Self-Regulation and Time Management Strategies: Predictors of Academic Achievement

Iqra Saifi[1], Anoj Raj[2]

[1,2]Department of Education, Swami Vivekanand Subharti University, Subhartipuram, Meerut Uttar Pradesh 250005

Abstract

Academic achievement is a multifactorial construct shaped by the dynamic interaction of cognitive, behavioral, and emotional processes. Among the various determinants, self-regulation and time management strategies have emerged as critical predictors of students' success across diverse educational contexts. Self-regulation involves the capacity to plan, monitor, and adjust one's learning behaviors and emotional responses to achieve academic goals, while time management encompasses the effective organization and prioritization of tasks to optimize productivity. This study aims to explore the predictive relationship between self-regulation, time management strategies, and academic achievement, highlighting their interdependence and combined impact on students' performance. Evidence from contemporary research underscores that students who exhibit high self-regulatory capacity—characterized by goal setting, sustained attention, self-monitoring, and adaptive coping—tend to perform better academically, regardless of their baseline cognitive ability. Similarly, effective time management enables students to allocate sufficient time for study, avoid procrastination, and maintain a balanced workload, thereby reducing academic stress and enhancing performance outcomes. Both constructs contribute to fostering academic self-efficacy, intrinsic motivation, and resilience, which serve as mediating variables between behavioral effort and achievement. Furthermore, the integration of self-regulatory and time management training within academic curricula has shown promising results in improving learners' autonomy and achievement levels. Overall, this study posits that fostering self-regulation and time management skills represents a vital pedagogical strategy for optimizing academic performance and promoting lifelong learning competencies. The findings are expected to provide educators and policymakers with actionable insights into developing evidence-based interventions that cultivate students' self-directed learning abilities and enhance academic achievement in increasingly competitive educational environments.

Keywords: Self-regulation; Time Management strategy; Learning Strategy; Educational Psychology; Self-discipline

1. Introduction

Academic success is a central goal of educational institutions, representing a composite outcome of students' cognitive, behavioral, and emotional engagement with learning environments. Traditionally measured by grade point averages, standardized test scores, and degrees of mastery, academic achievement is influenced by a multifaceted array of predictors, ranging from cognitive ability and self-efficacy to lifestyle habits and social support. Research utilizing advanced statistical models and machine learning has shown that the most powerful

predictors include historical academic performance, student engagement, self-efficacy, and effort-related behaviors. Factors such as cognitive control, psychological wellbeing, and even physical health have emerged as significant contributors, with their influence varying across age groups, educational levels, and academic subjects (Maghalian et al., 2023; Wang & Luo, 2024; Dubuc, 2022; Jin, 2023). Recent studies demonstrate that school effort, encompassing proactive learning behaviors, diligent task completion, and sustained engagement, is the single most influential predictor, exceeding the predictive power of demographic variables or basic intelligence measures. Academic self-efficacy, closely linked to effort regulation and goal orientation, also exhibits a robust positive correlation with achievement, emphasizing the importance of students' beliefs in their capability to succeed. As educational settings become increasingly complex, it is clear that success depends not only on ability but also on adaptable strategies and resilient mindsets (Maghalian et al., 2023; Jin, 2023). The scope of this review encompasses students across educational levels and sociocultural settings, including both face-to-face and online modalities. It examines contemporary empirical findings, influential theoretical perspectives (including those of Bandura, Zimmerman, and Walberg), and current intervention strategies designed to foster self-management competencies. Through a systematic analysis, the review elucidates not only what works, but for whom, in what contexts, and why laying the groundwork for actionable recommendations and promising research directions in the field of academic achievement. In summary, the need to support academic success through a nuanced understanding of self-regulation and time management is both theoretically compelling and practically essential. As educators face the challenge of serving increasingly diverse and digitally enabled students, maximizing the impact of these foundational skills offers a powerful avenue for enhancing engagement, equity, and learning outcomes worldwide. This review, therefore, aspires to bridge conceptual, empirical, and applied perspectives establishing a clear rationale for prioritizing self-regulation and time management as cornerstones of academic achievement and lifelong learning.

1.1 Importance of Self-Regulation and Time Management in Educational Settings

Self-control and effective time management are critical indicators of academic achievement. Self-regulation involves monitoring and adjusting thoughts, emotions, and behaviors to achieve educational goals (Zimmerman, 2002). Effective time management, centered on planning and prioritizing tasks, enhances performance and reduces stress.

This process includes goal setting, progress monitoring, and adapting strategically to challenges and distractions. Students who self-regulate demonstrate persistence, maintain focus during difficulties, and proactively manage setbacks—qualities strongly linked to superior academic performance across educational levels (Fu et al., 2025). Proficient time management, involving the organized prioritization of academic duties, is fundamentally connected to self-regulation. It promotes academic engagement directly and indirectly by fostering self-control and reducing procrastination and distractions (Lourenco & Paiva, 2024; Aydan & Capa-Aydin, 2025).

The essential skills of daily planning, task prioritization, setting SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals, and adaptability to changing demands are encompassed by time management (Fu et al., 2025; Aeon & Aguinis, 2017). Effective organization and efficient use of time in academic contexts are enabled by these competencies.

Theoretical frameworks such as volitional control theory and self-regulated learning theory posit that learning is optimized when students proactively regulate their behaviors including how they organize their time to achieve desired outcomes (Brady et al., 2022; Fu et al., 2025; Yadav et al., 2023; Aydan & Capa-Aydin, 2025). Numerous studies affirm that students who demonstrate high levels of time management and self-regulatory skills outperform their peers, displaying increased motivation, reduced stress, and higher engagement. Both educators and researchers advocate for interventions targeting these skills, as they are among the few variables consistently yielding improvements in academic achievement regardless of background or ability (Maghalian et al., 2023; Lourenco & Paiva, 2024; Yadav et al., 2023).

1.2 Rationale for the Review

The persistent global issue of student underachievement and diminished motivation underscores the necessity of synthesizing extant knowledge regarding effective predictors of academic success. Both theoretical and empirical studies increasingly identify self-regulation and time management as pivotal constructs essential to successful learning, which are also amenable to direct intervention within educational settings. Despite the extensive body of research, a comprehensive integration of these findings remains imperative to effectively guide pedagogical practice and educational policy development (Aydan & Capa-Aydin, 2025; Whitebread, 2014). Additionally, as learning environments evolve incorporating digital tools, remote instruction, and diverse learner needs the demand for skills that foster autonomy and adaptability has intensified. Strategies promoting self-regulation and time management not only address academic performance but also contribute to students' wellbeing, reducing stress and enhancing work-life balance. Thus, understanding the specific mechanisms and interventions that improve these skills remains critically relevant (Maghalian et al., 2023; Yadav et al., 2023).

1.3 Objectives and Scope of the Review

The empirical and theoretical literature on self-regulation and time management as predictors of academic achievement is systematically examined in this review. Contemporary findings and theoretical perspectives on academic success predictors are summarized, mechanisms by which self-regulation and time management impact academic outcomes are detailed, and the efficacy of interventions aimed at enhancing these skills is analyzed. Best practices and potential barriers are highlighted, and gaps in current knowledge are identified with future directions for research and educational practice proposed.

2. Theoretical Framework

2.1 Definitions and Models of Self-Regulation

Self-regulation in educational psychology refers to the processes by which students set goals, monitor progress, control emotions, and adjust behaviors to achieve desired academic

outcomes. Two leading scholars, Albert Bandura and Barry Zimmerman, have offered influential models:

Bandura's Social Cognitive Theory defines self-regulation as a triadic reciprocal system involving personal factors (beliefs, motivations), behavioral factors (actions, strategies), and environmental factors (contexts, feedback). Central to Bandura's model is the concept of self-efficacy: students' beliefs about their capabilities determine which tasks they undertake, how much effort they invest, and their persistence in the face of challenges. Agency, the belief in one's capacity to exert control is fostered through self-regulatory skills, which, in turn, heighten motivation and achievement. This dynamic, reciprocal process operates as learners observe their progress, adjust strategies, and increase their sense of competence and agency (Bandura, 1991; De la et al., 2022).

Zimmerman's Cyclical Phase Model expands Bandura's vision by outlining three iterative phases in self-regulated learning:

1. Forethought: Involves strategic planning, goal-setting, and motivation.
2. Performance: Centers on self-control, strategy use, and self-monitoring during task engagement.
3. Self-Reflection: Focuses on self-evaluation, causal attribution, and adaptive responses, such as altering strategies or setting new goals.

This model emphasizes that self-regulation is an ongoing, proactive, and cyclical activity, empowering learners to methodically adapt to challenges and maximize learning outcomes (De la et al., 2022; Zimmerman, 2002; Weibell, 2011; Carvalho & Araujo, 2022).

Additional Models: Self-regulation also draws from Vygotskian theory and self-determination perspectives, highlighting both personal agency and socially mediated learning processes. Key processes include metacognition (planning, monitoring, evaluating one's own knowledge and strategies), motivation regulation, and behavioural control (Brenner, C. A. (2022).

2.2 Time Management Theories

Time management is defined as the capacity to strategically plan, prioritize, allocate, and organize time to meet academic objectives. Among the various models, Macan's Process Model (1994) is one of the most prominent frameworks referenced in the literature. This model incorporates several key elements: the establishment of goals and priorities through systematic task organization; practical time management techniques such as scheduling, use of to-do lists, and planners; an individual preference for maintaining order in workspaces and plans; and perceived control over time, which reflects the belief in one's ability to manage time effectively (Mukhtar et al., 2016; Knowlden & Naher, 2023; Macan, 1994; Burrus, 2019).

According to Macan and colleagues, these behaviors contribute to an enhanced sense of time control, which is positively associated with academic success and lower stress levels. Instruments such as the Time Management Behavior Scale (TMBS) have been developed from this framework to assess individuals' time management competencies, including how they prioritize tasks and perceive control over time. Contemporary research consistently finds strong correlations between time management abilities, especially organizational skills and goal

setting, with increased study engagement and academic performance (Knowlden & Naher, 2023; Wolters et al., 2025).

2.3 Linkage between Self-Regulation, Time Management, and Achievement

Empirical research and theoretical models converge on the following points:

Synergistic Relationship: Time management and self-regulation are deeply intertwined. Time management behaviors planning, prioritizing, scheduling—are crucial self-regulatory strategies that directly impact learning and achievement (He & Zhang, 2019; Öztaş et al., 2024).

Mediating Mechanisms: Self-Control as a Mediator: Effective time management fosters self-control, aiding students in delaying gratification, sustaining attention, and resisting distractions. Self-control, in turn, bridges time management and academic engagement, significantly predicting achievement outcomes (Fu et al., 2025; Zhang et al., 2018). Independent Learning: Self-regulation of time management enhances independent learning tendencies, which further mediates the effect on academic performance (He & Zhang, 2019). Meta-analytic Evidence: Self-regulation predicts persistent effort, adaptive strategy use, and resilience, accounting for a substantial proportion of achievement variance.

Time management is positively correlated with study engagement and performance, with organization and scheduling serving as robust predictors; Conceptual Integration: Both Bandura's and Zimmerman's theoretical perspectives support a proactive, dynamic model whereby learners who set goals, actively monitor progress, and organize their time achieve higher motivation, lower stress, and sustained academic achievement (De la et al., 2022; Öztaş et al., 2024).

3. Self-Regulation Strategies: Theory, Evidence, and Practice

3.1 Cognitive strategies: goal setting, self-monitoring, metacognition

Self-regulation relies heavily on cognitive strategies such as goal setting, self-monitoring, and metacognition: Goal Setting; Effective learners set specific, measurable, achievable, relevant, and time-bound (SMART) goals. These goals provide direction, foster motivation, and trigger planning and resource allocation. Research shows that self-regulatory students routinely set short-term and long-term academic targets, adjust their strategies according to progress, and evaluate outcomes to refine future goals. Setting clear goals leads to goal-directed behavior and better academic achievement (Arianto, & Hanif, 2024; Frazier et al., 2021). Self-Monitoring; involves tracking one's own learning and performance. By regularly checking progress against goals, students can identify gaps, recognize successes, and modify their approach as needed. Empirical studies highlight that self-monitoring improves academic outcomes by prompting learners to check for understanding, adapt strategies, and maintain focus on learning objectives (Arianto, & Hanif, 2024; Pintrich, 2002; Serra, & Metcalfe, 2009). Metacognition; defined as "thinking about thinking," metacognition includes planning, monitoring, and evaluating cognitive activities. Training students in metacognitive strategies such as asking themselves what they know, what they need to learn, and how to approach a task has been shown to enhance self-regulation and academic success. Metacognition equips

students with tools to select effective learning techniques, assess their understanding, and reflect on their learning process. Interventions targeting metacognitive awareness yield significant improvements in academic performance, as students become adept at regulating their cognitive resources (Arianto, & Hanif, 2024; Pintrich, 2002; Serra, & Metcalfe, 2009; Sabaliauskas, 2025). A meta-analysis conducted by the Education Endowment Foundation found that explicit teaching of metacognitive and self-regulation approaches provides up to seven additional months of academic progress in primary and secondary school pupils. These strategies are most effective when embedded in routine classroom practice and explicitly taught as part of a holistic learning approach.

3.2 Motivational and Emotional Regulation

Alongside cognitive strategies, motivational and emotional regulation play a critical role in self-regulated learning: Motivational Regulation refers to techniques for boosting or sustaining academic drive, including positive self-talk, visualizing success, and connecting academic work to personal values or future goals ("possible selves"). Students who actively reinforce their motivation persist longer despite difficulties and setbacks, and are more likely to engage in deep learning (Frazier et al., 2021). Emotional Regulation; Successful students manage academic stress, frustration, anxiety, and disappointment through tactics such as mindfulness, cognitive reappraisal, and emotional awareness. Recent studies demonstrate that emotion regulation has a strong positive correlation ($r = 0.73$) with academic motivation and performance. Cognitive reappraisal reframing negative events in a positive light is particularly effective. Conversely, maladaptive strategies like emotional suppression lead to reduced motivation and poorer academic outcomes (Liang & Mao, 2025; Purohit, 2024). A study of 1,189 university students found that emotion regulation (particularly cognitive reappraisal) significantly predicted academic motivations and explained 44% of the variance in motivational scores. Other research confirms that interventions improving emotional awareness and regulation directly enhance learning engagement and achievement (Liang & Mao, 2025; Purohit, 2024).

3.3 Behavioral Regulation and Habit Formation

Self-regulation also encompasses behavioral regulation and the development of positive habits: Behavioral Regulation; involves controlling and directing one's actions toward academic goals. Strategies include creating study routines, scheduling review sessions, and setting reminders for assignments. Self-regulatory students display consistency in study habits, organize their workspace, and eliminate distractions to maintain motivation and focus. Habit Formation; habits are goal-directed behaviors that become automatic through repetition. Empirical studies note that forming study habits results from repeated performance in specific contexts such as always studying at the same time or place, which strengthens context-response associations. Planning and self-monitoring are essential for initiating and maintaining these habits, and positive reinforcement (like rewarding oneself after study sessions) accelerates habit development (Yamada & Toda, 2023; Feil et al., 2021; Gardner, 2015). Computational models and behavioral studies indicate that the amount of training, reward schedules, and the presence of choice affect how quickly habits form and how persistent they become. Planning acts as a cue-related factor, providing the "cognitive architecture" that turns intentional actions

into habits, making routine study behaviors easier to maintain. A systematic review of habit formation in academic contexts underscores the importance of planning and self-monitoring as essential elements in the development and maintenance of productive learning habits (Yamada & Toda, 2023; Feil et al., 2021; Gardner, 2015). Studies repeatedly show that students who combine cognitive (goal setting, self-monitoring, metacognition), motivational/emotional (self-talk, reappraisal), and behavioral (scheduling, habit formation) strategies achieve higher academic results and sustain performance over time. The MAPS model of self-regulation stresses the dynamic interplay between goal setting ("possible selves"), metacognitive strategies, and a sense of agency. These elements feed back into one another, reinforcing motivation, enhancing self-efficacy, and supporting persistent behavior toward academic goals (Frazier et al., 2021). Research highlights the importance of teaching self-regulation as a set of explicit, actionable skills through interventions that integrate goal setting, regular progress check-ins, emotional awareness, and behavioral routines. When these strategies are systematically embedded in educational practice, students not only achieve more but also become resilient and independent learners.

4. Time Management Strategies: Foundations and Research

Time management represents the purposeful organization, sequencing, and prioritization of tasks to maximize learning efficiency and academic achievement. Empirical evidence demonstrates that when students employ robust time management strategies—such as goal setting, planning, prioritizing, and the use of organizational tools—they experience better grades, improved motivation, and reduced stress. This section explores the essential components of time management and reviews supporting research (Fu et al., 2025; Calonia et al., 2023; Patzak et al., 2025).

4.1 Goal Setting and Prioritization

Successful time management begins with goal setting, allowing students to clarify their ambitions and break academic tasks into manageable, time-bound steps. The use of SMART goals (Specific, Measurable, Achievable, Relevant, Time-bound) provides structure and motivation, guiding students toward prioritized learning activities. Prioritization, an extension of goal setting, helps learners concentrate on high-value tasks, allocate effort to pressing deadlines, and avoid distractions. Research shows that students who systematically prioritize and subdivide larger tasks into smaller ones—each with self-imposed deadlines—maintain focus and minimize procrastination. Claessens et al. found a strong correlation between planning/prioritization and academic achievement ($r = .38$), demonstrating that effective prioritization is an antidote to academic stress and disengagement. Moreover, prioritization fosters balance between academics and extracurricular commitments, sustaining wellbeing and motivation (Calonia et al., 2023; Patzak et al., 2025).

4.2 Planning and Scheduling

Planning and scheduling serve as the operational backbone of time management. Students utilize weekly and daily schedules, allocating specific blocks of time for study, assignments, revision, and leisure. Advanced planning decreases cognitive overload, provides clarity about task deadlines, and supports proactive task completion. The implementation of planner tools

(physical or digital) enhances the accuracy and flexibility of schedules, allowing students to adapt routines to shifting priorities and unforeseen events. Research by Oettingen et al. and Hamdan et al. demonstrates that students who consistently plan achieve higher GPAs and complete more tasks ahead of deadline, while training in time management skills leads to reductions in stress and improvements in psychological health. These findings extend to workplace settings, underscoring the transferable value of robust planning skills in academic and professional contexts (Patzak et al., 2025).

4.3 Procrastination and Its Consequences

Procrastination is a maladaptive time management behavior that involves delaying or avoiding important academic tasks, often in favor of lower-priority or pleasurable activities. Research shows nearly all students procrastinate to some degree, and higher rates of procrastination are linked to poorer grades, increased stress, anxiety, and, in severe cases, depression. Procrastination undermines goal setting, planning, and prioritization, resulting in last-minute efforts, incomplete assignments, and ineffective learning. Studies from Gauhati University and elsewhere confirm a strong negative correlation between academic procrastination and achievement; as procrastination rises, performance declines. Procrastination also mediates the effect of academic stress on achievement, amplifying negative outcomes unless moderated by self-efficacy and resilience. Consequently, interventions targeting procrastination often employ goal-setting, prioritization, and motivational strategies, aiming to preempt delay and foster adaptive learning habits (Gayary & Kalita, 2025; Munda, 2024; Calonia et al., 2023).

4.4 Use of Tools: Calendars, Apps, and Planners

The value of time management is amplified by the use of organizational tools—calendars, digital planners, reminder apps, and scheduling platforms. These resources encourage systematic task tracking, provide visual cues for deadlines, and facilitate collaborative scheduling for group work. Digital platforms such as Calendly and ClickUp help students synchronize academic and extracurricular commitments, create dynamic weekly plans, and monitor progress across multiple courses and assignments. Research indicates that planner use supports habit formation and enhances learning outcomes: students who regularly use planners report higher rates of task completion, better engagement, and greater subjective wellbeing. The International Journal of Community Science reports that 31.4% of students benefiting from planners achieved better academic performance, especially when coupled with distraction management and goal-setting. The integration of physical and digital tools fosters routine, accountability, and adaptability, whereas neglecting these resources correlates with disorganization and diminished achievement (Hassan & Sison, 2025).

5. Relationship Between Self-Regulation, Time Management, and Academic Achievement

5.1 Review of Empirical Studies

Extensive empirical research underscores self-regulation learning (SRL) and time management as robust predictors of academic achievement across educational levels. Studies such as Caixia et al. (2025) confirm that students who proficiently apply self-regulatory strategies—goal setting, metacognitive monitoring, and motivational regulation—consistently outperform peers

academically. Time management skills, particularly planning and prioritization, likewise contribute significantly to performance and reduced academic stress (Fu et al., 2025).

Research by Jansen et al. (2019) integrating 142 studies revealed that learners with advanced SRL capacities demonstrate increased engagement and resilience, essential for both school and higher education settings. Xu et al. (2023), in a meta-analysis of 73 intervention studies, highlighted that while most SRL interventions yield positive academic outcomes, the variations in effectiveness stem from methodological diversity and contextual factors.

5.2 Meta-Analyses and Systematic Reviews

Meta-analyses validate the causal relationship between SRL/time management and academic success. Caixia et al. (2025) and Xu et al. (2023) demonstrate moderate to strong effect sizes for SRL strategies improving academic performance. Fu et al. (2025) emphasize that robust time management behaviours mediate reduced procrastination, facilitating sustained academic engagement.

5.3 Differences by Educational Level

The impact of SRL and time management intensifies in higher education due to demands for autonomous learning. College students depend more heavily on sophisticated metacognitive strategies and self-directed time allocation to navigate complex curricula and digital learning environments. Consequently, poor SRL and time management skills contribute to higher attrition rates among first-year university students globally (Tao & Hanif, 2025). Conversely, primary and secondary education focuses more on developing foundational SRL skills such as goal setting and self-monitoring, tailored to cognitive developmental stages.

5.4 Mediating and Moderating Variables

The relationship between self-regulation, time management, and academic achievement is shaped by various mediators and moderators:

- **Motivation and Self-Efficacy:** Motivational beliefs (e.g., self-efficacy, task value) and autonomous motivation significantly mediate academic achievement. Students with higher self-efficacy engage more deeply, persist longer, and perform better, though high anxiety or perceived task cost can moderate these effects (Lourenço & Paiva, 2024).

- **Stress and Emotional Regulation:** Effective time management and emotional regulation reduce anxiety and promote learning focus. In stressful environments, time management buffers negative outcomes and facilitates persistence (Lourenço & Paiva, 2024).

- **Personality Traits:** Learners who score high in conscientiousness and openness tend to adopt more effective SRL and time management habits, correlating with better academic outcomes (Lourenço & Paiva, 2024).

- **Contextual Factors:** Online and blended formats amplify the importance of SRL and time management skills. Differences in educational resource allocation, culture, and institutional support further moderate outcomes between countries and learning settings (Lourenço & Paiva, 2024).

5.5 Integration of Cyclical SRL Phases

Zimmerman's three-phase SRL model—forethought, performance, and reflection—shows cumulative evidence for positive impact, with forethought and performance phases exerting the strongest effect. The forethought phase (goal setting, motivation, planning) provides structure and direction, the performance phase emphasizes monitoring and strategy use, and the reflection phase fosters feedback-driven adjustments and long-term improvement. However, less research explores the reflection phase, highlighting a gap with respect to strategy adjustment and feedback integration (Lourenço & Paiva, 2024; Hemmler & Ifenthaler, 2024).
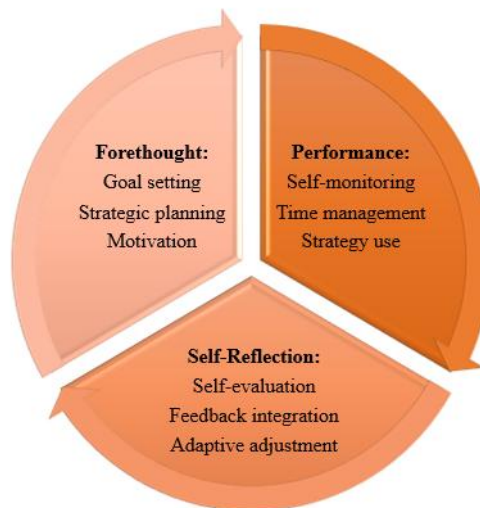
Zimmerman's Cyclical Model of Self-Regulated Learning

Synthesis

The interplay between self-regulation and time management is multidimensional and dynamic. Effective SRL provides the foundation for time management, which in turn supports planning, prioritization, and persistence. Empirical research affirms their joint predictive validity for academic achievement, with differences by educational stage and significant mediation/moderation by motivation, emotional stability, and contextual learning environments. Overall, cultivating SRL and time management skills is essential for academic resilience and success, especially in increasingly autonomous and digital learning contexts (Lourenço & Paiva, 2024)

Study & Year	Type of research design	Sample & Context	Key Focus	Main Findings
Caixia et al. (2025)	systematic literature review	70 studies; Higher education	Self-regulated learning (SRL) strategies	SRL strategies (goal setting, metacognition, motivation) strongly predict academic success.

Fu et al. (2025)	cross-sectional correlational survey design and statistical mediation (path-analysis)	College students; online/blended learning	Time management impact on engagement	Time management improves academic engagement and reduces procrastination.
Jansen et al. (2019)	Quantitative Meta-Analysis	142 studies; various educational levels	SRL and academic performance	Higher SRL skills correlate with better academic outcomes and greater resilience.
Tao & Hanif (2025)	quantitative cross-sectional correlational design	University students; EFL learners	SRL strategies and procrastination	SRL strategies reduce academic procrastination, improving success.
Wolters & Brady (2020)	quantitative cross-sectional correlational design	Postsecondary students	Time management in SRL context	Time management is a crucial SRL strategy linked to persistence and success.
Patzak et al. (2025)	quantitative + qualitative systematic literature review	Productivity and well-being in education	Time management benefits	Effective time management boosts productivity and well-being, aiding academic achievement.

Summary Table: Empirical Studies Linking Self-Regulation, Time Management, and Academic Achievement

6. Individual Differences and Contextual Factors in Academic Achievement

Academic performance and the effectiveness of self-regulation and time management strategies are significantly shaped by individual and contextual factors, including gender, age, academic discipline, socio-economic background, cultural influences, and parental or institutional support.

6.1 Gender, Age, Academic Discipline, and Socio-Economic Background

Empirical research indicates that gender differences persist in self-regulation and academic achievement. Malik & Parveen (2019) found that male university students exhibit higher self-regulation compared to their female counterparts, contributing to higher academic performance among males in their cohort. Other studies, however, show the effects of gender and age are nuanced; Kaedabi-Donkor et al. (2024) report that while there is some gender main effect on achievement, the interaction between gender and age does not strongly moderate academic

self-concept or performance. In terms of academic discipline, Bembenutty (2009) revealed that self-regulated learning strategies vary considerably among students in different fields, with disciplines requiring greater autonomy and creativity fostering stronger self-regulation skills. Such differences often reflect both curricular structure and the expectations of academic programs (Weis et al., 2013; Kaedabi-Donkor et al., 2025).

Socio-economic background is an influential factor: students from wealthier families benefit from greater access to educational resources, such as tutoring, technology, and supportive learning environments. Mukundi (2024) and Vadivel (2023) highlight that lower SES correlates with increased academic challenges, stress, and reduced opportunity for engagement, frequently resulting in lower achievement. Parental income, education level, and smaller family size contribute positively, providing individualized attention and enhanced expectations for learning. Conversely, students from low SES backgrounds face barriers in resource access and psychological wellbeing, which institutions must address through targeted support and equitable resource allocation (Lutfiu, & Hoxha, 2024; Vadivel et al., 2023; Rahman et al., 2023).

6.2 Cultural Influences

Culture plays a decisive role in shaping attitudes toward time and self-regulation. Fu et al. (2025) demonstrated that the high value placed on time in Chinese culture ("an inch of time is an inch of gold") instills effective time management practices and encourages collective educational achievement. This collectivist ethos motivates Chinese students to prioritize academic engagement for group benefit, which positively influences study habits and outcomes. Research across global contexts suggests that cultural emphasis on autonomy, collectivism, or grit directly impacts how students manage their time, regulate emotions, and sustain academic goals. Cultural orientation thus interacts with self-regulation and time management, mediating their effectiveness in diverse educational settings (Fu et al., 2025; Sangaire, 2012).

6.3 Role of Parental and Institutional Support

Parental support is consistently identified as a vital contributor to academic success. Perceived parental autonomy support reduces academic procrastination and improves time management by fostering autonomous motivation in students; adolescents who feel supported are better equipped to engage with academic tasks and manage their studies proactively. Studies by Huang, Zhang, and others explain that parents shape study habits both directly by helping children plan and allocate time and indirectly by instilling values and promoting independent motivation. Institutional support, meanwhile, involves schools and universities offering resources, mentorship, counseling, and active learning environments. Institutions that promote time management education, collaborative partnerships with families, and personalized interventions improve student self-regulation and performance, particularly for those from disadvantaged backgrounds. A positive school environment that recognizes and addresses unique challenges faced by students enables them to overcome SES-related barriers and thrive academically (Zhao et al., 2022, Kantova, 2024, Candel & Escote, 2024; Calonia et al., 2023; Đurišić & Bunijevac, 2017; Fu et al., 2025). In summary, academic achievement and the

application of self-regulation and time management skills are deeply influenced by gender, age, academic discipline, socio-economic factors, culture, and levels of parental and institutional support.

7. Interventions and Educational Implications

7.1 Effective Interventions and Training Programs

Published research shows that structured interventions and training programs in self-regulation and time management significantly improve student outcomes. Kader (2015) demonstrated that explicit instruction on time management strategies enhances both academic time management and self-efficacy, where students who received targeted training outperformed controls in planning and monitoring their work. A multivariate analysis by JARAC confirmed that training in study methods and time management increased self-regulation for both male and female students, with notable improvements in help-seeking and planning behaviors. Interventions like goal-setting workshops, study planning modules, and peer-supported programs have been affirmed as effective across secondary and higher education especially when customized for student demographics (Saman Azari et al., 2024; Kader et al., 2015; Ahlawat et al., 2015; Xu et al., 2023).

7.2 Integration into Curriculum

Integration of self-regulation and time management into curricula ensures development of these skills across education levels. Research shows that embedding such competencies within coursework enhances students' planning, prioritization, and task management, leading to improved academic engagement and achievement (Fu, 2025; Lourenço, 2024).

Guidelines from Time Analytics Software advocate embedding time management lessons within subject coursework, so that students learn to break down tasks, schedule incremental deadlines, and reflect on their progress in real-world contexts like writing assignments or problem-solving in math. Curriculum planners are encouraged to design age-appropriate instruction by introducing foundational concepts such as goal setting and scheduling for younger students, and progressively incorporating advanced modules on prioritization and long-term planning for older learners (Zimmerman, 2002; MacCann et al., 2012; Aeon & Aguinis, 2017).

Active learning methods—like group projects, simulations, role-playing, and student self-assessment—have been shown in Indian medical and higher-education settings to improve retention, deepen understanding, and help make these skills habitual and transferable (Dara, Mopuri & Sujatharani, 2024; Sande & Rajguru, 2025; Jagannatha & Parashar, 2025).

7.3 Teacher's Role and Institutional Strategies

Teachers play a pivotal role in modeling and facilitating self-regulation and time management. Hafeez (2021) and Zhang et al. (2024) found that students taught by trained teachers using diverse instructional strategies achieve higher engagement and improved academic performance, attributed to teachers' ability to personalize techniques such as interactive feedback, explicit instruction, and motivational support. Institutional support—through

mentorship programs, scheduled study periods, counseling, and collaborative partnerships with families—enables schools to address individual barriers and foster environments where self-regulation thrives. Positive teacher-student relationships, integration of emotional engagement in lessons, and routine feedback all contribute to a classroom culture conducive to independent learning and resilience. Institutions should also offer staff training so teachers can deploy evidence-based interventions matched to classroom needs (Fu et al., 2025; Hafeez, 2021; Zhang et al., 2024; Díaz Santana, 2025; Chen & Li, 2025).

7.4 Use of Technology and AI Tools

Technological solutions and AI-powered tools are reshaping the landscape of self-regulation and time management education. Systematic reviews by Nature and BERA journals show that AI applications including chatbots, adaptive feedback platforms, and writing assistants enable real-time monitoring, personalized study schedules, and immediate feedback to students. For example, AI-enabled writing systems (Chat GPT, AES) provide tailored grammar and structure guidance, allowing independent improvement and increased learner autonomy. Innovations such as scheduling apps, online planners, and classroom management platforms supplement these interventions by helping students set reminders, track progress, and visualize tasks over time. Furthermore, AI tools support the full cycle of self-regulated learning outlined by Zimmerman, improving forethought (planning), performance (monitoring), and self-evaluation (reflection). Meta-analytic evidence affirms a moderate effect size (ES = 0.69) for SRL interventions using digital platforms, confirming sustained academic gains in online and blended learning environments. The implementation of technology must also be accompanied by guidance and digital literacy training, ensuring equitable access and ethical integration for all learners (Mohebbi, 2025; Lan & Zhou, 2025; Mazı & Mazı, 2025; Xu et al., 2023; Xu et al., 2025).

8. Gaps in the Literature and Future Directions

Despite substantial advances in research on self-regulation and time management as predictors of academic achievement, critical gaps remain in the literature. Firstly, there is limited exploration of the long-term impact of self-regulated learning strategies and their sustained effects on academic performance, engagement, and procrastination; most studies focus on short-term interventions or immediate outcomes. The relationship between resource-management strategies—including effort regulation, metacognitive strategies, and time management is well documented in university populations, but less is known about their applicability and effectiveness in pre-university or adult learning contexts, including in professional and vocational education. Additionally, the role of contextual and cultural factors in shaping these strategies is under-investigated; there is a need for studies that account for diverse socio-economic, cultural, and instructional environments rather than relying predominantly on Western or higher education samples (Tao & Hanif, 2025; Caixia et al., 2025; Xu et al., 2023; Lourenço & Paiva, 2024; Hemmler & Ifenthaler, 2024). Methodologically, several limitations persist. Many studies employ self-report measures which are susceptible to bias and do not always reflect actual behavioral changes. There is also a reliance on cross-sectional designs, making it difficult to infer causality or track skill development over time. Intervention research often lacks ecological validity, as programs are primarily tested in

controlled classroom environments or as part of course requirements restricting generalizability to wider educational settings. Moreover, factors that mediate or moderate the relationship between self-regulation, time management, and achievement (such as motivational beliefs, perceived task difficulty, or levels of self-control) are often overlooked in existing models (Xu et al., 2023; Hong, 2025; Alyami et al., 2021; Brady et al., 2022; Wang & Sun 2023). Future research should address these gaps by conducting longitudinal studies that examine the evolution of self-regulation and time management skills and their enduring influence on academic and life outcomes. Mixed-methods designs and experimental interventions embedded in diverse and naturalistic contexts (e.g., outside of mandatory coursework) can provide more robust and transferable evidence. Greater attention should be paid to individual differences including age, discipline, cultural background, and learning environment and to mechanisms of action, such as the precise roles of metacognitive strategies and motivational regulation in educational success. Finally, future studies should investigate the integration of emerging technology and AI-driven interventions for personalized time management and self-regulation support, while rigorously evaluating their effectiveness and accessibility across learner populations.

Conclusion

The cumulative findings from recent studies firmly establish that self-regulation and time management function as interdependent yet distinct cognitive, behavioural, and affective processes that significantly predict academic success. Self-regulated learning (SRL) embodies the learner's capacity to plan, monitor, and evaluate their learning autonomously, guided by theoretical frameworks such as Zimmerman's cyclical phase model and Bandura's social-cognitive theory. A decade-long systematic review by Caixia et al. (2025) demonstrated that well-developed SRL strategies—particularly goal setting, metacognitive monitoring, self-assessment, and motivational regulation—substantially elevate academic performance across diverse educational settings. Moreover, Xu's (2023) meta-analysis confirmed the robust positive correlation between SRL interventions and learning outcomes, with average effect sizes indicating moderate to strong influence across online and blended formats.

Parallel to this, time management emerges as both a subset and a facilitator of self-regulation. Evidence-based reviews, such as those by Fu et al. (2025) and Patzak et al. (2025), highlight that strategies like planning, prioritization, and scheduling not only improve academic performance but also enhance self-control, reduce procrastination, and foster engagement and well-being. The interdependence of these constructs manifests in structural models showing that time management mediates the relationship between self-control and study engagement, amplifying academic achievement indirectly through volitional persistence. Additionally, recent findings confirm that deficiencies in self-regulation, particularly in metacognitive and effort regulation dimensions, are strongly linked to academic procrastination and reduced performance (Tao & Hanif, 2025).

For students and educators, these insights underscore the importance of cultivating both self-regulatory and time management competencies through deliberate, scaffolded instructional strategies. Institutions should integrate explicit SRL and time management training into curricula, employing feedback-rich environments and digital tools to foster strategic autonomy

and reflective learning cycles. Policymakers should emphasize these dimensions in educational reform policies aimed at improving lifelong learning outcomes and academic resilience, particularly amid technology-driven learning contexts.

In essence, academic achievement is not merely a reflection of intellectual ability but of students' capacity to self-regulate cognition, motivation, and time. Future educational paradigms must therefore prioritize interventions that concurrently strengthen self-regulatory processes and time management habits, thereby enhancing not only learning outcomes but also psychological well-being, adaptability, and persistence in lifelong learning.

References

Ahlawat, P., Sharma, P., & Tyagi, N. (2025). Educational Module Effectiveness on Academic Procrastination and Time Management Skills among Nursing Student: Quasi Experimental Study. *J Clin Biomed Sci*, *15*(1), 49-54.

Alyami, A., Abdulwahed, A., Azhar, A., Binsaddik, A., & Bafaraj, S. M. (2021). Impact of time-management on the student's academic performance: A cross-sectional study. *Creative Education*, *12*(3), 471-485.

Arianto, F., & Hanif, M. (2024). Evaluating Metacognitive Strategies and Self-Regulated Learning to Predict Primary School Students' Self-Efficacy and Problem-Solving Skills in Science Learning. *Journal of Pedagogical Research*, *8*(3), 301-319.

Aydan, S., & Capa-Aydin, Y. (2025). What makes them self-regulated? Self-regulation procedures of academically successful students and key influences. *Acta Psychologica*, *257*, 105106.

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational behavior and human decision processes*, *50*(2), 248-287.

Bembenutty, H. (2009). Academic delay of gratification, self-regulation of learning, gender differences, and expectancy-value. *Personality and individual differences*, *46*(3), 347-352.

Brady, A. C., Wolters, C. A., & Yu, S. L. (2022). Self-regulation of time: The importance of time estimation accuracy. *Frontiers in psychology*, *13*, 925812.

Brenner, C. A. (2022). Self-regulated learning, self-determination theory and teacher candidates' development of competency-based teaching practices. *Smart Learning Environments*, *9*(1), 3.

Burrus, A. L. (2019). *What does time management mean to you? Exploring measures of time management and group differences*. University of Missouri-Saint Louis.

Caixia, L., Bakar, Z. A., & Qianqian, X. (2025). Self-Regulated Learning and Academic Achievement in Higher Education: A Decade Systematic Review. *International Journal of Research and Innovation in Social Science*, *9*(3), 4488-4504.

Calonia, J. T., Pagente, D. P., Desierto, D. J. C., Capio, R. T., Tembrevilla, J. A. P., Guzman, C. A., & Nicor, A. J. S. (2023). Time Management and Academic Achievement: Examining the Roles of Prioritization, Procrastination and Socialization. *Online Submission*, *8*(6), 766-775.

Candel, J. L. G., & Escote, M. J. V. (2024). A Correlational Study on Parental Support and Academic Performance. *International Journal of Research and Innovation in Applied Science*, *9*(7), 362-375.

Carvalho, A., & Araújo, D. (2022). Self-regulation of learning in sport practices: An ecological dynamics approach. *Asian Journal of Sport and Exercise Psychology*, *2*(1), 3-7.

Chen, L. X., & Li, H. X. (2025). The impact mechanism of teaching strategies on student reading achievement in PISA 2018. *Asia Pacific Journal of Education*, 1-18.

De la Fuente, J., Martínez-Vicente, J. M., Santos, F. H., Sander, P., Fadda, S., Karagiannopoulou, E., ... & Kauffman, D. F. (2022). Advances on self-regulation models: A new research agenda through the SR vs ER behavior theory in different psychology contexts. *Frontiers in Psychology*, *13*, 861493.

Díaz Santana, O. D., Cardenal, M. E., & González-Betancor, S. M. (2025). Influence of the teacher role on academic performance in primary education. *Humanities and Social Sciences Communications*, *12*(1), 1-15.

Dubuc, M. M., Aubertin-Leheudre, M., & D KARELIS, A. N. T. O. N. Y. (2022). Predictors of academic performance in high school students: the longitudinal ASAP study. *International journal of exercise science*, *15*(4), 616.

Đurišić, M., & Bunijevac, M. (2017). Parental involvement as a important factor for successful education. *Center for Educational Policy Studies Journal*, *7*(3), 137-153.

Feil, K., Allion, S., Weyland, S., & Jekauc, D. (2021). A systematic review examining the relationship between habit and physical activity behavior in longitudinal studies. *Frontiers in psychology*, *12*, 626750.

Frazier, L. D., Schwartz, B. L., & Metcalfe, J. (2021). The MAPS model of self-regulation: Integrating metacognition, agency, and possible selves. *Metacognition and learning*, *16*(2), 297-318.

Fu, Y., Wang, Q., Wang, X., Zhong, H., Chen, J., Fei, H., ... & Li, N. (2025). Unlocking academic success: the impact of time management on college students' study engagement. *BMC psychology*, *13*(1), 323.

Gardner, B. (2015). A review and analysis of the use of 'habit' in understanding, predicting and influencing health-related behaviour. *Health psychology review*, *9*(3), 277-295.

Gayary, M., & Kalita, S. (2025). Relationship between academic procrastination and academic achievement of postgraduate students. *Journal of Education and Health Promotion*, *14*(1), 8.

Hafeez, M. (2021). Impact of Teacher's Training on Interest and Academic Achievements of Students by Multiple Teaching Methods. *Pedagogical Research*, *6*(3).

Hassan, W. D., & Sison, M. O. TIME MANAGEMENT SKILLS, STRESS, AND ACADEMIC PERFORMANCE AMONG RADIOLOGIC TECHNOLOGY STUDENTS OF UNIVERSIDAD DE ZAMBOANGA.

He, S., & Zhang, Z. (2019, June). The Relationship between Junior Students' Self-regulation of Time Management and Academic Performance: the Mediating Effect of Independent Learning. In *2nd International Seminar on Education Research and Social Science (ISERSS 2019)* (pp. 519-522). Atlantis Press.

Hemmler, Y. M., & Ifenthaler, D. (2024). Self-regulated learning strategies in continuing education: A systematic review and meta-analysis. *Educational Research Review*, *45*, 100629.

Hong, S. (2025). The impact of future time perspective on academic achievement: Mediating roles of academic burnout and engagement. *PloS one*, *20*(1), e0316841.

Jansen, R. S., Van Leeuwen, A., Janssen, J., Jak, S., & Kester, L. (2019). Self-regulated learning partially mediates the effect of self-regulated learning interventions on achievement in higher education: A meta-analysis. *Educational Research Review*, *28*, 100292.

Jin, X. (2023). Predicting academic success: machine learning analysis of student, parental, and school efforts. *Asia Pacific Education Review*, 1-22.

Kader, F. A. H. A., & Eissa, M. A. (2015). The Effectiveness of Time Management Strategies Instruction on Students' Academic Time Management and Academic Self Efficacy. *Online Submission*, *4*(1), 43-50.

Kaedabi-Donkor, R., Owusu Amponsah, M., Yusuf Dramanu, B., & Britwum, F. (2025). Gender and age variations in academic self-concept and academic achievement of distance learners at the college of distance education: a quantitative cross-sectional study. *Cogent Education*, *12*(1), 2493013.

Kantova, K. (2024). Parental involvement and education outcomes of their children. *Applied Economics*, *56*(48), 5683-5698.

Knowlden, A. P., & Naher, S. (2023). Time management behavior structural equation model predicts global sleep quality in traditional entry university students. *American journal of health education*, *54*(4), 265-274.

Lan, M., & Zhou, X. (2025). A qualitative systematic review on AI empowered self-regulated learning in higher education. *npj Science of Learning*, *10*(1), 21.

Liang, H., & Mao, X. (2025). Emotion regulation and perceptions of academic stress as key predictors of academic motivation in second language learning. *PloS one*, *20*(8), e0327071.

Lourenço, A. A., & Paiva, M. O. A. (2024). Self-regulation in academic success: Exploring the impact of volitional control strategies, time management planning, and procrastination. *International Journal of Changes in Education*, *1*(3), 113-122.

Lutfiu, B., & Hoxha, L. L. (2024). Socio-Economic Status of Students and Its Impact on the Quality of Studies. *European Journal of Education and Pedagogy*, *5*(4), 66-72.

Macan, T. H. (1994). Time management: Test of a process model. *Journal of applied psychology*, *79*(3), 381.

Maghalian, M., Ghafari, R., Tabrizi, S. O., Nikkhesal, N., & Mirghafourvand, M. (2023). Predictors of academic success in students of Tabriz University of Medical Sciences: a cross-sectional study. *Journal of Advances in Medical Education & Professionalism*, *11*(3), 155.

Malik, M., & Parveen, N. (2019). Self-regulation and Academic Achievement: a comparative analysis of high and low academic achievers. *Journal Of Behavioural Sciences*, *29*(2).

Mazı, A., & Mazı, A. (2025). Developing self-regulated artificial intelligence learning (SRAIL) Student Attitudes Scale. *Acta Psychologica*, *258*, 105227.

Mohebbi, A. (2025). Enabling learner independence and self-regulation in language education using AI tools: a systematic review. *Cogent Education*, *12*(1), 2433814.

Mukhtar, U., Ramzan, S., & Fatima, K. (2016). Analysis of Employees' Time Management Behavior Skills and Strategies (TMBSS) in Pakistan. *Strategic Management-International Journal of Strategic Management and Decision Support Systems in Strategic Management*, *21*(4).

Munda, X. (2024). The impact of academic procrastination on students' performance in Indian school education systems: a special research analysis-vision 2045. *Available at SSRN 4867411*.

Öztaş, G. S., Akçapınar, G., Hasnine, M. N., & Er, E. (2024). Understanding High and Low-Performing Students' Time Management Strategies through Assignment Submission Patterns. *Procedia Computer Science*, *246*, 3503-3511.

Patzak, A., Zhang, X., & Vytasek, J. (2025, July). Boosting Productivity and Well-Being Through Time Management: Evidence-Based Strategies for Higher Education and Workforce Development. In *Frontiers in Education* (Vol. 10, p. 1623228). Frontiers.

Pintrich. (2002). The Role of Metacognitive Knowledge in Learning, Teaching, and Assessing. *Theory Into Practice*, *41*(4), 219–225. https://doi.org/10.1207/s15430421tip4104_3

Purohit, M. (2024). The Relationship between Emotional Regulation and Academic Performance. *Open Access Journal of Behavioural Science & Psychology*, *7*(2), 1-12.

Rahman, S., Munam, A. M., Hossain, A., Hossain, A. D., & Bhuiya, R. A. (2023). Socio-economic factors affecting the academic performance of private university students in

Bangladesh: a cross-sectional bivariate and multivariate analysis. *SN social sciences*, *3*(2), 26.

Sabaliauskas, S., Gražulis, D., Žilinskienė, N., & Kaukėnas, T. (2025). Metacognitive strategies improve self-regulation skills in expert sports coaches. *Scientific Reports*, *15*(1), 3434.

Saman Azari, J., Livarjani, S., & Azmoodeh, M. (2024). Comparing the effectiveness of study methods and time management training on academic self-regulation among male and female students. *Journal of Assessment and Research in Applied Counseling*.

Sangaire, E. M. (2012). Self-regulation and cultural orientation on the academic achievement of university students on distance education in Kampala, Uganda.

Serra, M., Metcalfe, J. (2009). Effective implementation of metacognition. In D. Hacker, J. Dunlosky, & A. Graesser (Eds.), *Handbook of metacognition and education* (pp. 278-298). New York, NY: Routledge.

Tao, X., & Hanif, H. (2025). The effects of self-regulated learning strategies on academic procrastination and academic success among college EFL students in China. *Frontiers in Psychology*, *16*, 1562980.

Vadivel, B., Alam, S., Nikpoo, I., & Ajanil, B. (2023). The impact of low socioeconomic background on a child's educational achievements. *Education Research International*, *2023*(1), 6565088.

Wang, J., & Sun, Y. (2023). Time flies, but you're in control: the mediating effect of self-control between time attitude and academic procrastination. *BMC psychology*, *11*(1), 393.

Wang, S., & Luo, B. (2024). Academic achievement prediction in higher education through interpretable modeling. *Plos one*, *19*(9), e0309838.

Weibell, C. J. (2011). *Principles of learning: 7 principles to guide personalized, student-centered learning in the technology-enhanced, blended learning environment.* Retrieved July 4, 2011

Weis, M., Heikamp, T., & Trommsdorff, G. (2013). Gender differences in school achievement: The role of self-regulation. *Frontiers in psychology*, *4*, 442.

Whitebread, D. (2014). The importance of self-regulation for learning from birth. *Characteristics of Effective Early Learning: Helping Young Children Become Learners for Life*, 15-35

Wolters, C. A., & Brady, A. C. (2021). College students' time management: A self-regulated learning perspective. Educational Psychology Review, 33(4), 1319-1351.

Wolters, C. A., Brady, A. C., & Lee, H. J. (2025). Time Management and Achievement Motivation: A Review of What We Know and Directions for Where to Go. *Educational Psychology Review*, *37*(2), 58.

Xu, X., Qiao, L., Cheng, N., Liu, H., & Zhao, W. (2025). Enhancing self-regulated learning and learning experience in generative AI environments: The critical role of metacognitive support. *British Journal of Educational Technology*.

Xu, Z., Zhao, Y., Liew, J., Zhou, X., & Kogut, A. (2023). Synthesizing research evidence on self-regulated learning and academic achievement in online and blended learning environments: A scoping review. *Educational Research Review*, *39*, 100510.

Xu, Z., Zhao, Y., Zhang, B., Liew, J., & Kogut, A. (2023). 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*, *42*(16), 2911-2931.

Yadav, N., Yadav, K., Khare, A., Goel, O., & Goel, P. (2023). Dynamic self-regulation: A key to effective time management. *International Journal of Novel Research and Development*, *8*(11), d854-d876.

Yamada, K., & Toda, K. (2023). Habit formation viewed as structural change in the behavioral network. *Communications biology*, *6*(1), 303.

Zhang, H., Yang, J., & Liu, Z. (2024). Effect of teachers' teaching strategies on students' learning engagement: moderated mediation model. *Frontiers in Psychology*, *15*, 1475048.

Zhang, Y., Dong, S., Fang, W., Chai, X., Mei, J., & Fan, X. (2018). Self-efficacy for self-regulation and fear of failure as mediators between self-esteem and academic procrastination among undergraduates in health professions. *Advances in Health Sciences Education*, *23*(4), 817-830.

Zhao, W., Wang, X., Li, J., Li, Q., & Chen, C. (2022). "Time is My Own Treasure": Parental autonomy support and academic procrastination among Chinese adolescents. *Psychology Research and Behavior Management*, 2773-2782.

Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into practice*, *41*(2), 64-70.