How Does Resource Management Influence Language Learning?

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ABSTRACT

Resource management in language learning is an important aspect in language acquisition. It helps language learners to plan, monitor, as well as use their time, materials, and strategies effectively to make learning more focused and efficient. With good resource management, learners become more independent and are better able to maintain ongoing language development. The study is carried out to explore the influence of resource management on language learning, particularly on learners' perceptions of resource management, cognitive components, and metacognitive self-regulation, as well as the relationships among these components. It also seeks to identify whether significant differences exist across learner clusters. To extract the necessary data, a quantitative research approach using a survey method grounded in Self-Determination Theory (Ryan & Deci, 2000) was distributed among a total of 138 respondents from Universiti Teknologi MARA (UiTM) and AIMST University, Malaysia. The findings show consistent uses of resource management, cognitive strategies, and metacognitive self-regulation across learner clusters, with a positive relationship among these components. This suggests that strengthening learners' resource management and self-regulatory skills should be emphasised in Malaysian ESL classrooms to support more effective and sustainable language learning.

Keywords: Resource management, Language learning, language learning strategy, LLS

INTRODUCTION

Background of Study

Language acquisition is not merely an outcome of exposure to learning input and instruction. It also involves processes that are often strategic and complex. Recent research has underscored the crucial role of learners' resource management strategies, identifying them as important determinants of successful attainment of language competence and learning autonomy. Resource management methods, which encompass regulation of time, environment, help-seeking, and effort, have been reported as fundamental strategies or components that significantly empower learning (Oxford, 2017; Zimmerman, 2008). They assist learners in effectively planning their learning activities, creating supportive and conducive environments for doing so, and mobilising social support for sustaining engagement with learning tasks. In general, resource management is often utilised within the context of self-regulated learning (SRL), in which learners are described as actively planning, monitoring, and modifying their learning tactics to succeed. Moreover, self-regulated learners can effectively regulate their learning, adapt well in varied environments, evaluate and re-evaluate strategies used, and persistently put effort into completing challenging tasks.

Previous work focused primarily on cognitive and metacognitive methods, sidelining the important role of resource management. Recent studies, however, have increasingly concentrated on learners and their ability to

manage resources, which is central to the successful execution of language learning strategies and the attainment of linguistic competence. This is supported by, among others, a quantitative study by Che Mustafa et al. (2025), which showcases language learners' high preference for and tendency to use resource management strategies, namely, environmental control and effort. Their finding reported that the strategies are strongly associated with learners' utilisation of cognitive and metacognitive strategies in the context of second language learning, supporting the notion that resource management strategically regulates their implementation of overall strategies and learning behaviour.

Oxford (2017) defines strategies in learning as decisions made through actions that involve the techniques and approaches learners use in acquiring a language. Meanwhile, resource management refers to their ability to organise, strategise, and control resources, including effort, time, help-seeking, and learning contexts, based on their changing needs (Pintrich, 2004; Zimmerman, 2008). Teng et al. (2024) positively link resource management, as a part of self-regulated vocabulary learning, to learners' knowledge of vocabulary and highlights its strategic role in determining their perception and control, which consequently impacts their study behaviours. In the same way, learners' metacognitive self-regulation, which means organising and planning how to use feedback, helps them see themselves as more capable and better at managing speaking tasks, leading to improved involvement and performance in this skill.

Nonetheless, regardless of the many studies done on cognitive and metacognitive strategies, research on resource management remains scarce despite its importance in understanding how autonomous or self-regulated learning works. It is even more relevant in the modern era, where vast technology-mediated materials are available, and online blended learning environments are becoming more predominant. These situations not only require learners to be more independent in their learning but also warrant them to identify and utilise strategies that work best for themselves, including planning their study schedules, directing and redirecting their learning, overcoming distractions, and making strategic decisions in utilising their resource management.

Considering today's evolving (language) learning contexts, attaining a better understanding of learners' perceptions of resource management, metacognitive self-regulated learning, and cognitive processes is even more relevant. Moreover, the interrelationships between resource management and various strategies must be explored to shed light on a better understanding of how the two supporting elements will work best in learning. Most research has commonly looked at the relationships between instructional interventions and learners' academic performance, which makes exploring how learners perceive and integrate their strategies during the learning process more relevant. Therefore, a clear gap exists in identifying the strategic learning behaviours that learners consciously recognise, materialise, and consistently employ in real-world learning environments.

Statement of Problem

Studies related to L2 acquisition have mostly focused on the important role of self-regulated learning (SRL) in scaffolding effective language learning. Cognitive strategies, metacognitive self-regulation, and resource management have been reported as strongly associated and identified components in the foundational frameworks that enable learners to be highly engaged with their learning tasks (Pintrich, 2004; Zimmerman, 2008). Meanwhile, Oxford (2017) highlights them as crucial elements that guide learners in planning, monitoring, and assessing their language learning processes. Teng et al. (2024) and Zhang (2024) found that self-regulatory processes are closely connected to improvements in learning a second language, especially in how well learners understand vocabulary and participate in speaking activities. The more recent studies indicate that strategic regulation remains a much-researched topic in language learning studies.

Even though there are many studies conducted in this area, the majority have been focusing on investigating self-regulated learning and learners' autonomy and their direct associations and impact on the learning outcomes, leading to the establishment of a theoretical framework in this area. However, managing resources in language learning, which includes how learners control their effort, time, seeking help, and their learning environment, has mostly been considered a minor part rather than a key factor in ensuring that successful language learning takes place within the established SRL model. Meanwhile, despite finding close links

between resource management and both cognitive and metacognitive strategies, Che Mustafa et al. (2025) stressed the necessity of explaining how learners comprehend and experience these connections. Teng et al. (2004) and Zhang (2024) also mentioned other factors, such as learners' differences in regulating various self-regulatory components, specifically in autonomous and technology-mediated contexts, warranting the need to further investigate their perception of resource management and its impact on their language learning. This study, therefore, aims to bridge this gap by exploring learners' perception and regulation of resource management, as well as how it relates to their language acquisition.

Research Questions

This study was done to explore the influence of resource management on language learning. Specifically, this study is done to answer the following questions:

1.3.1 How do learners perceive their resource management in language learning?

1.3.2 How do learners perceive their cognitive components in language learning?

1.3.3 How do learners perceive their metacognitive self-regulation in language learning?

1.3.4 Is there a relationship between resource management and cognitive components?

(H1-There is no relationship between resource management and cognitive components)

1.3.5 Is there a relationship between resource management and metacognitive self-regulation?

(H2-There is no relationship between resource management and metacognitive self-regulation)

1.3.6 Is there a significant difference for all components across clusters?

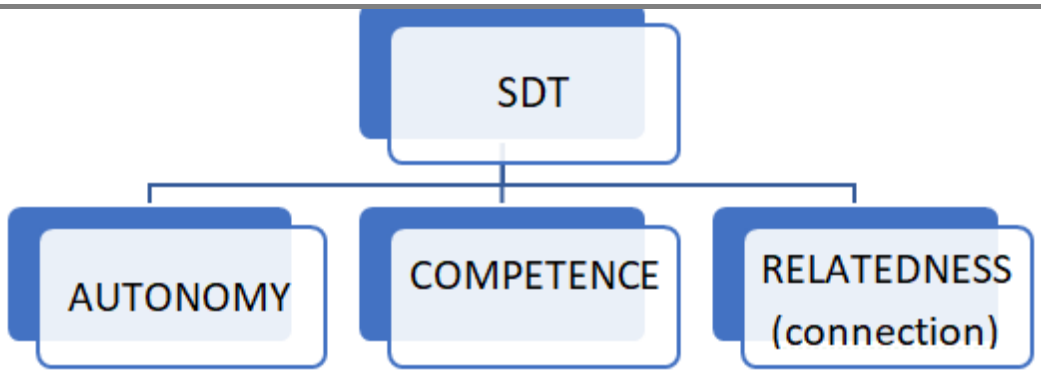
(H3-There is no significant difference for all components across clusters)

LITERATURE REVIEW

Theoretical Framework of the Study

Self-Determination Theory (SDT), developed by Ryan and Deci (2000), explains human motivation in terms of autonomy, competence, and relatedness. According to the theory, learners' engagement with learning activities becomes more effective when they have full control of their actions, feel confident about their ability to attain success, and are supported by meaningful social connections. In the context of language learning, this theory suggests that learners who experience a sense of control over their study methods, feel capable of mastering language tasks, and can interact effectively with peers or instructors are more intrinsically motivated to learn. Intrinsic motivation, which is central to SDT, is linked to sustained effort, active engagement, and the willingness to use various learning strategies, all of which are essential for successful language acquisition.

Applying SDT to language learning highlights how motivation influences learners' use of strategies like environment management, effort regulation, and help-seeking. Those who feel autonomous are more likely to plan their study environment and manage their resources effectively, as they see these actions as personally meaningful rather than externally imposed. A sense of competence encourages learners to persist through challenging tasks and regulate their effort, reflecting the metacognitive and cognitive strategies discussed in previous studies. Additionally, relatedness (connection) supports learners in seeking help from peers, seniors, or instructors, reinforcing collaborative and social strategies in language learning. Overall, SDT provides a conceptual framework for understanding why learners adopt specific strategies and how their motivation shapes their ability to self-regulate, manage resources, and achieve better language learning outcomes.



Language learning strategies

Oxford (1990) explains that Language Learning Strategies (LLS) involves learners' conscious actions and thoughts that are used in facilitating the acquisition, retrieving, and using a second language. In the ESL context, these strategies are essential in managing linguistic challenges and improving language proficiency. LLS are commonly categorised into cognitive, metacognitive, social, and affective strategies, each supporting different dimensions of language learning (O'Malley & Chamot, 1990; Oxford, 2011). Specifically, cognitive strategies assist learners in practising and manipulating language forms such as practising, analysing, summarising, and using memory-related techniques. This strategy helps ESL learners process linguistic input more effectively and support the development of vocabulary, grammar, and comprehension skills.

In addition, metacognitive strategies allow learners to take charge of their own learning through proper planning, monitoring, and evaluation. It encourages self-regulation and learner autonomy as it involves setting learning goals, organising study time and learners reflecting on their language learning process. Conversely, social strategies places importance on peer interaction for learning to take place, which include includes asking questions, seeking clarification, and cooperating with peers or teachers. It is a strategy particularly important in ESL learning, as meaningful communication and social engagement provide opportunities for authentic language use.

Lastly, affective strategies focus on managing emotions, motivation, and attitudes related to language learning. These strategies help ESL learners reduce anxiety, build confidence, and maintain motivation, which can positively influence their willingness to communicate and persist in learning.

Past studies on language learning strategies

Several research has been carried out on resource management in the context of language learning, particularly in relation to self-regulation strategies and learning outcomes, as well as self-regulated learners and their choices of strategies. Zhang (2024) conducted an experimental study among 80 Chinese EFL (English as a foreign language) students to compare those receiving self-regulation strategy instruction and others who used the traditional approach. A positive relationship was found, whereby students with self-regulation strategies had higher motivation, creativity and willingness to communicate. This proves that self-regulation strategy instruction helps students to improve the cognitive, affective, and communicative aspects, which enable them to learn the language with greater autonomy and efficiency. Meanwhile, Redmer (2022) utilised Oxford's strategic self-regulation (S^2R) model in a study among advanced language learners to elucidate how self-regulation and language learning strategies are used within the framework. Results indicate that strategy utilisation was dynamic, individualised, and interactive, with contextual elements including task requirements and learner objectives. The finding indicates that language learning strategies are interconnected elements of self-regulated behaviour, not isolated techniques. This means learners strategically regulate their learning strategies to align with their personal goals and external or situational contexts. Thus, when faced with challenging tasks, advanced learners strategically navigate their cognitive, metacognitive, and resource allocation processes.

Erdogan (2018) investigated university students' resource management, specifically their self-regulation and language learning strategies. A strong positive relationship was observed between their time management and

monitoring (as elements of self-regulated learning) and their use of strategic behaviours when dealing with language tasks. This finding emphasises the key role of resource management for effective learning to take place, in which higher strategic use in the cognitive and metacognitive domains among students who managed their attention, environment, and time well by adjusting their plan, monitoring, and strategies. Strong empirical evidence for this concept can be found in a study by Teng and Zhang (2026) that reported resource management as a foundational element that forms the basis for self-regulated learning in the context of language learning. Their study, which was based on a validated multidimensional model, showed that learners' engagement of cognitive and metacognitive strategies could be forecasted based on how well they are able to manage their time, effort, and learning environment. This finding significantly establishes resource management as an important condition for, rather than a mere outcome of, strategic learning. The result is also in line with Pintrich's (2024) self-regulated learning model that frames resource management as a guiding process or control mechanism that assists learners in performing their language learning tasks.

Prior research highlights the importance of strategic learning through learners' cognitive, metacognitive, and motivational elements that assist in language acquisition. Nonetheless, it is important to highlight that the reviewed studies often frame resource management as resulting from these elements or a secondary aspect rather than the primary regulatory mechanism in language learning. Moreover, the past studies did not scrutinise learners' perceptions of how (well) they manage learning resources when carrying out language learning tasks. Hence, the current study addresses this gap by tapping into their perspectives on their resource management strategies as a fundamental mechanism that influences their cognitive components and metacognitive self-regulation in language acquisition.

Studies on resources and language learning

Numerous studies have investigated how resource management influences language learning success. Among other, resource management is deemed a critical factor determining learning strategies use among second language learners (Raffi et al., 2023). Utilising the quantitative approach, this research seeks to discover how students perceive resource management and the relationships between resource management and other strategy components. The study used a 5-point Likert Scale questionnaire distributed among 118 university students at a public university in Malaysia to extract data on their demographic profile, cognitive components, metacognitive self-regulations and resource management. The findings revealed that resource management plays a crucial role in promoting academic achievement, particularly in the context of language learning. The findings suggest that effective language learning outcomes are achieved when cognitive, metacognitive, and resource management strategies operate in tandem. In a similar vein, Che Mustafa et al. (2025) also quantitatively assessed how learners perceived their choices of various language learning strategies when learning a new language. The study involved 110 undergraduate students from science as well as social sciences and humanities disciplines and utilised a 5-point Likert-scale survey comprising sections on demographic background, cognitive strategies, metacognitive strategies, and resource management. The results revealed that all three components are equally significant in supporting language learning and demonstrated a strong positive relationship between resource management, cognitive strategies, and metacognitive self-regulation. These findings suggest that learners who effectively manage their learning resources are more likely to engage in strategic and self-regulated learning. Consequently, the study highlights the importance for foreign language educators to recognise the diversity of learning strategies employed by learners and to incorporate resource management support into instructional practices, as it substantially influences learners' overall language learning strategies.

This has also been explored in prior study by Muniam et al. (2025) involving 142 Malaysian undergraduate ESL learners explored the motivational factors underlying language learning by examining the interrelationships among cognitive strategies, metacognitive self-regulation, and resource management. The 5-point Likert-scale questionnaire, developed by Wenden and Rubin (1987), revealed that all three variables significantly influence learners' language learning and are strongly interconnected. The findings indicated that cognitive strategies are crucial in improving language comprehension and retention while learners demonstrated at moderate to high levels of active participation and critical thinking through questioning. This indirectly revealed that language acquisition necessitates active learning to take place. Another significant element is metacognitive self-regulation which indicates learners' capabilities in monitoring and controlling

learning processes. Moreover, the effective integration of information from multiple learning resources was found to substantially enhance learning experiences and outcomes. These studies underscore the significant role of resource management as part of a broader strategic framework that supports self-regulated learning, suggesting that a deeper understanding of these interrelated strategies is essential for developing instructional interventions that enhance academic self-efficacy, foster supportive learning environments, and inform curriculum and instructional design. The reviewed literature highlights the important role of resource management in language learning, which has a close relationship with cognitive and metacognitive strategies. The findings suggest that learners who effectively manage their learning resources, regulate their effort, and seek appropriate support tend to demonstrate more strategic learning behaviour and achieve better language learning outcomes. These studies also show that resource management does not operate independently but works together with other learning strategies to support successful learning. Therefore, it can be argued that resource management functions as an important element in the language learning process by enabling learners to apply cognitive and metacognitive strategies more effectively. This highlights the importance of incorporating resource management into language instruction to support learner autonomy and improve overall language learning success.

Conceptual framework of the study

The conceptual framework of this study in illustrated in Figure 1 below. This research work investigates the impact of resource management on language learning strategies. Rahmat and Thasrabiab (2024) postulate that the environment has a positive impact on language learning. Learners respond to the learning environment and the response motivates their learning. The self-determination theory, proposed by Ryan and Deci (2000), in combination with the instrument by Wenden and Ruben (1987), is used as the basis for the current research. The theory states that learners need autonomy, competence and relatedness to stay motivated. In this regard, learners' need for autonomy through their use of rehearsal, organization, elaboration, and the abilities to think critically. Their need for competence is manifested through their self -regulation of metacognitive strategies. Lastly, learners gain relatedness using resource management aspect which includes environment management, effort management, and help-seeking strategies. Additionally, this research also works on investigating the link between resource management and all other factors in learning.

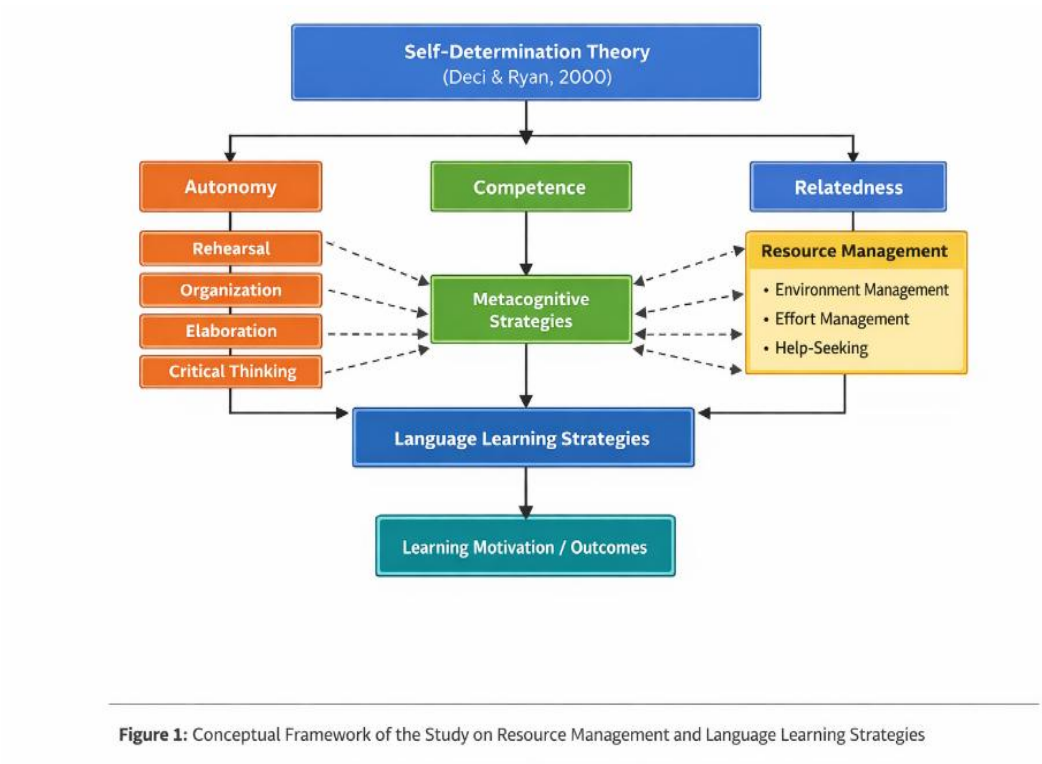


Figure 1. The conceptual framework of the study

(The Influence of Resource Management on Language Learning)

METHODOLOGY

This study is conducted to explore the influence of resource management on language acquisition. To extract the necessary data, A 5-Likert scale survey adapted from Wenden and Rubin (1987), was distributed among a convenient sample of 138 participants. For data analysis, the categories of responses are shown in Table 1 below.

Table 1. Likert Scale Use

1	Never
2	Rarely
3	Sometimes
4	Very Often
5	Always

The distribution of items in the survey is given in Table 2. The questionnaire is organised into three main variables namely Cognitive Components, Metacognitive Self-Regulation and Resource Management. Each variable is further divided into specific constructs adapted from Wenden and Ruben (1987). For section A, the Cognitive Components variable is distributed across four constructs namely Rehearsal (4 items), Organisation (4 items), Elaboration (6 items), and Critical Thinking (5 items). These constructs measure learners' cognitive processing strategies used in learning tasks. The Cronbach's alpha value for this variable is .928. In section B, the Metacognitive Self-Regulation incorporated 11 items, which assess the capabilities in planning, monitoring and evaluating learners' learning processes. This variable's Cronbach's alpha value is at .889.

Lastly, the Resource Management variable includes three constructs: Environment Management (4 items), Effort Management (4 items), and Help-Seeking (4 items). These constructs examine learners' use of strategies to manage learning resources, maintain effort, and seek assistance when necessary. The reliability analysis obtained Cronbach's alpha value of .822.

Ultimately, the instrument used showed great reliability with an overall Cronbach's alpha of .954. This confirms that the questionnaire used is a reliable method to assess learning strategies among ESL learners.

Table 2. Distribution of Items in the Survey

	VARIABLE (KEYWORD)		CONSTRUCT	ITEMS	TOTAL ITEMS	Cornbach Alpha
A	COGNITIVE COMPONENTS	(a)	Rehearsal	4	19	.928
		(b)	Organization	4		
		(c)	Elaboration	6		
		(d)	Critical Thinking	5		
B	METACOGNITIVE SELF-REGULATION				11	.889
C	RESOURCE MANAGEMENT	(a)	Environment Management	4	12	.822
		(b)	Effort Management	4		
		(c)	Help-Seeking	4		
					42	.954

Table 3. Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

To determine the internal reliability of the instrument, reliability analysis is done. Table 3 shows the distribution and interpretation of Cronbach Alpha range. According to Ahmad et al. (2024), Cronbach Alpha scores between 0.7 and 0.9 are considered acceptable and an excellent reliability level. Specifically, the Cronbach alpha of .928 is obtained for Cognitive components, followed by .889 for Metacognitive Self-Regulation, and .822 for Resource Management. Meanwhile, the overall Cronbach Alpha for all 42 items is .954, which indicates a good reliability of the instrument chosen. Data analysis of SPSS is used to present findings for all the research questions.

FINDINGS

Demographic Analysis

According to Zienefuss et al. (2021), researchers report demographic data in percentages to establish sample representatives and allow for generalisability to a larger population. The reporting also provides an overview of participants' characteristics. Percentages offer a clear and understandable picture of the sample makeup.

Table 4 - Percentage for Demographic Profile

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	41%
		Female	59%
3	Cluster	Science & Technology	62%
		Social Sciences & Business	38%

Respondents' demographic profile by gender and academic categories is presented in Table 4. Higher gender distribution is indicated for females (59%) compared to their male counterparts (41%). The Science and Technology programme contributed the highest number of respondents (62%), while the remaining are those from Social Sciences and Business (38%).

Descriptive Statistics

Why is there a need to report the mean and standard deviation? According to Vetter (2017), Mean (M) represents the average, or centre of a data set. Standard deviation (SD) indicates the typical distance of individual observations from the mean which shows the data's variability or spread. A low SD means the data points are clustered close to the mean whole a high. SD indicates they are more spread out. It is good to have a high SD.

Findings for Resource Management

Data retrieved for research question 1 (How do learners perceive their resource management in language learning?) are given in this section. The data are categorised based on three aspects namely, environment management, effort management, and help-seeking.

Table 5 - Mean for Environment Management (5 items)

ITEM	Mean	SD
RMCEMQ1 I usually study in a place where I can concentrate on my course work.	4.31	0.77
RMCEMQ 2 I make good use of my study time for the courses in this program.	4.06	0.76
RMCEMQ3 I have a regular place set aside for studying	4.02	0.80
RMCEMQ 4 I make sure that I keep up with the weekly readings and assignments for the courses.	4.51	0.73

Table 5 illustrates the mean for the environment. The highest mean score was recorded for Item RMCEMQ4 (I make sure that I keep up with the weekly readings and assignments for the courses) with a mean of 4.51 (SD = 0.73). This was followed by Item RMCEMQ1 (I usually study in a place where I can concentrate on my course work), which also showed a mean of 4.31 (SD = 0.77), Items related to effective use of study time (M = 4.06, SD = 0.76) and having a regular place for studying (M = 4.02, SD = 0.80) also received high mean scores.

Table 6- Mean for Effort Management (4 items)

ITEM	Mean	SD
RMCEMQ1 I have a regular place set aside for studying	3.92	0.97
RMCEMQ2 I work hard to do well in the classes in this program even if I do not like what we are doing.	4.04	0.86
RMCEMQ3 When course work is difficult, I either give up or only study the easy parts.	2.77	1.17
RMCEMQ4 Even when course materials are dull and un-interesting, I manage to keep working until I finish.	4.02	0.90

Table 6 presents the mean scores for items measuring learners' effort management. Item RMCEMQ1 (I have a regular place set aside for studying) recorded a mean score of 3.92 (SD = 0.97). Item RMCEMQ2 (I work hard to do well in the classes in this program even if I do not like what we are doing) showed a higher mean of 4.04 (SD = 0.86). In contrast, Item RMCEMQ3 (When course work is difficult, I either give up or only study the easy parts) recorded the lowest mean score of 2.77 (SD = 1.17). Finally, Item RMCEMQ4 (Even when course materials are dull and uninteresting, I manage to keep working until I finish) obtained a mean score of 4.02 (SD = 0.90).

Table 7- Mean for Help-Seeking (2 items)

ITEM	Mean	SD
RMCHSQ1 When I cannot understand the material in a course, I ask another student in the class for help.	3.62	0.91
RMCHSQ2 I try to identify students in the classes whom I can ask for help if necessary.	4.27	0.80
RMCHSQ3 When I cannot understand the material in a course, I ask my friends from other class for help.	3.85	0.99
RMCHSQ4 When I cannot understand the material in a course, I ask my seniors who have taken the course previously for help.	2.91	1.32

Table 7 demonstrates the mean scores for items measuring learners' help-seeking behaviour. Item RMCHSQ2 (I try to identify students in the classes whom I can ask for help if necessary) recorded the highest mean of 4.27 (SD = 0.80). This was followed by RMCHSQ3 (When I cannot understand the material in a course, I ask my friends from other classes for help) with a mean of 3.85 (SD = 0.99). Item RMCHSQ1 (When I cannot understand the material in a course, I ask another student in the class for help) showed a slightly lower mean of

3.62 (SD = 0.91). The lowest mean was observed for RMCHSQ4 (When I cannot understand the material in a course, I ask my seniors who have taken the course previously for help), at 2.91 (SD = 1.32).

Findings for Cognitive Components

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

Table 8- Mean for Rehearsal (4 items)

ITEM	Mean	SD
LSCCRQ1 When I study for the classes, I practice saying the material to myself over and over.	3.91	0.89
LSCCRQ2 When studying for the courses, I read my class notes and the course readings over and over again.	3.96	0.82
LSCCRQ3 I memorize key words to remind me of important concepts in this class.	4.17	0.800
LSCCRQ4 I make lists of important items for the courses and memorize the lists.	4.12	0.84

Table 8 shows the Mean for Rehearsal in measuring the students' Rehearsal practices in learning. In general, the students showed a consistent tendency to use rehearsal strategies when they study. The highest mean score was recorded for item LSCCRQ3 (I memorize key words to remind me of important concepts in this class) at 4.17 (SD = 0.8000). This is followed by LSCCRQ4 (I make a list of important items for the courses and memorize the lists) at a mean of 4.12 (SD = 0.84). LSCCRQ2 (When studying for the courses, I read my class notes and the course readings over and over again) reported a mean of 3.96 (SD = 0.82) while the lowest mean was seen for LSCCRQ1 (When I study for the classes, I practice saying the material to myself over and over) at only 3.91 (SD = 0.89).

Table 9 - Mean for Organization (4 items)

ITEM	Mean	SD
LSCCOQ1 When I study the readings for the courses in the program, I outline the material to help me organize my thoughts.	4.11	0.82
LSCCOQ2 When I study for the courses, I go through the readings and my class notes and try to find the most important ideas.	4.14	0.80
LSCCOQ3 I make simple charts, diagrams, or tables to help me organize course materials in this program.	3.65	1.12
LSCCOQ4 When I study for the courses, I go over my class notes and make an outline of important concepts.	4.09	0.84

Table 9 displays the Mean for Organization in measuring the students' organization habits in learning. The highest mean score is observed by LSCCOQ2 (When I study for the courses, I go through the readings and my class notes and try to find the most important ideas.) at 4.14 (SD = 0.80). This is followed closely by LSCCOQ1 (When I study the reading for the courses in the program, I outline the material to help me organize my thoughts.) at a mean of 4.11 (SD = 0.82). Following that, LSCCOQ4 (When I study for the courses, I go over my class notes and make an outline of important concepts.) indicated a mean of 4.09 (SD = 0.84). In contrast, LSCCOQ3 (When I make simple charts, diagrams, or tables to help me organize course materials in this program.) showed the lowest mean among the items at only 3.65 (SD = 1.12).

Table 10 - Mean for Elaboration (6 items)

ITEM	Mean	SD
LSCCEQ1 When I study for the courses in this program, I pull together information from different sources, such as lectures, readings, and discussions.	4.02	0.82
LSCCEQ2 I try to relate ideas in one subject to those in other courses whenever possible	3.88	0.86
LSCCEQ3 When reading for the courses, I try to relate the material to what I already know.	4.13	0.79
LSCCEQ4 When I study for the courses in this program, I write brief summaries of the main ideas from the readings and my class notes.	3.87	0.91
LSCCEQ5 I try to understand the material in the classes by making connections between the readings and the concepts from the lectures.	4.18	0.70
LSCCEQ6 I try to apply ideas from course readings in other class activities such as lecture and discussion.	4.08	0.72

Table 10 illustrates the Mean for Elaboration. It can be observed that the highest mean is recorded by LSCCEQ5 (I try to understand the material in the classes by making connections between the readings and the concepts from the lecturers.) at 4.18 (SD = 0.70). The second highest was LSCCEQ3 (When reading for the courses, I try to relate the material to what I already know.) at a mean of 4.13 (SD = 0.79). Following this, LSCCEQ6 (I try to apply ideas from course readings in other class activities such as lecture and discussion.) obtained a mean score of 4.08 (SD = 0.72). In contrast to those, the lowest two mean was recorded by LSCCEQ2 (I try to relate ideas in one subject to those in other courses whenever possible.) at 3.88 (SD = 0.86) and LSCCEQ4 (When I study for the courses in this program, I write brief summaries of the main ideas from the readings and my class notes.) at 3.87 (SD = 0.91)

Table 11 - Mean for Critical Thinking (5 items)

ITEM	Mean	SD
LSCCCTQ1 I often find myself questioning things I hear or read in the courses to decide if I find them convincing.	4.00	0.79
LSCCCTQ2 When a theory, interpretation, or conclusion is presented in classes or in the readings, I try to decide if there is good supporting evidence.	3.84	0.84
LSCCCTQ3 I treat the course materials as a starting point and try to develop my own ideas about it.	3.91	0.79
LSCCCTQ4 I try to play around with ideas of my own related to what I am learning in the courses.	3.40	0.79
LSCCCTQ5 Whenever I read or hear an assertion or conclusion in the classes, I think about possible alternatives.	3.86	0.84

In general, the data presented in Table 11 reveal an overall positive critical thinking inclination among the respondents. The highest mean was obtained for the item “I often find myself questioning things I hear or read in the courses to decide if I find them convincing” (M = 4.00, SD = 0.79), followed by “I treat the course materials as a starting point and try to develop my own ideas about it” (M = 3.91, SD = 0.79), suggesting consistent or active questioning and development of ideas, and assessment of choices. Meanwhile, “I try to play around with ideas of my own related to what I am learning in the courses” had the lowest mean (M = 3.40, SD = 0.79), indicating the respondents’ lesser engagement with self-generated ideas.

Findings for Metacognitive Self-Regulation

This section presents data to answer research question 3, i.e., How do learners perceive their metacognitive self-regulation in language learning?

Table 12 - Mean for Metacognitive Self-Regulation (11 items)

ITEM	Mean	SD
MSSRQ1 During class time, I often miss important points because I am thinking of other things.	3.17	1.07
MSSRQ2 When reading for the courses, I make up questions to help focus my reading.	3.67	0.92
MSSRQ3 When I become confused about something I am reading for the classes, I go back and try to figure it out.	4.03	0.85
MSSRQ4 If course readings are difficult to understand, I change the way I read the material.	3.99	0.81
MSSRQ5 Before I study new course material thoroughly, I often skim it to see how it is organized.	3.89	0.83
MSSRQ6 I ask myself questions to make sure I understand the material I have been studying in this program.	3.95	0.90
MSSRQ7 I try to change the way I study in order to fit any course requirements and the instructors' teaching style.	3.86	0.86
MSSRQ8 I try to think through a topic and decide what I am supposed to learn from it, rather than just reading it over when studying for the courses in this program.	3.83	0.87
MSSRQ9 When studying for the courses in this program, I try to determine which concepts I do not understand well.	3.93	0.80
MSSRQ10 When I study for the courses, I set goals for myself in order to direct my activities in each study period.	3.93	0.80
MSSRQ11 If I get confused taking notes in classes, I make sure I sort it out afterwards.	3.86	0.88

Table 12 presents data on respondents' use of metacognitive self-regulation, indicating that they generally employ a high level of self-regulated learning strategies. The highest mean was reported for the item, "When I become confused about something I am reading for the classes, I go back and try to figure it out" (M = 4.03, SD = 0.85), followed by "If course readings are difficult to understand, I change the way I read the material" (M = 3.99, SD = 0.81), which revealed respondents' strong engagement in evaluating their understanding and adjusting reading strategies accordingly. On the contrary, the respondents also tended to have less focus during class, as indicated by the low mean score (M = 3.17, SD = 1.07) obtained for the item, "During class time, I often miss important points because I am thinking of other things."

Exploratory Statistics

According to He (2024), correlation is a statistical technique that shows how strongly two variables are related to each other or the degree of association between the two. It's a common tool for describing simple relationships without making a statement about cause and effect. This section presents data to answer research questions on correlation.

Findings for the Relationship between resource management and cognitive components

This section presents data to answer research question 4- Is there a relationship between resource management and cognitive components? (H1- There is no relationship between resource management and cognitive components). To determine if there is a significant association in the mean scores between resource

management and cognitive components, data is analysed using SPSS for correlations. Results are presented separately in Table 13 below.

Table 13 - Correlation between resource management and cognitive components

		RESOURCE MANAGEMENT	COGNITIVE
RESOURCE MANAGEMENT	Pearson (Correlation	1	.769**
	Sig (2-tailed)		<.001
	N	138	138
COGNITIVE	Pearson (Correlation	.769**	1
	Sig (2-tailed)	<.001	
	N	138	138

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

Table 13 shows there is an association between resource management and cognitive components. Correlation analysis shows that there is a high significant association between resource management and cognitive components (r=.769**) and (p=<.001). According to He (2024), 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 cognitive components. Hence, null hypothesis is rejected.

Findings for the Relationship between resource management and metacognitive self-regulation

This section presents data to answer research question 5- Is there a relationship between resource management and metacognitive self-regulation? (H2- There is no relationship between resource management and metacognitive self-regulation). To determine if there is a significant association in the mean scores between resource management and metacognitive self-regulation, data is analysed using SPSS for correlations. Results are presented separately in Table 14 below.

Table 14 - Correlation between resource management and metacognitive self-regulation

		RESOURCE MANAGEMENT	METACOGNITIVE SELF-REGULATION
RESOURCE MANAGEMENT	Pearson (Correlation	1	.726**
	Sig (2-tailed)		<.001
	N	138	138
METACOGNITIVE SELF-REGULATION	Pearson (Correlation	.726**	1
	Sig (2-tailed)	<.001	
	N	138	138

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

Table 14 shows there is an association between resource management and metacognitive self-regulation. Correlation analysis shows that there is a high significant association between resource management and metacognitive self-regulation (r=.726**) and (p=<.001). According to He (2024), 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 self-regulation. Hence, null hypothesis is rejected.

Inferential Statistics

According to He (2024), there are three main functions of a T-test and ANOVA. Firstly, both are done to compare means. This test is also done to determine if the average scores (mean) or values of two groups, or one group against a known value, are different enough to be considered statistically meaningful and are not just due to random chance. Secondly, T-test and ANOVA are done to test hypotheses. Researchers use t-tests and ANOVA to test hypotheses about means, such as whether a new treatment significantly impacts a variable or if there's a difference in performance between two distinct groups. Lastly, T-test and ANOVA are done to identify significant differences. The output of a t-test provides a p-value (significance value). If this p-value is below a predetermined threshold (often 0.05), it indicates a statistically significant difference, allowing researchers to draw conclusions about the populations from which their samples were drawn.

This section presents data to answer research question 6- Is there a significant difference for all components across clusters? (H3-There is no significant difference for all components across clusters.

Table 15- T-test for all components across clusters

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean	Std. Error	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p	Difference	Difference	Lower	Upper
COGNITIVE	Equal variances assumed	1.147	.286	-.561	136	.288	.576	-.05419	.09655	-.24512	.13675
	Equal variances not assumed			-.547	101.318	.293	.586	-.05419	.09906	-.25069	.14232
METACOGNITIVE	Equal variances assumed	.104	.747	.275	136	.392	.784	.02910	.10583	-.18019	.23839
	Equal variances not assumed			.274	109.436	.392	.784	.02910	.10614	-.18126	.23946
RESOURCE_MANAGEMENT	Equal variances assumed	.189	.664	-.736	136	.231	.463	-.06957	.09452	-.25650	.11735
	Equal variances not assumed			-.719	101.909	.237	.474	-.06957	.09682	-.26162	.12247

With reference to Table 15, T-test was conducted to examine the effects of cognitive, metacognitive and resource management on clusters. The analysis shows there is no significant difference between cognitive (F=01.147, p=0.576), metacognitive (F=0.104, p=0.784), and resource management (F=0.189, p=0.463) across clusters. The null hypothesis is accepted.

CONCLUSION

Summary of Findings and Discussions

The study found that learners generally perceive their resource management in language learning positively, with some differences across environment management, effort management, and help-seeking behaviours. Learners were strongest in environment management, specifically in keeping up with weekly readings and studying in a focused space, while organizing study routines and managing study time were slightly less prominent. In terms of effort management, students demonstrated determination and motivation by continuing to engage with materials they found difficult or uninteresting, whereas giving up on difficult tasks was recorded as the least common behaviour. For help-seeking, learners preferred to ask peers in their own classes for support, moderately likely to seek help from friends in other classes, and least likely to approach seniors who had previously taken the course. Overall, these findings suggest that maintaining a structured study environment, maintaining effort, and strategically seeking help are important aspects of effective and

autonomous language learning, though support from less immediate sources remains underutilized. To compare, these results are consistent with findings from Erdogan (2018), Teng and Zhang (2026), Raffi et al. (2023), and Che Mustafa et al. (2025), which also highlighted the importance of resource management in supporting self-regulated and effective language learning.

Next, in terms of the way learners perceive their cognitive components in language learning, it can be said that learners perceive their cognitive strategies in language learning positively. In terms of rehearsal, the strongest use was seen in memorizing key words and making lists, while practicing material out loud was less frequent. In organization, identifying key ideas and outlining materials were the ones most commonly used. However, creating charts or diagrams was the least common strategy. For elaboration, connecting new material to prior knowledge and applying ideas across class activities were most practiced, while summarizing main ideas or linking concepts across courses was less used. As for critical thinking, students often questioned their course materials and developed their own ideas based on them, while engaging with ideas of their own was the least frequent. Overall, these findings suggest that learners prioritize strategies that reinforce understanding, structure, and meaningful connections, with slightly lower engagement in verbal rehearsal, visual organization, cross-course integration, and exploration of self-generated ideas. In relation to past studies, it aligns with Muniam et al. (2025) and Redmer (2022), in that cognitive strategies such as rehearsal, organization, elaboration, and critical thinking are important for effective language learning and are in tandem with self-regulation and resource management.

In addition, regarding the way learners perceive their metacognitive self-regulation in language learning, the respondents demonstrated a strong use of strategies to monitor and adjust their learning. The most frequent behaviours included revisiting confusing materials to clarify their understanding and to modify reading approaches when course materials were difficult, reflecting active evaluation and strategy adjustment. Although, some learners reported lower focus during class, occasionally missing important points due to distraction. The data suggests that learners are largely proactive in their learning process. It can be said that these results support the findings of SDT-based studies (Ryan & Deci, 2000; Muniam et al., 2025), which highlighted that learners with greater autonomy and engagement are more likely to use metacognitive strategies effectively, demonstrating self-regulated learning in language contexts.

As for the relationship between resource management and cognitive components, the data suggests a strong positive relationship between learners' resource management and their cognitive components in language learning. This shows that learners that effectively manage their study environment, effort, and help-seeking strategies also tend to employ cognitive strategies such as rehearsal, organization, elaboration, and critical thinking more habitually. This suggests that well-structured resource management supports and reinforces the use of effective cognitive strategies, highlighting that these components support and influence each other. Hence, the null hypothesis of no relationship between resource management and cognitive components is rejected. These results confirm findings by Erdogan (2018), Teng and Zhang (2026), Raffi et al. (2023), and Che Mustafa et al. (2025), whose studies also showed strong positive correlations between resource management and the use of cognitive strategy.

Furthermore, in terms of learners' resource management and their metacognitive self-regulation in language learning, the data also shows a strong positive relationship. This implies that students that effectively manage their study environment, effort, and help-seeking behaviours are also more likely to monitor, evaluate, and adjust their learning strategies effectively. The connection highlights the supportive role of resource management in helping learners regulate their cognition and learning processes. Therefore, the null hypothesis of no relationship between resource management and metacognitive self-regulation is rejected. These results are consistent with Teng and Zhang (2026) and Pintrich (2024), who emphasized the relationship between resource management and metacognitive self-regulation in the context of promoting self-regulated learning.

Lastly, in the aspect of differences for all components across clusters, the data reported no significant differences in cognitive components, metacognitive self-regulation, or resource management across clusters. This indicates that learners' strategies and behaviours in these areas are relatively consistent, regardless of their cluster grouping. Accordingly, the null hypothesis is supported, suggesting similar patterns of strategy use

across learner groups which are consistent with the finding from Raffi et al. (2023) and Che Mustafa et al. (2025).

Implications and Suggestions for Future Research

Theoretical and Conceptual Implications

The findings of this study provide empirical support for Self-Determination Theory (SDT) as a credible and comprehensive framework for understanding language learning strategies in the ESL context. Learners in this study showed a strong engagement in strategies associated with autonomy, competence, and relatedness which are consistent with Ryan and Deci's (2000) theory. This implies that motivation plays an important role in shaping the way learners manage resources and regulate their learning. The use of resource management strategies especially environment management, sustained effort, and seeking help from peers reflects learners' sense of relatedness and autonomy. Additionally, the learners' persistence in completing challenging tasks and their tendency to structure a conducive learning environment can be interpreted as intrinsic motivation and self-directed behaviour. Furthermore, the proactive use of metacognitive self-regulation strategies, like monitoring comprehension and adjusting reading approaches, reflects their perceived competence, which further strengthens SDT's claim that feelings of capability promote sustained engagement and effort from the learners.

From a conceptual point of view, the findings support the framework proposed in subsection 2.3, the Conceptual Framework of the Study, by confirming that resource management functions as a foundational mechanism that influences both cognitive components (like rehearsal, organization, elaboration, and critical thinking) and metacognitive self-regulation. The strong positive connections observed here suggest that resource management should not be viewed as a secondary strategy, but rather as one of the main strategies that enables learners to apply cognitive and metacognitive strategies more effectively.

Pedagogical Implications

The findings suggest that language learning instruction should move the focus from merely linguistic content to actively support learners' strategic and self-regulated learning. Given learners' strong engagement in resource management, cognitive, and metacognitive strategies, educators may integrate guidance on managing study environments, sustaining effort, and using peer support effectively when teaching language courses.

Additionally, since learners showed a preference for seeking help from peers; classroom practices such as collaborative tasks, peer feedback, and group discussions should be emphasised more, especially in the Malaysian ESL context. Furthermore, instructors should explicitly model and scaffold cognitive and metacognitive strategies, including identifying key ideas, making meaningful connections, and monitoring comprehension in aiding language learning among students.

Recommendations for Future Research

Future studies could explore differences across academic disciplines**,** institutions, or proficiency levels to determine whether learners' strategic behaviours vary within the Malaysian ESL context. Additionally, further research may investigate the role of technology and digital learning tools, including AI applications such as ChatGPT or Gemini, in supporting resource management and self-regulated language learning.

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