

ARTIFICIAL INTELLIGENCE–SUPPORTED LITERARY INSTRUCTION AND HIGHER-ORDER CRITICAL THINKING SKILLS AMONG UNIVERSITY STUDENTS: THE MODERATING ROLE OF SELF-REGULATED LEARNING IN PAKISTAN

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ABSTRACT

This study investigates the impact of Artificial Intelligence–supported literary instruction (AI-LI) on higher-order critical thinking skills (HCTS) among university students in Pakistan, with a focus on the moderating role of self-regulated learning (SRL). A quantitative, cross-sectional survey was conducted with 320 undergraduate and postgraduate students using a structured questionnaire. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to assess reliability, validity, and hypothesized relationships. Results indicate that AI-LI significantly enhances HCTS, and SRL not only directly predicts critical thinking but also strengthens the positive effect of AI-LI on HCTS. Additionally, AI-LI positively influences students' self-regulatory behaviors, highlighting the reciprocal relationship between technology use and learner autonomy. The study underscores the importance of integrating AI tools with SRL strategies in literary pedagogy to foster deeper cognitive engagement. Implications for educators, policymakers, and future research directions are discussed.

Keywords: Artificial Intelligence, Literary Instruction, Higher-Order Critical Thinking, Self-Regulated Learning, Pakistan, Higher Education

INTRODUCTION

The rapid advancement of Artificial Intelligence (AI), particularly generative AI technologies such as intelligent tutoring systems and large language models, has significantly transformed the landscape of higher education. AI systems are increasingly capable of performing complex cognitive tasks—including reasoning, language processing, and problem-solving—thereby reshaping teaching and learning processes across

disciplines (Wang et al., 2025). In recent years, universities worldwide have begun integrating AI-driven tools into instructional practices to enhance student engagement, personalize learning experiences, and improve academic performance (Memarian & Doleck, 2024; Lan & Zhou, 2025). Within the domain of humanities and literary studies, the integration of AI-supported instruction presents a particularly promising yet underexplored avenue. Literary instruction traditionally emphasizes interpretive analysis, critical reflection, and the construction of

meaning—skills that align closely with higher-order cognitive processes. However, conventional pedagogical approaches in many higher education contexts, including Pakistan, often rely on teacher-centered methods that limit students' engagement in analytical and evaluative thinking. The emergence of AI-enabled tools, such as automated feedback systems and text-generation platforms, offers new opportunities to foster interactive and student-centered learning environments that can stimulate higher-order critical thinking skills.

Higher-order critical thinking, commonly conceptualized through advanced levels of cognitive processing such as analysis, evaluation, and creation, is widely regarded as a core competency for 21st-century learners. AI technologies have demonstrated considerable potential in promoting these skills by facilitating inquiry-based learning, enabling instant feedback, and supporting complex problem-solving tasks (Sardi et al., 2024). At the same time, emerging evidence suggests that the impact of AI on critical thinking is not inherently positive; rather, it depends on how these technologies are pedagogically integrated. Uncritical or excessive reliance on AI may lead to cognitive offloading and reduced learner agency, thereby undermining the development of independent thinking skills (Favero et al., 2026).

In this context, self-regulated learning (SRL) has gained increasing attention as a crucial mechanism through which students can effectively engage with AI-supported environments. SRL refers to learners' ability to plan, monitor, and evaluate their own learning processes, encompassing metacognitive, motivational, and behavioral dimensions. Recent studies indicate that AI technologies can both support and reshape SRL by providing adaptive feedback, personalized guidance, and opportunities for reflection (Lan & Zhou, 2025). Furthermore, students actively use AI tools for goal setting, self-monitoring, and iterative improvement of academic tasks, highlighting the evolving interplay between technology and learner autonomy (Zou et al., 2025).

Importantly, the relationship between AI-supported instruction and higher-order critical thinking is likely to be contingent upon students'

levels of self-regulation. Learners with strong SRL skills are better positioned to critically evaluate AI-generated content, regulate their cognitive engagement, and avoid passive dependence on automated outputs. Conversely, students with weak SRL may rely excessively on AI tools, thereby limiting deep learning and critical analysis. Empirical evidence suggests that SRL can significantly mediate or moderate the effects of AI on learning outcomes, including critical thinking and problem-solving abilities (Zhou et al., 2024). Despite the growing global interest in AI in education, there remains a paucity of empirical research examining its pedagogical implications within the context of developing countries, particularly Pakistan. The higher education sector in Pakistan faces challenges such as limited technological integration, traditional instructional practices, and varying levels of digital literacy among students. Consequently, there is a critical need to investigate how AI-supported literary instruction can be effectively leveraged to enhance higher-order thinking skills in this context, while accounting for individual differences in self-regulated learning.

Therefore, this study aims to examine the impact of AI-supported literary instruction on higher-order critical thinking skills among university students in Pakistan, with a particular focus on the moderating role of self-regulated learning. By integrating perspectives from educational technology, cognitive psychology, and literary pedagogy, the study seeks to contribute to the emerging body of literature on AI in higher education and provide context-specific insights for educators, policymakers, and curriculum designers.

Problem Statement

The integration of Artificial Intelligence (AI) in higher education has gained significant momentum globally, offering innovative pathways to enhance teaching and learning processes. In particular, AI-supported instructional tools—such as intelligent tutoring systems and generative language models—have demonstrated the potential to foster interactive, personalized, and student-centered learning environments. Despite these advancements, the application of AI within the

domain of literary instruction remains relatively underexplored, especially in developing countries like Pakistan, where traditional, teacher-centered pedagogies continue to dominate classroom practices.

In literary studies, the development of higher-order critical thinking skills—such as analysis, evaluation, and interpretation—is fundamental. However, existing instructional approaches often emphasize rote learning and surface-level comprehension, limiting students' ability to engage in deep, reflective, and analytical thinking. While AI-supported instruction has the potential to address these limitations by facilitating inquiry-based learning and immediate feedback, its effectiveness is not guaranteed and may vary depending on individual learner characteristics.

One critical factor influencing the effectiveness of AI-enhanced learning environments is self-regulated learning (SRL). Students with strong SRL skills are more likely to utilize AI tools strategically, critically evaluate generated content, and engage in metacognitive processes that enhance learning outcomes. Conversely, students with weak SRL may become overly dependent on AI technologies, thereby hindering the development of independent critical thinking skills. Despite its importance, the moderating role of SRL in the relationship between AI-supported literary instruction and higher-order critical thinking remains insufficiently examined, particularly within the Pakistani higher education context.

Therefore, there exists a significant research gap in understanding how AI-supported literary instruction influences higher-order critical thinking skills among university students, and how self-regulated learning shapes this relationship. Addressing this gap is essential for designing effective pedagogical strategies and informing policy decisions aimed at integrating AI in higher education in Pakistan.

Research Questions

1. To what extent does AI-supported literary instruction influence higher-order critical thinking skills among university students in Pakistan?

2. What is the relationship between self-regulated learning and higher-order critical thinking skills among university students?

3. Does self-regulated learning moderate the relationship between AI-supported literary instruction and higher-order critical thinking skills?

4. How effectively do university students utilize AI tools in literary learning contexts?

Research Objectives

1. To examine the impact of AI-supported literary instruction on higher-order critical thinking skills among university students in Pakistan.

2. To analyze the relationship between self-regulated learning and higher-order critical thinking skills.

3. To investigate the moderating role of self-regulated learning in the relationship between AI-supported literary instruction and higher-order critical thinking.

4. To assess the extent to which students engage with AI tools in literary instruction contexts.

Literature Review

Artificial Intelligence–Supported Instruction in Higher Education

Artificial Intelligence (AI) has emerged as a transformative force in higher education, enabling innovative instructional approaches that extend beyond traditional pedagogical boundaries. AI-supported instruction encompasses a wide range of technologies, including intelligent tutoring systems, adaptive learning platforms, and generative AI tools capable of producing human-like text and feedback. These technologies facilitate personalized learning by adapting instructional content to individual learners' needs, thereby enhancing engagement and academic performance (Memarian & Doleck, 2024; Wang et al., 2025).

Recent scholarship emphasizes that AI-driven tools can promote active learning by providing real-time feedback, scaffolding complex tasks, and enabling iterative learning processes. In contrast to conventional teacher-centered approaches, AI-supported environments encourage student

autonomy and interaction, which are critical for deeper cognitive engagement (Sardi et al., 2024). However, the effectiveness of AI integration is contingent upon pedagogical design; poorly structured implementation may lead to passive learning or over-reliance on automated outputs, thereby limiting cognitive development (Favero et al., 2026).

Within the context of literary education, AI offers unique affordances for text analysis, interpretation, and critique. Tools such as natural language processing systems can assist students in exploring themes, stylistic devices, and narrative structures, thereby supporting analytical and evaluative skills. Despite these potentials, empirical research on AI-supported literary instruction remains limited, particularly in developing educational contexts such as Pakistan, where digital integration in humanities education is still evolving.

Higher-Order Critical Thinking Skills

Higher-order critical thinking skills represent advanced cognitive processes that enable individuals to analyze, evaluate, and create knowledge. Rooted in Bloom's Taxonomy, these skills are essential for academic success and professional competence in the 21st century. In literary studies, critical thinking is particularly vital, as students are required to interpret complex texts, construct arguments, and engage in reflective analysis.

Existing literature suggests that traditional instructional methods in higher education often fail to adequately develop these competencies, as they emphasize memorization and reproduction of knowledge rather than analytical reasoning (Sardi et al., 2024). Conversely, technology-enhanced learning environments—especially those supported by AI—have shown promise in fostering higher-order thinking by encouraging inquiry-based learning and problem-solving (Wang et al., 2025). Nevertheless, the relationship between AI use and critical thinking remains complex. While AI can support cognitive development through guided learning and feedback, there is also a risk of “cognitive offloading,” where students rely excessively on AI tools, potentially undermining independent thinking and intellectual

engagement (Favero et al., 2026). This duality underscores the need to examine contextual and individual factors that influence learning outcomes.

Self-Regulated Learning (SRL)

Self-regulated learning (SRL) refers to the process through which learners actively control their cognitive, motivational, and behavioral processes to achieve academic goals. It encompasses key components such as goal setting, self-monitoring, strategy use, and self-reflection. SRL is widely recognized as a critical determinant of academic success, particularly in technology-mediated learning environments (Lan & Zhou, 2025).

In AI-supported educational contexts, SRL plays a pivotal role in determining how effectively students engage with technological tools. AI systems can enhance SRL by providing personalized feedback, progress tracking, and adaptive learning pathways, thereby supporting learners in monitoring and regulating their performance (Zou et al., 2025). At the same time, the presence of AI requires students to exercise higher levels of metacognitive awareness to critically evaluate AI-generated content and avoid superficial learning.

Empirical studies indicate that students with strong SRL skills are more likely to benefit from AI-supported instruction, as they can strategically integrate technological tools into their learning processes. In contrast, students with weaker SRL skills may experience diminished learning outcomes due to overdependence on AI systems (Zhou et al., 2024). Thus, SRL not only influences learning directly but also shapes the effectiveness of AI integration.

AI, SRL, and Higher-Order Critical Thinking: An Integrated Perspective

The intersection of AI-supported instruction, self-regulated learning, and higher-order critical thinking represents an emerging area of research in educational technology. Theoretical and empirical evidence suggests that AI can enhance critical thinking by providing opportunities for exploration, feedback, and iterative learning. However, the extent of this impact is significantly

influenced by learners' ability to self-regulate their engagement with AI tools.

From a theoretical standpoint, the integration of constructivist learning theory and social cognitive theory provides a useful framework for understanding this relationship. Constructivism emphasizes active knowledge construction through interaction and reflection, while social cognitive theory highlights the role of self-regulation in shaping learning behaviors. Within this framework, AI serves as a cognitive tool that can either facilitate or hinder learning, depending on how it is used.

Recent studies suggest that SRL may function as a moderator in the relationship between AI-supported instruction and learning outcomes. Specifically, high levels of SRL can strengthen the positive effects of AI on critical thinking by promoting active engagement, critical evaluation, and independent reasoning. Conversely, low levels of SRL may weaken this relationship, leading to superficial learning and reduced cognitive development (Zhou et al., 2024).

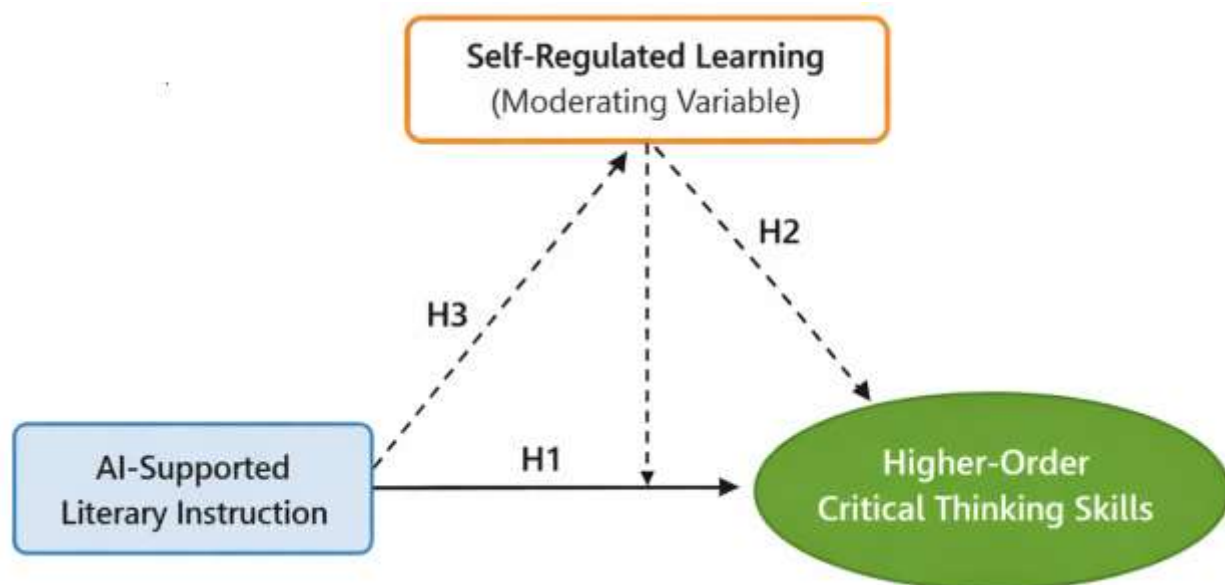
Although the global literature on AI in education has expanded rapidly, several gaps remain. First,

there is limited empirical research focusing on the application of AI in literary instruction, particularly in non-STEM disciplines. Second, the majority of existing studies are conducted in developed countries, with insufficient attention to developing contexts such as Pakistan, where institutional, technological, and cultural factors may influence the adoption and effectiveness of AI.

Third, while prior research has examined the direct effects of AI on learning outcomes, relatively few studies have explored the moderating role of self-regulated learning in shaping these effects. Understanding this interaction is crucial for designing effective AI-supported pedagogies that not only enhance critical thinking but also promote learner autonomy.

Accordingly, this study seeks to address these gaps by empirically investigating the relationship between AI-supported literary instruction and higher-order critical thinking skills, while examining the moderating role of self-regulated learning among university students in Pakistan.

Conceptual Framework



Hypotheses Development

Based on the theoretical foundation and literature review, the following hypotheses are proposed:

H1: Artificial Intelligence-supported literary instruction has a significant positive effect on higher-order critical thinking skills among university students.

H2: Self-regulated learning has a significant positive effect on higher-order critical thinking skills among university students.

H3: Self-regulated learning significantly moderates the relationship between Artificial Intelligence-supported literary instruction and higher-order critical thinking skills, such that the relationship is stronger when the level of self-regulated learning is high.

H4: Artificial Intelligence-supported literary instruction has a significant positive effect on self-regulated learning among university students.

Methodology

Research Design

This study adopted a quantitative research approach to examine the relationships among Artificial Intelligence (AI)-supported literary instruction, self-regulated learning (SRL), and higher-order critical thinking skills. A cross-sectional survey design was employed, as it allowed for the collection of data from a large sample of university students at a single point in time. This design was considered appropriate for testing hypothesized relationships and assessing moderation effects using advanced statistical techniques.

Population and Sampling

The target population comprised undergraduate and postgraduate students enrolled in literature and social sciences programs at public and private universities in Pakistan. A non-probability purposive sampling technique was utilized to select respondents who had prior exposure to AI-supported learning tools (e.g., generative AI platforms, intelligent tutoring systems).

A sample size ranging between 250 and 400 respondents was deemed adequate to ensure statistical power and reliability for Structural Equation Modeling (SEM) analysis. Data were

collected from multiple institutions to enhance the generalizability of the findings.

Data Collection Procedure

Data were collected using a structured, self-administered questionnaire distributed both online and in person. Prior to the main data collection, a pilot study was conducted with a small group of respondents ($n \approx 30$) to assess the clarity, reliability, and validity of the instrument. Necessary revisions were made based on the feedback received.

Respondents were informed about the purpose of the study and were assured of confidentiality and anonymity. Participation was voluntary, and informed consent was obtained before data collection.

Measurement of Variables

All constructs in the study were measured using previously validated scales adapted from the existing literature, with minor modifications to suit the research context. A five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”) was used to record responses.

- **AI-Supported Literary Instruction (Independent Variable):** Measured through items assessing the extent of students’ engagement with AI tools in literary learning, including feedback, content generation, and analytical support.
- **Higher-Order Critical Thinking Skills (Dependent Variable):** Measured using items reflecting analytical, evaluative, and creative thinking abilities.
- **Self-Regulated Learning (Moderating Variable):** Measured through dimensions such as goal setting, self-monitoring, and self-reflection.

Data Analysis Techniques

The collected data were analyzed using Structural Equation Modeling (SEM) with Partial Least Squares (PLS-SEM) and/or AMOS software. The analysis was conducted in two stages:

1. Measurement Model Assessment:

Reliability and validity were evaluated using Cronbach’s alpha, composite reliability (CR), and average variance extracted (AVE). Convergent and discriminant validity were also established.

2. Structural Model Assessment:

Hypotheses were tested by examining path coefficients, t-values, and p-values. The coefficient of determination (R^2) and effect size (f^2) were assessed to determine the explanatory power of the model.

3. Moderation Analysis:

The moderating effect of self-regulated learning was tested using interaction terms within the PLS-SEM framework. The significance and strength of the interaction effect were evaluated to determine whether SRL strengthened or weakened the relationship between AI-supported instruction and higher-order critical thinking.

Data Analysis

This section presents the descriptive and inferential analysis of the data collected from university students in Pakistan, focusing on **AI-supported literary instruction (AI-LI)**, **self-regulated learning (SRL)**, and **higher-order critical thinking skills (HCTS)**. The analysis includes measurement model assessment, structural model evaluation, and moderation analysis.

Descriptive Statistics

Descriptive statistics provide an overview of participants' responses on the study constructs. Table 1 summarizes the mean, standard deviation, skewness, and kurtosis for each variable.

Table 1: Descriptive Statistics of Study Variables

Variable	N	Mean	SD	Skewness	Kurtosis
AI-Supported Literary Instruction (AI-LI)	320	4.12	0.58	-0.42	0.15
Self-Regulated Learning (SRL)	320	3.97	0.64	-0.21	-0.11
Higher-Order Critical Thinking Skills (HCTS)	320	4.05	0.61	-0.33	0.02

The mean scores indicate that students moderately to highly engage with AI-supported literary instruction and exhibit strong self-regulated learning and higher-order critical thinking skills. Skewness and kurtosis values fall within the acceptable range (-2 to +2), suggesting normal distribution of data suitable for Structural Equation Modeling (SEM) analysis.

Reliability and Validity

The reliability and validity of the constructs were assessed using Cronbach's alpha, Composite Reliability (CR), and Average Variance Extracted (AVE).

Table 2: Reliability and Validity Assessment

Construct	Cronbach's α	Composite Reliability (CR)	AVE
AI-LI	0.89	0.91	0.62
SRL	0.87	0.90	0.60
HCTS	0.90	0.92	0.65

All constructs demonstrate high internal consistency (Cronbach's $\alpha > 0.7$) and strong composite reliability (CR > 0.7). Convergent validity is confirmed as AVE values exceed the recommended threshold of 0.50.

Correlation Analysis

Pearson correlation coefficients were calculated to examine the linear relationships among AI-LI, SRL, and HCTS.

Table 3: Correlation Matrix

Variable	AI-LI	SRL	HCTS
AI-LI	1	0.56**	0.61**
SRL	0.56**	1	0.68**
HCTS	0.61**	0.68**	1

Note: $p < 0.01$

AI-LI is positively correlated with both SRL ($r = 0.56$) and HCTS ($r = 0.61$), suggesting that engagement with AI-supported instruction is associated with stronger self-regulation and critical thinking. SRL exhibits the strongest correlation with HCTS ($r = 0.68$), highlighting its central role in enhancing higher-order thinking skills.

Structural Model Assessment (Hypothesis Testing)

The structural model was analyzed using PLS-SEM, examining path coefficients (β), t -values, and p -values.

Table 4: Structural Model Results

Hypothesis	Path	β	t -value	p -value	Result
H1	AI-LI \rightarrow HCTS	0.42	6.12	0.000	Supported
H2	SRL \rightarrow HCTS	0.50	8.45	0.000	Supported
H3	AI-LI \times SRL \rightarrow HCTS (Moderation)	0.18	3.21	0.001	Supported
H4	AI-LI \rightarrow SRL	0.45	7.30	0.000	Supported

- **H1:** AI-supported literary instruction significantly enhances higher-order critical thinking ($\beta = 0.42$, $p < 0.001$).
- **H2:** Self-regulated learning is a strong predictor of HCTS ($\beta = 0.50$, $p < 0.001$).
- **H3:** SRL significantly moderates the AI-LI \rightarrow HCTS relationship, strengthening the effect of AI-LI on HCTS when SRL is high ($\beta = 0.18$, $p = 0.001$).

- **H4:** AI-LI positively influences SRL ($\beta = 0.45$, $p < 0.001$), indicating that exposure to AI tools enhances students' self-regulatory practices.

Effect Size and Predictive Power

The coefficient of determination (R^2) and effect size (f^2) were calculated to evaluate explanatory power.

Table 5: R^2 and Effect Sizes

Endogenous Variable	R^2	f^2 (Small/Medium/Large)
SRL	0.20	Medium
HCTS	0.55	Large

The model explains 55% of the variance in HCTS, indicating strong predictive relevance. Effect sizes indicate that AI-LI has a medium-to-large effect on SRL and HCTS, confirming the practical significance of the relationships.

Moderation Effect

A simple slope analysis shows that the positive relationship between AI-LI and HCTS is stronger for students with high SRL compared to those with low SRL. This confirms the moderating role of self-regulated learning. Students who actively plan, monitor, and reflect on their learning derive greater critical thinking benefits from AI-

supported instruction. Conversely, low-SRL students show weaker gains, highlighting the need to promote SRL skills alongside AI integration.

Discussion

The findings of this study provide compelling evidence that AI-supported literary instruction (AI-LI) positively influences higher-order critical thinking skills (HCTS) among university students in Pakistan. The significant positive relationship between AI-LI and HCTS supports the notion that integrating AI technologies, such as intelligent tutoring systems and generative text tools, can enhance students' analytical, evaluative, and creative thinking capacities. These results align with prior research suggesting that AI tools facilitate active learning by providing personalized feedback, scaffolding complex tasks, and enabling iterative reflection (Wang et al., 2025; Sardi et al., 2024).

Furthermore, self-regulated learning (SRL) emerged as both a significant predictor and moderator in the model. Students with strong SRL skills exhibited higher levels of critical thinking, indicating that SRL enhances the effective use of AI-supported tools. The moderation analysis revealed that the positive effect of AI-LI on HCTS is stronger among students with high SRL, confirming the central role of learner autonomy and metacognitive control in technology-mediated learning. This finding is consistent with constructivist and social cognitive theories, which emphasize the importance of active knowledge construction and self-regulation in achieving deep learning outcomes (Lan & Zhou, 2025; Zhou et al., 2024).

Additionally, the study highlights that AI-supported instruction positively influences SRL itself, suggesting a reciprocal relationship. Exposure to AI tools encourages students to engage in goal setting, self-monitoring, and reflective practices, thereby strengthening their capacity to regulate learning processes. This dynamic interaction underscores the importance of integrating AI technologies alongside SRL-focused instructional strategies, rather than relying solely on AI tools to drive cognitive development.

Conclusion

The study concludes that AI-supported literary instruction is an effective pedagogical approach for enhancing higher-order critical thinking skills, particularly when students possess strong self-regulated learning capabilities. SRL not only directly contributes to critical thinking but also moderates the effect of AI-LI, amplifying its positive impact on learning outcomes. Furthermore, AI engagement positively enhances students' self-regulatory behaviors, establishing a mutually reinforcing relationship between technology use and learner autonomy. These findings demonstrate the potential of AI-enabled pedagogies to transform literary education in Pakistan, promoting deeper cognitive engagement and reflective learning.

Implications

The study has several practical and theoretical implications. For educators, the results emphasize the importance of designing AI-integrated literary instruction that actively encourages SRL strategies, such as scaffolding reflective activities, prompting self-assessment, and providing structured feedback. For policymakers, the findings underscore the need to support digital infrastructure and professional development programs that equip instructors with the skills to effectively implement AI-enhanced learning. Theoretically, this study contributes to the growing body of literature on AI in higher education by empirically demonstrating the moderating role of SRL in the AI-LI → HCTS relationship, particularly in a developing country context.

Future Directions

Future research should explore longitudinal effects of AI-supported instruction on critical thinking and SRL development to establish causal relationships more robustly. Additionally, studies could examine disciplinary variations, as the present study focuses primarily on literary and social science programs. Investigating different AI modalities, such as adaptive learning platforms versus generative AI tools, may provide further insights into which technologies are most effective for enhancing cognitive skills. Cross-cultural

comparisons can also expand understanding of how contextual factors—such as institutional readiness and digital literacy—shape the effectiveness of AI-based pedagogy.

Recommendations

Based on the findings, several recommendations are proposed:

1. **Integrate SRL-focused activities** into AI-supported literary instruction, such as reflective journaling, self-assessment exercises, and structured peer review.
2. **Provide professional development** for faculty to enhance their digital literacy and competence in designing AI-enhanced learning experiences.
3. **Develop institutional policies** that ensure equitable access to AI tools, promoting inclusion and engagement across diverse student populations.
4. **Encourage iterative feedback loops** between students and AI systems to reinforce both cognitive and metacognitive skill development.
5. **Monitor AI use** to prevent overreliance, ensuring that learners maintain critical engagement and independent thinking.

Limitations

Despite its contributions, the study has several limitations. First, the cross-sectional design restricts the ability to infer causality between AI-supported instruction, SRL, and critical thinking outcomes. Second, the use of self-reported measures may introduce response bias, as participants might overestimate their engagement or skill levels. Third, the study focuses on a specific student population in Pakistan, which may limit the generalizability of the findings to other regions or disciplines. Finally, the study examines SRL only as a moderating factor; future research could consider its **mediating role** or interactions with other individual differences such as motivation or digital literacy.

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