level (2-tailed)

Table 2 shows there is an association between metacognitive and cognitive components. The results of the correlation analysis indicate a highly significant association between these components, (r=.801**) and (p=.000). According to Jackson (2015), the coefficient is significant at the .05 level, and is measured on a scale from 0.1 to 1.0, where values between 0.1 and 0.3 indicate a weak positive correlation, 0.3 to 0.5 suggest a moderate positive correlation, and 0.5 to 1.0 represent a strong positive correlation. Based on these criteria, the findings confirm a strong positive relationship between metacognitive and cognitive components.

Table 3: Correlation between Cognitive Components and Resource Management Conclusion

Correlations

		Cognitive	Resource Management
Cognitive	Pearson Correlation	1	.557**
	Sig. (2-tailed)		.000
	N	421	421
Resource Management	Pearson Correlation	.557**	1
	Sig. (2-tailed)	.000	
	N	421	421

**. Correlation is significant at the 0.01 level (2-tailed)

Table 3 shows there is an association between cognitive and resource management components. The results of the correlation analysis indicate a highly significant association between these components, (r=.557**) and (p=.000). According to Jackson (2015), the coefficient is significant at the .05 level, and is measured on a scale from 0.1 to 1.0, where values between 0.1 and 0.3 indicate a weak positive correlation, 0.3 to 0.5 suggest a moderate positive correlation, and 0.5 to 1.0 represent a strong positive correlation. Based on these criteria, the findings confirm a strong positive relationship between cognitive and resource management components.

Table 4: Correlation between Resource Management Metacognitive Self-Regulation

Correlations

		Resource Management	Metacognitive
Resource Management	Pearson Correlation	1	.614**
	Sig. (2-tailed)		.000
	N	421	421
Metacognitive	Pearson Correlation	.614**	1
	Sig. (2-tailed)	.000	
	N	421	421

**. Correlation is significant at the 0.01 level (2-tailed)

Table 4 shows there is an association between resource management and metacognitive components. The results of the correlation analysis indicate a highly significant association between these components, (r=.614**) and (p=.000). According to Jackson (2015), the coefficient is significant at the .05 level, and is measured on a scale from 0.1 to 1.0, where values between 0.1 and 0.3 indicate a weak positive correlation, 0.3 to 0.5 suggest a moderate positive correlation, and 0.5 to 1.0 represent a strong positive correlation. Based on these criteria, the findings confirm a strong positive relationship between resource management and metacognitive components.

Conclusion

Summary of Findings and Discussions

This research indicates that learners are generally aware of metacognitive self-regulation strategies, learners reported effectively engaging in practices like adapting study methods to course requirements, setting study goals, and resolving unclear material, demonstrating moderate to high usage of metacognitive strategies. However, distractions during class time remained a notable challenge. These findings align with Raoofi et al. (2014), which emphasized metacognition as a predictor of academic success in language learning. This study also suggests that learners recognize the significance of cognitive components such as attention, memory, and problem-solving in processing information and constructing knowledge. Memorization was most commonly used, whereas creating diagrams or charts was less frequent. This is consistent with Min et al. (2022), who noted a preference for straightforward cognitive strategies over critical thinking or complex organizational methods. High scores were observed for environment management, effort management, and help-seeking strategies. Learners demonstrated proactive behaviours like creating conducive study environments and seeking peer support. This aligns with findings by Raffi et al. (2023), which highlight resource management as integral to learning efficiency.

Strong positive correlations were found between metacognitive self-regulation, cognitive components, and resource management. This supports the idea that these strategies are interconnected and collectively impact language acquisition, as demonstrated in past studies. Zarei, A. A., & Gilanian, M. (2017) found that cognitive and metacognitive strategies significantly predict metacognitive self-regulated learning, enhancing students' ability to manage their learning. Muhammad Syaffiq et al. (2023) also found similar results that resource management, metacognitive self-regulation, and cognitive strategies are related in learning foreign languages.

Pedagogical Implications and Suggestions for Future Research

The findings imply that educators should focus on fostering metacognitive awareness among learners and explicitly teach strategies for effective planning, monitoring, and evaluation. Incorporating activities that promote the conscious use of cognitive components and resource management can also enhance learning outcomes. Further research could explore the specific interaction among these strategies and their relative impact on different aspects of language learning.

Additionally, an investigation into the role of cultural and contextual factors in shaping the use of learning strategies could provide valuable insights for diverse learner groups. Moreover, incorporating qualitative methodologies in future studies may help the educators gain a deeper understanding of learners' experiences and perspectives on using these strategies.

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