

The Effectiveness of Using AI-Assisted Blended Learning to Improve the Critical Reading Skills of Vietnamese EFL Students and The Role of SFL In Interpreting the Self-Regulated Learning and Meaning-Making Processes

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ABSTRACT:

The study aimed to investigate the effectiveness of AI-supported blended learning for improving the critical reading skills of Vietnamese EFL learners. The methods used were an explanatory sequential mixed methods design. A structured questionnaire was used to collect quantitative data from 150 undergraduate students of an AI-assisted blended English reading course. Descriptive statistics, reliability analysis, Pearson correlation and multiple regression analyses were performed. Semi-structured interviews with 12 purposively selected students were used to collect qualitative data, which were subsequently analysed using reflexive thematic analysis. The findings indicated that AI-assisted blended learning, Self-Regulated Learning (SRL) and Systemic Functional Linguistics (SFL) meaning-making awareness were strongly positively correlated with critical reading skills. The critical reading outcomes were significantly predicted by AI-assisted blended learning and SRL, with the model explaining 61.8% of the variance. SFL-based analysis was also found to have raised students' awareness of ideational, interpersonal and textual meanings. AI-supported blended learning is shown to be effective in improving CR skills in conjunction with SRL strategies and analytical reading approaches. The role of AI is to augment, not supplant, student cognition and judgment. Education institutions should make the use of AI literacy, SRL training, and instruction of SFL-based critical reading in the blended learning environment a component of the educational process. Longitudinal and experimental designs should be used for future studies to investigate long-term effects.

Keywords: AI-assisted blended learning, Critical reading skills, Self-regulated learning (SRL), Systemic Functional Linguistics (SFL), Vietnamese EFL learners.

1. Introduction

Critical reading in English was one of the main academic needs of the Vietnamese EFL learners, as they needed to read university articles and identify the claims, test the evidence, compare views and question the author's stance in the articles (Le & Nguyen, 2024). However, the digital revolution has transformed English language learning as students are learning via classroom teaching, online platforms, mobile access and intelligent feedback systems. According to DataReportal (2025), Vietnam had 78.8% of internet users at the beginning of 2025, which is equivalent to 79.8 million users. Since blended learning has received considerable attention in English teaching in Vietnam after the COVID-19 period (Do et al., 2025). This indicated that the use of AI for BL was timely in EFL in Vietnam.

However, Le et al. (2024) found that Vietnamese English majors applied the critical reading strategies (CR) but had problems with vocabulary, limited knowledge of strategies, weak practice of the strategies, and low confidence. Le and Nguyen (2024) observed that students from the undergraduate level of education in Vietnam struggled to perform on the PISA-based reading tasks involving texts with unfamiliar topics, complex English, and open-ended questions. This indicated that the concept of critical reading cannot be reduced to comprehension. Language knowledge, judgement, and independent learning were all needed for critical reading. The support is crucial in students' transition from comprehension of information to an evaluation of the quality of academic arguments in English. AI-assisted blended learning was applicable to this problem due to the teacher guidance, the online access, and the tool-based feedback. Edmett et al. (2023) argued that the application of AI in English language teaching was found in reading, writing, speaking, pedagogy, assessment, and learner support. Alarifi et al. (2025) discovered that 170 EFL undergraduate students had favorable attitudes towards AI for reading comprehension. These scores were mainly reflective of learner perceptions, rather than evidence of deeper critical reading. The study of AI thus needs to be done on both learning outcomes and learning processes.

Additionally, AI reading support also required scrutiny, as the same tools could be used to facilitate or hinder critical thinking (Qusef et al., 2025). Darwin et al. (2024) discovered that AI assisted students with questioning ideas, assessing information and creating alternate perspectives. It also raised the issues of over-compliance, lack of personalisation and limited information exposure. Shafiee Rad (2025) suggested that if an AI reading intervention would enhance engagement and self-regulated learning, it would provide support for L2 comprehension. In contrast, Cislowska and Peña Acuña (2024) noted that with the use of a chatbot in L2 learning, interaction might be facilitated and the learners' attitude might be improved; however, these educational aspects require designing and evaluating the chatbot. These studies indicated that AI is a system that can provide guided support, not automatic solutions.

The significance of self-regulated learning in this study was the fact that AI-assisted blended learning provided more control for students in terms of the time, pace, feedback and strategy use. According to Theobald (2021), self-regulated learning had a positive impact on performance, strategies, and motivation. According to Yu (2023), autonomy was needed in online second language learning as the learner was required to take care of goals, resources and progress beyond the classroom. Given these findings, this study sought to investigate the planning, monitoring and reflecting processes of Vietnamese EFL learners in using AI tools to read. Hence, self-regulation was considered a major guide to the development of critical reading.

This study is guided by the Systemic Functional Linguistics (SFL) framework, which provides a clear approach to analysing meaning-making in critical reading. Gabbianelli (2023) identified three of four language textbooks that provided limited support for the understanding of how language choices produced meanings in context. Herman et al. (2023) demonstrated that SFL metafunctions could account for the representations of experience, the development of stance and organisation of information by learners. Nevertheless, Cheng (2024) discovered that SFL has been applied to discourse studies, multilingual studies, and language education. For

reading, ideational meaning enabled students to consider what was represented, interpersonal meaning enabled them to consider their stance and judgements, and textual meaning enabled them to consider their organisation and flow.

The main research question guiding the present study was how effective AI-assisted blended learning was in enhancing the critical reading skills of EFL learners in Vietnam, and how SFL would explain the self-regulated learning and meaning-making process of EFL learners in Vietnam. The study aims to explore the effectiveness of using AI-assisted blended learning to improve the critical reading skills of Vietnamese EFL students and the role of SFL in interpreting the self-regulated learning and meaning-making processes. The objective is to investigate the effect of AI-enhanced blended learning on the critical reading skills of Vietnamese EFL learners. It explores how students' self-regulated learning strategies develop in an AI-based blended learning model. It also investigates the nature of meaning construction in students' critical reading learning by systemic functional linguistics (ideational, interpersonal and textual meanings). Ultimately, it investigates the relationship between critical reading and SRL (self-regulated learning) in the context of AI-assisted blended learning.

2. Methodology

2.1 Research design

The study used an explanatory sequential mixed-methods approach, where quantitative data were gathered and analysed first, followed by qualitative data to explain and elaborate on the quantitative results. Toyon (2021) claimed that the explanatory sequential mixed-methods design facilitated the use of quantitative results to be explained and enriched by a qualitative exploration. Therefore, it allowed the researcher to detect the statistical relationships between critical reading skills, self-regulated learning (SRL), AI-assisted blended learning, and systemic functional linguistics (SFL) meaning-making awareness. The quantitative and qualitative results were integrated to get a more holistic

picture of how the use of AI-aided blended learning affects critical reading development.

2.2 Research Context and Intervention

The research was conducted at a public university in Vietnam, from which the subjects were undergraduate students majoring in Chinese, Korean and Japanese, with English as a compulsory foreign language of the university. Participants took part in an English reading course integrating AI-based blended learning, blending in-person with online learning activities with the help of AI technologies. The intervention comprised critical reading instruction, analysis of texts using SFL, guided discussion and AI-supported reading task and feedback.

2.3 Participants and sampling

In the quantitative phase, a total of about 150 undergraduate students were recruited using convenience and purposive sampling techniques. The intervention had been provided in a comparable way to all participants, as they all completed the AI-supported blended learning reading course. The sample size was found to be satisfactory for factor analysis and correlational study, as it met the criterion of respondent-to-item ratio for the questionnaire (Memon et al., 2020). During the qualitative phase, 12 subjects were selected by maximum variation purposive sampling. In the case of a focused population and narrow research goal, many qualitative studies were found to be saturated after 9–17 interviews were completed, as suggested by Hennink and Kaiser (2022). The students were selected based on their critical reading skills, previous internship experience at AI, and language major to ensure thematic saturation and diverse perspectives.

2.4 Instrumentation

The questionnaire and semi-structured interviews were used to gather data. The questionnaire included demographic items and five Likert-scale items regarding critical reading skills, SRL strategies, perceptions of AI-assisted learning, blended learning interaction, and SFL meaning-making awareness. Jebb et al. (2021) pointed out that likelihood scales must be based on well-defined constructs and well-formulated items. Thus, items were adapted from validated

instruments, while the SFL section was developed based on key principles of Systemic Functional Linguistics (SFL) theory, particularly meaning-making and language awareness constructs. This clearer theoretical grounding strengthens the alignment between the questionnaire items and the study's conceptual framework. Throughout the instrument, a five-point Likert scale was used, ranging from strongly disagree to agree strongly. A pilot study with 30 students was performed before the main study to assess item clarity, reliability and content validity. An expert review was also undertaken for the newly developed SFL scale. The reliability of the SFL items was evaluated by Cronbach's alpha, and exploratory factor analysis was performed to explore the factor structure of SFL items. The survey data were preliminarily analysed, and then semi-structured interviews were conducted. Four themes were targeted by the interview protocol: perceptions of AI-supported learning, SRL strategies, awareness of meaning-making, and the connection between self-regulation and critical reading ability. Each interview was conducted for about 30–45 minutes, recorded with the consent of the participants using a video camera, and transcribed verbatim for analysis.

2.5 Data Collection Procedure

There were two data collection periods. The online questionnaire was sent out following the intervention. Prior to the data collection, information was presented about the voluntary nature of the participation, confidentiality, and the right to withdraw. After the survey analysis, the participants were selected and invited to the interviews. All data collection was conducted with ethical approval from the appropriate university ethics committee, and participants' anonymity was ensured by using pseudonyms.

2.6 Data analysis

Descriptive statistics, reliability analysis, Pearson correlation and multiple regression analysis were used for quantitative data analysis. Descriptive statistics were used to summarise participant characteristics, as well as construct scores. Pearson correlation was used to investigate relationships between the key variables, and multiple regression was used to investigate the predictive power of the AI-assisted learning perceptions and SRL for critical reading outcomes. The assumptions of normality, linearity, homoscedasticity and multicollinearity were tested prior to interpretation. Reflexive thematic analysis of the six stages suggested by Braun and Clarke (2019) was used to analyse qualitative data. A hybrid deductive–inductive method was used. Initial coding was done using the research objectives, and new themes were generated as the participants shared their experiences (Kiger & Varpio, 2020). Lastly, quantitative and qualitative results were combined at the interpretation stage to highlight areas of convergence, areas of expansion, and areas of divergence, in order to offer a holistic interpretation of the relationship observed at the quantitative phase

3. Results

3.1 Quantitative Findings

3.1.1 Descriptive Statistics and Demographic Profile

Descriptive statistics were computed for all demographic variables and construct subscale means, directly informing the characterisation of the study population and providing the baseline for subsequent inferential analyses.

Table 1 Demographic Frequencies

Variable	Category	n	%
Gender	Male	56	37.3
	Female	84	56.0
	Prefer not to say	10	6.7
	Total	150	100.0
Year of Study	Year 1	34	22.7
	Year 2	38	25.3
	Year 3	35	23.3
	Year 4	43	28.7

Variable	Category	n	%
Major Language	Total	150	100.0
	Chinese	64	42.7
	Korean	50	33.3
	Japanese	36	24.0
English Proficiency	Total	150	100.0
	Elementary	10	6.7
	Intermediate	64	42.7
	Upper-Intermediate	54	36.0
	Advanced	22	14.7
English Reading Frequency	Total	150	100.0
	1–2 times/week	22	14.7
	3–4 times/week	81	54.0
	Daily	47	31.3
Prior AI Experience	Total	150	100.0
	Minimal	22	14.7
	Moderate	83	55.3
	Extensive	45	30.0
Total		150	100.0

The sample ($N = 150$) comprised equal proportions of male and female participants, with the majority enrolled in their fourth year of study (28.7%) and reporting Intermediate English proficiency (42.7%). 31.3% of participants

reported daily engagement with English reading and extensive prior experience with AI tools, indicating a technologically proficient cohort consistent with the Gen Z profile discussed in the literature.

Table 2. Descriptive Statistics for Construct Subscale Means

Construct	N	Mean	SD
AI-Assisted Blended Learning (AIBL)	150	4.296	0.386
Self-Regulated Learning (SRL)	150	4.255	0.378
Critical Reading (CR)	150	4.214	0.360
SFL Meaning-Making Awareness (SFL)	150	4.187	0.351
SRL–CR Relationship	150	4.311	0.392
Age	150	20.90	1.61

All construct means fall between 4.19 and 4.31 on a five-point Likert scale, indicating that participants consistently reported high levels of agreement across all constructs. The narrow standard deviations (range: 0.35–0.39) suggest a relatively homogeneous pattern of positive response, though this must be read in conjunction with the proficiency and AI experience profile of the sample.

3.1.2 Reliability Analysis

Following the pilot-stage validation reported in Section 2.4, Cronbach's alpha was recalculated for the full-sample data for each subscale. As Zakariya (2022) cautions, alpha estimates internal consistency and should not be treated as conclusive evidence of construct validity; results are interpreted accordingly.

Table 3 Internal Consistency Reliability (Cronbach's Alpha) by Subscale

Subscale	No. of Items	Cronbach's α
Self-Regulated Learning (SRL)	14	.897
Critical Reading (CR)	12	.870
AI-Assisted Blended Learning (AIBL)	13	.898
SFL Meaning-Making Awareness (SFL)	11	.851
SRL–CR Relationship	6	.776

Alpha values across all five subscales meet or exceed the .70 threshold conventionally regarded as adequate for research purposes (Nunnally, 1978), with AIBL ($\alpha = .898$) and SRL ($\alpha = .897$) approaching excellent reliability. The lowest coefficient was observed for the SRL–CR Relationship subscale ($\alpha = .776$), which, as noted in Section 2.4, was a newly constructed scale derived from existing theoretical frameworks. These values support the adequacy of the instruments for the inferential analyses that follow. However, Zakariya's (2022) caution regarding the limitations of alpha as a sole

indicator of reliability is duly noted in the interpretation below.

3.1.3 Pearson Correlation Analysis

Pearson correlation analysis was conducted to examine bivariate relationships among AI-assisted blended learning perceptions, SRL, SFL-based meaning-making awareness, and critical reading scores, directly addressing Objective 4. Assumptions of bivariate normality were assessed and met prior to analysis.

Table 4 Pearson Correlation Matrix for Key Constructs (N = 150)

Variable	CR	SRL	AIBL	SFL
CR	1	.747**	.733**	.690**
SRL	.747**	1	.774**	.687**
AIBL	.733**	.774**	1	.701**
SFL	.690**	.687**	.701**	1

** $p < .01$ (two-tailed)

All bivariate correlations were positive and statistically significant at the $p < .01$ level. AIBL perceptions showed the strongest association with SRL meaning-making awareness ($r = .774$), followed by CR scores ($r = .733$), and SRL ($r = .70$). The SRL–CR correlation ($r = .690$) indicates a moderate-to-strong positive relationship between self-regulated learning and critical reading performance, establishing the empirical basis for the regression analysis that follows. SFL awareness was also significantly correlated with CR ($r = .701$), suggesting that language-level analytical orientation covaries with reading outcomes.

3.1.4 Multiple Regression Analysis

Multiple regression analysis was performed with critical reading score (CR) as the dependent variable, and AI-assisted blended learning perceptions (AIBL) and SRL as predictor variables, to determine the relative contribution of each to critical reading outcomes. This analysis directly addresses Objectives 1 and 4. Assumptions were checked prior to interpretation: the Kolmogorov–Smirnov test confirmed approximate normality of residuals; scatterplots of standardised residuals against predicted values indicated linearity and homoscedasticity; and multicollinearity was assessed via the Variance Inflation Factor (VIF).

Table 5 Multiple Regression Model Summary

R	R ²	Adjusted R ²	Std. Error of Estimate
.786	.618	.612	.224

Table 6 ANOVA Summary for Regression Model

Source	SS	df	MS	F	p
Regression	11.90	2	5.95	118.76	<.001
Residual	7.37	147	.050		
Total	19.27	149			

The overall regression model was statistically significant, $F(2, 147) = 118.76$, $p < .001$, indicating that the combination of AIBL

perceptions and SRL explained a statistically significant proportion of variance in critical reading outcomes.

Table 7 Regression Coefficients, Standard Errors, and Collinearity Statistics

Predictor	B	SE B	β	t	p	VIF
Constant	.858	.425		2.50	< .001	
AIBL	.447	.077	.446	5.54	<.001	2.99
SRL	.361	.075	.388	4.81	<.001	2.99

The regression model explained 61.8% of the variance in critical reading scores ($R^2 = .618$, Adjusted $R^2 = .612$). Both AIBL ($\beta = .446$, $t = 5.543$, $p < .001$) and SRL ($\beta = .388$, $t = 4.814$, $p < .001$) were significant independent predictors of critical reading, with standardised coefficients of equal magnitude, suggesting that neither construct held a clearly dominant predictive role over the other. The overall model fit was strong, $F(2, 147) = 118.76$, $p < .001$, and the VIF value of 2.99 for both predictors confirmed that multicollinearity did not distort the estimates, despite the moderate intercorrelation observed between AIBL and SRL ($r = .747$) in the Pearson analysis above.

3.2 Qualitative Findings

Qualitative findings were generated from the responses given during the interview with 12 participants (P1-P12). Thematic analysis is useful in organising qualitative data into meaningful patterns that can provide answers to the research questions, as argued by Kiger and Varpio (2020). The study objectives were used to develop four themes.

Theme 1: The effect of AI-enhanced blended learning on critical reading skills of Vietnamese EFL learners

The majority of participants reported that AI tools clarified complex vocabulary, summarised arguments, and assisted in questioning arguments better. P1 stated that AI made it easier for me to break down the longer texts into smaller chunks so I could first check out the main claim before making a judgment about the evidence. The chatbot told me some examples of “weak” arguments, and then I looked for other examples of similar arguments that were in the article. The finding aligned with Alarifi et al. (2025), who found that reading comprehension with the support of AI had positive effects on EFL undergraduate students' attitudes, engagement, and satisfaction. However, participants also exhibited caution. P7 stated that there were times when AI provided a straightforward response, but it was not always complete, so I still had to read the original text. This aligns with the findings by Darwin et al. (2024) that EFL students appreciated AI's ability to facilitate

critical thinking but also experienced challenges, including inadequate personalisation and nuanced meanings. Thus, AI is helpful when used as a guide rather than a substitute for critical judgment.

Theme 2: How students' self-regulated learning strategies develop in an AI-based blended learning model

Students mentioned that AI has facilitated blended learning in fostering students to actively manage their reading. P2 stated that, before reading, I asked AI to make a reading plan, then I checked each section after reading. Similarly, P6 stated that I used AI feedback to understand what my gaps were, particularly where I did not understand the author's purpose. Chou and Zou (2020) argued that external feedback from digital SRL tools may be helpful for learners to compare the SRL system feedback with their own self-judgment. Students also discussed reflection following the reading. P10 stated that, following the class discussion, I went back to the AI notes and amended my summary as I realised that my initial response was too broad. Yu (2023) pointed out that L2 online learning demands a higher level of learner autonomy since time, strategies and progress in the L2 process are no longer under the teacher's control. Therefore, students' SRL emerged from the visibility of their reading process due to the use of AI feedback.

Theme 3: The nature of meaning construction in students' critical reading learning by systemic functional linguistics

Participants reported increased awareness of the use of language to create meaning in academic texts. P3 stated that I started to notice who was doing the action in the sentence, and this helped me see what the writer wanted to emphasise. This was ideal, meaning that the students studied participants, processes and represented experience. P5 stated that I was studying words such as may, must and clearly as they indicated the strength of the writer's opinion. This was consistent with Cheng (2024), who suggested that interpersonal meta-function studies focus on interpersonal stance, interpersonal social relations, and interpersonal evaluation in relation to discourse contexts. P8 noticed more connectors and the first half of sentences, as they

indicated the flow of the argument more. Herman et al. (2023) demonstrated the applicability of SFL metafunctions to the study of representation, stance and organisation in the context of EFL language learning.

Theme 4: Relationship between (SRL) and (CR) in the context of AI-assisted blended learning

The interviews revealed that students who planned and reflected were more likely to question and compare views. P9 stated that if I set myself to find the author's assumptions, I would read more carefully and not just translate. P11 added that self-monitoring helped me to stop when I did not understand the evidence, and ask better questions in class. Shafiee Rad (2025) concluded that AI reading intervention is capable of enhancing L2 comprehension by fostering engagement and SRL as long as it does so. However, a few students still required assistance. P12 reported that AI was useful, but I had to explain to the teacher which of the AI responses was reliable. This demonstrated that self-regulation was not automatic and needed to be "trained. In general, the link between SRL and critical reading was evident; that is, students performed better as readers when they actively planned, monitored, and adjusted their reading comprehension.

4. Discussion

The findings confirmed that AI-supports blended learning effectively improved critical reading skills, highlighting that AI tools are not only technological solutions but also cognitive scaffolds that facilitate a deeper understanding of text meaning. There is strong predictive validity between AIBL and critical reading that supports the sociocultural views that learning technologies can facilitate higher-order thinking when embedded in meaningful pedagogical contexts. This is in line with findings by Peña-Acuña and Fernandes Durão (2024) that AI-enabled environments foster analytical engagement and learner autonomy. The present study, however, shows that AI can help in evaluative and interpretative reading processes (Darwin et al., 2024), unlike the previous studies, which mainly concentrated on Vocabulary acquisition and language accuracy. The difference is significant

because critical reading involves the learner to question assumptions, analyse evidence and to identify ideological positioning, not just to understand the information in the text.

The role of SRL in critical reading development is an important finding. There is a high correlation between SRL and CR and a high regression coefficient for SRL, which shows that the better the learners' critical reading results are, the more active they are in planning, monitoring and evaluating their reading processes. This interpretation is confirmed by the qualitative results, which revealed that participants used AI to set reading objectives, identify areas of difficulty, and adjust their interpretations based on feedback. The results of this study are consistent with the current SRL theory that posits that cognitive and metacognitive processes are key to successful learning in digital environments, and these processes require self-regulation (Yu, 2023). In recent years, studies have also found that the use of SRL is an essential link between Trait Emotional Intelligence (TEI) and their enhancement of academic performance and Lifelong Learning Engagement (LLE) (Luo & Wang, 2023; Wang, 2021).

The results also help fill the gap in the knowledge of the correlation between AI and critical thinking. Overall, students had positive attitudes towards AI, but qualitative data showed some issues with the lack of explanations and the need to confirm AI output. The conclusion is important because it shows that the value of AI in education is not a foregone one and involves how the learner interacts with the information generated. Risk-taking and superficial processing are other potential dangers of relying on AI, while AI can also provoke questions and reflections as well, as argued by Darwin et al. (2024). Thus, in line with the present findings, AI can be best viewed as a cognitive scaffold and not as a replacement for human judgment.

For Objective 3, the results suggest that SFL was an effective framework to support critical reading development. Students showed greater sensitivity to the meaning of ideas, interpersonal relationships, and the textual semantics, which helped them to analyse the language used to shape arguments and to position readers. This is

evident from the strong correlation between SFL awareness and critical reading ($r = .701$), which indicates that linguistic awareness has a significant contribution to critical reading. Students were not only better able to comprehend the meaning of the texts, but also more able to analyse the authorial position, representation and organisation of the texts. In addition, this finding supports the previous SFL studies by proving that it can be applied in the context of AI-assisted blended learning and its usefulness in students' critical literacy development.

The findings also have significant implications for education practice and policy. Pedagogically, the results show that the use of AI in blended learning is beneficial and should be combined with SRL and critical reading strategy training. Such as Alkayed et al. (2023) suggested that teachers should create scaffolded activities that promote students' ability to challenge the outputs of AI, analyse evidence, and to consider their learning choices. Policy-wise, HEIs must create AI literacy policies with a focus on critical thinking over unthinkingly taking in AI-generated content. The importance of guiding the implementation, being aware of ethical considerations, and ensuring the autonomy of the learner in the use of AI in language teaching has also been highlighted in recent reviews of AI in L2 education (Peña-Acuña & Fernandes Durão, 2024).

However, there are a number of limitations that must be noted. The study was conducted at a single Vietnamese university, which may not be generalisable. Secondly, there could be selection bias in the convenience sampling. Thirdly, the cross-sectional design limits causal inferences from the observed relationships. Fourth, across constructs, the high mean scores might be due to social desirability bias or positive response tendencies. Critical reading was measured through self-report rather than objective performance-based assessments. Longitudinal and experimental studies conducted in different institutions help enhance the merits of using AI as a tool in blended learning for long-term critical reading development.

5. Conclusion

The study aimed to explore the effectiveness of the use of AI-supported blended learning in improving the critical reading ability of Vietnamese EFL learners and to look into the significance of SFL and SLL in the process. Findings revealed a high positive correlation between the variables of AI-assisted blended learning and SFL meaning-making awareness, SRL and critical reading. AI-assisted learning and SRL were found to be significant predictors of critical reading, accounting for a significant amount of variance in students' outcomes. It has also been found that AI helped learners to consider arguments, challenge evidence, track their understanding, and think about their reading processes. The study also emphasised the role of SRL as a process for students to convert the learning opportunities that were facilitated by the use of AI into gains in critical reading. Overall, these results imply that while access to AI technologies is important for the development of effective critical reading, so is the ability of the learner to regulate their learning and critically evaluate information. The findings from this study support the use of AI tools in the context of AI-based pedagogical models that

include self-regulation, reflection and critical analysis. AI literacy training should also be offered to promote responsible and critical use of AI technologies at institutions. Future studies should further adopt longitudinal and experimental designs in various educational contexts to investigate the long-term effects of AI-enhanced blended learning on the development of critical reading abilities and investigate other mediators that influence learning outcomes.

6. Author Declaration

We hereby confirm that this manuscript is our original work and has not been published or submitted elsewhere for publication. All information and references from sources used in this study have been correctly cited and acknowledged. The authors have contributed to the conception, design, data collection, analysis, and writing of the manuscript. There is no plagiarism, fabrication or falsification of data in the manuscript. The authors have no financial, professional, or personal conflicts of interest to declare that would have biased their research. All authors have read and approved the final manuscript and agree to its submission for publication.

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