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Enhancing Abstract Reasoning through AI and Reading for Emotion: Insights from Indonesian Pre-Service English Teachers

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ABSTRACT (11 pt)

This study explores the integration of Artificial Intelligence (AI) and the "Reading for Emotion" approach to enhance abstract reasoning skills among Indonesian pre-service English teachers at UIN Cyber Syekh Nurjati Cirebon. The research addresses a critical issue in teacher education: the necessity for effective strategies that foster deeper comprehension and critical analysis of academic texts. Existing literature emphasizes the role of emotions in learning, indicating that traditional cognitive approaches may overlook essential emotional dimensions. The primary aim of this research is to examine how pre-service English teachers utilize Reading for Emotion and Aesthetics to improve their understanding and critical analysis of academic papers. This aligns with Lian (2017) and Lian (2024) that transformative learning must begin with students reflecting on their relationship with the world, rather than merely performing tasks. Using a qualitative case study method, data were gathered from 10 participants via questionnaires and 3 informants through interviews throughout the third semester. The findings indicate that emotional engagement significantly enhances students' comprehension and analytical skills, suggesting that understanding emotions is crucial for effective learning. This research contributes to the discourse on innovative pedagogical strategies in teacher education, highlighting the need for further exploration of emotional approaches in academic contexts.

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1. INTRODUCTION

In the contemporary educational landscape, the development of abstract reasoning skills among Indonesian pre-service English teachers presents a significant challenge that demands urgent attention. These future educators are expected not only to master language

proficiency but also to cultivate critical thinking and analytical abilities essential for effective teaching and learning. However, empirical observations reveal a persistent gap in their capacity to engage deeply with academic texts, often resulting in superficial comprehension and limited critical analysis. This issue is compounded by the emotional detachment many learners experience during reading activities, which undermines their motivation and cognitive engagement. Emotional engagement in reading, therefore, emerges as a pivotal factor influencing comprehension and learning outcomes. Addressing this multifaceted problem requires innovative approaches that integrate emotional dimensions into reading practices, thereby fostering a more holistic development of abstract reasoning skills that align with the demands of modern education systems and pedagogical frameworks.

Lian's insightful paper (2022) emphasizes technology's pivotal role in shaping language learning practices and educational experiences. He argues that the evolution of language education is not just a product of academic research but is deeply intertwined with societal expectations and technological advancements. Based on research, Lian (2023) highlights how technology has become a ubiquitous part of our lives, influencing the language learning culture and necessitating that educators adapt to these changes. They point out that this access to technology empowers students, allowing them to take greater control of their learning journeys and fostering a sense of independence. According to the 2018 PISA results, Indonesia's literacy level among students was marked at approximately 371, a score notably below the global average of 487. This situation positioned Indonesia in a concerning 74th place out of 79 participating countries (OECD, 2019). However, the recent 2022 PISA findings paint an even grimmer picture, revealing a further decline to around 359. This downward trend reflects the persistent literacy challenges that Indonesian students face and raises alarms about the broader implications for the country's education system (OECD, 2023).

Abstract reasoning skills are the ability to understand non-concrete concepts and the relationships between ideas, which are vital for prospective English teachers in supporting the teaching and learning process. Research shows that these skills enable teachers to analyze and solve complex problems that may arise in English language learning, such as students' difficulties in understanding grammar and vocabulary usage (Yanti, 2021; Budiana, 2022). Additionally, abstract reasoning contributes to the development of a deeper understanding of the language being taught, allowing teachers to provide clearer and more contextual explanations for students (Hidayati, 2020; Ramadhani & Sari, 2023). Thus, mastery of abstract reasoning skills enhances the quality of teaching and positively impacts student learning outcomes (Nugroho, 2023).

However, despite the growing body of research on critical thinking and abstract reasoning, several gaps remain unaddressed. First, studies on Reading for Emotion and Aesthetics (RFEA) have largely been confined to literary analysis, focusing on aesthetic enjoyment rather than linking emotional engagement with the cultivation of higher-order thinking skills in academic contexts. Second, the integration of artificial intelligence (AI) into RFEA practices is still underexplored. Although AI is increasingly used for adaptive assessment and language tutoring, its potential to scaffold emotional engagement in reading and to support abstract reasoning among pre-service teachers in Indonesia remains an under-researched domain. Third, most existing research on literacy and reasoning skills has centered on secondary or general university students, leaving pre-service English teachers, a group crucial for future educational transformation, relatively understudied. Finally, methodological approaches tend to be short-term and quantitative, with limited in-depth case studies that can capture the reflective and developmental processes of pre-service teachers over time.

These gaps highlight the necessity of exploring how RFEA, supported by AI tools, can foster deeper comprehension and critical analysis of academic texts while simultaneously cultivating abstract reasoning and Higher-Order Thinking Skills (HOTS). As Sudimantara and Indriyani (2021) noted, Indonesia's reading ability has been concerningly low for over a decade, underscoring the urgency for innovative solutions. Integrating emotional literacy into pedagogy, as argued by Lian (2024) and supported by Damasio's findings on the interplay between emotion and reasoning, offers a promising direction. By situating pre-service English teachers at the center of this inquiry, the present study seeks to address these overlooked dimensions, providing both theoretical contributions and practical implications for teacher education in Indonesia.

2. METHODS

2.1. Research Design

A qualitative case study was chosen to capture the emotional, cognitive, and reflective experiences of pre-service English teachers. This design enables deep investigation of complex cognitive–affective processes in natural learning contexts.

2.2. Participants and Setting

Participants consisted of ten third-semester pre-service English teachers enrolled in a reading class integrating RfE, Aesthetics, and AI-based reflective tasks. Three participants were selected for follow-up interviews.

2.3. Data Collection

Two instruments were used: (1) a structured questionnaire to capture initial perceptions and self-reported reasoning development; and (2) semi-structured interviews that explored deeper emotional and cognitive engagements with RfE and AI.

2.4. Data Analysis

Thematic analysis (Braun & Clarke, 2006) guided coding and theme development. Responses were analyzed iteratively to identify patterns related to emotional engagement, abstract reasoning, and AI use. Triangulation across questionnaires and interviews strengthened validity.

3. RESULTS AND DISCUSSION

3.1. Understanding and Application of RfE and Aesthetics

Thematic analysis of the interview data with pre-service English teachers (PETs) revealed that their engagement with Reading for Emotion (RfE) and Aesthetics developed progressively from initial confusion to more sophisticated applications in text analysis and meaning-making. In line with Braun and Clarke's (2006) framework, the findings were organized into themes and sub-themes that illustrate both cognitive and affective dimensions of learning. Specifically, the theme Understanding and Application of RfE & Aesthetics captures how PETs gradually constructed conceptual clarity, applied the frameworks to various texts, and articulated perceived benefits. This process was also mapped against

Lian's (2021) RfE stages focus, disturbance, dialog, development, resolution, and moral, highlighting how pre-service teachers not only recognized these categories but also used them as analytical tools to deepen emotional and aesthetic engagement with texts. Table 1 presents the codes, sub- themes, themes, their alignment with RfE stages, and illustrative quotes from the participants.

Table 1. *Table of Findings: Understanding and Application of RfE & Aesthetics*

Code	Sub-theme	Theme	RfE Stage Link	Illustrative Quote (PET)
"At first I was shocked because it combined psychology & neuroscience…" (PET2)	Initial confusion and surprise	Understanding & Application of RfE & Aesthetics	**Focus / Disturbance**	"At first, I was shocked because it combined psychology & neuroscience... Over time, it helped me for HOTS." (PET2)
"Reactions at first, honestly quite confused...only explained definition without practice." (PET3)	Struggle in early exposure	Understanding & Application of RfE & Aesthetics	**Focus / Disturbance**	"Reactions at first, honestly quite confused… only explained definition without practice." (PET3)
"RfE: focus, disturbance, dialog, development, moral, resolution. RfA: peak shift, symmetry, metaphor..." (PET1)	Grasping conceptual structure	Understanding & Application of RfE & Aesthetics	**Focus → Moral**	"RfE: focus, disturbance, dialog, development, moral, resolution. RfA: peak shift, symmetry, metaphor..." (PET1)
"RfE structures the text from focus–moral to understand problem & solution. RfA sees the moral and essence." (PET2)	Distinguishing RfE and RfA roles	Understanding & Application of RfE & Aesthetics	**Development → Moral**	"RfE structures the text from focus moral to understand problem & solution. RfA sees the moral and essence." (PET2)

"I analyzed manually first, then gave it to ChatGPT for review." (PET1)	Practical application in analysis	Understanding & Application of RfE & Aesthetics	**Dialog / Development**	"I analyzed manually first, then gave it to ChatGPT for review." (PET1)
"In the first meeting, I was asked to analyze a song… then used Ania Lian's definitions." (PET3)	Using authentic texts for practice	Understanding & Application of RfE & Aesthetics	**Dialog / Development**	"In the first meeting, I was asked to analyze a song… then used Ania Lian's definitions." (PET3)
"After understanding RfE, other courses felt easier." (PET1)	Transfer of skills to other subjects	Understanding & Application of RfE & Aesthetics	**Resolution**	"After understanding RfE, other courses felt easier." (PET1)
"RfE makes the reader feel what the writer feels." (PET3)	Emotional and aesthetic engagement	Understanding & Application of RfE & Aesthetics	**Resolution / Moral**	"RfE makes the reader feel what the writer feels." (PET3)
"Aesthetic helps to structure the values or essences in the text." (PET2)	Aesthetics for meaning-making	Understanding & Application of RfE & Aesthetics	**Moral**	"Aesthetic helps to structure the values or essences in the text." (PET2)
"With RfE, I realized development can generate either a problem or a solution." (PET1)	Deepening understanding of structure	Understanding & Application of RfE & Aesthetics	**Development**	"With RfE, I realized development can generate either a problem or a solution." (PET1)

The analysis of pre-service English teachers' (PETs) responses demonstrates a developmental trajectory in their understanding and application of RfE and Aesthetics. At the outset, most PETs reported confusion and even surprise when first encountering the frameworks, particularly due to the interdisciplinary nature of RfE, which combines psychological and neuroscientific perspectives (PET2, PET3). This stage resonates with the focus and disturbance phases of RfE, where learners are confronted with new concepts that disrupt prior ways of reading and interpreting texts. As their exposure deepened, PETs began to grasp the conceptual structure of RfE are identify the sequential elements of focus, disturbance, dialog, development, resolution, and moral, and distinguishing it from the role of Aesthetics, which they associated with principles such as peak shift, symmetry, and metaphor (PET1, PET2). This stage reflects the movement toward dialogue and development

within the RfE framework, as students negotiated and refined their conceptual understanding.

Practical application marked the next stage of their learning. PETs integrated RfE and Aesthetics in analyzing various texts, ranging from songs to academic essays, and some compared manual analysis with AI-assisted reviews (PET1, PET3). Through this process, they demonstrated dialogic engagement with texts and tools, suggesting that the frameworks supported more systematic and reflective analysis. Finally, participants articulated perceived benefits, noting that RfE and Aesthetics helped them structure ideas, engage emotionally with texts, and uncover moral or essential values (PET2, PET3). They also reported transfer of skills to other courses, where the frameworks enhanced critical engagement and interpretive depth (PET1). These reflections align with the resolution and moral stages of RfE, where learners consolidate understanding and derive broader implications for meaning-making.

Overall, the theme of Understanding and Application of RfE & Aesthetics highlights how PETs transitioned from initial confusion to meaningful integration of the frameworks in their academic and personal learning contexts. This trajectory underscores the potential of RfE and Aesthetics not only as analytical tools but also as mediators of affective engagement, critical reflection, and knowledge transfer.

3.2. Integration of Emotion, Aesthetics, and AI in Critical Analysis

Another salient theme emerging from the data concerns the ways in which pre-service English teachers integrated emotion, aesthetics, and artificial intelligence (AI) in their critical text analysis. While RfE enabled participants to engage affectively with texts and Aesthetics highlighted the clarity and beauty of language, AI was perceived as a complementary tool that scaffolded reasoning, validated interpretations, and provided alternative perspectives. However, participants also noted the limitations of AI, particularly its tendency to produce static or affectively detached responses, which required them to supplement logical structure with emotional depth. In this sense, the integration of human affective sensitivity and AI-driven reasoning reflects a dialogic process aligned with the development and resolution stages of RfE. Table 2 illustrates how these dynamics unfolded through codes, sub-themes, and representative quotes.

Table 2. *Table of Findings: Integration of Emotion, Aesthetics, and AI in Critical Analysis*

Code	Sub-theme	Theme	RfE Stage Link	Illustrative Quote (PET)
"AI can provide a new perspective that sometimes I could not think of." (PET1)	AI as complementary tool	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Dialog/Development**	"AI can provide a new perspective that sometimes I could not think of." (PET1)
"AI helped validate my reasoning and gave logical explanations when my analysis felt	AI as scaffolding for reasoning	Integration of Emotion, Aesthetics, and AI in	**Development**	"AI helped validate my reasoning and gave logical explanations when my analysis felt

vague." (PET2)		Critical Analysis		vague." (PET2)
"Sometimes AI's output was static and less flexible, so I still needed to adjust it with my own interpretation." (PET3)	Limitations of AI	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Disturbance**	"Sometimes AI's output was static and less flexible, so I still needed to adjust it with my own interpretation." (PET3)
"RfE gave me a way to feel and reflect, while AI structured the reasoning." (PET1)	Blending emotion and logic	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Dialog → Resolution**	"RfE gave me a way to feel and reflect, while AI structured the reasoning." (PET1)
"With aesthetics, I could see clarity and beauty in the text; AI then helped me articulate it in academic terms." (PET2)	Aesthetics supported by AI articulation	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Development → Moral**	"With aesthetics, I could see clarity and beauty in the text; AI then helped me articulate it in academic terms." (PET2)
"Using AI, I could test whether my interpretation was logical, not only emotional." (PET3)	Balancing emotional and logical engagement	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Dialog / Resolution**	"Using AI, I could test whether my interpretation was logical, not only emotional." (PET3)
"Emotion makes the text alive, while AI makes the analysis more structured." PET1)	Emotion for engagement, AI for structure	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Resolution**	"Emotion makes the text alive, while AI makes the analysis more structured." PET1)
"When I asked AI about metaphors, it explained clearly but without feelings. My role was to add	AI lacks affective depth	Integration of Emotion, Aesthetics, and AI in Critical Analysis	**Disturbance / Resolution**	"When I asked AI about metaphors, it explained clearly but without feelings. My role was to add

| the emotional depth." (PET2) | the emotional depth." (PET2) |

The findings show that pre-service English teachers (PETs) positioned emotion, aesthetics, and AI as complementary yet distinct dimensions of critical text analysis. A recurring pattern in their reflections is the acknowledgement that AI provided logical scaffolding and alternative perspectives that expanded their interpretive repertoire. PET1, for instance, emphasized that "AI can provide a new perspective that sometimes I could not think of," underscoring the role of technology in extending cognitive resources. Similarly, PET2 noted that AI not only validated her reasoning but also supplied logical explanations when her own analysis lacked clarity, which corresponds to the development stage of RfE where learners refine their interpretations through external support.

At the same time, participants recognized the limitations of AI, particularly its tendency to be static, rigid, and emotionally detached. PET3 described AI's outputs as "less flexible" and requiring personal adjustment, while PET2 highlighted that AI could explain metaphors clearly but failed to capture their emotional depth. These reflections represent the disturbance stage of RfE, as learners identified tensions between technological precision and human affective engagement.

Despite these challenges, participants consistently reported that the integration of emotion and aesthetics with AI enhanced the depth of analysis. For instance, PET1 observed that "RfE gave me a way to feel and reflect, while AI structured the reasoning," while PET2 explained that aesthetics revealed the "clarity and beauty in the text" which AI then articulated in academic terms. These insights point to a dialogic relationship between human and machine, in which affective sensitivity and aesthetic appreciation balance technological rationality.

Finally, participants stressed the importance of balancing emotional and logical engagement, with PET3 reflecting that AI helped her "test whether my interpretation was logical, not only emotional." This demonstrates a shift toward resolution within the RfE cycle, as PETs reconciled emotion, aesthetics, and AI into a coherent approach to critical analysis. Overall, the integration of these dimensions suggests that AI was not viewed as a substitute for human interpretation but as a mediator that complemented emotional and aesthetic ways of knowing.

3.3. Development of Higher-Order Thinking Skills (HOTS)

A further theme identified in the data relates to the development of higher-order thinking skills (HOTS) through the use of RfE, Aesthetics, and AI. Participants emphasized that these tools encouraged them to move beyond literal comprehension toward structured analysis, reflective engagement, evaluative judgment, and creative idea generation. Consistent with Bloom's revised taxonomy, their accounts highlighted growth in analysis, evaluation, and creation, often mediated by emotional and aesthetic sensitivity. RfE provided a scaffold for step-by-step interpretation, while Aesthetics guided attention to moral and essential values. At the same time, AI functioned as a supportive resource that helped refine abstractions, strengthen reasoning, and validate arguments. This integration of affective and cognitive dimensions reflects the dialog, development, and resolution stages of RfE, where learners consolidate their critical insights into transferable academic practices. Table 3 presents the codes, sub-themes, themes, their alignment with RfE stages, and illustrative quotes.

Table 3. *Table of Findings: Development of Higher-Order Thinking Skills (HOTS)*

Code	Sub-theme	Theme	RfE Stage Link	Illustrative Quote (PET)
"With RfE, I learned to analyze text step by step and not just read literally." (PET1)	Structured analytical thinking	Development of HOTS	**Focus → Development**	"With RfE, I learned to analyze text step by step and not just read literally." (PET1)
"I began to reflect on the meaning beyond words, like the moral or essence of the text." (PET2)	Reflective and evaluative engagement	Development of HOTS	**Dialog/Moral**	"I began to reflect on the meaning beyond words, like the moral or essence of the text." (PET2)
"RfE taught me to see multiple perspectives in a text, not only from one side." (PET3)	Critical perspective-taking	Development of HOTS	**Dialog / Development**	"RfE taught me to see multiple perspectives in a text, not only from one side." (PET3)
"AI corrected my abstraction when it was too vague and helped me give logical reasoning." (PET2)	AI as scaffolding for abstraction & reasoning	Development of HOTS	**Development**	"AI corrected my abstraction when it was too vague and helped me give logical reasoning." (PET2)
"By using AI and RfE together, I could evaluate arguments better, not just accept them." (PET1)	Enhancing evaluative judgment	Development of HOTS	**Development → Resolution**	"By using AI and RfE together, I could evaluate arguments better, not just accept them." (PET1)
"When creating my own text, I used RfE as a structure for idea development." (PET3)	Creative writing and idea generation	Development of HOTS	**Development/Creation**	"When creating my own text, I used RfE as a structure for idea development." (PET3)

"I realized HOTS means not only analyzing but also connecting emotion with reasoning." (PET2)	Integrating emotion and cognition	Development of HOTS	**Resolution**	"I realized HOTS means not only analyzing but also connecting emotion with reasoning." (PET2)
"Through reflection, I could see how my interpretation changed from the beginning to the end." (PET1)	Meta-cognitive reflection	Development of HOTS	**Dialog →Resolution**	"Through reflection, I could see how my interpretation changed from the beginning to the end." (PET1)

The data indicate that the use of RfE, Aesthetics, and AI significantly supported the development of higher-order thinking skills (HOTS) among pre-service English teachers (PETs). At the foundational level, participants described how RfE provided a step-by-step structure for analysis, allowing them to move beyond surface-level reading. PET1 reflected, "With RfE, I learned to analyze text step by step and not just read literally," which aligns with the focus and development stages of RfE, where learners begin to organize their interpretations more systematically.

As their engagement deepened, PETs reported heightened reflective and evaluative practices. PET2 emphasized that she began to see "the moral or essence of the text" beyond its literal meaning, while PET3 acknowledged that RfE encouraged her to view texts from multiple perspectives. These reflections illustrate how the dialog and moral stages of RfE facilitated not only critical perspective-taking but also evaluative engagement, key components of HOTS.

The integration of AI further advanced participants' analytical and evaluative capacities. PET2 stated that "AI corrected my abstraction when it was too vague and helped me give logical reasoning," pointing to AI's function as scaffolding for abstraction and reasoning. Similarly, PET1 noted that combining AI with RfE enabled more robust evaluative judgment, as it allowed him to test arguments rather than accept them uncritically. These accounts demonstrate that AI served as a mediator in the development and resolution phases, where learners refined reasoning and validated interpretations.

Participants also highlighted the role of RfE in creative and generative thinking. PET3 explained that she used RfE as a structural tool for composing her own texts, illustrating how RfE moved beyond analysis to support idea creation, consistent with the creation level of Bloom's revised taxonomy. Furthermore, meta-cognitive growth was evident in PET1's observation that reflection allowed him to track how his interpretation evolved from beginning to end, a hallmark of higher-level critical thinking and self-regulation.

Collectively, these findings suggest that HOTS development was fostered through the integration of cognitive scaffolding, emotional engagement, and aesthetic sensitivity. RfE offered the structural pathway, Aesthetics enriched moral and affective awareness, and AI functioned as a logical validator. This synergy empowered PETs to progress from literal

comprehension to critical, evaluative, and creative engagement with texts demonstrating the transformative potential of combining human and technological resources in the cultivation of HOTS.

3.4. Challenges and Pedagogical Implications

The final theme emerging from the data concerns the challenges participants faced in engaging with RfE, Aesthetics, and AI, as well as the pedagogical implications they envisioned. On the one hand, PETs reported difficulties in mastering theoretical complexity, classifying RfE stages accurately, and formulating effective prompts for AI. They also highlighted the static nature of AI outputs, which often required human adjustment to infuse emotional or reflective depth. On the other hand, these challenges stimulated awareness of pedagogical opportunities. Participants saw the integration of RfE and Aesthetics not only as tools for their own learning but also as resources to cultivate critical and reflective thinking among future students. This balance between limitations and opportunities reflects both disturbance and resolution within the RfE cycle, underscoring the dual role of these frameworks as sources of struggle and as drivers of pedagogical innovation. Table 4 presents the detailed findings with sub-themes and illustrative quotes.

Table 4. *Table of Findings: Challenges and Pedagogical Implications*

Code	Sub-theme	Theme	RfE Stage Link	Illustrative Quote (PET)
"Sometimes I struggled to design the right prompt for AI to get useful output." (PET1)	Difficulty in prompt-making	Challenges and Pedagogical Implications	**Disturbance**	"Sometimes I struggled to design the right prompt for AI to get useful output." (PET1)
"It was complex to understand the neuroscience and psychology aspects in RfE." (PET2)	Complexity of theoretical understanding	Challenges and Pedagogical Implications	**Focus / Disturbance**	"It was complex to understand the neuroscience and psychology aspects in RfE." (PET2)
"I was confused about which part of the text belongs to which RfE stage." (PET3)	Misclassification of RfE stages	Challenges and Pedagogical Implications	**Disturbance → Dialog**	"I was confused about which part of the text belongs to which RfE stage." (PET3)
"AI sometimes gave static responses, so I had to adjust and add my own	Limitation of AI	Challenges and Pedagogical Implications	**Disturbance**	"AI sometimes gave static responses, so I had to adjust and add my own

reflection." (PET2)				reflection." (PET2)
"I see RfE as a tool to train students in critical thinking for higher levels." (PET1)	Pedagogical potential for HOTS	Challenges and Pedagogical Implications	**Resolution**	"I see RfE as a tool to train students in critical thinking for higher levels." (PET1)
"In the future, I would like to integrate RfE and Aesthetics into my teaching of reading and writing." (PET3)	Future integration in pedagogy	Challenges and Pedagogical Implications	**Resolution / Moral**	"In the future, I would like to integrate RfE and Aesthetics into my teaching of reading and writing." (PET3)
"The challenge is to balance AI's logic with human feeling, but that is also what makes it useful for learning." (PET2)	Balancing AI logic and human affect	Challenges and Pedagogical Implications	**Dialog → Resolution**	"The challenge is to balance AI's logic with human feeling, but that is also what makes it useful for learning." (PET2)

The accounts of PETs reveal that working with RfE, Aesthetics, and AI was not without challenges. One prominent difficulty was the technical complexity of using AI effectively, particularly in crafting prompts that could yield meaningful outputs. PET1 admitted, *"Sometimes I struggled to design the right prompt for AI to get useful output,"* highlighting the trial-and-error nature of interacting with generative tools. Similarly, PET2 emphasized the conceptual challenge of grappling with the interdisciplinary basis of RfE, describing the integration of psychology and neuroscience as overwhelming. PET3 also noted difficulties in classifying text segments into RfE stages, a challenge linked to the *disturbance* phase, where learners wrestle with unfamiliar frameworks.

In addition, participants described the limitations of AI, especially its static and affectively detached responses. PET2 observed that AI required her to add personal reflection to make the analysis meaningful, which illustrates the necessity of combining machine logic with human sensitivity. Yet, this very limitation led PETs to recognize the importance of their interpretive agency, reinforcing the idea that AI should function as a partner rather than a replacement in the learning process.

Despite these struggles, PETs articulated clear pedagogical implications. PET1 viewed RfE as a valuable instrument to foster critical thinking at higher levels, while PET3 expressed an intention to integrate RfE and Aesthetics into her future teaching of reading and writing. PET2 further reflected that the key challenge and opportunity lay in balancing AI's logical structure with human feeling, a task that resonates with the *dialog* and *resolution* stages of RfE.

Taken together, these findings illustrate that challenges and opportunities are deeply intertwined. While PETs encountered obstacles in theory, practice, and technology,

these very difficulties also sharpened their awareness of how to employ RfE, Aesthetics, and AI pedagogically. The data thus highlight that critical learning occurs not in the absence of challenges but through negotiating them, transforming disturbance into resolution and paving the way for innovative classroom practices.

4. CONCLUSION

This study examined how pre-service English teachers (PETs) engaged with Reading for Emotion (RfE) and Aesthetics, as well as how these frameworks contributed to the development of higher-order thinking skills (HOTS). With regard to the first research question, the findings demonstrate that PETs initially struggled with understanding the theoretical complexity of RfE and Aesthetics, often experiencing confusion in applying these concepts. However, through repeated practice and guided analysis, they gradually developed a clearer conceptual grasp. RfE provided them with a structured lens to trace emotional progression in texts, while Aesthetics offered tools to appreciate and analyze clarity, beauty, and moral values. This dual engagement allowed PETs to move beyond surface-level comprehension toward a more critical and affectively informed analysis of texts.

In applying these frameworks, PETs described how RfE and Aesthetics encouraged them to analyze a wide range of texts, from songs to academic essays. The structured stages of RfE (focus, disturbance, dialog, development, resolution, and moral) served as a scaffold for organizing interpretations, while aesthetic principles such as metaphor, symmetry, and peak shift enriched their understanding of meaning and values. Importantly, PETs emphasized that these tools enabled them to connect emotionally with texts, making reading not only a cognitive but also an affective and reflective process. Such integration underscores the role of RfE and Aesthetics as mediators of critical literacy, supporting both analytical rigor and emotional resonance.

The second research question highlighted how PETs developed HOTS through their engagement with RfE, Aesthetics, and, to some extent, AI. The data reveal that these tools facilitated growth across multiple dimensions of HOTS, including structured analytical thinking, reflective and evaluative practices, creative and generative thinking, integrative reasoning, and metacognitive awareness. PETs reported that RfE helped them organize their analytical process step by step, while Aesthetics encouraged them to question underlying values and consider alternative perspectives. At the same time, AI-supported abstraction, logical reasoning, and argument validation, enabling PETs to balance emotional engagement with rational structure.

Crucially, the integration of emotional, cognitive, and technological resources allowed PETs to progress from literal comprehension to higher levels of Bloom's taxonomy, particularly evaluation and creation. They not only evaluated texts critically but also used RfE and Aesthetics as frameworks for generating new ideas and constructing their own writing. Reflection played a pivotal role in this process, as PETs became increasingly aware of how their interpretations evolved, how emotions influenced their judgments, and how reasoning could be strengthened through scaffolding. Such metacognitive growth signifies a deeper transformation in their approach to learning, positioning them as reflective practitioners capable of transferring these skills to academic and pedagogical contexts.

The findings also highlight several challenges, including difficulties in prompt-making for AI, misclassification of RfE stages, and the conceptual complexity of integrating psychology and neuroscience. Nevertheless, these challenges became growth opportunities, as PETs recognized the potential of RfE and Aesthetics as pedagogical tools. They envisioned integrating these approaches into future teaching practices to foster

students' critical thinking, reflective engagement, and emotional sensitivity in reading and writing. In conclusion, this study demonstrates that RfE and Aesthetics not only enhanced PETs' comprehension and critical analysis of texts but also supported the holistic development of HOTS. By combining emotional resonance, aesthetic sensitivity, and logical reasoning augmented by AI pre-service teachers cultivated a balanced approach to critical literacy. The interplay of affective and cognitive engagement within the RfE framework provided a powerful pathway for developing analytical, evaluative, creative, and reflective capacities. These insights underscore the pedagogical value of integrating RfE and Aesthetics into teacher education, preparing future teachers to nurture both the intellectual and emotional dimensions of literacy in their classrooms.

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