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Self-Regulated Learning in Elementary School Students: Trends, Strategies, and Impact on Learning Outcomes

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ABSTRACT

Self-regulated learning (SRL) has become an essential competency for elementary school students in the twenty-first century, particularly in supporting independent learning, academic achievement, and learning adaptability. This study aimed to systematically review research trends, instructional strategies, and the impact of SRL on learning outcomes among elementary school students. The study employed a Systematic Literature Review (SLR) approach using the PRISMA framework. Articles were collected from Scopus-indexed published between 2016 and 2026. Bibliometric mapping was conducted using VOSviewer to analyze research trends. The search process identified 194 articles for trend analysis. Meanwhile, studies discussing instructional strategies and learning outcomes were selected using specific inclusion criteria emphasizing quantitative and experimental research designs. The findings revealed that SRL research in elementary education has developed into a multidimensional field closely associated with self-efficacy, motivation, feedback, online learning, goal setting, and academic achievement. The most commonly implemented strategies for developing SRL included metacognitive instruction, goal-setting activities, reflective learning, collaborative learning, self-assessment, gamification, and technology-assisted learning environments. In addition, the reviewed studies consistently demonstrated that SRL positively contributes to students' academic achievement, learning motivation, problem-solving skills, and independent learning behaviors. Overall, this review highlights the importance of strengthening SRL through explicit instructional support and technology-enhanced learning environments to foster adaptive and independent learners in elementary education.

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1. INTRODUCTION

Self-regulated learning (SRL) is recognized as a key competency in 21st-century education because it enables students to become active, independent, and adaptive [1], [2], [3]. Not only related to academic abilities, SRL includes how students plan, monitor, and evaluate their learning process [4]. In today's era of digital transformation, where learners have unlimited access to digital content, SRL becomes important in managing attention, selecting digital tools and learning activities that are appropriate to learning goals, and maintaining motivation so as not to be distracted by inappropriate digital content [5], [6], [7].

The transition toward student-centered learning, technology-enhanced instruction, and blended learning models has shifted the educational focus from teacher dependency to learner autonomy. These changes became more visible after the COVID-19 pandemic, during which many elementary school students experienced difficulties maintaining motivation, concentration, discipline, and learning persistence when direct teacher supervision decreased [8], [9], [10], [11]. Consequently, researchers increasingly recognized SRL as a critical determinant of students' academic adaptation and learning continuity in primary education. Students with strong self-regulation abilities tend to achieve better academic performance, stronger motivation, higher engagement, and improved emotional resilience compared to those with lower self-regulation capacities [12], [13], [14], [15].

Elementary school students are in a crucial developmental phase where metacognitive awareness, motivation, and self-monitoring skills begin to form [16], [17]. Unlike older learners, younger students often require structured guidance and scaffolding to develop effective self-regulation strategies [18], [19]. Teachers play a crucial role in facilitating SRL by modeling cognitive strategies, encouraging reflective thinking, providing scaffolding, and fostering meaningful student engagement [20], [21], [22], [23]. High-quality interactions between teachers and students were also found to strengthen students' confidence, motivation, and ability to regulate their learning behaviors effectively [24], [25]. These raise important questions about how SRL is conceptualized, implemented, and supported in elementary classrooms.

Research concerning SRL has grown substantially during the last decade across multiple disciplines and educational contexts. Scholars have investigated SRL from psychological, pedagogical, technological, and socio-cultural perspectives. Recent studies increasingly explore the relationship between SRL and digital learning environments, student engagement, collaborative learning, and academic achievement [26], [27], [28], [29]. In addition, advances in educational technology have encouraged researchers to examine how technology-enhanced environments, online learning platforms, and AI-supported systems can facilitate students' self-regulation processes [30], [31], [32], [33], [34]. Nevertheless, despite the increasing number of studies, the existing literature remains fragmented because many investigations focus only on specific interventions or isolated variables without comprehensively synthesizing broader research trends, dominant strategies, and the overall impact of SRL on elementary students' learning outcomes.

Based on these considerations, this study aims to systematically review the existing literature regarding self-regulated learning in elementary school students by examining three major aspects: research trends, instructional strategies used to foster SRL, and the impact of SRL on students' learning outcomes. Through this review, the study seeks to identify dominant themes, methodological tendencies, influential educational practices, and potential research gaps that may guide future research directions. The findings are expected to contribute theoretically to the development of SRL research in elementary education and practically to support teachers, curriculum developers, researchers, and policymakers in designing learning environments that effectively cultivate students' independent learning capacities from an early age.

2. METHOD

This study employed a Systematic Literature Review (SLR) approach using the PRISMA Statement framework to systematically identify, evaluate, and synthesize previous studies related to self-regulated learning (SRL) among elementary school students. The PRISMA procedure was applied through four stages, namely identification, screening, eligibility assessment, and inclusion, in order to ensure transparency, rigor, and replicability throughout the review process [35]. This study focused on three major objectives: (1) mapping research trends on SRL in elementary education, (2) identifying instructional strategies used to develop SRL, and (3) analyzing the impact of SRL on students' learning outcomes.

The literature search was conducted using the Scopus database. To identify research trends related to SRL in elementary education, the search process used the Boolean keywords: ("self-regulated learning" AND "elementary school") OR ("self-regulated learning" AND "primary school"). These keywords were selected to capture broad research developments concerning SRL among primary-level students published between 2016 and 2026. All retrieved articles were exported in RIS formats and subsequently analyzed using VOSviewer to visualize keyword co-occurrence, dominant themes, research clusters, and publication trends related to SRL in elementary school contexts. The bibliometric mapping generated network, overlay, and density visualizations to identify the evolution and dominant focus of SRL research over the last decade.

Meanwhile, to analyze instructional strategies and the impact of SRL on learning outcomes, a more specific Boolean search was conducted using the following keywords: ("self-regulated learning" AND "elementary students" AND "strategies") OR ("self-regulated learning" AND "primary students" AND "strategies"), "self-regulated learning" AND ("learning outcomes" OR "academic achievement") AND ("elementary students" OR "primary students" OR "pupils"). These combinations were intended to identify empirical studies discussing interventions, instructional approaches, and the relationship between SRL and students' academic performance in elementary school contexts.

The inclusion and exclusion criteria were determined carefully to ensure the quality and relevance of the selected articles. For trend analysis, the inclusion criteria consisted of: (1) articles discussing self-regulated learning in elementary or primary school settings; (2) articles published between 2016 and 2026; and (3) articles indexed in Scopus. Meanwhile,

for the analysis of instructional strategies and learning outcomes, the inclusion criteria were more specific, namely: (1) quantitative research or mixed methods; (2) studies involving elementary or primary school students as research participants; (3) studies examining SRL interventions, instructional strategies, or the effect of SRL on learning outcomes; and (4) articles published in reputable journals indexed by Scopus. Conference proceedings, theses, dissertations, book chapters, review articles, and studies focusing exclusively on secondary or higher education students were excluded from the review.

The full-text articles meeting the inclusion criteria were analyzed qualitatively using content analysis. The selected studies were categorized based on publication year, research design, measured variables, and research findings. In addition, thematic synthesis was conducted to identify dominant instructional approaches and the effects of SRL on learning outcomes and academic achievement. By integrating PRISMA-based systematic review procedures and bibliometric visualization with VOSviewer, this study provides a comprehensive overview of the development of self-regulated learning research among elementary school students. The findings are expected to contribute theoretically to the enrichment of the SRL literature and, practically, to support educators and researchers in designing effective instructional strategies that foster independent learning skills in primary education.

3. RESULTS AND DISCUSSION

3.1. Research Trends on SRL in Elementary School

To identify research trends in self-regulated learning (SRL) among elementary school students, a bibliometric analysis was conducted using VOSviewer. The data collection process began by searching articles in Scopus databases using the Boolean keywords ("self-regulated learning" AND "elementary school") OR ("self-regulated learning" AND "primary school"). The search process resulted in 194 relevant articles published within the selected time range (2016-2026). Subsequently, all selected articles were exported in RIS format and imported into VOSviewer for bibliometric mapping and network visualization analysis. Through this process, VOSviewer generated keyword co-occurrence networks that were used to identify dominant themes, research clusters, and emerging trends in studies related to self-regulated learning among elementary or primary school students.

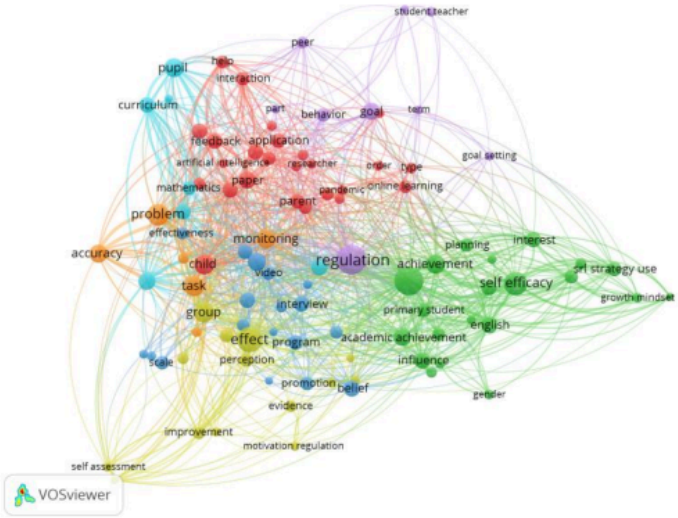

Figure 1. Network Visualization of SRL Research Trends

The VOSviewer network visualization illustrates the development of research on self-regulated learning (SRL) among elementary or primary school students. The keyword "regulation" appears as the central and most connected node, indicating that regulation processes remain the primary focus of SRL research in primary education. The visualization also demonstrates that SRL research is closely associated with students' abilities to manage cognition, motivation, behavior, and learning strategies in academic settings. Several interconnected clusters reveal that SRL has evolved into a multidimensional research field involving psychological, instructional, technological, and social perspectives.

The green cluster predominantly discusses the relationship between SRL and academic dimensions, including "self-efficacy," "academic achievement," "planning," "interest," "growth mindset," and "SRL strategy use." This finding indicates that many studies focus on how self-confidence, motivation, and strategic learning behaviors influence students' academic success. Meanwhile, the red cluster highlights the roles of learning environments and instructional interaction, as indicated by keywords such as "feedback," "interaction," "online learning," "pandemic," "parent," and "artificial intelligence." The emergence of these terms reflects the growing scholarly interest in digital learning environments and post-pandemic educational transformations, particularly regarding how elementary school students regulate their learning in technology-supported settings.

Other clusters further strengthen the multidimensional nature of SRL research. The blue and yellow clusters emphasize monitoring, intervention effectiveness, self-assessment, and motivation regulation, suggesting that many studies investigate the effectiveness of instructional programs designed to improve students' self-regulation skills. In addition, the purple cluster highlights the importance of "goal setting," "peer," and "behavior," indicating that collaborative learning and social interaction also play essential roles in developing SRL among elementary students. Overall, the visualization

demonstrates that contemporary SRL research increasingly integrates cognitive, motivational, technological, and social dimensions, with emerging trends focusing on online learning, self-efficacy, growth mindset, and technology-enhanced learning environments.

3.2. Instructional Strategies Used to Develop SRL in Elementary School

Instructional strategies used to develop SRL among elementary students are identified through a systematic literature review in the Scopus database. The article selection process followed the PRISMA framework, including identification, screening, eligibility, and inclusion. 17 articles were obtained and considered eligible based on the inclusion criteria. The following diagram illustrates the article selection process according to PRISMA.

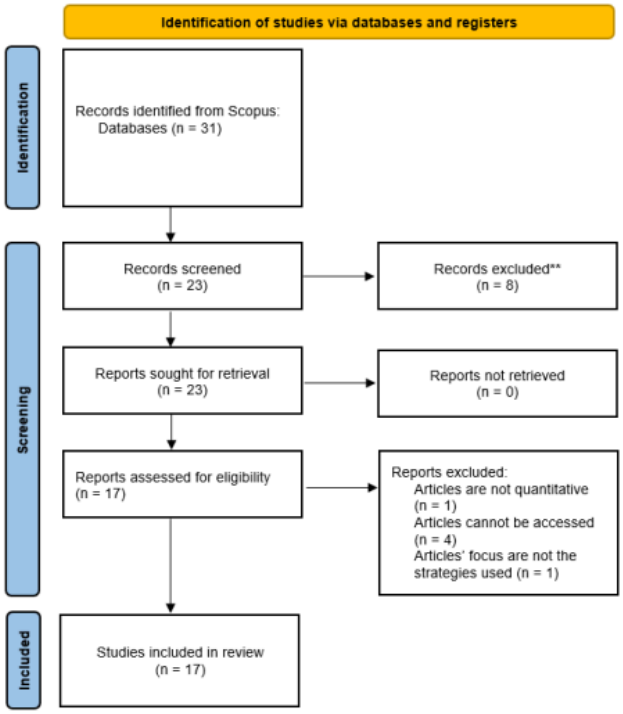

Figure 2. PRISMA Flow Chart for Strategies Used to Develop SRL

The following table shows a synthesis of articles that meet the eligibility criteria.

Table 1. Reviewed Studies on Strategies for Developing SRL

No.	Author/Year	Research Design	Variables	Key Finding
1	(Kong & Yang, 2024) [36]	Framework development and case study	Generative AI, SRL, student engagement	Generative AI-supported human-centered learning enhanced students' attention, engagement, self-reflection, and individualized learning
2	(Alnafea & Curtis, 2017)	Cross-sectional survey	Parenting style, self-efficacy,	Authoritative parenting positively influenced students'

	[37]		metacognitive strategies, SRL	self-efficacy, metacognitive strategy use, and study management
3	(Torrington et al., 2024a) [38]	Observational quantitative study	SRL behaviors, task performance, digital learning	Students' understanding of planning and monitoring strategies predicted better task performance in digital learning contexts
4	(Noriega Cortes & Carreño-Bolivar, 2024) [39]	Mixed-method action research	Gamification, SRL strategies, language learning	Gamified virtual learning environments improved students' goal-setting and self-monitoring skills
5	(M. Chen & Feng, 2026) [40]	Quasi-experimental (2×2 design)	Goal-setting, self-explanation, programming performance	Focused self-explanation and phase-goal setting significantly improved programming comprehension, motivation, and SRL processes
6	(C. Liu et al., 2026) [41]	Experimental study	Cooperative programming, metacognitive awareness, self-efficacy	Self-regulated cooperative programming enhanced metacognitive awareness and self-efficacy among elementary students
7	(Zhao & Zheng, 2026) [42]	Randomized experimental study	Metacognitive feedback, inquiry behavior, science achievement	Metacognitive feedback fostered higher-order inquiry behavior and stronger SRL processes than elaborative feedback
8	(Z.-M. Liu et al., 2026) [43]	Randomized controlled trial	LLM-supported CALLA, SRL strategies, writing motivation	AI-assisted SRL instruction significantly improved writing performance, motivation, and SRL strategy use
9	(Losenno et al., 2020) [44]	Mixed-method study	Cognitive reappraisal, SRL phases, mathematics achievement	Cognitive reappraisal positively predicted planning, monitoring, and learning strategy enactment
10	(Di Leo & Muis, 2020) [45]	Experimental mixed-method intervention	Cognitive-emotional strategy training, mathematics problem solving	Cognitive-emotional SRL training improved metacognitive strategies, emotional regulation, and mathematics performance
11	(Bai et al., 2020) [46]	Quantitative survey	SRL writing strategies, proficiency, grade level	Higher writing proficiency was associated with stronger SRL writing strategy use
12	(Kong & Liu, 2023) [47]	Mixed-method intervention study	Performance-based assessment, scaffolding, SRL	Embedded scaffolding and automated feedback supported students' SRL development during programming tasks
13	(S.-F. Chen, 2017) [48]	Structural equation modeling	Digital literacy, socioeconomic	Strengthening SRL strategies positively influenced students'

			factors, SRL strategies	digital reading literacy
14	(Zhu & Mok, 2018) [49]	Multi-level path analysis	Teacher feedback, interest, goal orientation, SRL	Interest, teacher feedback, and personal best goals significantly predicted SRL processes
15	(Torrington et al., 2023) [50]	Exploratory observational study	Online learning, planning, monitoring strategies	Elementary students showed limited planning and monitoring skills, indicating the need for explicit SRL instruction
16	(Torrington et al., 2024b) [51]	Natural experiment	Remote learning, online SRL	Remote learning did not automatically improve SRL skills, emphasizing the need for intentional SRL scaffolding
17	(Bala et al., 2020) [52]	Survey research	SRL profile, elementary students in rural areas	Students demonstrated moderate SRL abilities and required instructional strategies that explicitly foster SRL

The reviewed studies demonstrate that instructional scaffolding, metacognitive strategy training, feedback mechanisms, and technology-supported learning environments strongly influence the development of self-regulated learning (SRL) among elementary school students. Several studies emphasized the importance of explicit SRL instruction because elementary students often lack sufficient planning, monitoring, and reflective learning skills. Torrington et al. (2024a) found that students in digital learning environments spent relatively little time engaging in planning and monitoring activities, suggesting that young learners require direct guidance to develop effective SRL behaviors. Similarly, Zhu and Mok (2018) reported that teacher feedback, learning interest, and goal orientation significantly predicted students' planning, monitoring, and adaptive learning reactions. These findings indicate that teacher support and motivational reinforcement remain fundamental elements in strengthening SRL among primary school students.

Another dominant strategy identified across the reviewed studies involves metacognitive and cognitive-emotional interventions. Chen and Feng (2026) demonstrated that goal-setting and focused self-explanation significantly improved students' programming comprehension, learning motivation, and SRL processes. Likewise, Zhao and Zheng (2026) found that metacognitive feedback in simulation-based inquiry learning promoted higher-order inquiry behaviors and more effective self-regulation compared to elaborative feedback. In mathematics learning contexts, Di Leo and Muis (2020) developed a cognitive-emotional strategy training intervention that successfully improved students' metacognitive strategies, emotional regulation, and mathematical problem-solving performance. These studies collectively suggest that effective SRL development requires not only cognitive strategy instruction but also emotional regulation support to help students manage frustration, confusion, and motivation during complex learning tasks.

Technology-enhanced and AI-supported learning environments also emerged as important strategies for fostering SRL in elementary education. Kong and Liu (2023) revealed that performance-based assessment platforms equipped with scaffolding and

automated feedback effectively supported students' self-regulation during programming activities. Similarly, Liu et al. (2026) demonstrated that integrating large language models (LLMs) into writing instruction significantly enhanced students' writing performance, motivation, and SRL strategy use. Gamified virtual learning environments were also found to improve goal-setting and self-monitoring skills among young learners [53]. Furthermore, Kong and Yang (2024) emphasized that generative AI can support individualized learning, immediate feedback, self-reflection, and active engagement in learning processes. Overall, the reviewed studies indicate that the most effective strategies for developing SRL among elementary school students involve a combination of explicit metacognitive instruction, motivational support, emotional regulation training, collaborative learning, and technology-assisted scaffolding that actively engages students in planning, monitoring, and reflecting on their learning processes.

3.3. Impact of SRL on Students' Learning Outcomes

To examine the impact of self-regulated learning (SRL) on students' learning outcomes, a systematic literature review was conducted in the Scopus database. The search process employed the Boolean keywords: "self-regulated learning" AND ("learning outcomes" OR "academic achievement") AND ("elementary students" OR "primary students" OR "pupils"). These keywords were selected to identify empirical studies specifically investigating the relationship between SRL and academic achievement among elementary school students. The search process resulted in 13 relevant articles published within the predetermined publication range.

The article selection process followed the PRISMA framework, including identification, screening, eligibility assessment, and inclusion. During the screening and eligibility process, only studies directly examining the impact of SRL on students' learning outcomes were retained for further analysis. As a result, three articles were considered eligible for inclusion in the review. Meanwhile, ten articles were excluded for several reasons. One article was excluded because it employed a systematic literature review design, which did not match the inclusion criteria for empirical studies. Five articles were excluded because self-regulated learning functioned as the dependent variable rather than the independent variable. In addition, two articles focused primarily on instrument development and validation, while the remaining two studies were excluded because their research participants were not elementary or primary school students. Therefore, the final review focused exclusively on three empirical studies that specifically investigated the influence of self-regulated learning on elementary students' academic achievement and learning outcomes. These selected studies were subsequently analyzed to identify the extent to which SRL contributes to students' academic performance and learning success in primary education contexts.

The limited number of eligible articles discussing the direct impact of self-regulated learning (SRL) on academic achievement or learning outcomes among elementary school students can be closely associated with the research trends illustrated in the previous VOSviewer visualization. Although the bibliometric mapping showed that SRL research in elementary education has developed extensively, the dominant clusters

primarily focused on psychological, motivational, and instructional dimensions rather than on direct causal relationships between SRL and academic achievement. Keywords such as "self-efficacy," "planning," "interest," "feedback," "online learning," "monitoring," and "goal setting" appeared more prominently than terms directly related to measurable academic outcomes. This indicates that most studies tend to investigate SRL as a developmental process, an instructional construct, or an intervention target rather than explicitly positioning it as a predictor of academic achievement.

The developmental characteristics of elementary school students may also influence the relatively small number of eligible studies. Compared to secondary or university students, research examining direct relationships between SRL and academic achievement in primary education remains limited because younger learners are still developing metacognitive awareness, emotional control, and independent learning capacities. Therefore, many researchers first focus on identifying effective strategies to foster SRL rather than on measuring its long-term impact on academic performance. This trend is clearly reflected in the VOSviewer clusters, which emphasize "feedback," "monitoring," "goal setting," "self-assessment," and "intervention programs." Overall, the bibliometric mapping suggests that current SRL research in elementary education is still dominated by exploratory and intervention-oriented studies, which explains why only a small number of articles specifically examine the direct influence of SRL on students' academic achievement or learning outcomes.

Table 2. Selected Articles to Identify SRL Contribution

No.	Author/Year	Research Design	Variables	Key Finding
1	(Shing & Rameli, 2020) [54]	Quantitative survey research	Self-regulation, academic achievement in English, and gender	Self-regulation significantly influenced upper primary students' English academic achievement, particularly during the forethought and performance phases of SRL. Higher-achieving students demonstrated stronger SRL across all phases
2	(Losenno et al., 2020) [40]	Mixed-method explanatory study	Cognitive reappraisal, SRL phases, mathematics problem-solving outcomes	Cognitive reappraisal positively predicted all phases of SRL, while SRL enactment significantly predicted mathematics problem-solving outcomes among elementary students
3	(Akhmedjanova, 2026) [30]	Survey research with structural equation modelling	Self-regulated learning, self-efficacy, mathematics achievement, reading achievement	SRL and self-efficacy jointly predicted students' mathematics and reading achievement. SRL and self-efficacy explained 28% of the variance in mathematics scores and 18% in reading scores

The reviewed studies consistently demonstrate that self-regulated learning (SRL) has a significant positive impact on elementary school students' academic achievement and learning outcomes. Self-regulation significantly influenced upper primary students' English achievement, particularly during the forethought and performance phases, indicating that students who effectively plan, monitor, and manage their learning tend to achieve higher academic performance [37]. The study also revealed that high-achieving students demonstrated stronger SRL skills across all phases of learning than lower-achieving students, suggesting that self-regulatory processes play an important role in improving language learning outcomes among elementary students.

Losenno et al. (2020) demonstrated that SRL significantly contributed to mathematics problem-solving performance among elementary-aged students. The study found that cognitive reappraisal positively predicted all SRL phases, including task definition, planning, enactment, and monitoring. More importantly, the enactment phase of SRL directly predicted mathematics problem-solving outcomes, indicating that students who actively apply learning strategies and regulate their cognitive and emotional processes achieve better mathematics performance. These findings suggest that SRL not only supports cognitive engagement but also helps students manage emotional challenges such as confusion and frustration during complex learning tasks.

Akhmadianova (2026) reported that SRL and self-efficacy jointly predicted mathematics and reading achievement among elementary school students in Russia. The study revealed that SRL and self-efficacy explained 28% of the variance in mathematics scores and 18% in reading scores, emphasizing the substantial contribution of self-regulatory processes to academic success. In addition, self-efficacy mediated the relationship between SRL and academic achievement, suggesting that students with greater confidence in their abilities are more likely to regulate their learning effectively and achieve higher academic outcomes.

The review of the three eligible studies consistently demonstrates that self-regulated learning (SRL) has a significant positive contribution to elementary school students' academic achievement and learning outcomes across different subject areas. Students with stronger SRL skills tend to perform better in English, mathematics, and reading because they are more capable of planning, monitoring, evaluating, and regulating their learning processes. In addition, the studies revealed that SRL supports students' problem-solving abilities, learning motivation, emotional regulation, and strategic learning behaviors during complex learning tasks. Self-efficacy also emerged as an important mediating factor, indicating that students who believe in their capabilities are more likely to regulate their learning successfully and achieve higher academic outcomes. Overall, the findings confirm that SRL functions as an important predictor of academic success among elementary school students and plays a crucial role in fostering independent, motivated, and adaptive learners.

4. CONCLUSION

This systematic literature review indicates that self-regulated learning (SRL) has become an important and rapidly developing research area in elementary education,

particularly in relation to motivation, self-efficacy, digital learning, and academic achievement. The findings reveal that effective SRL development requires explicit instructional support through strategies such as metacognitive training, goal setting, feedback, reflective learning, collaborative learning, and technology-assisted instruction. Furthermore, the reviewed studies consistently show that students with stronger SRL skills tend to achieve better academic performance, higher motivation, and stronger problem-solving abilities. Overall, SRL plays a crucial role in fostering independent and adaptive learners in elementary education, though further empirical research is needed to examine its long-term impact on students' academic achievement.

Future research is recommended to conduct more longitudinal and experimental studies examining the direct impact of self-regulated learning (SRL) on elementary students' academic achievement across various subject areas. Researchers should also explore integrating technology-assisted and AI-supported learning environments to strengthen students' self-regulation skills in contemporary educational contexts. In classroom practice, teachers are encouraged to implement explicit SRL-oriented strategies such as goal setting, self-monitoring, reflective learning, feedback, and metacognitive scaffolding to support students' independent learning development from an early age. In addition, schools and policymakers should provide learning environments and instructional policies that systematically promote students' self-regulation skills as a foundation for lifelong learning and academic resilience.

REFERENCES

[1] D. Akhmedjanova, "Role of self-regulated learning and self-efficacy in predicting academic results of elementary school students in Russia," *Educational Studies*, vol. 52, no. 3, pp. 271–291, 2026, doi: 10.1080/03055698.2025.2479605.

[2] R. R. Aliyyah, Rasmitadila, G. Gunadi, A. Sutisnawati, and S. Febriantina, "Perceptions of elementary school teachers towards the implementation of the independent curriculum during the COVID-19 pandemic," *Journal of Education and E-Learning Research*, vol. 10, no. 2, pp. 154–164, 2023, doi: 10.20448/jeelr.v10i2.4490.

[3] T. Alnafea and D. D. Curtis, "Influence of mothers' parenting styles on self-regulated academic learning among Saudi primary school students," *Issues in Educational Research*, vol. 27, no. 3, pp. 399–416, 2017.

[4] L. Anthonysamy, K. Ah Choo, and H. Soon Hin, "Investigating Self-Regulated Learning Strategies for Digital Learning Relevancy," *Malaysian Journal of Learning and Instruction*, vol. 18, 2021, doi: 10.32890/mjli2021.18.1.2.

[5] A. Arvatz, B. Hadas, R. Waitzman, and Y. J. Dori, "Putting self-regulated learning and teaching into practice: Insights from two science teachers and their students," *Instructional Science*, vol. 53, no. 5, pp. 973–1003, 2025, doi: 10.1007/s11251-025-09719-6.

[6] B. Bai, B. Shen, and H. Mei, "Hong Kong primary students' self-regulated writing strategy use: Influences of gender, writing proficiency, and grade level," *Studies in Educational Evaluation*, vol. 65, Art. no. 100839, 2020, doi: 10.1016/j.stueduc.2020.100839.

[7] R. Bala, D. Sulisworo, and I. Maryani, "The Analysis of Self-Regulation Learning on Elementary Schools at the Rural Area in Indonesia," *Universal Journal of Educational Research*, vol. 8, no. 2, pp. 395–401, 2020, doi: 10.13189/ujer.2020.080209.

[8] S. K. Banihashem, M. Bond, N. Bergdahl, H. Khosravi, and O. Noroozi, "A systematic mapping review at the intersection of artificial intelligence and self-regulated learning," *International Journal of Educational Technology in Higher Education*, vol. 22, no. 1, p. 50, 2025, doi: 10.1186/s41239-025-00548-8.

[9] N. S. Bayard, M. H. Van Loon, M. Steiner, and C. M. Roebers, "Developmental Improvements and Persisting Difficulties in Children's Metacognitive Monitoring and Control Skills: Cross-Sectional

and Longitudinal Perspectives," *Child Development*, vol. 92, no. 3, pp. 1118–1136, 2021, doi: 10.1111/cdev.13486.

[10] W.-L. Chang and J. C.-Y. Sun, "Evaluating AI's impact on self-regulated language learning: A systematic review," *System*, vol. 126, Art. no. 103484, 2024, doi: 10.1016/j.system.2024.103484.

[11] M. Chen and C. Feng, "Goal-Setting and Self-Explanation in Elementary Programming: A Self-Regulated Learning Study," *Journal of Computer Assisted Learning*, vol. 42, no. 1, Art. no. e70177, 2026, doi: 10.1002/jcal.70177.

[12] S.-F. Chen, "Modeling the influences of upper-elementary school students' digital reading literacy, socioeconomic factors, and self-regulated learning strategies," *Research in Science & Technological Education*, vol. 35, no. 3, pp. 330–348, 2017, doi: 10.1080/02635143.2017.1314958.

[13] N. J. De Ruig, P. F. De Jong, and M. Zee, "Stimulating Elementary School Students' Self-Regulated Learning Through High-Quality Interactions and Relationships: A Narrative Review," *Educational Psychology Review*, vol. 35, no. 3, p. 71, 2023, doi: 10.1007/s10648-023-09795-5.

[14] N. J. De Ruig, M. Zee, and P. F. De Jong, "Understanding the interplay between teacher self-efficacy, teacher–student interactions, and students' self-regulated learning skills at different levels of classroom ecology," *Frontiers in Education*, vol. 9, Art. no. 1392907, 2024, doi: 10.3389/feduc.2024.1392907.

[15] I. Di Leo and K. R. Muis, "Confused, now what? A Cognitive-Emotional Strategy Training (CEST) intervention for elementary students during mathematics problem solving," *Contemporary Educational Psychology*, vol. 62, Art. no. 101879, 2020, doi: 10.1016/j.cedpsych.2020.101879.

[16] C. Dignath and M. V. J. Veenman, "The Role of Direct Strategy Instruction and Indirect Activation of Self-Regulated Learning—Evidence from Classroom Observation Studies," *Educational Psychology Review*, vol. 33, no. 2, pp. 489–533, 2021, doi: 10.1007/s10648-020-09534-0.

[17] A. El-Adl and H. Alkharusi, "Relationships between self-regulated learning strategies, learning motivation and mathematics achievement," *Cypriot Journal of Educational Sciences*, vol. 15, no. 1, pp. 104–111, 2020, doi: 10.18844/cjes.v15i1.4461.

[18] A. Fitria, B. Najihah, M. A. Paris, M. F. Atsnan, and M. L. Nareki, "Motivation, self-regulated learning, and their effects on learning outcomes of derivative materials during the Covid-19 pandemic," *Jurnal Riset Pendidikan Matematika*, vol. 8, no. 2, pp. 153–166, 2021, doi: 10.21831/jrpm.v8i2.42184.

[19] Y. Gambo and M. Z. Shakir, "Review on self-regulated learning in smart learning environment," *Smart Learning Environments*, vol. 8, no. 1, p. 12, 2021, doi: 10.1186/s40561-021-00157-8.

[20] D. Gülmez and A. Ordu, "Back to the classroom: Teachers' views on classroom management after Covid-19," *International Journal of Modern Education Studies*, vol. 6, no. 2, 2022, doi: 10.51383/ijonmes.2022.197.

[21] F. Han, "Sustainable Lifelong Learning Competence: Understanding University Students' Self-Regulated Learning in Flipped Classrooms by Combining Questionnaire and Learning Analytics Data," *Sustainability*, vol. 17, no. 21, Art. no. 9495, 2025, doi: 10.3390/su17219495.

[22] S.-H. Jin, K. Im, M. Yoo, I. Roll, and K. Seo, "Supporting students' self-regulated learning in online learning using artificial intelligence applications," *International Journal of Educational Technology in Higher Education*, vol. 20, no. 1, p. 37, 2023, doi: 10.1186/s41239-023-00406-5.

[23] J. Junaštíková, "Self-regulation of learning in the context of modern technology: A review of empirical studies," *Interactive Technology and Smart Education*, vol. 21, no. 2, pp. 270–291, 2024, doi: 10.1108/ITSE-02-2023-0030.

[24] Y. Karlen and S. Hertel, "Inspiring self-regulated learning in everyday classrooms: Teachers' professional competences and promotion of self-regulated learning," *Unterrichtswissenschaft*, vol. 52, no. 1, pp. 1–13, 2024, doi: 10.1007/s42010-024-00196-3.

[25] S.-C. Kong and B. Liu, "Supporting the Self-Regulated Learning of Primary School Students With a Performance-Based Assessment Platform for Programming Education," *Journal of Educational Computing Research*, vol. 61, no. 5, pp. 977–1007, 2023, doi: 10.1177/07356331221143832.

[26] S.-C. Kong and Y. Yang, "A Human-Centered Learning and Teaching Framework Using Generative Artificial Intelligence for Self-Regulated Learning Development Through Domain Knowledge Learning in K–12 Settings," *IEEE Transactions on Learning Technologies*, vol. 17, pp. 1562–1573, 2024, doi: 10.1109/TLT.2024.3392830.

[27] C. Liu, Z. Cui, and X. Weng, "Effects of a Self-Regulated Cooperative Programming Approach on Elementary Students' Programming Knowledge, Metacognitive Awareness, and Self-Efficacy," *Journal of Computer Assisted Learning*, vol. 42, no. 1, Art. no. e70167, 2026, doi: 10.1002/jcal.70167.

[28] J. Liu, J. Gao, and M. H. Arshad, "Teacher-student relationships as a pathway to sustainable learning: Psychological insights on motivation and self-efficacy," *Acta Psychologica*, vol. 254, Art. no. 104788, 2025, doi: 10.1016/j.actpsy.2025.104788.

[29] Z.-M. Liu, G.-J. Hwang, C.-Q. Chen, X.-D. Chen, and X.-D. Ye, "Integrating large language models into EFL writing instruction: Effects on performance, self-regulated learning strategies, and motivation," *Computer Assisted Language Learning*, vol. 39, no. 3, pp. 466–490, 2026, doi: 10.1080/09588221.2024.2389923.

[30] K. M. Losenno, K. R. Muis, B. Munzar, C. A. Denton, and N. E. Perry, "The dynamic roles of cognitive reappraisal and self-regulated learning during mathematics problem solving: A mixed methods investigation," *Contemporary Educational Psychology*, vol. 61, Art. no. 101869, 2020, doi: 10.1016/j.cedpsych.2020.101869.

[31] M. Mejeh, L. Sarbach, and T. Hascher, "Effects of adaptive feedback through a digital tool – a mixed-methods study on the course of self-regulated learning," *Education and Information Technologies*, vol. 29, no. 14, pp. 1–43, 2024, doi: 10.1007/s10639-024-12510-8.

[32] M. F. Montoya, B. Tornero, D. Palacios Farias, and F. J. Morrison, "Linking Self-Regulation Scaffolding to Early Math Achievement: Evidence from Chilean Preschools," *Education Sciences*, vol. 15, no. 11, Art. no. 1426, 2025, doi: 10.3390/educsci15111426.

[33] V. I. Morosanova, I. N. Bondarenko, and T. G. Fomina, "Conscious Self-regulation, Motivational Factors, and Personality Traits as Predictors of Students' Academic Performance: A Linear Empirical Model," *Psychology in Russia: State of the Art*, no. 4, pp. 170–187, 2022, doi: 10.11621/pir.2022.0411.

[34] S. S. Mukhari and D. A. Sanders, "How School Closures Affected the Teaching and Learning of English During The COVID-19 Pandemic," *International Journal of Education and Literacy Studies*, vol. 11, no. 1, pp. 112–119, 2023, doi: 10.7575/aiac.ijels.v.11n.1p.112.

[35] D. T. K. Ng, C. W. Tan, and J. K. L. Leung, "Empowering student self-regulated learning and science education through CHATGPT: A pioneering pilot study," *British Journal of Educational Technology*, vol. 55, no. 4, pp. 1328–1353, 2024, doi: 10.1111/bjet.13454.

[36] M. A. Noriega Cortes and L. Carreño-Bolivar, "Virtual game-based learning environments to promote self-regulated learning skills in foreign language learners," *F1000Research*, vol. 13, Art. no. 1541, 2024, doi: 10.12688/f1000research.157746.1.

[37] M. J. Page, J. E. McKenzie, P. M. Bossuyt, I. Boutron, T. C. Hoffmann, C. D. Mulrow, L. Shamseer, J. M. Tetzlaff, E. A. Akl, S. E. Brennan, R. Chou, J. Glanville, J. M. Grimshaw, A. Hróbjartsson, M. M. Lalu, T. Li, E. W. Loder, E. Mayo-Wilson, S. McDonald, and D. Moher, "The PRISMA 2020 statement: An updated guideline for reporting systematic reviews," *Journal of Clinical Epidemiology*, vol. 134, pp. 178–189, 2021, doi: 10.1016/j.jclinepi.2021.03.001.

[38] A. Ragusa, J. González-Bernal, R. Trigueros, V. Caggiano, N. Navarro, L. A. Minguez-Minguez, A. I. Obregón, and C. Fernandez-Ortega, "Effects of academic self-regulation on procrastination, academic stress and anxiety, resilience and academic performance in a sample of Spanish secondary school students," *Frontiers in Psychology*, vol. 14, Art. no. 1073529, 2023, doi: 10.3389/fpsyg.2023.1073529.

[39] M. Raković, M. L. Bernacki, J. A. Greene, R. D. Plumley, K. A. Hogan, K. M. Gates, and A. T. Panter, "Examining the critical role of evaluation and adaptation in self-regulated learning," *Contemporary Educational Psychology*, vol. 68, Art. no. 102027, 2022, doi: 10.1016/j.cedpsych.2021.102027.

[40] K. Sharma, A. Nguyen, and Y. Hong, "Self-regulation and shared regulation in collaborative learning in adaptive digital learning environments: A systematic review of empirical studies," *British Journal of Educational Technology*, vol. 55, no. 4, pp. 1398–1436, 2024, doi: 10.1111/bjet.13459.

[41] L. S. Shing and M. R. M. Rameli, "The Influence of Self-Regulation towards Academic Achievement in English among Malaysian Upper Primary Students," *Universal Journal of Educational Research*, vol. 8, no. 5A, pp. 1–11, 2020, doi: 10.13189/ujer.2020.081901.

[42] M. Sinkkonen and A. Tapani, "Review of the Concept 'Self-Regulated Learning': Defined and Used in Different Educational Contexts," *International Journal on Social and Education Sciences*, vol. 6, no. 1, pp. 130–151, 2024, doi: 10.46328/ijonses.640.

[43] P. Sins, R. De Leeuw, J. De Brouwer, and E. Vrieling-Teunter, "Promoting explicit instruction of strategies for self-regulated learning: Evaluating a teacher professional development program in primary education," *Metacognition and Learning*, vol. 19, no. 1, pp. 215–247, 2024, doi: 10.1007/s11409-023-09368-5.

[44] I. Tammouch, S. Nouna, A. Elouafi, and A. Nouna, "A competitive learning approach to enhancing teacher effectiveness and student outcomes," *IAES International Journal of Artificial Intelligence*, vol. 14, no. 5, pp. 3647–3655, 2025, doi: 10.11591/ijai.v14.i5.pp3647-3655.

[45] M. Tankari, "Examining the Effects of Self-Regulated Learning Skills on Digital Lifelong Learning Among Online Graduate Students," *International Journal on Studies in English Language and Literature*, vol. 10, no. 12, pp. 26–42, 2022, doi: 10.20431/2347-3134.1012003.

[46] D. Taranto and M. T. Buchanan, "Sustaining Lifelong Learning: A Self-Regulated Learning (SRL) Approach," *Discourse and Communication for Sustainable Education*, vol. 11, no. 1, pp. 5–15, 2020, doi: 10.2478/dcse-2020-0002.

[47] J. Torrington, M. Bower, and E. C. Burns, "What self-regulation strategies do elementary students utilize while learning online?," *Education and Information Technologies*, vol. 28, no. 2, pp. 1735–1762, 2023, doi: 10.1007/s10639-022-11244-9.

[48] J. Torrington, M. Bower, and E. C. Burns, "Elementary students' self-regulation in computer-based learning environments: How do self-report measures, observations and teacher rating relate to task performance?," *British Journal of Educational Technology*, vol. 55, no. 1, pp. 231–258, 2024, doi: 10.1111/bjet.13338.

[49] J. Torrington, M. Bower, and E. C. Burns, "How remote learning impacted elementary students' online self-regulation for learning: A COVID-19 natural experiment," *Education and Information Technologies*, vol. 29, no. 10, pp. 12989–13023, 2024, doi: 10.1007/s10639-023-12352-w.

[50] M. Van Loon and C. M. Roebers, "Development of metacognitive monitoring and control skills in elementary school: A latent profile approach," *Metacognition and Learning*, vol. 19, no. 3, pp. 1065–1089, 2024, doi: 10.1007/s11409-024-09400-2.

[51] S. G. Vos, L. Wijnia, R. L. Martens, and R. H. M. De Groot, "How do distance learners self-regulate learning? A latent profile analysis of self-regulated learning and its relationship with self-regulatory efficacy, motivation, need satisfaction, need frustration, academic achievement, and well-being," *Learning and Individual Differences*, vol. 120, Art. no. 102678, 2025, doi: 10.1016/j.lindif.2025.102678.

[52] Z. Xu, Y. Zhao, B. Zhang, J. Liew, and A. Kogut, "A meta-analysis of the efficacy of self-regulated learning interventions on academic achievement in online and blended environments in K-12 and higher education," *Behaviour & Information Technology*, vol. 42, no. 16, pp. 2911–2931, 2023, doi: 10.1080/0144929X.2022.2151935.

[53] Y. Zhao and Y. Zheng, "Effects of elaborative and metacognitive feedback on students' science achievement, epistemological beliefs, and inquiry behaviors in simulation-based science inquiry learning," *Interactive Learning Environments*, pp. 1–19, 2026, doi: 10.1080/10494820.2026.2638487.

[54] J. Zhu and M. M. C. Mok, "Predicting primary students' self-regulated learning by their prior achievement, interest, personal best goal orientation and teacher feedback," *Educational Psychology*, vol. 38, no. 9, pp. 1106–1128, 2018, doi: 10.1080/01443410.2018.1497775.

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19 Asmaa Ahmed Ibrahim Morsy, Mohamed Hussein Ramadan Atta, Mahmoud Ahmed Elsheikh, Yasmeen Mohamed Shehata. "Spotlighting the Atychiphobia among nursing Students: the role of online self-efficacy and self-regulated learning", Nurse Education Today, 2025
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20 jeps.qu.edu.sa
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22 Submitted to University of Cambridge
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28 journal-gehu.com
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30 Diana Akhmedjanova, Tatjana Kanonire, Andrey Zakharov. "Moderation analysis of subjective well-being, self-efficacy, and academic performance of 4th grade children in Russia", PLOS One, 2026
Publication

31 Md Rabiul Alam, Mohammad Sulaiman, Md Mijanur Rahman Bhuiyan, Md Sahidul Islan al. "Online Corrective Feedback and Self-Regulated Writing: Exploring Student Perceptic and Challenges in Higher Education", World Journal of English Language, 2025
Publication

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34 journal.inspire-kepri.org
Internet Source

35 proceeding.unnes.ac.id
Internet Source

36 www.researchgate.net
Internet Source

37 Chengye Liu, Zhihao Cui, Xiaojing Weng. "Effects of a Self-Regulated Cooperative Programming Approach on Elementary Students' Programming Knowledge, Metacogni Awareness, and Self-Efficacy", Journal of Computer Assisted Learning, 2025
Publication

38 Samer Adnan Abdel Hadi, Mahmoud Alquraan. "Academic self-regulation as a bridge between mindfulness and emotional self-efficacy among undergraduate students", International Journal of Evaluation and Research in Education (IJERE), 2026
Publication

39 www.grafiati.com
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Publication

41 Bing Liu, Jing Liu, Qianrong Yang. "A Survey on High School Students' Online Self-Regulated Learning Skills", International Journal of Web-Based Learning and Teaching Technologies, 2024
Publication

42 Carsten Kronborg Bak, Simon Schulin, Jeanne Krammer. "Discovering the Learning Gradient of Students' Preferences for Learning Environment", Journal of Intelligence, 2(
Publication

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Publication

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Publication

54 "Artificial Intelligence and Human Agency in Education: Volume One", Springer Science and Business Media LLC, 2025
Publication

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