Self-Regulated Learning and Academic Achievement in Higher Education: A Decade Systematic Review

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ABSTRACT

Academic success relies not only on mastering subject knowledge but also on developing self-regulated learning (SRL) skills. Many students, however, struggle with effective SRL strategies, hindering their ability to manage self-directed learning and lowering academic performance. This systematic review analyzed 70 studies published over the past decade, focusing on the impact of different SRL phases and strategies on academic achievement. Following PRISMA guidelines, 1,912 studies were initially identified, with 70 studies included in the final analysis. Results indicate that effective SRL strategies, particularly in complex and self-directed learning tasks, significantly improve performance. While Cognitive and metacognitive strategies in the performance phase have been extensively studied, whereas motivation regulation strategies and the self-assessment phase remain comparatively underexplored. Research focus on individual phases and strategies, with less emphasis on the full SRL cycle, especially the self-assessment phase. Moreover, SRL's influence on non-academic outcomes, such as learning satisfaction and dropout intentions, is shaped by emotional experiences and perceptions of the learning environment. These findings highlight the need for educators to integrate SRL strategies into supportive learning environments to promote academic and emotional success. Future research should address gaps in understanding the full SRL cycle and its broader effects on learning outcomes.

Keywords: Self-regulated learning; Academic achievement; Higher education; Systematic review.

INTRODUCTION

Improving academic achievement is a key priority in education policies worldwide. As digital transformation and automation reshape the global economy, students are expected to develop subject-specific knowledge. Additionally, they need to cultivate lifelong and self-regulated learning skills to meet the demands of a rapidly changing job market. Students who perform well academically are more likely to complete their studies and secure an advantage in competitive labor markets (OECD, 2021). However, around 30% of higher education students globally do not finish their first year (OECD, 2019). In higher education, especially in remote and blended learning environments, students face heightened demands for self-regulation. Many lack the necessary strategies to manage independent learning effectively, resulting in poor academic performance (Tang et al., 2024). This academic failure presents long-term challenges for both students' career prospects and educational systems (OECD, 2019). Consequently, education policies are now focusing on improving self-regulated learning (SRL) skills to help students achieve better outcomes in increasingly dynamic learning contexts (UNESCO, 2021). SRL is also considered vital for lifelong learning (EU Council, 2002).

SRL is a multidimensional framework that underscores the learner's active role (Panadero, 2017). According to Zimmerman (2000), SRL involves the self-generation of thoughts, emotions, and actions that are strategically planned and adapted to achieve personal goals. The SRL process occurs in three phases: forethought, performance, and reflection. During the forethought phase, students prepare by analyzing tasks, activating motivation, and setting goals. Key elements include goal setting, planning, and motivational beliefs, such as self-efficacy and task value. In the performance phase, students monitor and regulate their learning using cognitive

and metacognitive strategies, resource management, and motivation regulation (Pintrich, 2004; Efklides, 2011). In the reflection phase, students assess their learning outcomes and adjust based on feedback, shaping their future motivation and SRL strategies (Panadero et al., 2019). This cycle promotes more efficient learning and improved academic outcomes (Schunk & Greene, 2017; Torre & Daley, 2023).

Extensive research supports the positive impact of SRL on academic achievement across different learning settings. A meta-analysis of 142 studies by Jansen et al. (2019) found that learners with higher self-regulation skills were more engaged and achieved better academic results. Strong motivational beliefs, closely tied to SRL, were shown to predict higher academic performance (Muhamad Yew et al., 2023). SRL helps students manage their learning processes, adapt strategies as needed, and maintain motivation, leading to enhanced academic performance (Pylväs et al., 2022). Other studies confirmed that students using SRL strategies, such as time management and metacognition, tend to perform better in diverse subjects and tasks (Khan et al., 2020; Roth et al., 2016). However, not all research is consistent regarding SRL's impact on academic achievement. Xu et al. (2023) reviewed 73 studies and found that while 63% showed positive effects of SRL interventions on academic achievement, 14 studies found no significant effects, and 13 showed mixed results. Importantly, no studies reported negative effects. These findings suggest that the mechanisms linking SRL to academic achievement are still not fully understood and require further investigation across different contexts.

Academic achievement typically refers to students' ability to complete academic tasks (Maqableh et al., 2021). It is generally measured through grades such as GPA, exam scores, or final course grades (Jossberger et al., 2020; Madigan & Curran, 2021). However, some studies assess academic achievement through non-academic outcomes, such as perceived achievement, satisfaction, dropout intentions, and engagement, reflecting lasting changes in behavior and abilities (Cassady et al., 2022; Yaxin & Noordin, 2024). While both approaches capture essential aspects of academic success, they are not fully interchangeable. Research has shown that the choice of measurement can influence outcomes, highlighting the need for careful consideration of metrics in studies of academic achievement (Spinath, 2012).

This study provides a comprehensive evaluation of the relationship between SRL and academic achievement in higher education over the past decade. The main objectives are to identify research trends in SRL within higher education, assess the use of research methods. Additionally, the study aims to clarify the overall relationship between SRL process and academic achievement. By conducting a systematic literature review, we aim to offer valuable insights for both learners and educators.

Our review covers the period from 2015 to 2024. While previous studies have focused on specific areas such as blended learning (Luo & Zhou, 2024.), online teaching (Xu et al., 2023), adolescent learners (Dent & Koenka, 2016), and non-academic outcomes (Anthonysamy et al., 2020), there has been little comprehensive research on SRL process and academic achievement specifically within higher education. This review seeks to fill that gap, providing a holistic understanding of SRL process and offering practical guidance for fostering autonomous learning in higher education.

METHODS

Search Strategy

To ensure the review's quality, we focused on selecting high-caliber publications. In June 2024, we conducted a comprehensive search across relevant academic databases, concentrating on studies from the past decade that examined SRL among higher education students. The search strategy utilized Boolean logic, combining the following terms: ("self -regulat*" OR "self-regulated learn*" OR "SRL") as keywords, along with abstract terms such as ("academic achievement" OR "academic performance" OR "academic outcome" OR "learning performance" OR "learning outcome" OR "academic success" OR "grade" OR "score" OR "GPA") and ("higher education" OR "college" OR "university" OR "tertiary").

To maintain high standards of rigor and accuracy, only peer-reviewed journal articles with full-text access were included in this review. We sourced relevant studies on the relationship between SRL and academic achievement from platforms such as Web of Science, Scopus, and EBSCO. These databases were selected for their extensive

coverage of high-quality, peer-reviewed literature and their reputation for rigorous indexing standards. The search was conducted using Google Chrome to ensure consistency and reproducibility. Specific inclusion and exclusion criteria were developed (Table 1), and each article underwent thorough screening to confirm its suitability for analysis. Studies such as books, conference papers, reports, book reviews, and non-peer-reviewed or non-English articles were excluded from this review.

Table 1 Inclusion and exclusion criteria.

Inclusion criteria	**Exclusion criteria**
"Higher education" OR “college” OR “university” OR “tertiary”	Not higher education
SRL as in dependent variable(s)	SRL not as dependent variable(s)
Relationship between SRL and academic achievement	Only SRL or academic achievement
Written in English	Written in other languages
Journal papers	Conference paper,book,report,review
Peer-reviewed journal papers	Not peer-reviewed journals
Full text available	Full text not available
Academic achievement as dependent variable(s)	Academic achievement not as dependent variable(s)

Selection Process and Results

This study followed the PRISMA 2020 review framework (Figure 1), which includes the steps of identification, screening, eligibility assessment, and analysis. After several rounds of screening, 70 studies met the inclusion criteria and were selected for review.

Using the PRISMA flowchart as a guide (Figure 1), an initial search of the databases identified 1,912 papers. In the screening phase, 224 duplicate records were removed using reference management Rayyan software, leaving 1,688 papers. The titles and abstracts of these remaining papers were then reviewed to assess whether they met the inclusion criteria. As a result, 1,386 records were excluded, leaving 302 papers for further eligibility review.

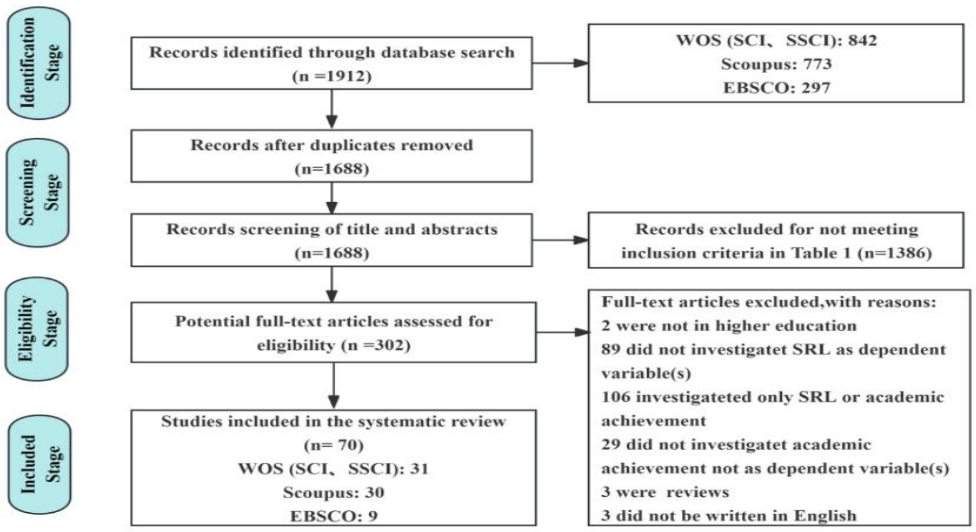

Fig. 1 Flow diagram of papers included in review based on PRISMA

During the eligibility phase, full-text reviews were conducted on the remaining 302 papers to verify compliance with the inclusion criteria. Papers that did not meet the criteria were excluded. A total of 232 papers were excluded for failing to meet the inclusion standards. In the final phase, 70 papers were deemed eligible for review. These studies met all the inclusion criteria and focused on the relationship between self-regulated learning and academic achievement in higher education.

Coding Scheme

To enhance understanding of the studies, five coding schemes were used: (1) Bibliometric Coding: This scheme categorizes bibliometric information based on the year of publication and the authors' country of origin. (2) Research Method Coding: Following Van Laer and Elen (2017), the research methods were coded based on the type of study design, classifying them into quantitative, qualitative, and mixed-methods studies. (3) Theoretical Coding: Primarily based on SRLS theory (Pintrich, 1999; Zimmerman & Martinez-Pons, 1988), this scheme coded the phases of SRL, and the regulatory strategies involved. (4) Learning Context Coding: Learning was classified into three categories according to different learning environments: offline, online, and blended learning. (5) Outcome Coding: Papers were categorized based on effectiveness as having a positive impact, negative impact, or mixed impact. Mixed impact refers to studies that show positive, negative, or no effects across different variables.

RESULTS

Analysis of Publication Trends

This study provides a descriptive analysis of the 70 selected papers, categorized by country, research method, and academic achievement. The papers were classified by country to offer a clearer understanding of the global focus on this topic. The data reveals that the publications originated from 20 different countries and regions, with the United States, China, and both Australia and Germany leading the way. The United States contributed 15 papers, followed by China with 10, and Australia and Germany with 7 each, representing 20%, 14%, and 10% of the total publications, respectively. Combined, these four countries contributed over half of the total publications in the last decade (Table 2).

Table 2. Source of Papers by Country

Country	Frequency	Percentage (%)	Country	Frequency	Percentage (%)
United States	15	21.4	Vietnam	1	1.4
Spain	2	2.9	China	10	14.3
Iran	2	2.9	Chile	1	1.4
Indonesia	2	2.9	Australia	7	10
Ecuador	1	1.4	Germany	7	10
Philippines	1	1.4	Netherlands	5	7.1
South Korea	1	1.4	Turkey	5	7.1
Japan	1	1.4	Italy	3	4.3
Uganda	1	1.4	Malaysia	2	2.9
Israel	1	1.4	Pakistan	2	2.9
Total	**70**	**100**			

Looking at the publication trends, the number of studies remained relatively stable prior to the COVID-19 pandemic, with a strong focus on offline teaching. In 2019, 9 papers were published on offline learning. However, during the pandemic (2020 to 2022), the number of studies increased significantly, peaking in 2022. In these three years, 34 papers were published, representing roughly half of the total studies reviewed. Of these, 20 papers specifically examined online and blended learning, indicating a shift in research focus towards these teaching modes. At the same time, offline teaching continued to be a key area of research. After 2022, the number of studies began to decline, possibly due to the pandemic's resolution and adjustments in educational formats. Nevertheless, research on online and blended learning continued to receive attention, reflecting ongoing changes in educational models (Table 3).

Table 3. Studies on the topic cited in different contexts over the past decade

Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total
Online Learning	0	1	0	0	1	3	3	6	1	2	17
Offline Learning	1	1	4	2	9	5	0	9	3	0	34
Blended Learning	1	2	3	1	0	0	5	3	0	2	17
Not Mentioned	0	1	0	1	0	0	0	0	0	0	2
Total	2	5	7	4	10	8	8	18	4	4	70

A closer look at country-specific trends over the past decade shows that the United States has consistently explored the relationship between SRL and academic achievement across various teaching contexts. In contrast, China experienced a surge in research on this topic during the pandemic, publishing 8 papers in just three years, which accounted for 80% of its total output over the past decade. These studies primarily focused on online and blended learning. Australia's research emphasized blended learning, with 5 papers, while Germany concentrated more on offline teaching, also with 5 papers. These differences highlight varying research priorities across countries, likely reflecting differences in educational resource allocation, teaching preferences, and strategies developed in response to the pandemic.

Summary of methodology of the reviewed papers

Research on the relationship between SRL and academic achievement falls into three main categories: cross-sectional studies, longitudinal studies, and mixed designs. Of the 70 papers published between 2015 and the present, 48 utilized cross-sectional designs. These studies collected data at a specific point in time to evaluate the link between SRL and academic achievement, making this the most commonly used approach in the field (Di et al., 2020). Findings from these studies indicate that SRL strategies, such as time management and seeking help, significantly predict academic performance.

With SRL increasingly recognized as a dynamic and ongoing process, longitudinal studies offer notable advantages for assessing its long-term effects. Twenty papers employed longitudinal designs, including 7 quasi-experimental studies and 13 tracking studies. These studies highlight how SRL influences academic achievement over time, with quasi-experimental designs proving essential for investigating causal relationships between SRL and academic outcomes (Cassady et al., 2022; Trentepohl et al., 2022). Additionally, 2 papers combined cross-sectional and longitudinal designs, offering a more holistic perspective by capturing both short-term changes and long-term trends. These studies show that SRL not only affects immediate academic performance but also has lasting implications for long-term success (Kryshko et al., 2020).

Quantitative methods have been the most widely adopted due to their objectivity and broad applicability. Most studies have relied on surveys and standardized tests to measure SRL's impact on academic achievement (Muwonge et al., 2018). However, 11 studies utilized mixed-methods approaches, which have allowed for a deeper exploration of the complex relationship between SRL and academic outcomes. For instance, mixed methods have helped uncover how perceived costs influence students' motivation and long-term academic performance, highlighting the importance of supportive teacher-student relationships (Wu & Corpus, 2023; Schippers et al., 2020).

In summary, cross-sectional designs and quantitative methods have been effective in illustrating SRL's broad influence on academic outcomes over the past decade. However, the use of longitudinal studies and mixed methods has deepened researchers' understanding of SRL's long-term effects and its impact across various contexts. These diverse research approaches have provided a more comprehensive view of the complexity of SRL and its role in academic achievement.

Summary of academic achievement measures in the reviewed studies

Researchers vary in how they define and measure academic achievement. The reviewed studies mainly use two types of indicators: academic and non-academic outcomes. Of the 70 studies, 51 used quantitative measures of academic achievement, 7 relied on non-academic indicators, and 12 combined both types. Academic outcomes are typically evaluated through objective metrics such as GPA, credits, exam scores, or final course grades (Cheema et al., 2019; Gilar-Corbi et al., 2020). GPA, in particular, is a key measure of overall academic performance across a semester or course (Park et al., 2022; Ghanizadeh, 2017). Exam and course grades offer more flexibility in assessing specific tasks (Roick & Ringeisen, 2018; Cigdem & Oncu, 2024). These evaluations are often standardized, making them comparable across institutions and a common form of academic assessment.

At the same time, there has been growing interest in expanding the definition of academic achievement to include non-academic outcomes. These are typically measured using subjective indicators such as student satisfaction, attitudes toward learning, perceived learning outcomes, dropout intentions, and persistence (Anthonysamy et al., 2021; van Rooij et al., 2018). Subjective measures capture not only learning outcomes but also emotional and behavioral responses throughout the learning process. For instance, Liang et al. (2023) focused on effort-related indicators like perseverance in overcoming challenges, engagement in learning tasks, persistence, and problem-solving ability as markers of academic success.

Some studies incorporate both academic and non-academic indicators, especially when exploring the long-term effects of self-regulated learning and motivation on academic achievement. Kryshko et al. (2020), for example, combined academic performance with dropout intentions to examine how motivation regulation strategies contribute to academic success. This multidimensional approach offers a broader framework for understanding the complex relationship between self-regulated learning and academic outcomes (Schippers et al., 2020; Yip, 2021; Mindrila & Cao, 2022).

Phases of Self-Regulated Learning

Zimmerman divides SRL into three phases: forethought, performance, and self-reflection. The forethought phase includes self-efficacy, goal orientation, task value, motivation, and goal setting. The performance phase focuses on cognitive strategies, metacognitive monitoring, resource management, and motivational regulation. The self-reflection phase involves attribution, feedback, self-evaluation, and self-satisfaction.

Among the 70 studies reviewed, 59 examined the forethought phase, 62 explored the performance phase, and only 15 focused on the self-reflection phase. 18 studies concentrated on a single phase of SRL, with 8 solely investigating the forethought phase and 10 exclusively addressing the performance phase. 38 studies examined both the forethought and performance phases, while only 14 covered all three phases, with limited focus on the self-reflection phase.

Key topics within each phase varied. In the forethought phase, motivational beliefs and goal setting were the primary areas of focus. The performance phase emphasized cognitive strategies, metacognitive strategies,

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resource management, and motivation/emotion regulation. The self-reflection phase centered on feedback and self-evaluation (Table 4). Some studies combined multiple SRL phases, highlighting the importance of the forethought and performance phases, as well as the role of motivational beliefs, cognitive, and metacognitive strategies in higher education.

Table 4. Frequency of Self-Regulated Learning Strategies

SRL phase	Strategies	Frequency
Forethought phase	Self-efficacy	37
	Task value	10
	Goal orientation	23
	Goal setting	5
Performance phase	Cognitive strategy	35
	Metacognitive control	37
	Time and environment management	22
	Peer learning	7
	Seeking help	15
	Effort management	5
	Motivational/Emotional Regulation	13
Self-reflection phase		15

Forethought Phase

Motivational beliefs in the forethought phase primarily consist of self-efficacy, task value, and goal orientation. 37 studies have consistently demonstrated that self-efficacy is a strong predictor of academic success across various subjects and learning environments (Sun et al., 2018; Huang et al., 2022; Muljana et al., 2023). Honicke et al. (2020) noted that students with high self-efficacy tend to exhibit stronger intrinsic motivation and goal orientation, both closely tied to academic achievement. However, the influence of self-efficacy may diminish in highly anxious students, particularly in specific academic fields (Los & Schweinle, 2019; Díaz Mújica et al., 2019).

Task value, discussed in 10 studies, was shown to enhance student engagement, focus, and satisfaction, which collectively improve academic performance (Wu & Corpus, 2023; Cheema et al., 2019; Yalçın & Dennen, 2024). Task value is also linked to metacognitive strategies and resource management, further strengthening self-regulated learning (Muwonge et al., 2018). However, in high-anxiety contexts, task value may be less effective, indicating the need for further research (Broadbent & Fuller-Tyszkiewicz, 2018). Additionally, perceived costs can lower student engagement and negatively affect academic performance (Wu & Corpus, 2023; Kryshko et al., 2020).

Goal orientation was the focus of 23 studies, with results showing a significant positive effect on academic achievement, especially in mastery goal orientation. This type of orientation improves academic outcomes by enhancing self-efficacy, metacognitive strategies, and resource management (Yeh et al., 2019; Schippers et al.,

2020; Honicke et al., 2020; Wilby, 2022; Xu et al., 2022). Conversely, performance-avoidance and mastery-avoidance orientations were associated with lower academic performance (Dai, 2021; Muljana et al., 2023).

5 studies explored the impact of goal setting on academic achievement. Goal setting enhances academic performance by boosting motivation, reducing exam anxiety, encouraging the use of self-regulation strategies, and increasing engagement (De la Fuente et al., 2017; Roick & Ringeisen, 2018; Park et al., 2022). Schippers et al. (2020) highlighted that writing personal goals, regardless of their content, helps improve academic performance. Furthermore, Chang et al. (2022) found that combining goal setting with self-assessment and feedback significantly enhances critical thinking and learning outcomes.

Performance Phase

35 studies analyzed cognitive strategies such as elaboration, rehearsal, organization, and task strategies. These strategies have been shown to enhance academic achievement, particularly in online learning environments (Yu et al., 2021; Song & Kim, 2021; Karacan et al., 2022; Roick & Ringeisen, 2018). When combined with motivational beliefs and critical thinking, cognitive strategies deepen understanding and further support academic success (Ghanizadeh, 2017; Anthonysamy, 2021).

Metacognitive strategies were the focus of 37 studies, highlighting their role in promoting self-monitoring (Los & Schweinle, 2019; Sebesta & Bray Speth, 2017), reflection, critical thinking (Ghanizadeh, 2017), and cross-domain knowledge transfer (Heaysman & Kramarski, 2022). These strategies foster self-directed learning, and when combined with time and resource management, they enhance motivation and optimize strategy use, directly or indirectly improving academic performance, particularly in online and blended learning environments (Sun et al., 2018; Anthonysamy et al., 2021; Wilby, 2022; Muljana et al., 2023; Peteros, 2024).

Resource management strategies, including time and environment management, effort regulation, peer learning, and help-seeking, were discussed in 22 studies on time and environment management, 7 on peer learning, 15 on help-seeking, and 5 on effort regulation. Broadbent et al. (2021) emphasized that effective time management reduces academic stress and helps students complete tasks efficiently, especially in online settings, where it significantly predicts final grades. Anthonysamy et al. (2021) noted that optimizing the learning environment improves focus and reduces distractions, particularly in digital learning. Effort regulation helps students overcome obstacles and sustain motivation (Grunschel et al., 2016). Help-seeking, through interactions with teachers and peers, provides valuable resources, significantly improving academic performance (Ghanizadeh, 2017; Cassady et al., 2022; Muljana et al., 2023).

Although less frequently studied, motivational regulation was explored in 12 studies. Findings suggest that students who use motivational regulation strategies perform better in goal setting and task management, increasing academic effort, reducing procrastination, lowering dropout risk, and enhancing academic success (Engelschalk et al., 2017; Gilar-Corbi et al., 2020; Koh et al., 2022). Grunschel et al. (2016) emphasized that the quality of motivational regulation strategies is more important than their quantity, with higher-quality strategies strongly predicting academic success. Some studies also examined emotional regulation, which helps students maintain emotional stability in high-pressure environments, reducing anxiety and improving focus and academic performance (Kassab et al., 2015; Ghanizadeh, 2017).

Reflection Phase

Research on the influence of the reflection phase on academic performance is relatively limited, with only 15 studies focusing on this area. Ghanizadeh (2017) emphasized that self-reflection significantly enhances critical thinking, enabling students to gain a deeper understanding of complex material and improve their academic outcomes. Chang et al. (2022) found that self-assessment, through self-monitoring and strategy adjustment, substantially boosts academic performance. Broadbent and Fuller-Tyszkiewicz (2018) further noted that critical reflection helps students recognize challenges and adjust their learning strategies, particularly in online learning, where self-reflection strengthens self-discipline and increases learning efficiency. Suhandoko and Hsu (2020) added that self-reflection supports emotional regulation, reducing anxiety, enhancing motivation, and boosting self-confidence, ultimately contributing to academic success.

Relationship between SRL cyclical process and academic achievement

A review of 70 studies on academic achievement in higher education over the past decade reveals that the three phases of SRL generally have a positive influence on academic performance. 44 studies reported significant positive outcomes. Specifically, 35 studies found that the forethought phase had a notable positive effect on academic achievement, 41 studies showed that the performance phase significantly enhanced academic performance, and 11 studies highlighted the positive impact of the self-reflection phase.

Additionally, 23 studies reported mixed results, with 21 indicating varied effects for the forethought phase, 19 for the performance phase, and 4 for the self-reflection phase. Two studies found the effects present but not statistically significant, while one study reported a negative effect (Table 5). Overall, the three phases of SRL have been shown to have a predominantly positive impact on academic outcomes, with the forethought and performance phases being particularly influential.

Table 5 The relations between SRL phases and academic achievement.

SRL phase	Positive	Negative	Mixed	No significance	Total
Forethought phase	35	1	21	2	59
Performance phase	41	0	19	2	62
Self-reflection phase	11	0	4	0	15

DISCUSSION

Impact of the Forethought Phase on Academic Achievement

In the forethought phase, students prepare for learning tasks by setting clear goals, planning effective strategies, and activating intrinsic motivation, which are critical for academic success. Goal setting and motivation regulation are key elements of this phase. Muwonge et al. (2018) found that setting specific learning goals and enhancing intrinsic motivation improves critical thinking and organizational skills, leading to better academic outcomes. Sebesta and Bray Speth (2017) also found that high-achieving students who selected effective strategies and created study plans during this phase performed better in exams. Xu et al. (2022) noted that students with strong metacognitive abilities could better assess task difficulty and manage time, improving their GPA in online learning environments. Wu and Corpus (2023) emphasized that students with a higher task value showed greater engagement in learning, leading to improved performance. Schippers et al. (2020) highlighted that writing and reflecting on personal goals increased self-efficacy, maintaining motivation throughout the learning process and enhancing academic achievement. Shen and Bai (2022) underscored the role of motivation regulation strategies in foreign language writing tasks, with self-efficacy mediating better performance in complex tasks. Thus, goal setting, motivation activation, and metacognitive planning in the forethought phase provide structure and focus to students' learning efforts.

Impact of the performance phase on academic achievement

During the performance phase, students execute learning tasks by applying regulatory strategies, monitoring their progress, and adjusting their approaches. Cassady et al. (2022) emphasized that self-monitoring and strategy adjustment allow students to identify problems early and take corrective measures, significantly improving academic performance. In online learning environments, self-monitoring and regulatory strategies play a decisive role in determining academic outcomes (Liang et al., 2023; Mindrila & Cao, 2022). Effective use of strategies is a vital part of this phase. Los and Schweinle (2019) highlighted that metacognitive monitoring improves exam performance and boosts self-efficacy. Biasi et al. (2019) found that metacognitive strategies facilitate cross-domain knowledge transfer, such as from language learning to mathematics, enhancing academic achievement. Trentepohl et al. (2022) stressed that good time management in self-directed learning environments reduces procrastination, leading to higher academic achievement.

Additionally, motivation regulation strategies help students maintain focus and manage challenges in complex tasks. Research shows that motivation regulation supports goal setting and task management, especially through emotional regulation, which helps students assess challenges and reduce academic failure risks (Gilar-Corbi et al., 2020). Combining various strategies can also enhance learning outcomes. Lu et al. (2022) emphasized that feedback combined with metacognitive regulation helps students better understand task requirements, improving academic performance. Yeh et al. (2019) found that combining cognitive and motivation regulation strategies keeps students motivated and enables them to manage complex tasks, resulting in superior academic achievement. Studies also show that integrating metacognitive strategies with time and resource management improves performance in online and blended learning environments (Anthonysamy et al., 2021; Wilby, 2022; Muljana et al., 2023). Thus, during the performance phase, students who effectively self-monitor and adjust strategies can complete tasks more efficiently and continuously refine their learning processes, ultimately enhancing academic performance.

Impact of the reflection phase on academic achievement

The reflection phase involves assessing the learning process and outcomes. Through metacognitive and emotional regulation, students identify areas of improvement and adjust future strategies, which has a lasting effect on academic achievement. Wilby (2022) highlighted that reflection allows students to pinpoint weaknesses and make adjustments in future tasks, improving academic performance. Pérez-González et al. (2022) found that using metacognitive strategies during reflection helps students identify learning issues and refine strategies to boost performance. Grunschel et al. (2016) noted that self-monitoring reduces procrastination and promotes the development of more effective learning strategies, enhancing learning efficiency. Sebesta and Bray Speth (2017) discovered that high-achieving students use self-assessment to adjust their strategies, leading to better exam outcomes.

Feedback is a crucial aspect of the reflection phase. Broadbent (2017) emphasized the importance of reflecting on external feedback, as it allows students to adjust strategies and improve future performance. Lu et al. (2022) found that the quality of feedback is closely linked to higher SRL behaviors and self-efficacy, with metacognitive strategies being particularly relevant during the reflection phase. Research shows that metacognitive strategies help students evaluate their learning holistically, reduce errors, and improve efficiency, leading to better outcomes (Sun et al., 2018; Leana-Taşcılar, 2016). Heaysman and Kramarski (2022) further stressed that metacognitive reflection significantly enhances students' ability to transfer knowledge across disciplines, improving their performance in various subjects. Thus, the reflection phase enables students to continuously refine their strategies, maintain motivation, and make necessary adjustments for improved learning outcomes.

Impact of the SRL cyclical process on academic achievement

The interaction of the three SRL phases—forethought, performance, and reflection—has a significant impact on academic achievement. The forethought phase sets the foundation, where students establish goals, plan tasks, and regulate motivation in preparation for learning. Ghanizadeh (2017) found that clear goal setting enhances performance in complex tasks, particularly when students have strong self-efficacy, motivating them to adopt effective strategies during the performance phase. However, Broadbent (2018) cautioned that overly vague or ambitious goals may undermine the effectiveness of learning strategies in the performance phase. High self-efficacy can also lead students to set unrealistic goals, diminishing their ability to assess and adjust strategies during the reflection phase, ultimately affecting their academic performance (Suhandoko & Hsu, 2020).

The performance phase requires students to apply cognitive and metacognitive strategies, such as time management, critical thinking, and task monitoring. Gilar-Corbi et al. (2020) emphasized that effective self-monitoring and cognitive strategy use can significantly improve academic outcomes, particularly in complex tasks. However, Suhandoko and Hsu (2020) found that students who focus excessively on time management and task monitoring during the performance phase may compromise the quality of their reflection phase. A heavy focus on details can limit the ability to reflect critically on the overall learning process, hindering future strategy adjustments.

In the reflection phase, feedback plays a critical role. Students reflect on their learning process and adjust their strategies accordingly (Koh et al., 2022). Kryshko et al. (2020) suggested that self-assessment and reflection allow students to improve the quality of their learning strategies in the next SRL cycle. However, reflection does not always lead to significant improvements. Engelschalk et al. (2017) found that some students, even when recognizing their learning problems, fail to make effective adjustments in the forethought phase due to a lack of self-efficacy and concrete action plans, limiting the impact of reflection on academic success.

The Impact of Self-Regulated Learning on Academic Achievement

The influence of SRL on academic achievement is both multifaceted and complex. Numerous studies have demonstrated that SRL strategies—such as motivation regulation, cognitive strategies, metacognitive monitoring, time management, and self-assessment—significantly enhance academic performance. Ma and She (2024) emphasized the crucial role of self-efficacy in goal setting, noting that it helps students maintain motivation and improve academic outcomes. Similarly, Manganelli et al. (2019) pointed out that autonomous motivation drives students to set challenging goals, fostering academic success, while controlled motivation may hinder performance. Di et al. (2020) highlighted the role of cognitive and metacognitive strategies in improving GPA and math scores, especially during the performance phase. Effective time management, as noted by Trentepohl et al. (2022), reduces procrastination and significantly boosts academic performance. Van Rooij et al. (2018) and Huang et al. (2022) stressed that combining intrinsic motivation with cognitive strategies enhances students' ability to perform well in complex academic tasks. Furthermore, Yan (2020), Roick and Ringeisen (2018) emphasized that self-assessment during the reflection phase enables students to adjust their learning strategies, leading to more stable performance over time and contributing to long-term academic success.

However, SRL strategies are not universally effective in all contexts. Manganelli et al. (2019) noted that controlled motivation may limit academic performance, even when SRL strategies are employed, due to a lack of autonomy and intrinsic interest. External pressures and life burdens, as reported by List and Nadasen (2017), also diminish the effectiveness of SRL strategies for community college transfer students. Additionally, Khan et al. (2020) found that the effectiveness of motivation regulation varies based on gender and cultural background, influencing SRL outcomes. Nabizadeh et al. (2019) observed that low-achieving students, lacking self-monitoring or external support, failed to improve academic performance significantly through SRL strategies. Wu and Corpus (2023) suggested that when tasks are too cognitively demanding, SRL strategies might increase stress and lead to poorer academic outcomes. Biasi et al. (2019) further emphasized the role of inadequate social support and external pressures, noting that SRL strategies may be less effective for students at risk of dropping out.

The dual impact of SRL on academic achievement may stem from individual learner differences. Broadbent (2017) highlighted that students' ability to adjust learning strategies based on feedback varies, with some failing to utilize feedback effectively, resulting in limited progress. Honicke et al. (2020) found that students with strong emotional regulation persist under pressure, while those with weaker regulation accumulate negative emotions, negatively affecting their academic performance. Similarly, Pérez-González et al. (2022) noted that students with poor emotional regulation may experience disruptions in learning due to emotional instability. Heaysman and Kramarski (2022) observed that successful transfer of metacognitive strategies across domains enhances academic performance, but failure to transfer these strategies limits success in various subjects. Thus, SRL's complex influence on academic achievement reflects the nuanced use of strategies, where over-reliance on certain approaches or insufficient self-regulation can result in negative outcomes.

The effectiveness of SRL strategies also depends on the context in which they are applied. Roick and Ringeisen (2018) found that self-efficacy enhanced strategy use in mathematics, leading to better performance, but long-term reliance on metacognitive strategies may increase cognitive load. Overlapping strategies might also create an inhibitory effect, impairing future academic outcomes. Yan (2020) noted that while self-assessment is an essential part of SRL, over-assessment can cause students to focus excessively on details, hindering progress and reducing academic performance. Muljana et al. (2023) suggested that cultural background, family dynamics, and social pressures may limit the effectiveness of SRL strategies in certain subjects or digital environments. Therefore, the utility of SRL is shaped by various factors, and its effectiveness should be understood in context.

Moreover, the impact of SRL on academic outcomes varies based on the type of outcomes being measured. Most studies indicate that SRL strategies, such as goal setting, time management, and metacognitive monitoring, significantly improve academic outcomes, including GPA and exam scores (Cheema et al., 2019; Gilar-Corbi et al., 2020). In contrast, SRL's impact on non-academic outcomes, such as learning satisfaction and dropout intentions, is more nuanced. Research has shown that SRL strategies can enhance students' perceived learning experiences, reduce anxiety, and lower dropout intentions, thereby indirectly promoting positive experiences in online learning environments (Kryshko et al., 2020; Yalçın & Dennen, 2024). However, Wu and Corpus (2023) found that when students perceive high cognitive or time costs, even strong SRL skills may increase anxiety and decrease learning satisfaction. List and Nadasen (2017) also noted that while SRL improves academic performance for online transfer students, it is less effective in reducing dropout intentions due to life stress and time management challenges.

The differences in SRL's impact on academic and non-academic outcomes likely stem from the distinct learning processes involved. Academic outcomes are generally tied to specific learning goals and task completion, such as exam scores and GPA. In these cases, students' abilities to set goals, manage time, and regulate learning behaviors directly translate into improved academic performance. These outcomes rely on the use of SRL strategies like metacognitive monitoring and critical thinking, which help students handle academic tasks more effectively (Manganelli et al., 2019; Di et al., 2020; Peteros, 2024). By contrast, non-academic outcomes, such as learning satisfaction and dropout intentions, are closely tied to students' emotional experiences and perceptions of their learning environment. These outcomes are influenced by a wider range of factors, including teacher support, peer interactions, and the overall learning environment (Dinh & Nguyen, 2022; Wu & Corpus, 2023).

CONCLUSION

This review has systematically examined the application of SRL in higher education over the past decade, with a particular focus on its impact on academic achievement at different stages. Analyzing 70 studies, we identified how key factors such as self-efficacy, goal orientation, cognitive and metacognitive strategies, and resource management influence academic success through various mechanisms across the three SRL phases. The findings suggest that the strategic use of these elements at each phase contributes significantly to academic achievement, particularly when students face complex tasks or engage in self-directed learning. However, the review also highlights a research gap, as much of the existing work concentrates on individual strategies or combinations within specific phases, with limited attention to the full SRL cycle, especially the self-assessment phase. Although cognitive and metacognitive strategies have been well-explored in the performance phase, further research is needed on motivation regulation.

Despite its contributions, this review has several limitations. First, the inclusion of only peer-reviewed, English-language articles may have excluded relevant studies published in other languages or non-peer-reviewed sources. Second, the focus on specific databases might have led to the omission of studies available in other platforms. Third, the heterogeneity in the measurement of SRL and academic achievement across studies may limit the generalizability of the findings. Future research could address these limitations by incorporating a broader range of sources and exploring the cultural and contextual factors that influence SRL effectiveness.

The findings underscore the importance of fostering supportive learning environments and emphasizing key phases and strategies of SRL to enhance academic achievement. First, policymakers and educators should prioritize creating learning environments that promote student autonomy and address emotional and psychological needs. This can be achieved through adaptive learning platforms, structured feedback mechanisms, and opportunities for reflective practice, especially in online and blended learning contexts where self-regulation is crucial. Second, interventions should focus on the core phases of SRL. Educators should guide students in setting clear goals, applying cognitive and metacognitive strategies, and engaging in systematic self-assessment and feedback. By addressing these phases and strategies, policymakers and practitioners can better equip students with the skills needed for long-term academic success and personal growth.

Disclosure statement

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