

# A Study on Self-Regulated Learning Strategies in AI-Assisted Reading Preparation: Evidence from the Content and Language Integrated Course Comprehensive English: British Literary Works

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**Abstract:** *In flipped classrooms under the Content and Language Integration (CLI) framework, English majors' self-regulated learning (SRL) ability plays a crucial role in the quality of pre-class learning. However, in traditional flipped classrooms without the support of generative artificial intelligence (GenAI), SRL feedback is often delayed and lacks personalization, which restricts the development of students' goal setting, learning monitoring, and strategy regulation. To explore the empowering mechanism of GenAI in SRL, this study draws on Zimmerman's social-cognitive model of SRL and Pintrich's classification system of SRL strategies. Six English-major students were selected through purposive sampling to participate in two rounds of AI-assisted preview practice. By analyzing their AI interaction texts, reflective journals, and interview data, this study qualitatively reveals the influence of AI on the use of cognitive, metacognitive, and resource management strategies across the three phases of forethought, performance, and reflection. The findings show that metacognitive monitoring and help-seeking strategies were significantly activated, while critical thinking, time management, and organizational strategies were moderately used, whereas deep-processing and collaborative strategies were used to a limited extent. Through immediate feedback and external scaffolding, GenAI supported learners' goal setting, task decomposition, and self-evaluation, but still faced challenges in stimulating deep cognitive processing and learning motivation. The findings provide a theoretical foundation and practical path for integrating GenAI into foreign language teaching.*

**Keywords:** Self-regulated learning strategies, Generative artificial intelligence, English-major students.

## 1. Introduction

Content and Language Integration (CLI) is an educational philosophy in which a foreign language is used to teach or learn both content and language for multiple purposes (Chang, 2020), and its positive effects have been effectively verified (Chang & Zhao, 2020). In the flipped classroom model guided by CLI, learners are required to complete knowledge input before class, while classroom time focuses on application and production. This model requires students to possess strong autonomous learning ability, and self-regulation in task understanding, goal setting, and strategy selection is particularly crucial.

However, CLI teaching materials are characterized by high lexical density and complex syntax (Wang, 2024), which impose a heavy cognitive load on learners. Traditional teacher-led pre-class preparation often fails to meet learners' individual differences and need for real-time feedback, leading to insufficient motivation and limited preview effectiveness. Against this background, generative artificial intelligence (GenAI), with its capacity for language understanding, interactive generation, and personalized feedback, offers possibilities for assisting students in goal setting, strategy guidance, and monitoring feedback, thus becoming a potential scaffolding tool for pre-class learning.

Self-regulated learning (SRL) is a dynamic cyclical process in which learners engage in planning, monitoring, regulation, and reflection under goal-oriented conditions (Zimmerman, 2000). It involves not only cognitive processing and metacognitive regulation of tasks, but also the regulation of learning motivation and the management of external resources

(Pintrich et al., 1991). However, systematic research on the role of GenAI across different phases of SRL remains scarce. In particular, in the context of language learning, there is still no clear theoretical or empirical account of how learners activate different types of SRL strategies through interaction with AI.

Against this background, this study is situated in the pre-class preview context of a CLI flipped classroom. By integrating Zimmerman's three-phase SRL model with Pintrich's classification of strategies, it examines the performance and characteristics of English majors' self-regulated strategies under GenAI support, with the aim of revealing the mechanism through which AI empowers SRL and offering practical suggestions for personalized foreign language teaching.

## 2. Literature Review

### 2.1 Self-Regulated Learning (SRL)

Self-regulation refers to the process by which individuals actively plan, monitor, and continuously adjust their thoughts, emotions, and behaviors in order to achieve goals (Barry J. Zimmerman, 1989). In instructional contexts, self-regulated learning (SRL) refers to learners' behavior of actively setting goals, employing strategies, and continuously monitoring and evaluating both the learning process and outcomes (B. J. Zimmerman, 2008).

Research has shown that high achievers tend to use more self-regulated learning strategies than low achievers (Pintrich & Groot, 1990; B. Zimmerman & Martinez-Pons, 1986), and

a large body of subsequent studies has consistently supported the positive relationship between SRL strategy use and academic achievement (Barnard-Brak et al., 2010; Broadbent & Poon, 2015; Cho & Heron, 2015; Cho & Shen, 2013).

With increasing attention in psychology to the regulation of metacognitive processes, researchers have proposed various self-regulation models from different theoretical orientations in order to understand more systematically the internal mechanisms and developmental process of self-regulated learning (Puustinen & Pulkkinen, 2001). Although these models differ in perspective and structural emphasis, they generally stress learners' active regulation of cognition, motivation, behavior, and contextual factors during the learning process.

First, as the agent of learning, learners should actively formulate learning plans, monitor and regulate related learning activities, and take responsibility for the entire learning process. Second, SRL is a cyclical process of continuous feedback, in which learners constantly monitor the effectiveness of their learning strategies and adjust them accordingly, ranging from subtle cognitive changes to significant behavioral shifts, such as replacing one strategy with another (Zimmerman, 2002). Based on these characteristics, this study defines SRL as a process in which learners actively engage in a series of metacognitive self-regulatory activities to gradually reduce the gap between their current state and hierarchical goals.

## 2.2 The Social-Cognitive Model of Self-Regulated Learning

Zimmerman's model divides the process of self-regulated learning into three cyclical phases: the forethought phase, the performance phase, and the self-reflection phase (B. J. Zimmerman, 2000). In the forethought phase, learners prepare themselves psychologically for learning through goal setting, task analysis, and self-efficacy judgments. In the performance phase, learners employ various cognitive and metacognitive strategies to monitor task progress and maintain motivation. In the self-reflection phase, learners conduct self-evaluation and attribution based on learning outcomes and accordingly adjust subsequent goals and strategies. This model highlights the cyclical and dynamic feedback nature of self-regulation, arguing that effective learning stems from the continuous optimization between "planning–performance–reflection."

Correspondingly, Pintrich's model is more comprehensive and hierarchical in structure. He divides self-regulated learning into four phases—forethought and planning, monitoring, control, and reflection and reaction—which operate across four domains: cognition, motivation and affect, behavior, and context or task characteristics (Pintrich, 2000). This model focuses not only on learners' cognitive regulation but also emphasizes the role of motivational regulation and contextual factors, highlighting the need for learners to actively maintain interest and commitment to goals throughout the learning process. Based on this framework, Pintrich and his colleagues developed the widely used Motivated Strategies for Learning Questionnaire (MSLQ) to measure learning motivation and strategy use (Pintrich & Groot, 1990).

Overall, Zimmerman's and Pintrich's models show a high degree of consistency in both structure and core ideas. Both reflect the cyclical nature of self-regulated learning and stress learners' active control over cognition, motivation, and behavior. However, they differ slightly in emphasis: Zimmerman pays more attention to self-efficacy and feedback mechanisms at the individual level, whereas Pintrich emphasizes the role of motivation and contextual interaction. Their complementarity makes the social-cognitive theoretical system of SRL more complete and provides a solid framework for understanding learners' self-regulation in dynamic learning environments.

## 2.3 Definition and Multidimensional Classification of Self-Regulated Learning Strategies

Self-regulated learning strategies are generally defined as the cognitive, metacognitive, motivational, and behavioral regulation means that learners consciously adopt in order to achieve learning goals (Zimmerman, 2000). Unlike "learning strategies" in a general sense, SRL strategies focus not only on techniques for knowledge processing and task completion, but also on learners' active control and reflection over the learning process. In other words, self-regulated learning strategies include not only the behavioral aspect of "how to learn," but also the psychological regulation process of "why learn in this way."

In terms of classification, scholars have proposed various multidimensional frameworks. Pintrich divides SRL strategies into three major categories: motivational strategies (control of learning beliefs and self-efficacy for learning and performance), cognitive and metacognitive strategies (such as rehearsal, elaboration, organization, critical thinking, and metacognitive regulation), and resource management strategies (such as environment and time management, effort regulation, peer learning, and help seeking) (Pintrich et al., 1991). Weinstein and Mayer (1986) proposed a similar classification, emphasizing the interaction between cognitive processing and metacognitive monitoring. Zimmerman and Martinez-Pons (1986), in their classic study, identified 14 specific strategies, including goal setting, self-monitoring, self-reward, and environmental management. Boekaerts (1999) further incorporated motivation and emotion regulation into the strategic framework, arguing that strategies are not only manifestations of cognitive behavior but also reflect learners' motivational investment and emotional coping. In recent years, Broadbent and Poon (2015) proposed a three-dimensional model of "cognitive – metacognitive – resource management" in online learning contexts, emphasizing time management, task planning, and help-seeking in technology-supported environments.

Overall, although classification criteria vary, mainstream research generally defines and categorizes SRL strategies from multiple dimensions: learners process information through cognitive and metacognitive strategies, sustain effort and beliefs through motivational regulation, and coordinate environment and behavior through resource management.

## 2.4 Fostering Self-Regulated Learning Ability in AI-Supported Language Learning Environments

Research has shown that in instructional settings, AI chatbots can play the roles of partners, assistants, and even tutors in learning environments (Fidan & Gencel, 2022; Wollny et al., 2021), thereby stimulating learners' interest (Wambganss et al., 2021), enhancing learning motivation (Chien et al., 2022; Kim, 2018b), engagement (Ruan et al., 2021), and learning self-efficacy (Yin et al., 2021). Other researchers have found that GenAI can assist learners in knowledge construction, improve the process of self-regulation, enhance learners' self-regulated learning ability, and thereby improve academic performance (Hao & Qi, 2025; Pan et al., 2025).

The effectiveness of fostering self-regulated learning ability in AI-supported language learning environments has been well demonstrated. However, a review of the literature shows that existing studies in this field are still limited and have several shortcomings. First, although a small number of studies have verified the effectiveness of AI-supported environments in fostering self-regulated learning, most existing empirical studies rely heavily on questionnaires and use structural equation modeling and factor analysis to examine relationships among variables. While such studies can reveal the influence of different factors on autonomous learning at a macro level, they mainly focus on learners' self-reports and lack in-depth exploration of learning data and dynamic tracking of learners' psychological processes. Overall, they pay insufficient attention to the level of interaction between learners and AI in learning. Second, since learners in CLI classrooms need to accomplish both content learning and language learning tasks, higher demands are placed on pre-class preparation; however, relatively few studies have examined the preview stage in CLI classrooms. Finally, most studies focus only on a single self-regulation strategy and pay little attention to the coordinated relationship between learners' self-regulation and GenAI. Research on the empowering mechanism of AI within the SRL theoretical framework is still in its infancy. There is still no study clarifying how AI enhances autonomous learning ability at different SRL stages, such as task definition and goal planning, especially in flipped classroom settings, where empirical evidence remains lacking.

Therefore, this study focuses on the pre-class preview stage of the flipped classroom with GenAI-mediated feedback and proposes the following research questions:

In AI-assisted literary reading preview, what self-regulated learning (SRL) strategies do learners employ in the phases of planning, performance, and reflection?

What characteristics do these strategies exhibit?

### 3. Research Design

#### 3.1 Participants

This study adopted a qualitative case study approach and selected six first-year English majors from a language university in Northeast China as research participants. Since 2007, the School of English at this university has been implementing CLI curriculum reform and has established a relatively complete CLI curriculum system. All participants came from one intact class and were selected through

purposive sampling with their informed consent. Among them, two were male. Table 1 summarizes the participants' background information.

**Table 1:** Basic Information of the Participants

Participant	Gender	Comprehensive English Achievement	Self-discipline	AI Use
S1	Female	Good	Good	Occasionally
S2	Female	Excellent	Excellent	Occasionally
S3	Male	Poor	Poor	Rarely
S4	Female	Excellent	Good	Occasionally
S5	Male	Excellent	Excellent	Frequently
S6	Female	Poor	Poor	Rarely

All six participants were enrolled in the course Comprehensive English: British Literature, which follows the CLI philosophy and adopts a flipped classroom model.

#### 3.2 Research Context

The study was conducted in the required course Comprehensive English (British Literary Works) for English majors at a university. This course is a core compulsory course developed by the foreign language university in implementing the educational philosophy of Content and Language Integration (CLI) and promoting curriculum reform for English majors. The course mainly introduces classic works of British literature and encourages students to read and appreciate original English literary texts independently. Its main purpose is to help students improve their comprehensive language competence while acquiring basic knowledge of British literature, enhancing their cultural awareness and literary appreciation, and cultivating socialist core values and patriotic feelings through comparisons between Chinese and English literary cultures.

The course Comprehensive English: British Literature is taught twice a week, with each class lasting 80 minutes, and one unit is usually completed in two weeks. For each unit, the first three sessions are devoted to detailed teaching of the text content and language in sequence and by section, while the fourth session focuses on discussion and summary of themes, writing style, and other aspects, followed by a unit quiz. The participants completed their preview task for Unit 6, *A Woman on a Roof*. Since the text for this unit is a complete short story, it could provide a relatively complete preview process within a short period of time, thus enabling better observation and analysis of the participants' self-regulated learning process.

#### 3.3 Research Instruments

1) Human–AI interaction data and preview notes

Because DeepSeek is equipped with the powerful reasoning model R1, it was selected for use in this study. With participants' consent, the researcher collected screenshots of their interactions with AI. The data included AI's heuristic suggestions, the learners' established goals and methods, their questions to AI, their preview outcomes, and AI's feedback and guided reflections. Through the interaction records between participants and DeepSeek, the researcher directly captured strategy application and the "situational" evidence

that triggered decision-making.

### 2) Semi-structured learning journals

After each preview session, participants completed a semi-structured learning journal on the same day to record their key learning decisions and reflective processes. The journal consisted of three parts. The first part, “My preview plan and implementation process,” guided learners to review goal setting, strategy selection, and implementation, thus presenting their learning behaviors in the planning and performance phases. The second part, “My cognitive activities and emotional experiences,” focused on cognitive activities and emotional changes during reading and explored the influence of affective factors on strategy use. The third part, “My difficulties, strategies, and self-evaluation,” prompted learners to summarize gains and challenges, evaluate strategy effectiveness, and propose plans for improvement.

These journals served not only as tools for learners’ self-monitoring and reflection, but also as important data for the researcher to analyze the stage-specific characteristics and changing mechanisms of SRL strategies.

### 3) Stimulated recall interviews

After the weekly preview tasks were completed, the researcher conducted semi-structured stimulated recall interviews based on the participants’ AI interaction records and the key learning behaviors reflected in their learning journals, such as strategy selection, adjustment, and responses to feedback. Using these original records as cues, the interviews guided learners to recall their thoughts and emotional reactions at the time, with particular focus on why they made such choices and how they felt at that moment. In this way, the researcher was able to explore more deeply the motivational, emotional, and contextual factors behind learners’ strategic decision-making and provide supplementary and corroborative evidence for understanding the dynamic changes in SRL strategies.

## 3.4 Data Collection

The collected data included learners’ interaction data with AI, reflective journals, and interview records. During the study, a total of 1) 8 sets of human–AI interaction data and preview notes, 2) 8 learning journals, and 3) 4 stimulated recall interview transcripts were collected.

With participants’ permission, all interviews were audio-recorded and transcribed verbatim. In addition, all screenshots of the participants’ interactions with AI during the preview process were collected.

## 3.5 Data Analysis

The analytical framework of this study was derived from Zimmerman’s social-cognitive SRL model and Pintrich’s motivational–metacognitive model. During the coding process, the researcher remained particularly sensitive to and attentive to phenomena related to theoretical concepts such as “goal setting,” “strategy use,” “metacognitive monitoring,”

“emotional response,” “AI feedback,” and “task environment” in the data. Based on this framework, nine coding categories were identified: metacognition, time management, effort regulation, peer learning, elaboration, rehearsal, organization, critical thinking, and help seeking. After the coding scheme was determined, the interview transcripts were imported into the qualitative analysis software NVivo 11 and coded according to the thematic content of the discourse and the corresponding coding framework. The findings reported below are further refinements based on the coding results, and the cited data were obtained by the researcher through accessing relevant coding nodes.

## 4. Findings

### 4.1 The Use of Self-Regulated Learning Strategies in an AI-Supported Language Learning Environment

Table 2 presents the use of self-regulated learning strategies based on interview data and reflective journals. The SRL strategies identified included metacognition, help seeking, critical thinking, time management, organization, elaboration, effort regulation, rehearsal, and peer learning.

**Table 2:** Use of Self-Regulated Learning Strategies

Self-regulated learning strategy	Number of nodes	Percentage
Metacognition	64	28.07%
Help seeking	41	17.98%
Critical thinking	33	14.47%
Time management	31	13.60%
Organization	28	12.28%
Elaboration	12	5.26%
Effort regulation	12	5.26%
Rehearsal	4	1.75%
Peer learning	3	1.32%

Each SRL strategy was used in different contexts and served different functions. Metacognitive strategies refer to learners’ awareness and control of their mental processes; help seeking refers to seeking assistance from teachers, peers, or other resources to cope with academic challenges; critical thinking refers to examining the learning process from a dialectical perspective; time management refers to planning study time and tasks; organization refers to highlighting key points during learning; elaboration means integrating new information with existing knowledge to remember new materials; effort regulation refers to maintaining persistence in the face of academic challenges; rehearsal refers to learning through repetition; and peer learning refers to cooperating with other learners to facilitate one’s own learning.

Regarding the use of metacognitive strategies, all six participants employed them to varying degrees across different phases of self-regulated learning. For example, in the goal-setting and planning phase, S3 stated: “Because my foundation is relatively weak, I set aside one hour for preview, mainly to learn new words and understand the protagonist’s personality and the theme of the text.” In the phase of optimizing and adjusting future learning, S6 realized that “during the interaction with artificial intelligence, I became aware that my sense of time was poor, that my ability to analyze action and language description was weak, and that my vocabulary was also rather limited.” A synthesis of the

coded nodes shows that participants were generally able to use metacognitive strategies at different stages of self-regulated learning, though with different emphases. Some students, such as S3, focused more on using AI before preview to set goals and plan time so as to enhance control over learning, whereas others, such as S5, emphasized reflection and self-diagnosis after completing the preview to identify deficiencies in both themselves and the AI and to formulate improvement plans for the next round.

Help-seeking strategies were also activated to varying degrees during interaction with AI. Learners sought help from AI, online resources, and occasionally peers. When S3 encountered unfamiliar words or difficult sentences, he asked AI to analyze them (Figure 1); if he still could not understand after AI's explanation, he would ask peers. During the preview process, S4 liked to share her own ideas and therefore frequently sent them to AI for evaluation. S5 had a wider range of help sources: after consulting AI, he also turned to online sources or literature to verify the accuracy of AI's responses.



Figure 1: S3 Seeking Help from GenAI

As for critical thinking, almost all participants used this strategy to some extent. For instance, S5 observed that “AI kept asking me to continue optimizing my answer, but in fact this process would eventually make the answer more and more similar to AI's own ideas. While listening to AI's suggestions, I still wanted to preserve some of my own thoughts.” Under AI's guidance, S1 discovered that the contrast between the identities of the “workers” and the “pilot's wife” in the text represented a class divide.

Participants also employed time management strategies to varying degrees. Following the AI-assisted preview procedure, learners were required to provide AI with personal information such as their English proficiency and expected preview time after identifying the preview task. Based on this information, AI generated personalized preview plans, including clearly segmented preview steps and suggested time allocation. Therefore, learners' time management strategies were triggered during the preview process. Participants held different views and adopted different practices regarding the time planned by AI. S2 strictly used a timer and completed tasks according to the time divisions suggested by AI, while also adjusting the schedule moderately according to her own situation to maximize efficiency. She believed that this way of managing time helped alleviate her procrastination. By contrast, S5 actively used AI to analyze and summarize difficult points in the text from the perspective of saving time. As shown in Figure 2, S6 used AI to divide her preview time and received positive feedback after completing the task, so she continued to adopt the strategy of setting completion time for tasks in her subsequent learning optimization phase.

#### 1. 预习步骤与时间分配

##### 总目标分解:

- 词汇与短语 (30分钟)
- 角色分析 (20分钟)
- 批判性讨论 (10分钟)

##### 步骤1: 词汇与短语 (30分钟)

##### 任务:

- Word Matching (15分钟): 匹配10个单词与定义 (需结合上下文)。
- Phrase Interpretation (15分钟): 解释4个短语的含义。

Figure 2: S6 Using GenAI to Plan Preview Time

Participants also used organizational strategies when analyzing the text, mainly through “marking, highlighting key points, and overall comparison.” For example, S1 said, “Before I start reading the text, I ask AI to extract high-frequency difficult words from the text and provide example sentences so that I can quickly become familiar with the vocabulary in a short time.” As shown in Figure 3, S4 noted that “AI suggested that I identify and compare the behaviors of different characters while reading the text. I had never tried this in previous preview sessions.” S6 also used AI to organize her preview tasks. Because she lacked a clear understanding of what to preview, she asked AI to provide her with a detailed task list.

##### • 词汇学习:

- 制作单词卡片 (正面单词+段落句子, 背面定义)。
- 用颜色标记情感词汇 (如“resentful”红色, “indulgent”绿色)。

##### • 角色分析:

- 画人物关系图, 标注互动箭头 (如Stanley→Mrs. Pritchett: 调情)。
- 对比法: 比较Stanley的暴躁与Harry的沉稳。

Figure 3: AI Suggesting That S1 Organize the Text

The four strategies of elaboration, effort regulation, rehearsal, and peer learning were used with relatively low frequency, accounting for only 13.59% of all coded nodes.

## 4.2 Characteristics of the Use of Self-Regulated Learning Strategies

From the perspective of frequency, the coding data show that the participants' use of self-regulated learning strategies in the AI-supported language learning environment displayed a clear imbalance. Among them, metacognitive strategies accounted for the highest proportion, mainly reflected in learners' continuous monitoring of both the learning tool and themselves during the preview process. This was followed by help seeking (41 nodes, 17.98%), critical thinking (33 nodes, 14.47%), time management (31 nodes, 13.60%), and organization (28 nodes, 12.28%), whereas strategies such as elaboration, effort regulation, rehearsal, and peer learning were used much less frequently.

1) GenAI significantly promotes the activation of metacognitive strategies

The dynamic feedback and task-planning functions provided by AI greatly enhanced students' awareness and control of the learning process, making metacognitive behaviors such as self-monitoring, self-evaluation, and plan adjustment occur frequently, which is consistent with the characteristics of the performance and reflection phases proposed by Zimmerman.

2) Cognitive strategies are moderately manifested under the influence of AI task prompts

Although AI can provide suggestions for processing vocabulary and sentences, learners tend to seek results rather than engage in deep processing. As a result, rehearsal and elaboration strategies were relatively weak. This suggests that without explicit strategic guidance, AI cannot automatically enhance the depth of learners' cognitive processing.

3) The use of resource management strategies is jointly influenced by individual differences and the characteristics of AI

The convenience of AI encouraged students to actively seek help, but some learners also developed dependency, which weakened the use of traditional resource management strategies such as peer collaboration. Effort regulation was mainly affected by the speed of AI responses and the positive feedback embedded in the content, indicating that AI can also function as a motivational regulator in constructing learning behavior.

4) There is a risk of "scaffold dependence" in AI-based regulation

Some students developed dependent behaviors under the "instructional guidance" of AI and lacked the ability to reflect and transfer learning strategies independently. This phenomenon suggests that teachers need to intervene in the design of AI use by embedding strategic reminder templates so as to strengthen students' awareness of evaluating AI feedback.

## 5. Discussion

The findings of this study show that in a GenAI-supported language learning environment, learners employed nine types of self-regulated learning strategies: metacognition, time management, effort regulation, peer learning, elaboration, rehearsal, organization, critical thinking, and help seeking, and the frequency of use of these strategies varied significantly.

First, metacognitive strategies were used most frequently. In different learning tasks and stages, learners engaged in metacognitive control so as to optimize subsequent learning cycles or phases (Winne & Hadwin, 1998). Therefore, in the process of self-regulated learning empowered by GenAI, metacognitive strategies were significantly activated.

Second, help-seeking strategies were also significantly activated. The immediate interactive nature of GenAI markedly stimulated learners' proactive help-seeking behavior, such as asking AI to help formulate preview plans, solve problems encountered during learning, reflect on their performance, and plan the next round of learning tasks (Ng et al., 2024).

Critical thinking strategies were moderately activated. During both the strategy implementation and reflection phases, learners generally reviewed and evaluated their learning process and outcomes through GenAI's evaluative feedback

and thereby engaged in critical thinking and self-reflection (Jin et al., 2023).

Time management strategies were also moderately activated. Learners needed to manage available time and monitor task progress according to the schedule (Silverajah et al., 2022), while GenAI could generate personalized task schedules for them.

Organizational strategies were moderately employed as well. During the strategy implementation phase, learners needed to use organizational strategies to extract key information and structure it systematically (Broadbent, 2021), and GenAI could guide learners in summarizing and extracting the required information effectively.

By contrast, effort regulation, elaboration, rehearsal, and peer learning were used only minimally. This result is inconsistent with Broadbent's (2021) SRL framework for online learning, possibly because her research context was a traditional online learning environment, whereas the present study was conducted in a GenAI-based online learning environment. Learners' reliance on AI may have inhibited peer collaboration, which explains the limited occurrence of collaborative learning. In addition, effort regulation is closely related to motivation, and learners tend to prefer human-provided motivational support (Jin, 2023). Rehearsal strategies are more often used in the post-class stage to consolidate what has been learned.

## 6. Conclusion

Based on a GenAI-supported language learning environment, this study examined the use of self-regulated learning strategies by English majors during the pre-class preview stage and provided new implications for classroom practice. Teachers may introduce GenAI into the preview stage of the flipped classroom and design differentiated preview prompts according to different learning goals and ability levels. For lower-level learners, prompts may focus on process guidance, such as "How can I improve my strategy for looking up words?" For higher-level learners, prompts may provide extension-oriented suggestions, such as "Compare this work with similar literary texts." In addition, SRL prompt templates can be embedded into learner-GenAI interaction. For example, in the planning phase, learners may be asked: "Are your preview goals related to the theme of the text?" In the reflection phase, they may be prompted: "What kinds of textual evidence are still missing?"

Moreover, preview should not be limited to memorizing vocabulary or merely understanding the text. Learners should make full use of AI's powerful reasoning ability and treat it as a metacognitive scaffolding tool to break down preview goals, monitor the preview process, and evaluate and reflect on their preview performance in light of AI feedback, thereby improving overall learning effectiveness.

This study still has certain limitations. First, the number of participants was limited, involving only a small number of learners, and thus cannot fully reflect the strategy use of different learner groups in GenAI-supported environments. Second, the study focused mainly on the preview stage and

did not cover the full process of in-class and post-class learning, so insufficient attention was paid to the dynamic evolution of self-regulated learning strategies. Third, the research relied primarily on qualitative data and lacked multidimensional quantitative measurement and long-term tracking. Future research may proceed in the following directions: first, expanding the sample size to include learners from different disciplines and proficiency levels; second, combining multiple research methods, such as learning journals, learning analytics big data, and quantitative questionnaires, to enhance the reliability and validity of the findings; and third, examining the sustainability and transferability of self-regulated learning in GenAI-supported language learning environments over a longer time span.

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