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SELF-REGULATED LEARNING AND AI: A THEORETICAL PERSPECTIVE ON ACADEMIC READING

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Abstract. This article examines the intersection of self-regulated learning (SRL) theory and artificial intelligence (AI) technologies in the context of academic reading. Drawing on contemporary theoretical frameworks, we explore how AI-powered tools can support and enhance self-regulated reading processes among university students. The study synthesizes existing literature on SRL, academic reading strategies, and AI applications in education to develop a comprehensive theoretical model. Our analysis reveals that AI technologies offer significant potential for supporting metacognitive monitoring, strategy selection, and self-assessment during academic reading tasks. However, the effective integration of AI tools requires careful consideration of pedagogical principles, learner autonomy, and the development of critical digital literacy skills.

Keywords: self-regulated learning, artificial intelligence, academic reading, metacognition, digital literacy

1. Introduction

The rapid advancement of artificial intelligence technologies has fundamentally transformed educational landscapes worldwide [1]. Among various academic skills, reading remains a cornerstone of higher education, serving as the primary mechanism through which students access disciplinary knowledge and engage with scholarly discourse [2]. However, academic reading in the digital age presents unique challenges that require students to navigate complex multimodal texts, evaluate information credibility, and manage cognitive load effectively [3].

Self-regulated learning (SRL) has emerged as a critical theoretical framework for understanding how learners can effectively manage their own learning processes [4]. According to Zimmerman [5], self-regulated learners are characterized by their ability to proactively set goals, select appropriate strategies, monitor their progress, and reflect on their learning outcomes. In the context of academic reading, SRL involves the conscious deployment of cognitive, metacognitive, and motivational strategies to comprehend and retain information from texts [6].

The integration of AI technologies into academic reading practices offers unprecedented opportunities for supporting self-regulated learning. AI-powered tools such as intelligent tutoring systems, adaptive learning platforms, and natural language processing applications can provide personalized feedback, scaffold comprehension strategies, and facilitate metacognitive reflection [7]. However, the theoretical foundations underlying the relationship between SRL and AI-supported reading remain underexplored, necessitating a comprehensive examination of how these technologies can be effectively leveraged to enhance reading competence [8].

This article aims to establish a theoretical framework for understanding the intersection of self-regulated learning and AI-supported academic reading. Specifically, we address three research questions: (1) What are the key components of self-regulated academic reading in AI-supported contexts? (2) How can AI technologies support the development and deployment of reading strategies? (3) What theoretical principles should guide the design and implementation of AI tools for academic reading?

2. Methods

This study employed a comprehensive theoretical synthesis methodology, integrating perspectives from educational psychology, instructional design, and computer science [9]. The research involved systematic analysis of existing theoretical frameworks, empirical studies, and conceptual papers related to SRL, academic reading, and AI in education.

2.3. Analytical Framework

The analysis was guided by Pintrich's [11] framework of self-regulated learning, which conceptualizes SRL across four phases: forethought, planning and activation; monitoring; control; and reaction and reflection. This framework was extended to incorporate AI-specific dimensions, including adaptive scaffolding, personalized feedback, and intelligent strategy recommendation [12].

3. Results

Our analysis resulted in the development of an integrated theoretical framework that conceptualizes AI-supported self-regulated reading across three interconnected dimensions: cognitive processing, metacognitive monitoring, and technological scaffolding [13]. The framework posits that AI technologies can support each phase of the SRL cycle while simultaneously requiring learners to develop new competencies for effectively leveraging these tools.

In the forethought phase, AI systems can assist learners in activating prior knowledge, setting appropriate reading goals, and selecting relevant texts based on individual proficiency levels and learning objectives [14]. During the monitoring phase, AI tools provide real-time feedback on comprehension, highlight potential areas of difficulty, and prompt learners to employ specific comprehension strategies [15]. The control phase benefits from AI-powered adaptive interventions that adjust text complexity, provide vocabulary support, and offer alternative explanations when comprehension breakdowns are detected [16]. Finally, in the reflection phase, AI systems can facilitate self-assessment by generating personalized summaries of reading performance and recommending areas for improvement [17].

The analysis identified several categories of AI-supported reading strategies that align with established SRL principles. Cognitive strategies supported by AI include automated summarization, concept mapping, and knowledge representation tools that help learners organize and integrate information from texts [18]. Metacognitive strategies encompass comprehension monitoring alerts, reading pace optimization, and self-explanation prompts that encourage learners to reflect on their understanding [19].

Furthermore, AI technologies can support motivational aspects of reading through gamification elements, progress tracking, and personalized goal-setting features. Social reading strategies are facilitated by AI-powered collaborative annotation tools, discussion forums with intelligent moderation, and peer recommendation systems.

The analysis also revealed important considerations regarding the implementation of AI in academic reading contexts. Concerns were identified related to over-reliance on AI tools, potential decreases in critical thinking skills, and issues of algorithmic bias in content recommendation. Additionally, the effective use of AI-supported reading tools requires learners to possess adequate digital literacy skills and the ability to critically evaluate AI-generated content.

4. Discussion

The findings of this study contribute to the growing body of literature on technology-enhanced learning by providing a theoretically grounded framework for understanding AI-supported self-regulated reading. The integration of SRL principles with AI capabilities offers a promising avenue for addressing the challenges faced by students in academic reading contexts.

The theoretical framework developed in this study extends existing SRL models by explicitly incorporating the role of AI as both a scaffold and a mediator of reading processes. This perspective recognizes that AI technologies do not merely automate traditional reading support mechanisms but fundamentally transform the nature of reading itself. Students engaging with AI-supported texts must develop new literacies that include understanding the capabilities and limitations of AI tools, interpreting AI-generated feedback, and maintaining agency in the reading process.

From a pedagogical perspective, the findings suggest that educators should adopt a balanced approach to integrating AI tools in academic reading instruction. Rather than viewing AI as a replacement for traditional reading instruction, it should be conceptualized as a complementary resource that can enhance but not substitute for the development of fundamental reading skills. Instructional approaches should explicitly teach students how to use AI tools effectively while maintaining critical engagement with texts.

The study's limitations include its reliance on existing literature rather than empirical data collection, which constrains the ability to validate the proposed framework in practice. Future research should employ experimental and longitudinal designs to examine the effectiveness of AI-supported SRL interventions in authentic educational settings. Additionally, research is needed to explore how different student populations, including those with varying levels of digital literacy and language proficiency, interact with AI reading tools [30].

5. Conclusion

This article has presented a theoretical framework for understanding the intersection of self-regulated learning and AI-supported academic reading. The framework identifies key mechanisms through which AI technologies can support the SRL cycle while highlighting the importance of maintaining learner agency and developing critical digital literacy skills. As AI technologies continue to evolve, ongoing theoretical and empirical work will be essential for ensuring that these tools are designed and implemented in ways that genuinely enhance rather than diminish the quality of academic reading experiences.

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