



## Research Article

# Achievement Goals, Reading Efficacy, and Self-Regulated Learning in EMI: Their Impact on University Students' Performance

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**Abstract:** Achievement goals play a crucial role in higher education, shaping students' self-perceived competence, knowledge mastery, and academic performance. In English-Medium Instruction (EMI) contexts, students' motivation to engage with academic textbooks is further influenced by subject-specific knowledge and linguistic challenges. This study examines the predictive roles of achievement goals, reading efficacy, reading involvement, and Self-Regulated Learning (SRL) strategies in university students' academic performance in an EMI course. A questionnaire survey was conducted with 256 university students enrolled in an EMI course in Taiwan. Hierarchical multiple regression analysis revealed that reading efficacy was the strongest predictor of academic achievement, followed by performance-avoidance goals, organization strategies, reading involvement, and time/study environment strategies. Students perceived elaboration and organization as the most effective SRL strategies, whereas effort regulation and time/study environment strategies were rated less effective. Additionally, students' views on metacognitive self-regulation strategies varied, with their effectiveness largely depending on students' comprehension of English and course content. These findings offer insights into the interplay between motivation, reading engagement, and SRL strategies in EMI contexts, highlighting the need for targeted instructional support to enhance students' self-regulated learning and academic success.

**Keywords:** achievement goals, reading efficacy, reading involvement, self-regulated learning strategies, academic performance

## 1. Introduction

In response to the internationalization of higher education, English as a Medium of Instruction (EMI) has rapidly expanded in non-English-speaking countries and regions, including Taiwan (Rose et al., 2023; Smit, 2023). To enhance students' English proficiency and strengthen Taiwan's competitiveness in global higher education, the Ministry of Education (MOE) launched the *Bilingual Education for Students in College* (BEST) program in 2021 (Ministry of Education, 2021). Under this initiative, seven universities and 45 colleges across 25 additional universities have been designated as key EMI institutions and receive government support to promote bilingual instruction. By 2030, the policy aims for more than 50% of second-year university students in these institutions to reach English proficiency at the Common European Framework of Reference for Languages (CEFR) B2. Although EMI is intended to facilitate the simultaneous development of disciplinary knowledge and English proficiency, it also poses substantial challenges for English as a Foreign Language (EFL) learners, who must process complex academic content in a second language.

Success in EMI contexts therefore requires not only linguistic competence but also strong Self-Regulated Learning (SRL) skills.

SRL refers to learners' ability to manage their own learning through goal setting, strategic planning, monitoring, and reflection (Henri et al., 2018; Usher & Schunk, 2017; Zimmerman, 2000). Among the psychological and motivational constructs associated with SRL, achievement goals play a particularly central role. Achievement goals influence how students interpret academic demands, regulate their effort, and persist in learning tasks (Elliot & McGregor, 2001; Midgley et al., 1998; Wigfield & Cambria, 2010). In EMI settings, where academic reading in English is a core requirement, students' reading efficacy (belief in their ability to comprehend academic texts) and reading involvement (engagement during reading tasks) are also likely to affect SRL and academic outcomes. Self-efficacy and self-regulation are mutually reinforcing, as students' judgments of their capability guide their willingness to apply regulatory strategies (Chou, 2019; Zimmerman et al., 2017).

Although SRL, achievement goals, and reading motivation have been widely examined in L1 and general EFL contexts (Honicke et al., 2020; Miller et al., 2021), little research has investigated how these constructs function together to predict academic performance in EMI courses. Existing EMI research has instead focused mainly on: (1) policy implementation across Asian higher education systems (e.g., Bolton et al., 2023; Tsou & Baker, 2021), (2) classroom practices, including the influence of English proficiency and instructional strategies for improving content comprehension (e.g., Chou, 2018; Graham, 2024; Lin & Lei, 2021; Tsou & Kao, 2017), and (3) evaluations of EMI effectiveness in Taiwan and other Asian contexts (e.g., Xie & Curle, 2022). Consequently, little is known about how students regulate their learning in subject-specific EMI environments, or which SRL strategies they perceive as most or least effective.

To address these gaps, this study aims to: (1) examine the relationships among achievement goals, reading efficacy, reading involvement, and SRL strategies; (2) assess how these variables predict university students' academic performance in an EMI course; and (3) identify the most and least effective SRL strategies as reported by students. Insights from this research may inform instructional design and support strategies to enhance learning outcomes in EMI contexts.

## 2. Literature review

### 2.1 Achievement goals

Achievement goals refer to students' cognitive orientations toward competence and academic success, influencing how they approach learning tasks, regulate effort, and evaluate their performance (Elliot & McGregor, 2001; Midgley et al., 1998). The widely used  $2 \times 2$  framework proposed by Elliot and McGregor (2001) distinguishes between four goal types: (1) *mastery-approach* (aiming to develop competence and master tasks), (2) *mastery-avoidance* (seeking to avoid misunderstanding or failing to learn), (3) *performance-approach* (striving to demonstrate competence relative to others), and (4) *performance-avoidance* (aiming to avoid performing poorly or being judged negatively).

Extensive research has examined the impact of these achievement goals on various academic outcomes. Mastery-approach and performance-approach goals have consistently been associated with higher motivation, self-efficacy, and the use of SRL strategies (Chou, 2023; Katz-Vago & Benita, 2024; Lim & Lim, 2020; Zhong et al., 2023). In contrast, mastery-avoidance and performance-avoidance goals are generally linked to negative emotions and lower academic performance (Diaconu-Gherasim et al., 2023; Senko & Freund, 2015). A meta-analysis by Noordzij et al. (2021) found mastery-approach goals to be the strongest predictors of academic achievement among the four goal types, while avoidance goals were more closely tied to anxiety and disengagement.

Although the achievement goal framework has been widely applied across academic disciplines in L1 contexts, its role in EMI courses remains underexplored. Understanding how different goal orientations influence students' motivation and SRL strategies in content-based English environments is particularly important, given the added linguistic demands and performance pressures in such settings. This study investigates the extent to which achievement goals predict academic performance in an EMI course and how they relate to students' reading motivation and use of SRL strategies.

## 2.2 Self-efficacy and involvement in reading

Self-efficacy in academic tasks plays a crucial role in shaping students' academic performance, motivation, and strategy use. In the context of reading, reading efficacy, derived from Bandura's (1986) concept of self-efficacy in social cognitive theory, refers to students' beliefs and expectations about their ability to read and comprehend subject-specific materials. Academic texts, particularly those used in higher education, often involve complex syntax, specialized vocabulary, and assumed disciplinary knowledge, all of which challenge reading comprehension. Denton et al. (2015) emphasized that informational texts are typically more demanding than narrative texts due to their dense structure and content-specific terminology. Empirical studies have consistently shown that reading efficacy positively influences reading fluency, self-regulation, strategy use, and overall reading comprehension (Peura et al., 2021; Troyer et al., 2019; Unrau et al., 2018; Yang et al., 2024).

In contrast, reading involvement pertains to the intrinsic pleasure and interest students experience during reading (Wigfield & Guthrie, 1997). Research in L1 contexts has demonstrated that elementary school students who are more involved in reading tend to engage in reading more frequently and exhibit superior reading comprehension (Rettig & Schiefele, 2023; Schiefele & Löweke, 2018; Troyer et al., 2019). Moreover, reading involvement has been shown to correlate positively with reading efficacy, suggesting a reciprocal relationship between enjoyment and perceived competence. Similar trends have been observed in EFL contexts, where both constructs are significantly linked (Wang & Gan, 2021).

While substantial research has underscored the importance of reading efficacy and involvement across L1 and EFL settings in primary and secondary education, limited attention has been given to their role in EMI contexts at the university level. Given the heightened linguistic and cognitive demands of reading academic content in English, further investigation is warranted. Specifically, future research should (1) explore the interrelationships among key psychological and motivational variables, such as achievement goals, reading efficacy, reading involvement, and SRL strategies, and (2) evaluate the extent to which these factors predict academic success in EMI courses.

## 2.3 SRL strategies

SRL refers to learners' ability to actively direct and manage their own learning through processes such as planning, strategy use, self-monitoring, and reflection (Usher & Schunk, 2017; Zimmerman, 2000). In academic contexts, effective self-regulation is associated with increased autonomy, persistence, and academic success, particularly when students encounter complex or cognitively demanding tasks.

According to Pintrich et al.'s (1991) taxonomy, SRL strategies can be broadly categorized into cognitive, metacognitive, and resource management strategies. **Cognitive and metacognitive strategies** include: (1) *rehearsal*; (2) *elaboration* (e.g., paraphrasing, summarizing, creating analogies, note-taking), which helps learners integrate new information with prior knowledge; (3) *organization* (e.g., outlining, clustering, identifying main ideas), which requires active structuring of content; (4) *critical thinking*; and (5) *metacognitive self-regulation*, which involves goal setting, self-monitoring, self-testing, and reflection to improve learning outcomes. **Resource management strategies**, which support learning by optimizing study habits, include: (1) *time and study environment management*; (2) *effort regulation* (sustaining motivation in the face of challenges or distractions); (3) *peer learning*; and (4) *help seeking*.

A growing body of research highlights the positive effects of cognitive and metacognitive strategies on general academic achievement and motivation (de Boer et al., 2018; Theobald, 2021), as well as subject-specific outcomes in L1 contexts (Avargil et al., 2018; Hayat et al., 2020) and general English courses (Chou, 2021a; Mohseni et al., 2020). Notably, high-achieving students consistently report more frequent use of metacognitive strategies than their lower-achieving peers (Chou, 2021b; He et al., 2024). Among resource strategies, time management has emerged as especially influential. Meta-analyses and empirical studies have shown that effective time management enhances learning outcomes and academic performance (Adams & Blair, 2019; Aeon et al., 2021; Wolters & Brady, 2021; Wolters et al., 2017).

While the value of SRL strategies is well-documented, much of the existing literature focuses on students studying academic subjects in their L1 or taking general English courses. However, studying academic content in English in an EFL context presents a dual challenge—managing both language demands and subject-specific content. Thus, examining how EFL university students apply SRL strategies in EMI courses is essential for understanding how they navigate and

succeed in these linguistically and cognitively demanding environments. The current research addresses the following research questions:

- (1) What are the relationships among the four types of achievement goals, reading efficacy, reading involvement, and the five types of SRL strategies?
- (2) To what extent do university students' achievement goals, reading motivation, and SRL strategies predict their academic performance in an EMI course? Among these factors, which serves as the strongest predictor of academic achievement?
- (3) Which SRL strategies do university students perceive as the most effective for learning in an EMI course, and what reasons do they provide for their effectiveness?
- (4) Which SRL strategies do university students perceive as the least effective for learning in an EMI course, and what reasons do they provide for their perceived ineffectiveness?

### 3. Method

#### 3.1 Participants

The study involved 256 EFL students (178 females and 78 males;  $M = 22.3$  years) enrolled in a compulsory EMI course at a university in Taiwan. All participants were teacher education majors. The course aimed to (1) familiarize students with key concepts and terminology related to language assessment and evaluation, (2) introduce various assessment approaches, techniques, and tools, and (3) provide hands-on practice in test design. Course assessments included pen-and-paper tests and students' development of test items.

#### 3.2 Instruments

Data were collected in two stages over an 18-week semester. In Week 16 of the EMI course, Participants completed an online questionnaire measuring achievement goals, reading efficacy, reading involvement, and SRL strategies. All questionnaire items were administered in English, consistent with the original scales. The questionnaire also included two open-ended questions: *'Which type of SRL strategy do you find most effective for learning in this EMI course, and why?'* and *'Which type of SRL strategy do you find least effective for learning in this EMI course, and why?'*. The questionnaire was piloted one semester earlier with a comparable cohort of EMI students, and no concerns regarding item clarity or comprehension were reported. In Week 18, the final achievement test was administered, and students' scores were recorded for analysis. Prior to participation, students provided informed consent, acknowledging that data collection would take place in two stages.

##### 3.2.1 Achievement goals

Achievement goals were assessed using items adapted from Elliot and McGregor (2001). The scale measured four goal orientations, with three items per dimension: (1) performance-approach (e.g., *'My goal in this class is to get a better grade than most of the other students'*), (2) mastery-avoidance (e.g., *'I worry that I may not learn all that I possibly could in this class'*), (3) mastery-approach (e.g., *'I want to learn as much as possible from this class'*), and (4) performance-avoidance (e.g., *'My goal in this class is to avoid performing poorly'*). Responses were rated on a 6-point Likert scale (1 = strongly disagree to 6 = strongly agree). The internal consistency of the scale was satisfactory (Cronbach's  $\alpha = 0.78$  to  $0.84$ ).

##### 3.2.2 Reading efficacy and reading involvement

Reading efficacy and reading involvement were measured using the Reading Motivation Questionnaire in an English as a Foreign Language context (RMQ-EFL) developed by Wang and Gan (2021). Reading efficacy consisted of six items (e.g., *'It is easy for me to get the meaning of the sentences in this textbook'*), while reading involvement included four items (e.g., *'I tend to get deeply engaged when I read the English textbook of this course'*). Both subscales were rated on a 6-point Likert scale (1 = almost never true of me to 6 = almost always true of me). The internal

consistency was high (Cronbach's  $\alpha = 0.89$  for reading efficacy, 0.83 for reading involvement).

### 3.2.3 SRL strategies

SRL strategies were measured using Pintrich et al.'s (1991) *Motivated Strategies for Learning Questionnaire*. The 6-point Likert scale ranging from 1 (almost never) to 6 (almost always) included five items of Elaboration (e.g., 'When I study for this course, I write brief summaries of the main ideas from the readings and the concepts from the lectures'), four items of Organization (e.g., 'When I study the readings for this course, I outline the material to help me organize my thoughts'), seven items of Metacognitive Self-regulation (e.g., 'I ask myself questions to make sure I understand the material I have been studying in this class'), four items of Time and Study Environment Management (e.g., 'I usually study in a place where I can concentrate on my course work'), and four items of effort regulation (e.g., 'I work hard to do well in this class even if I don't like what we are doing') Cronbach's  $\alpha$  reliabilities ranged from 0.71 to 0.87.

## 3.3 Data analysis

To validate the questionnaire items in this study, Confirmatory Factor Analysis (CFA) was conducted using Analysis of Moment Structures (AMOS) version 27. Quantitative data were analyzed using IBM SPSS 27. A hierarchical multiple regression model was employed, entering eleven independent variables (four achievement goals, two reading motivation variables, and five SRL strategies) in theoretical order. Qualitative data from the open-ended questions were analyzed using MAXQDA 2023, a Computer-Assisted Qualitative Data Analysis Software (CAQDAS) (Kuckartz & Rädiker, 2019). Responses were coded and categorized to identify common themes and patterns.

## 4. Results

### 4.1 RQ1: What are the relationships among the four types of achievement goals, reading efficacy, reading involvement, and the five types of SRL strategies?

The fit indices for the CFA models, presented in Table 1, indicated good model fits, confirming the validity of the proposed items in the EFL contexts. Table 2 presents the means, standard deviations, and correlations for all study variables. Performance-approach goals were positively correlated with mastery-approach goals, reading efficacy, reading involvement, SRL strategies, and final achievement scores ( $r = 0.22$  to  $0.43$ ,  $p < 0.01$ ), but showed no association with performance-avoidance or mastery-avoidance goals. Mastery-approach goals were positively correlated with mastery-avoidance goals, performance-approach goals, reading efficacy, reading involvement, and SRL strategies ( $r = 0.14$  to  $0.47$ ,  $p < 0.01$ ), but were not significantly related to performance-avoidance goals or final achievement scores. Performance-avoidance and mastery-avoidance goals were positively correlated ( $r = 0.31$ ,  $p < 0.01$ ), yet both were negatively associated with reading efficacy ( $r = -0.16$  and  $-0.30$ ,  $p < 0.01$ ) and final achievement scores ( $r = -0.25$  and  $-0.29$ ,  $p < 0.01$ ). No significant relationship was found between these two avoidance goals and reading involvement or SRL strategies. Reading efficacy, reading involvement, SRL strategies, and final achievement scores were positively correlated ( $r = 0.23$  to  $0.49$ ,  $p < 0.01$ ), indicating that higher perceived reading ability and engagement were associated with greater use of SRL strategies and better academic performance. Finally, the five types of SRL strategies were strongly interrelated ( $r = 0.31$  to  $0.73$ ,  $p < 0.01$ ) and positively associated with final achievement scores ( $r = 0.25$  to  $0.38$ ,  $p < 0.01$ ), suggesting that students who employed a range of SRL strategies tended to achieve higher academic outcomes.



**Table 1.** Goodness-of-Fit Indices for the CFA Models

Model	$\chi^2$	$\chi^2/df$	GFI	CFI	TLI	RMSEA	SRMR
Achievement Goals	67.13(48)	1.40	0.94	0.98	0.97	0.05	0.04
Reading Efficacy & Involvement	108.27(34)	3.18	0.92	0.95	0.93	0.09	0.05
Cognitive & Metacognitive Strategies	180.63(62)	2.91	0.90	0.94	0.92	0.09	0.06
Resource management strategies	35.71(13)	2.75	0.96	0.94	0.90	0.08	0.06

Note: GFI = Goodness-of-Fit Index; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

**Table 2.** Correlations of Achievement Goals, Reading Efficacy, Reading Involvement, SRL Strategies, and Achievement Score (N = 256)

	1	2	3	4	5	6	7	8	9	10	11	12
1. Performance-approach Goals	0.78											
2. Mastery-avoidance Goals	−0.01	0.84										
3. Mastery-approach Goals	0.42**	0.14*	0.81									
4. Performance-avoidance Goals	0.04	0.31**	0.07	0.77								
5. Reading Efficacy	0.23**	−0.30**	0.17**	−0.16**	0.89							
6. Reading Involvement	0.25**	−0.08	0.36**	−0.06	0.56**	0.83						
7. Elaboration	0.35**	−0.10	0.42**	−0.05	0.48**	0.47**	0.87					
8. Organization	0.43**	−0.05	0.40**	0.03	0.42**	0.47**	0.73**	0.81				
9. Metacognitive Self-regulation	0.39**	−0.07	0.47**	0.05	0.36**	0.50**	0.71**	0.67**	0.85			
10. Time/Study Environment	0.32**	−0.02	0.36**	0.03	0.26**	0.40**	0.53**	0.61**	0.60**	0.71		
11. Effort Regulation	0.23**	−0.11	0.18**	0.01	0.14*	0.20**	0.31**	0.33**	0.31**	0.49**	0.71	
12. Achievement Scores	0.22**	−0.25**	0.11	−0.29**	0.49**	0.23**	0.34**	0.38**	0.25**	0.32**	0.25**	—
Mean	4.41	3.74	5.04	4.30	3.59	3.49	4.51	4.60	4.32	4.82	4.56	68.87
SD	0.95	1.24	0.78	1.21	0.94	0.99	0.90	0.92	0.85	0.78	0.74	11.46

\*\*  $p < 0.01$ ; Reliabilities of the variables are given in the diagonal (Cronbach's  $\alpha$ ).

#### 4.2 RQ2: To what extent do university students' achievement goals, reading motivation, and SRL strategies predict their academic performance in an EMI course? Among these factors, which serves as the strongest predictor of academic achievement?

Hierarchical multiple regression was conducted to examine the predictive power of achievement goals, reading motivation (efficacy and involvement), and SRL strategies on academic achievement. First, collinearity diagnostics showed that tolerance values exceeded 0.10, and Variance Inflation Factor (VIF) values were below 10 (Pallant, 2020), suggesting no multicollinearity concerns. Second, outlier detection using Mahalanobis' distance revealed a maximum

value of 28.83, which fell within the acceptable range of 31.26 for models with eleven independent variables, indicating no significant outliers.

Students' four types of achievement goals were entered at Step 1, explaining 16.8% of the variance in academic achievement. After entry of reading efficacy and reading involvement at Step 2, the total variance explained by the model as a whole was 30.9%,  $F = 18.591$ ,  $p < 0.001$ . The two measures explained an additional 14.2% of the variance in academic achievement after controlling for the four types of achievement goals,  $\Delta R^2 = 0.142$ ,  $F$  change = 25.552,  $p < 0.001$  (Table 3).

Next, five types of SRL strategies were entered at Step 3. The total variance explained by the model as a whole was 38.1%,  $F = 16.677$ ,  $p < 0.001$ . The five measures explained an additional 7.2% of the variance in academic achievement after controlling for achievement goals, reading motivation and involvement,  $\Delta R^2 = 0.072$ ,  $F$  change = 5.682,  $p < 0.001$ . In the final model, five measures were statistically significant, with reading efficacy recording the highest beta value ( $\beta = 0.416$ ,  $p < 0.001$ ), followed by performance-avoidance goals ( $\beta = -0.231$ ,  $p < 0.001$ ), organization strategies ( $\beta = 0.204$ ,  $p = 0.015$ ), reading involvement ( $\beta = 0.164$ ,  $p = 0.017$ ), and finally time/study environment strategies ( $\beta = 0.151$ ,  $p = 0.040$ ). Among all predictors, reading efficacy had the highest beta coefficient, indicating that students' confidence in their reading abilities was the strongest predictor of their academic achievement in the EMI course.

**Table 3.** Regression weights of measured variables and model summary of the hierarchical multiple regression

Variables	Block 1			Block 2			Block 3		
	Beta	<i>t</i>	<i>p</i>	Beta	<i>t</i>	<i>p</i>	Beta	<i>t</i>	<i>p</i>
1. Performance-approach Goals	0.204	30.198	0.002	0.136	2.294	0.023	0.058	0.989	0.324
2. Mastery-approach Goals	0.063	0.984	0.326	0.026	0.421	0.674	-0.023	-0.371	0.711
3. Performance-avoidance Goals	-0.248	-4.092	0.000	-0.214	-3.856	0.000	-0.231	-4.297	0.000
4. Mastery-avoidance Goals	-0.178	-2.910	0.004	-0.054	-0.928	0.354	-0.042	-0.733	0.464
5. Reading Efficacy				0.450	6.661	0.000	0.416	6.133	0.000
6. Reading Involvement				0.085	1.263	0.208	0.164	2.412	0.017
7. Elaboration							-0.022	-0.252	0.801
8. Organization							0.204	2.443	0.015
9. Metacognitive Self-regulation							-0.060	-0.727	0.468
10. Time/Study Environment							0.151	2.066	0.040
11. Effort Regulation							0.097	1.663	0.098
<i>R</i> <sup>2</sup>	0.168			0.309			0.381		
<i>F</i>	12.638			18.591			16.677		
<i>p</i>	0.000			0.000			0.000		
$\Delta R^2$	0.168			0.142			0.072		
<i>F</i> change	12.638			25.552			5.682		
<i>p</i> of <i>F</i> change	0.000			0.000			0.000		

### 4.3 RQ3: Which SRL strategies do university students perceive as the most effective for learning in an EMI course, and what reasons do they provide for their effectiveness?

Among the five SRL strategies examined in this study, 44.9% of the participants (115 out of 256) identified elaboration as the most effective strategy for supporting their learning in the EMI course. This was followed by organization (20.7%), metacognitive self-regulation (14.5%), effort regulation (10.1%), and time and study environment management (9.8%). The majority of participants reported engaging in elaborative strategies such as note-taking during lectures, paraphrasing sentences, and summarizing textbook content. These practices were perceived to enhance their comprehension, support effective memorization, and facilitate the activation and retrieval of knowledge. As the following excerpts from the open questions showed:

*“In class, I take notes, and before quizzes and exams, I paraphrase the main points using different colored pens. I then double-check for any missing parts in the course book. This method helps me review the content quickly.” (Participant 121)*

*“When studying this course, I review the content several times. Afterward, I close the book and summarize the chapter on my own. Then, I revisit the course material to ensure I haven’t missed anything. I find this strategy highly effective because it helps me memorize the main ideas and structure of each chapter, and it enables me to apply the knowledge quickly when designing tests.” (Participant 23)*

*“I believe that synthesizing the lectures, in-class discussions, and course book, and summarizing the main ideas of lectures are the most effective strategies. The sentences in the course book are often long, and the text is formal, which makes reading tedious. Therefore, I take notes during lectures and summarize them in my own way. This method helps me retrieve the main points more efficiently before exams.” (Participant 39)*

Another effective SRL strategy identified for the EMI course was organization. Many participants reported using visual aids such as tables or graphs to synthesize and structure the course content. They indicated that focusing on key words or phrases within these visual representations helped them internalize important concepts and supported memorization during reading and review. As the following three responses from students have shown:

*“I heavily rely on visual mnemonics, particularly tables, to memorize course content effectively. When I encounter uncertainty while answering questions on tests, I rely on recalling information from these tables.” (Participant 43)*

*“While I believe note-taking is crucial, what matters most to me is organizing those notes, creating bullet points, and summarizing the main points in my own words.” (Participant 97)*

*“Simply reading the course book doesn’t facilitate me to locate main points. I find it easier to grasp main ideas, compare technical concepts, contrast opposing parts, and review for tests using tables and graphs.” (Participant 73)*

The participants highlighted metacognitive self-regulation strategies such as summarizing, self-questioning, and self-answering as effective methods for deepening understanding, retaining memory, monitoring reading comprehension. As the following two excerpts showed:

*“I typically integrate the main points from the course material with the teacher’s lectures. To test my understanding, I ask myself questions and assess how many I can answer. I prioritize reviewing the questions I struggle with before exams.” (Participant 134)*

*“I find that asking myself questions is crucial for ensuring my complete understanding of the concepts in the*



*course book. Additionally, I read the texts aloud to deepen my impression. If there are still concepts that elude me, I actively seek information on the Internet or ask my classmates and the teacher for help.” (Participant 3)*

Effort regulation and time and study environment strategies were deemed effective by a minority of participants. Their reasons included the necessity for independent study to foster focused thinking, internalization, and reflection. Other participants expressed the need to digest and assimilate the content of this compulsory course, despite lacking personal interest.

#### **4.4 RQ4: Which SRL strategies do university students perceive as the least effective for learning in an EMI course, and what reasons do they provide for their perceived ineffectiveness?**

With regard to ineffective SRL strategies, 55.5% of the participants (142 out of 256) identified effort regulation as the least effective, followed by metacognitive self-regulation (21.9%), time and study environment (13.1%), organization (7.2%), and elaboration (2.7%). Participants reported that a lack of interest in the academic subject matter led to discomfort and a reluctance to invest effort, often resulting in passive learning attitudes, such as aiming merely to pass the course rather than actively engaging with the content. The following excerpts exemplify the participants’ thoughts:

*I believe the most ineffective way to study is putting effort into academic subjects I’m not interested in. Besides struggling to understand the content, I still have to comprehend it in order to pass the course. It’s really painful. (Participant 62)*

*I usually put forth my best effort in every academic subject, regardless of my personal interest in it. However, when it comes to subjects I’m not interested in, I tend not to exert as much effort. My focus shifts to studying just enough to pass the course, and often, I forget about the content shortly after exams. (Participant 18)*

More participants considered metacognitive self-regulation strategies to be ineffective compared to those who regarded them as effective. The primary reason for this perception stemmed from students’ difficulties in understanding or uncertainty about subject-specific content in the academic course, which hindered their ability to generate self-questions and effectively monitor their own learning process. As the two excerpts showed:

*Sometimes I can’t grasp main points in the textbook. Even if I ask myself questions, I can’t answer them. I prefer to follow the teacher’s lecture and review the notes. (Participant 247)*

*My biggest challenge is that I’m slow on the uptake, so I often rely on rote learning. I struggle to apply what I’ve learned in class to solve tasks during exams. (Participant 98)*

A small proportion of participants reported time and environment, organization, and elaboration as ineffective SRL strategies, citing personal learning styles as a reason. For example, some struggled with understanding information presented in the form of tables and figures, while others found it challenging to locate a suitable place to study.

## **5. Discussion**

### **5.1 Achievement goals and academic performance**

Among the four types of achievement goals, both performance-avoidance and mastery-avoidance goals were negatively correlated with students’ academic performance in the EMI course. However, only performance-avoidance goals significantly and negatively predicted their final achievement scores. Students who aimed to avoid performing poorly ultimately scored lower on the final assessment. A plausible explanation is that students experiencing performance pressure or fear of failure may perceive themselves as less competent, which undermines their academic

self-efficacy and performance (Miller et al., 2021; Senko & Freund, 2015). This interpretation is supported by the present findings, which showed that performance-avoidance goals were negatively associated with students' reading self-efficacy when engaging with English academic textbooks.

Moreover, research on academic self-handicapping suggests that students with strong performance-avoidance tendencies, combined with low self-esteem and fear of failure, often engage in behaviors that create obstacles to success, such as delaying study, reducing effort, or presenting a lack of ability as an excuse (Schwinger et al., 2022; Török et al., 2018; Urdan & Midgley, 2001). These behaviors ultimately impair learning and performance. Consistent with this pattern, earlier studies have shown that performance-avoidance goals negatively predict academic achievement (Alhadabi & Karpinski, 2020; Diaconu-Gherasim et al., 2023; Zhong et al., 2023).

To mitigate the negative effects of avoidance-oriented goals, researchers recommend autonomy-supportive instructional practices, such as allowing students to discuss challenges openly and providing emotional and cognitive scaffolding to help them manage anxiety and fear of failure (Patall et al., 2018; Tan et al., 2023). Additionally, mindfulness interventions have been shown to reduce fear of failure and improve emotional regulation (Feng et al., 2025). Such approaches may help students shift away from avoidance-driven goals toward more adaptive achievement orientations.

In contrast, mastery-approach and performance-approach goals have been widely recognized as positive predictors of academic engagement, learning strategy use, and academic performance (Alhadabi & Karpinski, 2020; Chou, 2023; Katz-Vago & Benita, 2024; Lim & Lim, 2020; Noordzij et al., 2021). Surprisingly, the present study did not support these findings, as neither approach-oriented goal significantly predicted students' final scores in the EMI course. Although correlation analyses revealed that students with mastery-approach and performance-approach goals reported greater use of SRL strategies, these orientations did not lead to improved test performance. One explanation concerns the influence of other variables, such as reading efficacy, involvement, and SRL strategy use, that entered the predictive model. When achievement goals were examined as the sole predictors, three goals (performance-approach, performance-avoidance, and mastery-avoidance) significantly predicted academic achievement. However, after reading efficacy, involvement, and SRL strategies (organization and time/study environment management) were added, the predictive power of performance-approach and mastery-avoidance goals diminished. This suggests that success in EMI courses is shaped by a broader constellation of factors beyond achievement goals.

A second explanation relates to the interaction between students' comprehension of disciplinary content and their perception of task difficulty. Senko and colleagues (Senko et al., 2011; Senko & Freund, 2015) argue that learners' perceptions of task difficulty can influence both the adoption of achievement goals and the outcomes associated with those goals. In the present study, students were required to complete formal assessments and tasks based on complex academic texts and discipline-specific content. When the linguistic demands of English intersected with challenging subject matter, students' perceived task difficulty may have mitigated the positive effects typically associated with mastery- and performance-approach goals.

## ***5.2 Reading efficacy, reading involvement, and academic performance***

Compared to achievement goals and SRL strategies, reading self-efficacy emerged as the most influential predictor of students' academic performance in the EMI course. Prior research has consistently demonstrated that both reading efficacy and reading involvement are key contributors to improved reading comprehension and increased reading quantity (Li et al., 2024; Rettig & Schiefele, 2023; Schiefele & Löweke, 2018; Troyer et al., 2019; Wang & Gan, 2021; Wigfield & Guthrie, 1997). Moreover, learners' academic self-efficacy has been positively associated with academic achievement in general and EFL learning contexts (Chou, 2019; Honicke et al., 2020; Zheng et al., 2017). The current study reinforces these findings, showing that both reading efficacy and reading involvement significantly predicted students' test performance, with reading efficacy emerging as the strongest predictor among all variables included in the model. While most prior studies have concentrated on L1 academic subjects or general EFL contexts, this study highlights the critical role of students' perceived competence and engagement in reading subject-specific English textbooks within a university-level EMI context.

In addition, the results support previous research indicating that students' reading self-efficacy and involvement play important roles in promoting SRL strategy use and academic success (Troyer et al., 2019; Unrau et al., 2018). Reading involvement, a core aspect of intrinsic reading motivation (Cremin & Scholes, 2024; Wigfield & Guthrie,

1997), was especially evident among students who demonstrated a strong intrinsic interest in the EMI course. These students tended to engage more deeply with the reading material, visualize content mentally, and apply SRL strategies while reading English-language academic texts. Given that EMI learning may not inherently interest all EFL learners (Zhang & Pladevall-Ballester, 2022), the findings underscore the importance of fostering both reading self-efficacy and motivation.

Previous studies have shown that mastery-approach goals, prior academic success, and positive emotional experiences contribute to the development of stronger academic self-efficacy (Chou, 2022; Diaconu-Gherasim et al., 2023; Elliot & McGregor, 2001; Midgley et al., 1998). To promote reading efficacy in EMI contexts, researchers recommend the use of inquiry-based and autonomy-supportive instructional environments that incorporate tasks offering successful reading experiences (Elliot & McGregor, 2001; Hinduja et al., 2024; Unrau et al., 2018). Furthermore, strategy training that includes explicit instruction on reading strategies, opportunities for guided practice, and repeated application across diverse content areas can enhance both reading strategy use and self-efficacy (Grabe & Stoller, 2020; Unrau et al., 2018).

### 5.3 SRL strategies and academic performance

The correlation results indicated that different types of SRL strategies were positively related to each other and to academic achievement. However, only organization and time/study environment management significantly predicted students' EMI course performance. Although correlation alone does not imply causality (Pallant, 2020), the shift in significance during multiple regression suggests that other variables may influence the relationship. The predictive strength of SRL strategies was overshadowed when variables such as performance-avoidance goals, reading efficacy, and reading involvement were entered into the model, indicating that academic performance in EMI courses depends on more than students' achievement goals alone.

The participants' responses to the open-ended questions indicated that elaboration and organization strategies were perceived as the most effective methods for learning and comprehending the EMI course content. However, the qualitative findings contradicted the quantitative results, which revealed that only organization strategies, not elaboration strategies, positively predicted academic performance. Previous research has shown that students' self-perceived effective learning strategies, such as rereading notes, summarizing content, and highlighting texts, do not necessarily lead to improved academic outcomes (Blasiman et al., 2017; Rivers, 2021; Walck-Shannon et al., 2021). Blasiman et al. (2017) specifically noted that rereading notes or textbooks can create an *illusion of competence* (referred to as a discrepancy between predicted performance and actual performance) (Koriat & Bjork, 2005), leading students to believe they have fully internalized the material when, in reality, deeper cognitive processing is required. This phenomenon explains why many participants in this study considered reviewing notes, summarizing lectures, and rereading textbooks effective, despite the fact that organization strategies, such as clustering, comparing, contrasting, and structuring subject-specific concepts in tables and figures, were the actual predictors of academic achievement in the EMI course.

Another important but often undervalued SRL strategy that emerged as a positive predictor was time and study environment management. Students who attended class consistently, studied in a focused environment, and allocated their study time efficiently outperformed peers who did not. Time management has repeatedly been linked to academic success (Adams & Blair, 2019; Aeon et al., 2021; Wolters & Brady, 2021; Wolters et al., 2017). Despite few students ranking this strategy highly, its predictive power remained strong. Wolters et al. (2017) also showed that effective time management reduces procrastination. Pedagogically, instructors can support students by helping them set clear priorities and short-term goals to reduce maladaptive delays.

A more unexpected result emerged for metacognitive self-regulation strategies. While previous research shows that self-regulation enhances academic achievement (Avargil et al., 2018; de Boer et al., 2018; Hayat et al., 2020; Theobald, 2021), the present study revealed mixed student feedback. Although strategies such as self-questioning and self-testing are highly effective in L1 contexts (Blasiman et al., 2017; Ebersbach et al., 2020; Walck-Shannon et al., 2021), students in this study reported difficulty applying them due to limited comprehension of the English-medium textbook. While English proficiency was not directly measured, positive correlations between metacognitive self-regulation strategies and reading efficacy and involvement suggest that students with stronger reading confidence and engagement are more capable of regulating their own learning. Research has shown that reading self-efficacy and involvement predict reading comprehension in L1 contexts (Rettig & Schiefele, 2023; Schiefele & Löweke, 2018; Troyer et al., 2019). In EMI

settings, these findings imply that learners may need sufficient language proficiency before they can fully benefit from metacognitive SRL strategies to acquire discipline-specific knowledge.

## 6. Conclusion

This study examined the roles of achievement goals, reading efficacy, reading involvement, and SRL strategies in predicting university students' academic achievement in an EMI course. The quantitative analysis revealed that reading efficacy was the strongest predictor of academic performance, followed by performance-avoidance goals, organization strategies, reading involvement, and time/study environment strategies. However, the qualitative findings highlighted a discrepancy between students' self-perceived effective SRL strategies and the actual predictive power of certain strategies on their academic achievement.

The findings contribute to a more nuanced understanding of the dynamics between language proficiency and content mastery in EMI settings. While prior research has often treated English language proficiency as a prerequisite or background variable, this study suggests that students' perceived reading efficacy—not merely their objective language competence—is a critical determinant of academic success. This challenges the traditional assumption that linguistic proficiency alone drives learning outcomes in EMI courses, highlighting instead the pivotal roles of learner beliefs, motivation, and strategy use. Moreover, the finding that performance-avoidance goals negatively predicted academic performance underscores the importance of addressing affective and motivational dimensions in EMI pedagogy. Taken together, the findings underscore the need for a learner-centered approach in EMI research and instructional design—one that extends beyond language proficiency to emphasize the roles of self-efficacy, achievement goals, and SRL strategies. Pedagogically, providing supplementary reading materials and structured scaffolding can strengthen students' reading efficacy and reduce cognitive overload during EMI course engagement (Lee, 2024; Zhang & Pladevall-Ballester, 2022). Moreover, given that organization strategies, such as outlining, clustering, and representing key ideas in tables or diagrams, were effective predictors of academic performance, teachers are encouraged to present content visually (e.g., tables, concept maps, graphs) to facilitate comprehension and support students in acquiring discipline-specific knowledge through EMI.

Despite its contributions, this study has several limitations. First, the research was limited to a single EMI course for students majoring in teacher education, which may restrict the generalizability of the findings to other disciplines or course types. Second, while English proficiency is a key factor in EMI learning, it was not directly assessed in this study. Although language ability was not a formal prerequisite for course participation, future research should consider the interaction between English proficiency, motivational constructs, and SRL strategies to provide a more holistic account of EMI success. Nevertheless, this study offers meaningful contributions to the literature on academic motivation and SRL in EMI contexts. It is hoped that these findings will inform future investigations into the cognitive and motivational mechanisms underlying student performance, as well as guide educators in designing EMI courses that better support diverse learner profiles.

## Ethics approval and consent to participate

The study protocol was approved by the National Cheng Kung University Human Research Ethics Committee (Approval No.: NCKU HREC-E-112-300-2) on July 18, 2023. Prior to the commencement of the study, informed consent was obtained from all participants. They were assured that no identifiable information would be disclosed during the data analysis process. Signed consent forms were collected from all participants.

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## Conflict of interest

The author declares no competing financial interest.

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