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STRENGTHENING AI-BASED CRITICAL LITERACY IN LITERATURE LEARNING UNDER THE MERDEKA CURRICULUM

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Abstrak

Pembelajaran sastra pada era transformasi digital menuntut penguatan literasi kritis peserta didik agar mereka tidak hanya memahami teks secara literal, tetapi juga mampu menafsirkan, mengevaluasi, dan mengonstruksi makna secara reflektif. Kehadiran kecerdasan buatan (AI) dalam pendidikan membuka peluang baru untuk memperkaya pembelajaran sastra, tetapi juga menghadirkan risiko ketergantungan pada jawaban instan apabila tidak diarahkan secara pedagogis. Penelitian ini bertujuan menguji efektivitas model pembelajaran sastra berbasis AI dalam meningkatkan literasi kritis peserta didik serta mendeskripsikan respons mereka terhadap integrasi AI dalam pembelajaran sastra di bawah Kurikulum Merdeka. Penelitian menggunakan pendekatan kuantitatif dengan desain kuasi-eksperimen nonequivalent control group. Populasi penelitian adalah 360 siswa kelas XI di sebuah SMA negeri di Kota Kediri, dengan sampel 120 siswa yang dipilih secara purposif dan dibagi menjadi kelompok eksperimen dan kontrol, masing-masing 60 siswa. Instrumen penelitian meliputi tes literasi kritis berbentuk 20 soal esai, angket respons siswa, dan lembar observasi. Perlakuan dilaksanakan selama enam minggu dalam 12 sesi pembelajaran. Data dianalisis menggunakan statistik deskriptif, uji t berpasangan, uji t independen, gain score, dan Cohen's d. Hasil penelitian menunjukkan bahwa kelompok eksperimen meningkat dari skor rata-rata 56,4 menjadi 84,7, sedangkan kelompok kontrol meningkat dari 55,9 menjadi 67,2. Uji t terhadap gain score menunjukkan perbedaan signifikan dengan $t=12,47$, $p=0,000$, dan Cohen's $d=1,82$. Respons siswa juga sangat positif, dengan 86,7% menyatakan AI membantu berpikir kritis. Temuan ini menunjukkan bahwa pembelajaran sastra berbasis AI efektif, pedagogis, dan relevan untuk memperkuat literasi kritis dalam implementasi Kurikulum Merdeka. Model ini juga mendorong pembelajaran sastra yang lebih interaktif, reflektif, dan berorientasi pada verifikasi.

Kata Kunci: literasi kritis, pembelajaran sastra, kecerdasan buatan, Kurikulum Merdeka

Abstract

Literature learning in the era of digital transformation requires the strengthening of students' critical literacy so they can interpret, evaluate, and construct meaning reflectively, not merely understand texts literally. The emergence of artificial intelligence (AI) offers opportunities to enrich literature learning, yet creates risks of dependence on instant answers when not pedagogically guided. This study examined the effectiveness of an AI-based literature learning model in improving students' critical literacy and described their responses to AI integration under the Merdeka Curriculum. The study employed a quantitative approach with a nonequivalent control group quasi-experimental design. The population consisted of 360 eleventh-grade students at public senior high school in Kediri City, Indonesia. A total of 120 students were selected through purposive sampling and divided into an experimental group and a control group, each consisting of 60 students. The instruments included a critical literacy test consisting of 20 essay questions, a student response questionnaire, and an observation sheet. The treatment was implemented over six weeks through 12 learning sessions. Data were analyzed using descriptive statistics, paired sample t-test, independent sample t-test, gain score, and Cohen's d. The results showed that the experimental group increased from 56.4 to 84.7, while the control group increased from 55.9 to 67.2. The independent sample t-test on gain scores indicated a significant difference, with $t=12.47$, $p=0.000$, and Cohen's $d=1.82$. Student responses were positive, with 86.7% stating that AI supported critical thinking. These findings indicate that AI-based literature learning is effective and relevant for strengthening critical literacy in Merdeka Curriculum.

Keywords: critical literacy, literature learning, artificial intelligence, Merdeka Curriculum

1. INTRODUCTION

The The rapid digital transformation of education has fundamentally changed the ways students access, understand, interpret, and produce knowledge. One of the most influential forms of this transformation is the emergence of artificial intelligence (AI), particularly generative AI, which can generate texts, provide explanations, construct interpretations, and respond to questions instantly. In the context of Indonesian language and literature education, AI can no longer be viewed merely as a technological supplement; rather, it has become part of the learning ecology that shapes students' reading, writing, thinking, and textual interpretation practices. Therefore, AI integration in learning needs to be pedagogically directed so that it does not merely facilitate task completion, but also promotes students' critical, reflective, and ethical thinking.

In twenty-first-century education, critical literacy has become an essential competence. Critical literacy is not limited to the ability to read and understand the literal meaning of a text; it also includes the ability to analyze, evaluate, interpret, and connect texts with social, cultural, ideological, and experiential contexts. Febriyana and Sitepu (2025) argue that digital and critical literacy in Indonesian language learning should move students from merely reading texts to interpreting them more deeply. Similarly, Fauzi et al. (2025) emphasize that literature learning in the twenty-first century needs to integrate media literacy so that students can understand literary works through broader and more contextual perspectives.

Literature learning holds a strategic position in strengthening critical literacy because literary texts contain not only aesthetic elements but also social values, cultural meanings, human issues, ideologies, conflicts, and power relations. Through literature learning, students can be

trained to identify perspectives, evaluate the credibility of ideas, recognize bias, compare interpretations, and construct arguments based on textual evidence. Luke and Freebody (1999), through the **four resources model**, position **readers not only as code breakers but also as meaning makers, text users, and text critics**. Thus, literature learning should not stop at identifying plot, characters, setting, and moral messages; it should also lead students toward critical reading of the meanings and contexts surrounding literary texts.

The urgency of strengthening critical literacy is also closely related to the implementation of the Merdeka Curriculum in Indonesia. This curriculum emphasizes student-centered learning, independence, creativity, collaboration, and critical reasoning. In this context, literature learning should provide opportunities for students to explore meaning, express personal responses, engage in discussion, compare multiple perspectives, and connect literary texts with real-life issues. However, these goals require a learning model that is dialogic, reflective, and responsive to technological development. Without proper pedagogical design, literature learning may remain conventional, teacher-centered, focused on memorizing intrinsic elements, and less supportive of students' critical interpretation.

Despite curriculum reform, Indonesian students' literacy achievement remains a serious concern. The PISA 2022 report shows that Indonesian students' reading score was still below the OECD average, with Indonesia scoring 359 points compared to the OECD average of 476 points (OECD, 2023). Furthermore, only a very small proportion of Indonesian students reached the highest proficiency levels in reading literacy. This condition indicates that students' ability to evaluate, reflect on, and integrate information from texts still needs to be strengthened. The 2023 National Assessment also shows that the reading literacy competence of secondary school

students remains concentrated at low to medium levels (Kemendikbudristek, 2024). These facts confirm that strengthening critical literacy should become a central agenda in Indonesian language and literature education.

This challenge becomes more complex with the emergence of generative AI tools such as ChatGPT, Gemini, and similar platforms. On the one hand, AI can function as a learning partner that helps students obtain alternative interpretations, compare perspectives, formulate questions, and evaluate literary texts more deeply. Rahmawati, Suryani, and Haryanto (2024) state that AI integration in literature classrooms opens new opportunities for learning, particularly in enriching interaction, broadening perspectives, and increasing student engagement. Suryani, Waluyo, and Anwar (2025) also show that AI-assisted critical reading can support the improvement of students' critical reading skills. On the other hand, AI also presents risks, such as dependence on instant answers, weakening originality of thought, and the tendency to accept AI-generated outputs without verification.

The main issue in using AI in the classroom is not whether AI should be allowed or prohibited, but how it should be integrated pedagogically. Common Sense Media (2024) reports that students' use of AI for school-related tasks continues to increase. This phenomenon indicates that banning AI completely is not an adequate solution. Instead, students need to be equipped with AI literacy so that they can understand the limitations, biases, and potential inaccuracies of AI-generated outputs. Pratama, Riadi, and Nurzafira (2025) argue that digital transformation in Indonesian language learning should be directed toward interactive, multimodal, and pedagogically meaningful learning. Therefore, AI should be positioned not as a substitute for thinking, but as a cognitive stimulus that encourages students to test, compare, and strengthen their own arguments.

Several previous studies have discussed digital literacy, media literacy, and technology use in language and literature learning. Hernawan, Kusmiatun, and Nurhadi (2025), for example, show that digital literacy is closely related to the strengthening of critical thinking in Indonesian language learning. Wahid et al. (2024) also demonstrate that critical literacy-based literature reading affects the improvement of students' critical thinking skills. Meanwhile, Zaenuri and Hidayat (2025) emphasize the importance of digitizing Indonesian literature as an innovation in literature learning in the Society 5.0 era. However, most of these studies still position digital technology as a supporting medium rather than as an interpretive partner systematically designed to train students' critical literacy.

Therefore, several research gaps remain to be addressed. First, studies that specifically integrate generative AI into literature learning to improve critical literacy are still limited. Second, few learning models explicitly train students to compare AI-generated interpretations with textual evidence, evaluate information accuracy, identify bias, and construct independent interpretations. Third, in the context of the Merdeka Curriculum, AI integration in literature learning still requires empirical evidence so that it can be implemented in a directed, ethical, and pedagogically relevant manner for twenty-first-century learning.

The novelty of this study lies in the development and examination of an AI-based literature learning model specifically designed to strengthen students' critical literacy. Unlike previous studies that mainly discuss the use of digital media in general, this study positions AI as a comparative interpretation tool and a critical discussion partner. Through structured learning stages, students are guided to explore literary texts, interact with AI-generated interpretations, compare different viewpoints, verify textual evidence, engage in collaborative discussion, and

produce original appreciative responses. This approach is consistent with Wadsworth's (2018) interpretation of Piagetian constructivism, which views knowledge as being constructed through an active process when learners encounter cognitive disequilibrium and build new understanding through reflection.

Based on this background, this study aims to examine the effectiveness of an AI-based literature learning model in improving students' critical literacy and to describe students' responses to AI integration in literature learning. Specifically, this study addresses two main research questions: (1) Is there a significant difference in critical literacy improvement between students who participate in AI-based literature learning and those who participate in conventional learning? and (2) How do students respond to the use of AI in literature learning? The findings of this study are expected to contribute theoretically to the development of critical literacy and AI literacy studies, practically to teachers' design of technology-based literature learning, and pedagogically to the implementation of the Merdeka Curriculum in the era of digital transformation.

2. METHOD

This study employed a quantitative approach with a nonequivalent control group quasi-experimental design. This design was selected because the study aimed to examine the effectiveness of an AI-based literature learning model in improving students' critical literacy skills in an authentic classroom setting where full random assignment was not feasible. In line with Creswell and Creswell (2018), a quasi-experimental design is appropriate for educational intervention studies that compare treatment and control groups under natural learning conditions. The experimental group received AI-based literature learning, while the control group received conventional literature learning. Both groups were administered a pre-

test before the intervention and a post-test after the intervention to measure changes in students' critical literacy skills.

The research was conducted at a public senior high school in Kediri City, Indonesia, within the context of Indonesian literature learning under the Merdeka Curriculum. The population consisted of 360 eleventh-grade students, from which 120 students were selected using purposive sampling. The sample was divided into two groups: 60 students in the experimental group and 60 students in the control group. The selection criteria included students' access to digital devices and internet connection, their lack of previous experience with AI-based literature learning, and their willingness and permission to participate in the study. Before the intervention, the equivalence of the two groups was examined through a homogeneity test to ensure that both groups had comparable initial abilities.

The instruments used in this study consisted of a critical literacy test, a student response questionnaire, and an observation sheet. The critical literacy test was designed in the form of 20 essay questions that measured four indicators: identifying ideology or bias, evaluating source credibility, analyzing perspectives, and constructing alternative interpretations. Each item was assessed using an analytic rubric with a score range of 0–5. The instrument was validated by three experts, with Aiken's V values ranging from 0.82 to 0.94, indicating strong content validity. The reliability test produced a Cronbach's Alpha value of 0.89, showing that the instrument had a high level of internal consistency. The questionnaire used a four-point Likert scale to examine students' responses to AI integration, while the observation sheet was used to monitor participation, classroom interaction, and the consistency of treatment implementation.

The intervention was implemented over six weeks in 12 learning sessions. In the experimental group, the AI-based literature learning model was conducted through structured learning activities that positioned AI as a tool for interpretation, comparison, verification, and reflection rather than as a substitute for students' thinking. Students first explored selected literary texts, then interacted with generative AI to obtain alternative interpretations or questions related to the texts. Afterward, they compared AI-generated responses with their own interpretations and textual evidence, discussed the results collaboratively, evaluated the strengths and weaknesses of AI responses, and produced original appreciative texts. In contrast, the control group received conventional literature instruction through teacher explanation, reading activities, discussion, and written assignments without structured AI integration.

The collected data were analyzed using descriptive and inferential statistics. Descriptive statistics were used to calculate the mean, standard deviation, percentage, and gain score of students' critical literacy achievement. Before hypothesis testing, the data were examined for normality and homogeneity to ensure that the assumptions of parametric testing were met. A paired sample *t*-test was used to examine the difference between pre-test and post-test scores within each group, while an independent sample *t*-test was used to compare the gain scores between the experimental and control groups. Cohen's *d* was calculated to determine the magnitude of the treatment effect, as recommended by Cohen (2013), because effect size provides important information about the practical significance of an intervention. Ethical considerations were also applied by ensuring institutional permission, voluntary participation, confidentiality of students' identities, and responsible use of AI as a learning aid rather than a tool for plagiarism or thought substitution.

3. RESULTS AND DISCUSSION

The results of the pre-test showed that students' initial critical literacy skills in both the experimental and control groups were relatively similar before the intervention. The experimental group obtained a total mean score of 56.4 with a standard deviation of 5.2, while the control group obtained a total mean score of 55.9 with a standard deviation of 5.4. The independent sample *t*-test showed no significant difference between the two groups before treatment, with $t = 0.51$ and $p = 0.613$. This indicates that both groups had comparable initial critical literacy levels before the AI-based literature learning model was implemented.

Table 1. Pre-test Critical Literacy Scores

Indicator	Experimental (n=60) Mean (SD)	Control (n=60) Mean (SD)
Identifying ideology/bias	52.3 (6.1)	51.8 (6.4)
Evaluating source credibility	48.7 (5.8)	49.2 (5.9)
Analyzing perspective	58.4 (6.5)	57.9 (6.7)
Constructing alternative interpretation	56.2 (6.2)	55.6 (6.3)
Total Score	56.4 (5.2)	55.9 (5.4)

After six weeks of treatment through 12 learning sessions, both groups showed improvement in critical literacy skills. However, the improvement in the experimental group was substantially higher than that in the control group. The experimental group increased from 56.4 to 84.7, with a gain score of 28.3 points. Meanwhile, the control group increased from 55.9 to 67.2, with a gain score of 11.3 points. The paired sample *t*-test showed that both groups improved significantly, but the independent sample *t*-test on gain scores showed a significant difference between the two groups, with $t = 12.47$, $df = 118$, $p = 0.000$, and Cohen's $d = 1.82$. This indicates that the AI-based literature learning model had a

very large effect on students' critical literacy improvement.

Table 2. Comparison of Pre-test, Post-test, and Gain Scores

Group	Pre-test Mea n (SD)	Post -test Mea n (SD)	Gai n (Δ)	Paire d t	p
Experimen tal (n=60)	56.4 (5.2)	84.7 (6.3)	+28. 3	23.41	0.00 0
Control (n=60)	55.9 (5.4)	67.2 (5.8)	+11. 3	9.87	0.00 0

The distribution of students' critical literacy categories also changed after the intervention. In the experimental group, only 3.3% of students were in the high critical literacy category before the intervention. After the intervention, this percentage increased sharply to 56.7%. In the control group, the percentage of students in the high category only increased from 3.3% to 13.3%. These findings show that AI-based literature learning not only improved students' average scores but also helped more students reach a higher level of critical literacy.

Table 3. Student Responses to AI-Based Literature Learning (n=60)

Group	Pre-test	Post-test	Increase
Experimental	3.3%	56.7%	+53.4%
Control	3.3%	13.3%	+10.0%

The student response questionnaire showed that students responded positively to the integration of AI in literature learning. A total of 91.7% of students agreed that AI helped them see new perspectives in poetry and short stories. In addition, 88.3% stated that AI made literature learning more interesting, 85.0% felt more motivated to read literary texts, 78.3% stated that AI challenged them to think critically rather than simply accept information, and 90.0% expressed willingness to use AI as a learning aid in the future. Overall, the findings indicate that AI-based literature learning was positively received

by students and contributed to more active, reflective, and critical engagement with literary texts.

Table 4. Student Responses to AI-Based Literature Learning

Aspect	% Agree & Strongly Agree	Mean (SD)
AI helps see new perspectives in poetry/short stories	91.7%	3.42 (0.58)
AI makes literature learning more interesting	88.3%	3.35 (0.62)
I am more motivated to read literary texts	85.0%	3.28 (0.67)
AI challenges me to think critically, not just accept	78.3%	3.15 (0.71)
I will use AI as a learning aid in the future	90.0%	3.38 (0.59)

DISCUSSION

The findings indicate that AI-based literature learning significantly improved students' critical literacy skills. The experimental group showed a much higher gain score than the control group, and the effect size reached Cohen's $d = 1.82$, which indicates a very large effect. This result is important because statistical significance alone is not sufficient to determine the practical value of an intervention. As Cohen (2013) emphasizes, effect size helps explain the strength of the treatment beyond the p-value. Therefore, the result suggests that the AI-based learning model was not only statistically effective but also pedagogically meaningful for improving students' critical literacy.

The effectiveness of the AI-based model can be explained from a constructivist perspective. In the learning process, students did not merely receive information from AI; instead, they were encouraged to compare AI-generated interpretations with their own reading of literary texts. This condition created cognitive conflict

and required students to verify meaning using textual evidence. Wadsworth (2018), in his explanation of Piaget's cognitive and affective development, emphasizes that knowledge is constructed through active interaction between learners and their environment. In this study, AI functioned as part of the learning environment that stimulated students to question, compare, revise, and reconstruct their understanding of literary texts.

The improvement in students' ability to evaluate source credibility, analyze perspectives, and construct alternative interpretations also demonstrates that the AI-based model strengthened students' role as critical readers. This is consistent with Luke and Freebody's (1999) four resources model, which positions readers not only as code breakers but also as meaning makers, text users, and text critics. In the present study, students were guided to identify ideology or bias, evaluate AI-generated interpretations, compare viewpoints, and develop original appreciative responses. Thus, AI was not treated as a single source of truth, but as a dialogic tool that helped students become more critical toward texts and interpretations.

The findings also support previous research on critical literacy and literature learning. Wahid et al. (2024) found that critical literacy-based literature reading had a positive effect on students' critical thinking skills. Similarly, Hernawan, Kusmiatun, and Nurhadi (2025) emphasized the close relationship between digital literacy and critical thinking in Indonesian language learning. The present study extends these findings by showing that generative AI can bridge digital literacy and critical literacy when its use is structured around comparison, verification, and reflective interpretation.

The results are also relevant to the development of literature learning in the twenty-first century. Fauzi et al. (2025) argue that media literacy is important in literary learning because students need to understand literature through

broader and more contextual perspectives. Febriyana and Sitepu (2025) also emphasize that Indonesian language learning under the Independent Curriculum should move from reading activities toward deeper interpretation. In this study, AI helped students encounter multiple interpretations of literary texts, but the learning process still required students to evaluate those interpretations critically. This shows that AI can enrich literature learning when it is integrated into a well-designed pedagogical framework.

The positive student responses further indicate that AI integration increased students' engagement and motivation in literature learning. This finding aligns with Rahmawati, Suryani, and Haryanto (2024), who state that AI integration in literature classrooms offers opportunities to broaden perspectives and enrich students' learning experiences. It is also consistent with Suryani, Waluyo, and Anwar (2025), who found that AI-assisted critical reading can support students' critical reading development. The high percentage of students who agreed that AI helped them see new perspectives and made literature learning more interesting suggests that AI can make literary interpretation more interactive and dialogic.

However, the use of AI in learning also requires ethical and pedagogical control. Common Sense Media (2024) reports that the use of generative AI among students for school assignments is increasing, which raises concerns about overreliance, plagiarism, and uncritical acceptance of AI outputs. In this study, these risks were minimized by positioning AI as a tool for idea exploration rather than thought substitution. Students were required to compare AI responses with textual evidence, discuss interpretations in groups, and produce their own original responses. This finding supports Pratama, Riadi, and Nurzafira (2025), who argue that digital transformation in Indonesian language learning should be interactive, multimodal, and pedagogically meaningful.

The findings also contribute to the broader agenda of literary digitalization and educational innovation. Zaenuri and Hidayat (2025) emphasize that the digitalization of Indonesian literature is an important innovation in literature learning in the Society 5.0 era. The present study shows that digitalization should not only involve the availability of literary texts in digital formats but also the development of learning models that allow students to interact critically with technology. In this sense, AI-based literature learning creates a learning space in which students interact with texts, technology, peers, and their own reflective thinking.

The relevance of this study becomes stronger when viewed in relation to Indonesia's literacy challenges. OECD (2023) reported that Indonesian students' reading performance in PISA 2022 remained below the OECD average, and Kemendikbudristek (2024) also showed that students' reading literacy still needs to be strengthened. These conditions indicate that critical literacy must become a major concern in Indonesian language and literature education. The AI-based model tested in this study offers one possible pedagogical response to this challenge because it trains students to read, question, evaluate, and construct interpretations rather than merely receive information.

At the policy level, the findings are consistent with Madinah et al. (2025), who emphasize the need for language and national education policies that are responsive to technological change. They are also aligned with Pambudi and Fajrin (2026), who highlight the importance of rethinking curriculum reform and language pedagogy in Indonesia. In the context of the Merdeka Curriculum, AI should be integrated not as a technological trend, but as a pedagogical instrument to support independent learning, creativity, collaboration, and critical reasoning.

From a methodological perspective, this study also reflects the appropriateness of using a quasi-experimental design in classroom-based

intervention research. Creswell and Creswell (2018) explain that quasi-experimental designs are suitable when researchers examine the effect of an intervention in natural educational settings where full randomization is difficult. In addition, although the main data were quantitative, students' responses and classroom observations can be interpreted more meaningfully through systematic thematic reading, as suggested by Braun and Clarke (2021). This strengthens the interpretation of students' perceptions of AI integration in literature learning.

Overall, the findings show that AI-based literature learning is effective in improving students' critical literacy. The increase in post-test scores, the significant difference in gain scores, the very large effect size, the improvement in the high critical literacy category, and students' positive responses all indicate that AI can become a productive learning partner when integrated ethically and pedagogically. Therefore, teachers should not simply prohibit AI use in classrooms. Instead, they need to guide students to use AI for questioning, comparing, verifying, and constructing critical interpretations. This model can support the implementation of the Merdeka Curriculum and contribute to the strengthening of critical literacy in the digital era.

4. CONCLUSION

This study concludes that the AI-based literature learning model is effective in improving students' critical literacy skills under the Merdeka Curriculum. The effectiveness is demonstrated by the substantial increase in the experimental group's mean score from 56.4 in the pre-test to 84.7 in the post-test, compared with the control group, which increased from 55.9 to 67.2. The independent sample t-test on gain scores showed a significant difference between the two groups, with $p = 0.000$ and Cohen's $d = 1.82$, indicating a very large effect. These findings confirm that AI-based literature learning provides a stronger pedagogical impact than conventional

instruction in developing students' ability to identify bias, evaluate source credibility, analyze perspectives, and construct alternative interpretations.

The findings also indicate that AI can function as a productive learning partner when it is integrated through structured, ethical, and reflective learning procedures. In this study, AI was not used as a substitute for students' thinking, but as a tool for stimulating interpretation, comparison, verification, discussion, and original response production. Students' positive responses further support this conclusion, as most students agreed that AI helped them see new perspectives, made literature learning more interesting, increased their motivation to read literary texts, and challenged them to think critically. Therefore, the integration of AI in literature learning can support the goals of the Merdeka Curriculum, particularly in strengthening critical reasoning, creativity, independence, and reflective learning.

However, the implementation of AI-based literature learning requires careful pedagogical control. Teachers need to provide clear learning guidelines, ethical rules, and verification mechanisms so that students do not depend on AI-generated answers without critical evaluation. This study is limited to eleventh-grade students in one school context; therefore, future research should involve broader participants, different educational levels, various literary genres, and longer intervention periods. Further studies may also explore how AI-based learning affects students' literary appreciation, writing quality, digital ethics, and long-term critical literacy development.

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