

THE INFLUENCE OF METACOGNITIVE SELF-REGULATION ON LEARNING STRATEGIES IN MANDARIN LEARNING

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Abstract. Due to China's rapid economic development, there has been an increased demand for Chinese language education in Malaysia. The utilization of appropriate language learning strategies plays a crucial role in ensuring successful learning outcomes. Therefore, the objective of this research is to investigate learners' perception regarding their use of learning strategies in acquiring Mandarin as a foreign language. A quantitative survey was conducted among 148 students enrolled in an Introductory Mandarin course in a public university. The survey employed a 5 Likert-scale and consisted of four sessions which are demographic profile, cognitive components, metacognitive self-regulation and resource management. The collected data were analyzed using SPSS. The findings indicate that the resource management components "environment management" and "help-seeking" received a highest mean scores (M=4.14, 4.15), followed by the cognitive component "rehearsal" (M=4). Conversely, metacognitive self-regulation strategies had the lowest mean score (M=3.78). Furthermore, the research also reveals a strong positive correlation between metacognitive self-regulation, cognitive strategies and resource management strategies in foreign language learning. It is hoped that this study can provide insights for instructors to enhance their teaching approach to facilitate students' learning.

Keywords: *learning strategies, metacognitive self-regulation, mandarin, foreign language*

Introduction

Due to the rapid economic development of China, the demand for Chinese language education has risen in Malaysia. Wu (2021) has stated that "According to data from the Malaysian Ministry of Education, in 2010, non-Chinese students accounted for 11.84% of the total number of students in Chinese primary schools, but by 2020, this percentage had risen to 19.75%." Lee (2010) also noted that in 1994, the number of students learning Mandarin as a foreign language at Universiti Teknologi MARA (UiTM) was about 788, but the number increased tremendously to around 8,000 in 2004. In 2023, Ufuture UiTM has stated that the number of students learning Mandarin as a foreign language in UiTM has exceeded 16,000. These numbers demonstrate the rapid increase in the demand for Chinese language learning in Malaysia, highlighting the growing importance of Mandarin in the country.

A foreign language is a language that plays no major role in the community and it is primarily learned only in the classroom. Therefore the foreign language learning settings will be radically different in both what is learned and how it is learned compared to second language learning (Ellis, 1994). With the explosion of methodologies in the late 70s and early 80s, there has been a shift in the focus of the classroom from a teacher-centered approach to a learner-centered one (Wenden and Rubin, 1987). Consequently, appropriate language learning strategies play a crucial role in ensuring successful learning outcome (Oxford, 1990). Wenden and Rubin (1987) and Oxford (1990) have mentioned that learning strategies refer to the language learning behaviors, learners engage in to facilitate and regulate the learning of a second

language, make learning easier, faster, more enjoyable and more self-directed, more effective and more transferable to new situations.

Problem statement

The acquisition of Mandarin as a foreign language has garnered substantial attention due to its global significance in trade, culture, and diplomacy. Central to this acquisition is the role of self-regulated learning in shaping the efficacy and efficiency of learning strategies. Self-regulated learning is an active and constructive process in which the interaction of three essential components—cognition, motivation, and metacognition—serves to govern learning (Schraw et al., 2006). Some studies have suggested the positive influence of metacognitive self-regulation (MSR) on language learning outcomes. Metacognitive strategies are defined as knowledge about cognition, awareness and control (O'Malley and Chamot, 1990; Pintrich and De Groot, 1990). Veenman et al. (2006) offered insights into how metacognition affects learning, indicating its importance in proficient learning processes.

Ross et al. (2006) conducted a study to investigate whether college students adjust their study strategies to meet the cognitive demands of testing, a metacognitive self-regulatory skill. Marimuthu et al. (2015) investigated the use of metacognitive self-regulatory learning strategies among Universiti Teknologi MARA Pulau Pinang students from different faculties, and suggested that the metacognitive self-regulatory learning strategies used were only moderate. Lew (2020) looked at the application of cognitive strategies among students of Universiti Teknologi MARA Perlis in their Mandarin language learning process. Current studies explained that metacognitive awareness and strategies have a notable impact on language learning across various languages, suggesting that learners who exhibit higher MSR tend to demonstrate better language proficiency and fluency. However, the relationship between MSR and specific learning strategies tailored to Mandarin remains less explored. Given the unique tonal and script characteristics of Mandarin, as well as its syntactical and morphological structures, it is crucial to investigate how MSR can guide learners to adopt effective strategies. There exists a research gap pertaining to the influence of MSR on strategies for Mandarin as a foreign language. This study seeks to bridge this gap and enhance our understanding of the relationship between metacognitive self-regulation and the success of learners in the Mandarin language sphere.

Objective of study and research questions

This study is carry out to explore perception of learners on their use of learning strategies on learning Mandarin as a foreign language. Specifically, this study is aims to answer the following questions: (1) How do learners perceive the use of metacognitive self-regulation in learning? (2) How do learners perceive the use of cognitive strategies in learning? (3) How do learners perceive resource management strategies in learning? and (4) Is there a relationship between metacognitive strategies and learning strategies?

Literature review

Learning strategies for foreign language learning

Learning strategies have been widely used and recognized in educational publications since the 1970s (Idris et al., 2022; Atmowardoyo et al., 2021; Pawlak,

2021). Numerous studies have explored the use of learning strategies in foreign language learning. The majority of researchers and scholars agree that learning strategies are crucial elements influencing every language learner. Oxford (2003) asserted that a language learning style and strategy can influence students' proficiency in acquiring a foreign language. Oxford (1990) emphasized that learning strategies are essential tools for active, self-directed involvement in developing learners' communication skills. Consequently, appreciating language learning strategies results in improved language proficiency and boosts self-confidence. Since each learner has their own learning style and strategies for language acquisition, several models and tools for evaluating learning strategies have been developed. Oxford (1990) proposed six basic types of language learning strategies in teaching and learning language, namely Metacognitive, Cognitive, Memory, Compensation, Social, and Affective. O'Malley and Chamot (1990) recommended three domains of language learning strategies, including (1) metacognitive, (2) cognitive, and (3) social. Metacognitive strategies involve learners' planning, thinking, and monitoring of their learning process, as well as evaluating their learning outcomes (Lee, 2010).

Cognitive strategies pertain to specific learning tasks and encompass more direct exploitation of the learning material itself (Brown, 2007). Social Affective strategies relate to social activities and interactions with others (Brown, 2007). Thamrin (2021) indicates that learning strategies encompass the behaviors and thought processes used by learners, influencing what is learned. Several researchers have investigated how learners use learning strategies to acquire Chinese/Mandarin as a foreign language. Tan et al. (2019), Thamrin (2021), and Min et al. (2022) found that the most frequently used learning strategy by learners in acquiring Mandarin was the metacognitive strategy, which focuses on language learning, planning, organizing learning, and evaluating independent learning. Moreover, Tang (2022) and Shuang et al. (2022) reported that learners applied the cognitive strategy, involving mental processes and thinking in language learning activities such as practicing, receiving and sending messages, analyzing and reasoning, and constructing input and output structures, most often in their pursuit of learning Mandarin as a foreign language. However, most of the studies depicted that learners utilized all learning strategies when acquiring Mandarin as a foreign language (Lai et al., 2023; Min et al., 2022; Sae-thung and Boonsuk, 2022; Shuang et al., 2022; Umeanowai and Lei, 2022)."

Past studies on the use of learning strategies to learn foreign language

Many studies have been conducted to investigate foreign language learning, including Chinese/Mandarin, with a focus on learning strategies. Umeanowai and Lei (2022) as well as Sae-thung and Boonsuk (2022) conducted research on learning strategies for Chinese/Mandarin as a foreign language. Umeanowai and Lei (2022) conducted a study regarding learners' beliefs, learning strategies used, and proficiency in learning Chinese/Mandarin as a foreign language in China. The language learning strategies questionnaire was adapted from the strategy inventory language learning by Oxford (1990). The sample of this study involved 120 international students from different countries that study Chinese (Hanyu Shuiping Kaoshi HSK: 4) as a foreign language at various Chinese universities in China. They employed mixed methods of the study. Quantitative research questionnaires were distributed to 120 international students, and qualitative interviews were conducted with a random selection of six students from the initial pool. Referring to the finding, students used metacognitive

learning strategies more frequently than other learning strategies in learning Chinese/Mandarin as a foreign language. The majority of students use new Chinese words in a sentence so they can remember them (mean=4.07). Moreover, students also utilized other learning strategies while learning Chinese/Mandarin. The finding also revealed that students with stronger learning beliefs and more extensive use of learning strategies tend to perform better in their Chinese/Mandarin language learning.

Sae-thung and Boonsuk (2022) conducted research to investigate the Chinese language learning strategies employed by Thai higher education students in learning Chinese/Mandarin as a foreign language. The research encompassed four universities representing different regions of Thailand: the South, Central, Northeast, and North. Quantitative methods were employed to collect data from 114 Thai students enrolled in Chinese language programs. Purposive sampling was utilized for participant selection. To align with the research objectives, the researchers adapted a questionnaire based on Oxford (1990) Strategy Inventory for Language Learning (SILL). The questionnaire on Chinese learning strategies consisted of 70 items categorized into six strategy components: metacognitive, cognitive, memory, social, compensation, and affective. The results regarding metacognitive strategies revealed that students regularly paid attention to and sought to understand the meaning of spoken Chinese, learned from their mistakes, and used these mistakes to improve their subsequent speech. Additionally, they employed off-class strategies to enhance their Chinese speaking skills autonomously. While, regarding cognitive strategies, learners practiced speaking Chinese through online media, memorized Chinese dialogues and sentence patterns for application in real-life conversations, and watched Chinese-speaking TV programs, movies, or series. The research findings endorse that learners frequently utilized all six strategies in their efforts to learn to speak Chinese as a foreign language. It is evident that these strategies collectively contributed to the improvement of their Chinese speaking skills.

Conceptual framework

Learning a foreign language can be challenging and learners need more than motivation to get by. According to Rahmat et al. (2021), learners who are motivated approach the learning task with more enthusiasm. Little milestones motivate learners go aim for more learning success. Successful learners employ learning strategies to facilitate their learning. *Figure 1* shows the conceptual framework of the study. According to Pintrich et al. (1991), there are three learning strategies and they are metacognitive self-regulation, cognitive components and also resource management. This study explores the influence of metacognitive components on cognitive components and resource management.

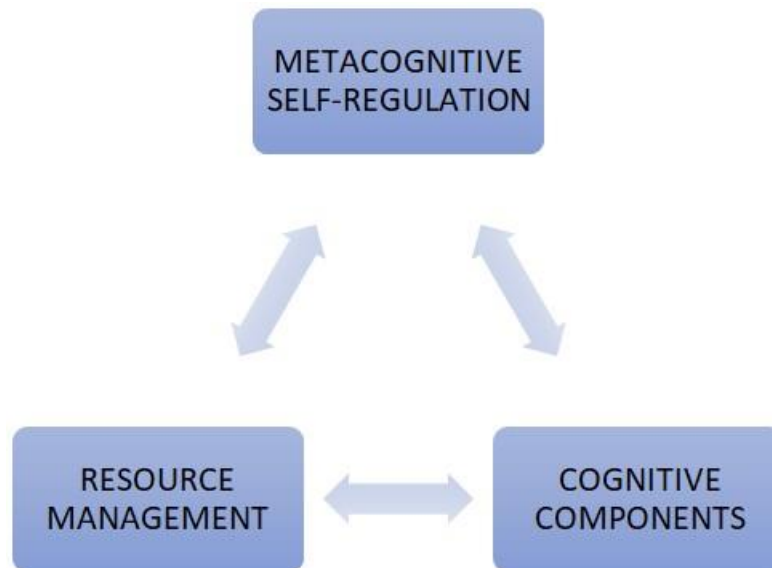


Figure 1. Conceptual framework of the study: The influence of metacognitive components on learning strategies.

Materials and Methods

This quantitative study is done to explore strategies used for learning among undergraduates. A purposive sample of 148 participants responded to the survey. The instrument used is a 5 Likert-scale survey and is rooted from Pintrich et al. (1991) to reveal the variables in *Table 1*. The survey has 4 sections. Section A has items on demographic profile. Section B has 19 items on cognitive components. Section C has 11 items on metacognitive self-regulation and section D has 11 items on resource management. *Table 2* shows the reliability of the survey. The analysis shows a Cronbach alpha of .961, thus, revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

Table 1. Distribution of items in the survey.

Category	Description	Total
Cognitive components	Rehearsal	4
	Organization	4
	Elaboration	6
	Critical thinking	5
Metacognitive self-regulation	-	11
Resource management	Environment management	5
	Effort management	4
	Help-seeking	2
Total		41

Table 2. Reliability of survey.

Cronbach's Alpha	N of items
.961	41

Results and Discussion

Findings for demographic profile

The data in *Figure 2* shows that 18% of the 148 respondents are male students and 82% are female students. *Figure 3* shows that 38% of the 148 respondents are from the science and technology discipline, 25% are from social sciences and 37% are from business. *Figure 4* shows that 30% of the 148 respondents are from Mandarin level 1, 49% are from Mandarin level 2 and 21% are from Mandarin level 3.

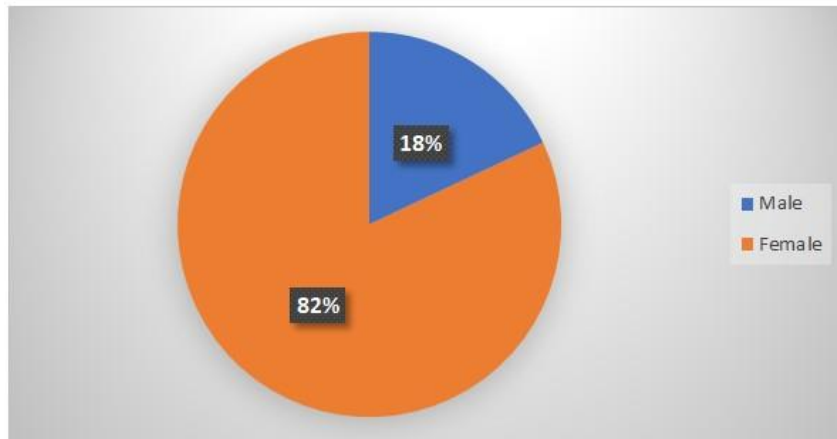


Figure 2. The percentage for gender.

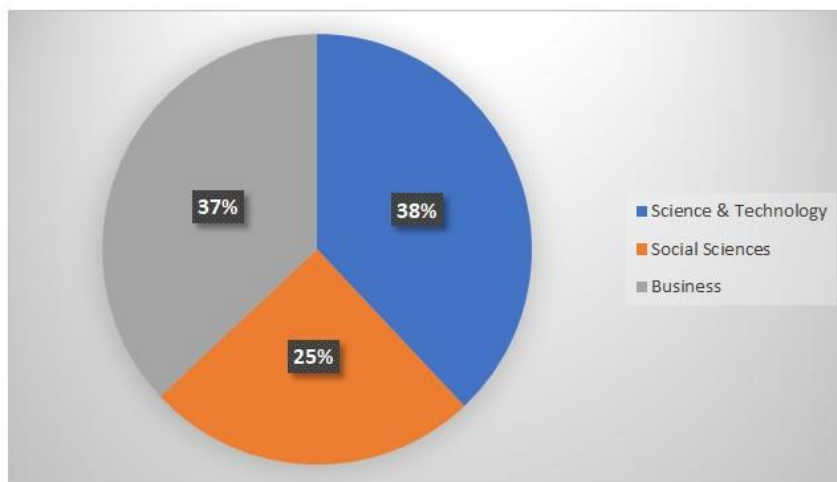


Figure 3. The percentage for discipline.

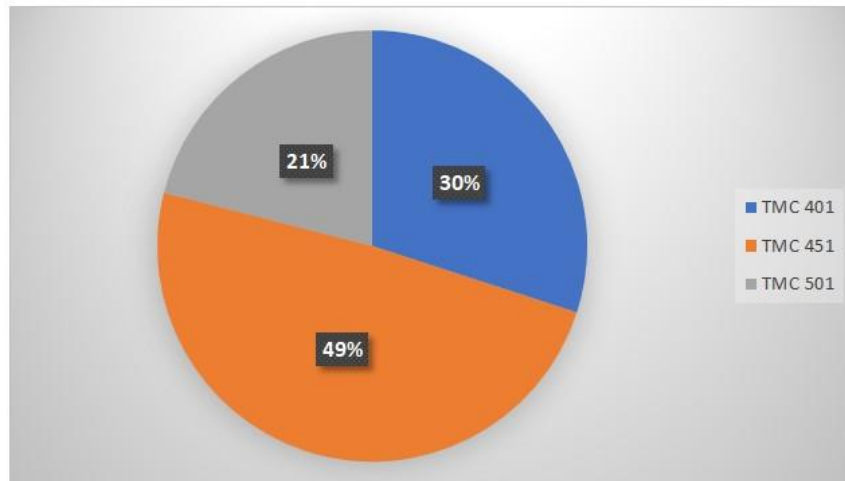


Figure 4. The percentage for mandarin level.

Findings for metacognitive self-regulation

This section presents data to answer research question 1: How do learners perceive the use of metacognitive self-regulation in learning?

Metacognitive self-regulation (11 items)

Figure 5 displays the averages indicating the impact of metacognitive self-regulation on the acquisition of foreign languages. The mean scores varied between 3 and 4 across eleven items. MSSRQ 3 has the highest mean ($M=4$), indicating that when learners are confused about something they are reading in class, they will try to figure it out. Additionally, both item MSSRQ 9 and MSSRQ 10 demonstrate that learners try to determine the concepts they don't understand well and set goals in each study period when they study for the courses ($M=3.9$). The items MSSRQ 4, MSSRQ 6, MSSRQ 7, and MSSRQ 11 all shared a mean score of 3.8. Following closely were the two items labeled as MSSRQ 5 and MSSRQ 8, with a mean of ($M=3.7$). The lowest mean at 3 was recorded by the item MSSRQ1, which shows that learners miss important points due to a lack of focus during class.

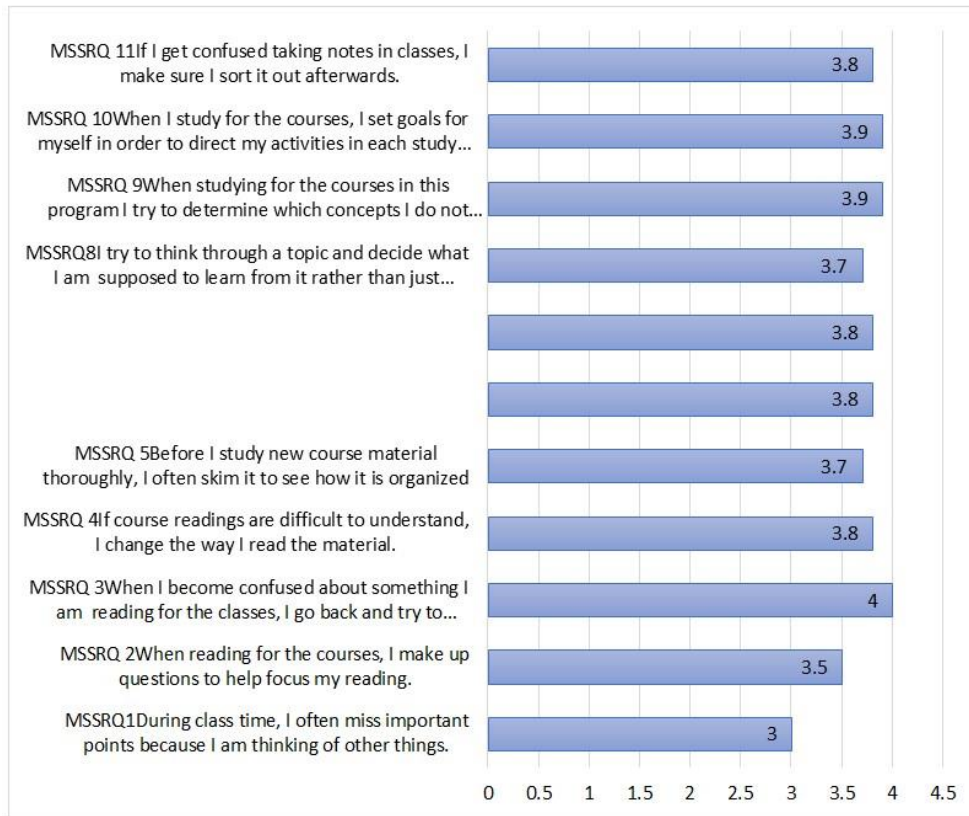


Figure 5. Mean for metacognitive self-regulation.

Findings for cognitive strategies

This section presents data to answer research question 2: How do learners perceive the use of cognitive strategies in learning?

Cognitive components (19 items)

Rehearsal (4 items)

As shown in *Figure 6*, Rehearsal can be seen as a potential indicator for Cognitive components in the context of learning Mandarin as a foreign language. Most students tend to memorize keywords to remind themselves of important concepts in Mandarin class (M=4.2). Next at mean score 4 is “When I study for the classes, I practice saying the material to myself over and over”. Items LSCCRQ2 and LSCCRQ4 also show a high mean score at 3.9, which are “When studying for the courses, I read my class notes and the course readings over and over again.” and “I make lists of important items for the courses and memorize the lists.”

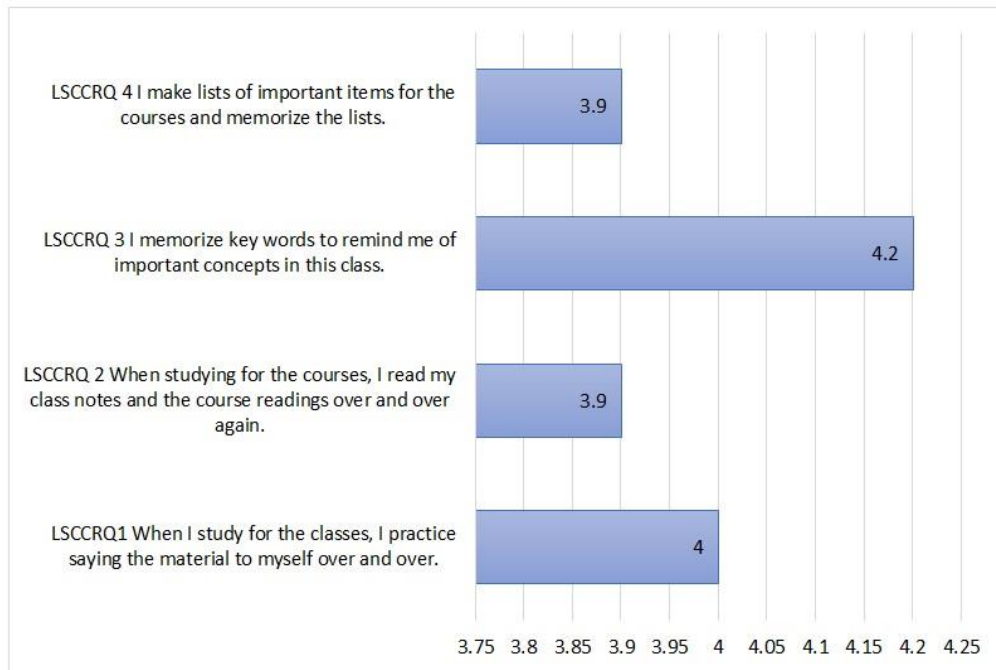


Figure 6. Mean for rehearsal.

Organization (4 items)

Figure 7 presents the mean score for Organization. Item LSCCOQ2 shows the highest mean (M=4), whereby students agree that when they study for the course, they go through the readings and class notes and try to find the most important ideas. Followed by item LSCCOQ4 (M=3.9), students go over their class notes and make an outline of important concepts when studying the course. Next at mean score 3.8 is “When I study the readings for the courses in the program, I outline the material to help me organize my thoughts”. Item LSCCOQ3 received the lowest mean score (M=3.3), which is “I make simple charts, diagrams, or tables to help me organize course materials in this program”.

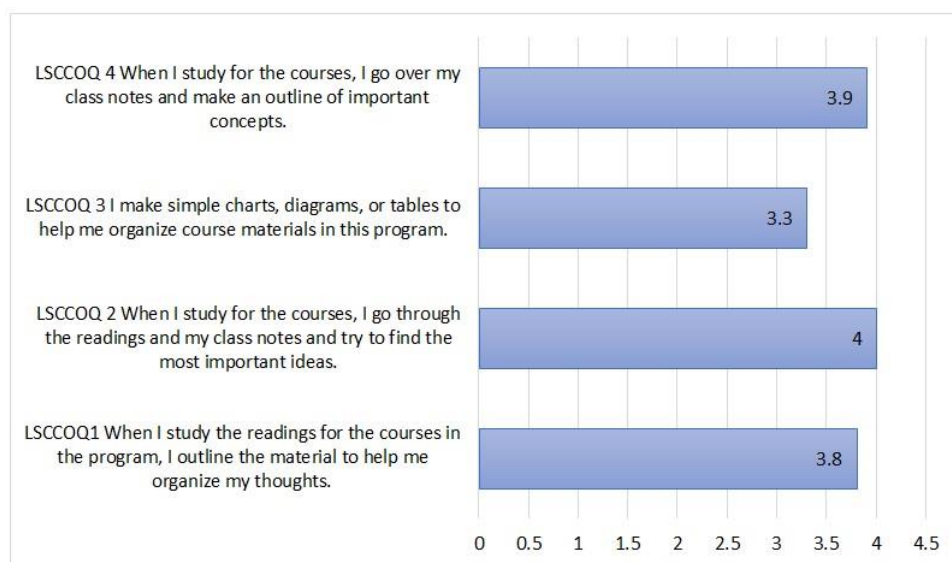


Figure 7. Mean for organization.

Elaboration (6 items)

Figure 8 displays the mean score for Elaboration. The highest mean score, at 4, is associated with two items, which are “When reading for the courses, I try to relate the material to what I already know” and “I try to understand the material in the classes by making connections between the readings and the concepts from the lectures”. The lowest mean score, at 3.6, is attributed to the statement “When I study for the courses in this program, I write brief summaries of the main ideas from the readings and my class notes”.

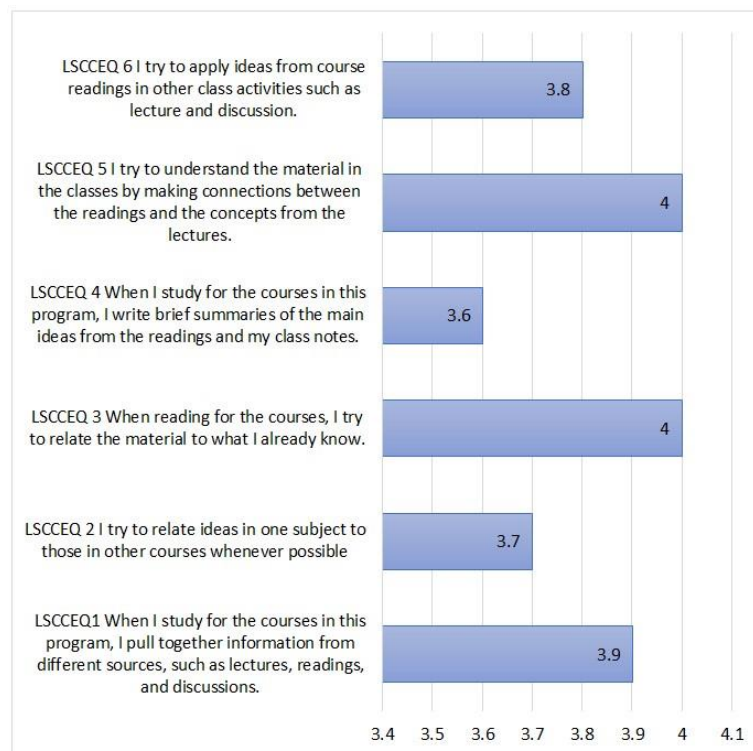


Figure 8. Mean for elaboration.

Critical thinking (5 items)

Figure 9 displays the mean score of the critical thinking of learners. The highest mean score (M=3.9) belongs to two items, which “I often find myself questioning things I hear or read in the courses to decide if I find them convincing” and “I try to play around with ideas of my own related to what I am learning in the courses”. The second higher mean score recorded for two items (LSCCCTQ 3 and LSCCCTQ 5) with mean score M=3.8. The lowest mean score M=3.7 was recorded for the item “LSCCCTQ 2When a theory, interpretation, or conclusion is presented in classes or in the readings, I try to decide if there is good supporting evidence.” Nevertheless, the average mean score of critical thinking falls between 3.6-3.9 which were interpreted as “often”. This revealed that learners/participants “very often” engage in critical thinking during Mandarin language learning.

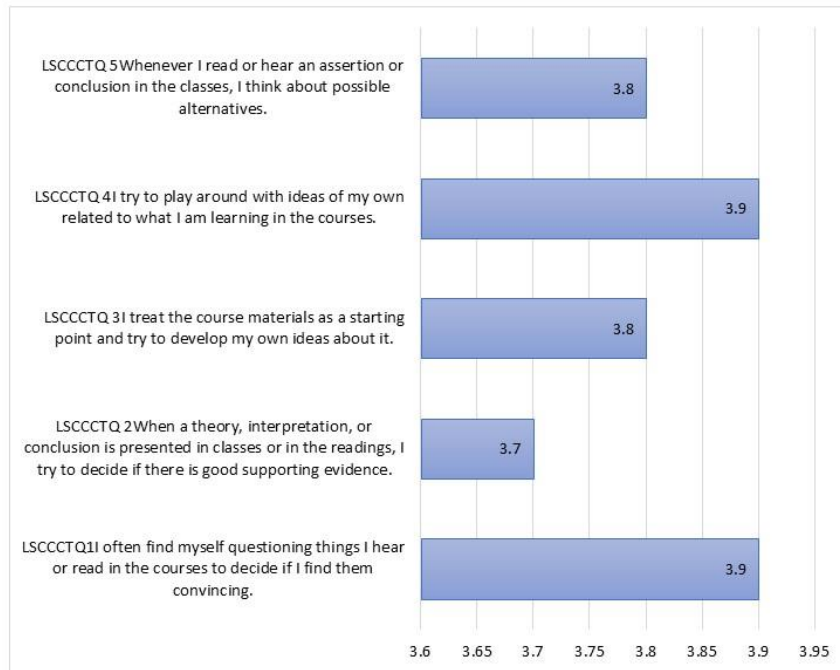


Figure 9. Mean for critical thinking.

Findings for resource management

This section presents data to answer research question 3: How do learners perceive resource management strategies in learning?

Resource management component (11 items)

Environment management (5 items)

Figure 10 indicates the results for the environment management use in mean scores for learning Mandarin as a foreign language. 4 out of 5 items recorded the mean scores between 4.0 to 4.5. Learners, who attend the classes regularly, score the highest mean at 4.5, followed by learners who usually study in a place where learners can concentrate on their coursework. The two items: RMCEMQ 2 and RMCEMQ3, shared the same mean of 4. The lowest mean at 3.9 was recorded by the item RMCEMQ 4, which indicates that “I make sure that I keep up with the weekly readings and assignments for the courses.” It shows that environment management plays an important role in learners learning the Mandarin language.

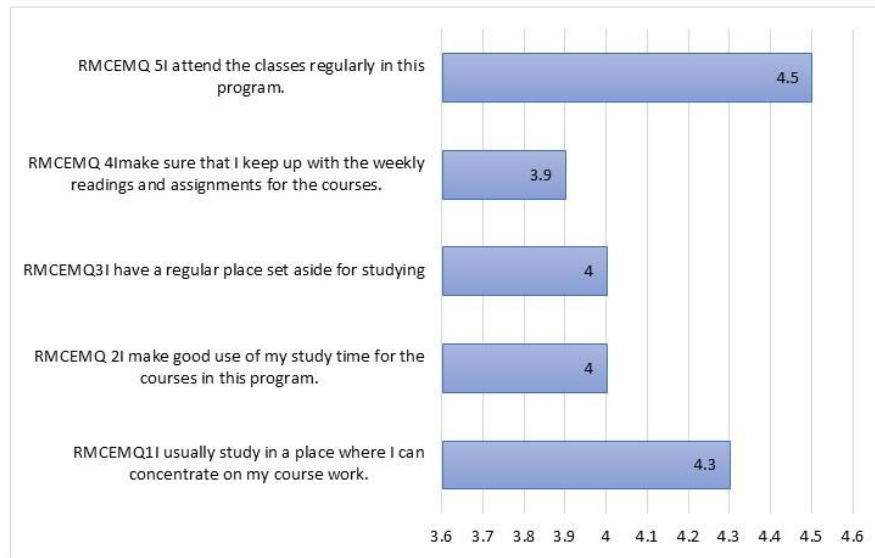


Figure 10. Mean for environment management.

Effort management (4 items)

Figure 11 implies the mean results of effort management ranging from 3.9 to 4.0. The highest mean score of both items marked RMCEMQ1 and RMCEMQ2 with $M=4.00$ correspondingly. It revealed that learners have a regular place set aside for studying and work hard to do well in the classes when learning Mandarin. On the other hand, two items (RMCEMQ 3 and RMCEMQ 4) display the lowest mean with $M=3.9$.

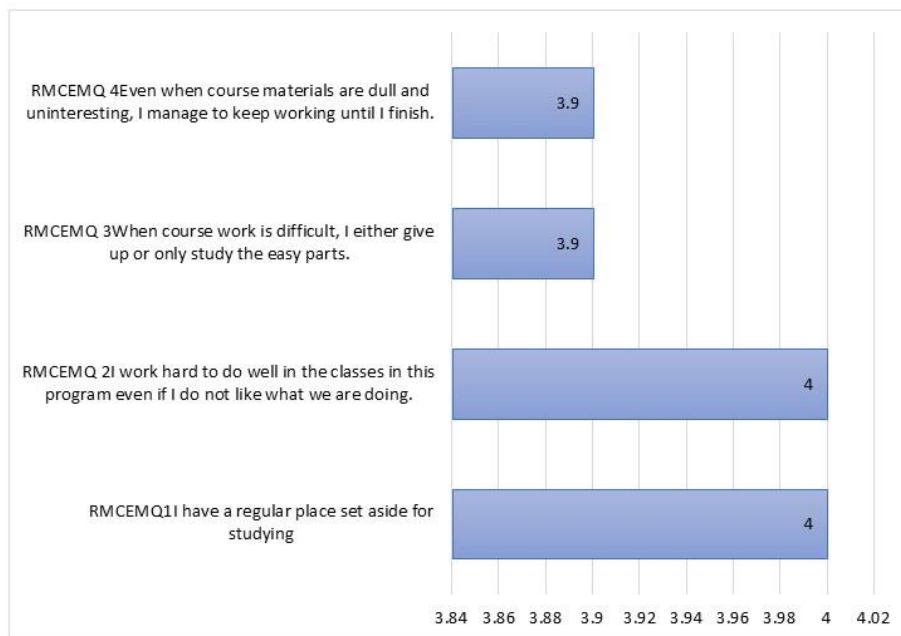


Figure 11. Mean for effort management.

Help-seeking (2 items)

As shown in Figure 12, learners who ask another student in the class for help when cannot understand the materials obtained the highest mean score of $M=4.2$. Besides, learners try to identify students in the classes whom they can ask for help, with the

mean verified at 4.1. The finding reveals that help-seeking elements could help learners learn Mandarin better.

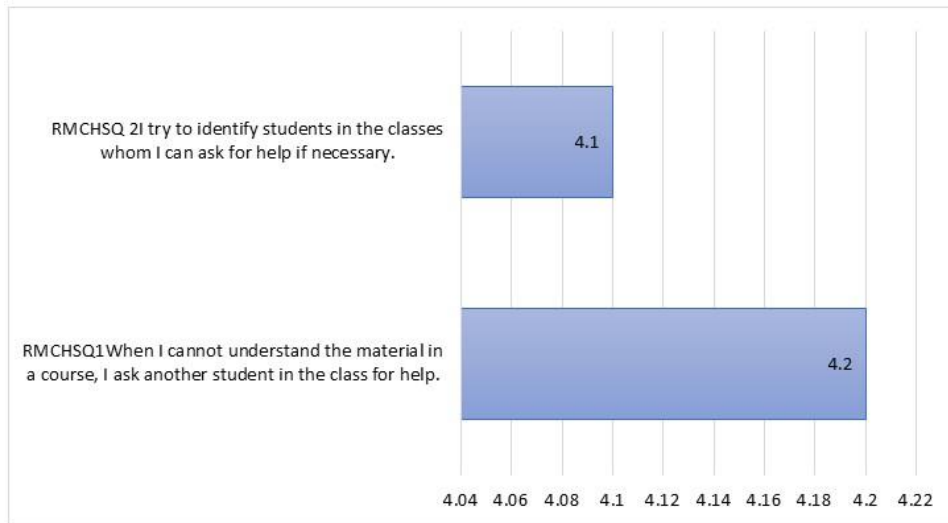


Figure 12. Mean for help-seeking.

Findings for relationship between metacognitive strategies and learning strategies

This section presents data to answer research question 4: Is there a relationship between metacognitive strategies and learning strategies? To determine if there is a significant association in the mean scores between metacognitive, effort regulation, cognitive, social and affective strategies data is analysed using SPSS for correlations. Results are presented separately in Table 3, Table 4, and Table 5.

Table 3. Correlation between metacognitive self-regulation and cognitive components.

Category		Metacognitive	Cognitive
Metacognitive	Pearson correlation	1	.831**
	Sig. (2-tailed)	-	.000
	N	148	148
Cognitive	Pearson correlation	.831**	1
	Sig. (2-tailed)	.000	-
	N	148	148

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

Table 4. Correlation between cognitive components and resource management.

Category		Metacognitive	Cognitive
Cognitive	Pearson correlation	1	.708**
	Sig. (2-tailed)	-	.000
	N	148	148
Resource management	Pearson correlation	.708**	1
	Sig. (2-tailed)	.000	-
	N	148	148

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

Table 5. Correlation between resource management and metacognitive self-regulation.

Category		Metacognitive	Cognitive
Resource management	Pearson correlation	1	.737**

	Sig. (2-tailed)	-	.000
	N	148	148
Metacognitive	Pearson correlation	.737**	1
	Sig. (2-tailed)	.000	-
	N	148	148

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

Table 3 shows there is an association between metacognitive and cognitive strategies. Correlation analysis shows that there is a high significant association between metacognitive and cognitive strategies ($r=.831^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between metacognitive and cognitive strategies. Table 4 shows there is an association between cognitive and resource management strategies. Correlation analysis shows that there is a high significant association between cognitive and resource management strategies ($r=.708^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between cognitive and resource management strategies. Table 5 shows there is an association between resource management and metacognitive strategies. Correlation analysis shows that there is a high significant association between resource management and metacognitive strategies ($r=.737^{**}$) and ($p=.000$). According to Jackson (2015), coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between resource management and metacognitive strategies.

Conclusion

This study investigated the strategies employed by learners during their language acquisition process. The analyzed data indicates that during the acquisition of the Mandarin language, the most commonly utilized metacognitive self-regulation strategy is to revisit and clarify confusing material encountered during class readings. This finding is aligned with the previous studies (Seng et al., 2023; Min et al., 2022; Idris et al., 2022). Regarding cognitive strategies, rehearsal emerges as the most frequently employed technique among the four strategies. This finding shows that students often choose to enhance their Mandarin proficiency by memorizing key vocabulary and repeatedly practicing the material, which is consistent with prior research (Umeanowai and Lei, 2022; Gao, 2020), where the memory strategies had been highly used in Chinese language learning. In terms of resource management strategies, environment management and help-seeking are frequently employed by Mandarin learners, in line with a previous studies (Min et al., 2022).

Additionally, the result reveals a strong positive correlation between metacognitive self-regulation strategies, cognitive strategies and resource management strategies

throughout the Mandarin language learning process. This correlation shows that metacognitive self-regulation strategies aid and assist by cognitive strategies and resource management strategies during language acquisition, thereby indirectly impacting the overall language learning process. In the conducted research, metacognitive self-regulation learning strategies manifested a moderate impact on overall learning strategies, exhibiting the lowest mean value among all evaluated strategies ($M=3.78$). Nevertheless, the findings delineate a robust correlation between metacognitive self-regulation strategies, cognitive strategies, and resource management strategies. Consequently, it is empirically evident that these three strategies exert a synergistic influence on one another, profoundly shaping students' acquisition and proficiency in the Mandarin language.

This research examines the strategies used by Mandarin language learners during their language-learning process. By understanding the language learning strategies employed by students, instructors can enhance their teaching approach to facilitate students' learning. For instance, this study reveals that help-seeking and environment management strategies are the most commonly used strategies among Mandarin language learners. Based on these findings, instructors could organize more group activities to assist students in applying help-seeking strategies, thereby achieving successful learning outcomes. Regarding the environment management strategy, instructors can provide a conducive environment to support students' language acquisition. In our survey, it was observed that there was an imbalance in the number of respondents from both genders. This discrepancy precludes us from drawing definitive conclusions regarding the influence of gender on the selection of learning strategies. Consequently, it is recommended that future studies address this research gap, with a broader sample encompassing a more diverse demographic of language learners. Such an endeavor holds the potential to provide valuable insights to educators, enabling them to tailor their pedagogical approaches to the unique characteristics and needs of their students. Ultimately, this tailored approach to instruction may indirectly contribute to enhanced learning outcomes and the cultivation of successful language learners.

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Conflict of interest

The authors confirm that there is no conflict of interest involve with any parties in this research study.

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