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How to Differentiate AI-Writing with Man's Writing: The Macro-Thinking Approach

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Abstract: ***The proliferation of artificial intelligence (AI) and large language models (LLMs) presents multifaceted challenges to contemporary pedagogical practices, particularly within the domain of English writing teaching. This phenomenon is largely attributable to the capacity of numerous LLM platforms to either assist in or autonomously generate entire passages of text based on user-specified themes. Moreover, scholarly inquiry has identified a critical deficit in the coherence and inherent logical structure of AI-generated discourse, underscoring the imperative for a systematic pedagogical methodology to effectively integrate these technologies into educational contexts and guide students in their utilization. This paper posits that a macro-thinking approach can serve as a valuable pedagogical tool for navigating the complexities of English writing instruction in the AI era. This framework can empower educators to effectively discriminate between AI-generated and human-crafted text, while simultaneously facilitating the provision of constructive feedback. Macro-thinking, a cognitive approach characterized by the human propensity to apprehend the overarching structure of complex phenomena, offers a versatile analytical lens applicable not only to everyday experiences but also to scholarly inquiry and pedagogical practice. By fostering a holistic understanding of textual production, this framework can equip students with the critical thinking skills necessary to discern, evaluate, and engage with both AI and human-generated discourse, ultimately fostering a more nuanced and sophisticated approach to English writing in an increasingly technologically-mediated world.***

Keywords: AI-writing; Large language models; Education; English writing; Macro-thinking.

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1. Introduction

The origins of language models can be traced back to the early days of statistical and rule-based systems, such as n-gram models and Hidden Markov Models (HMMs) (Eddy, 2004). However, these initial models were inherently constrained in their capacity to manage intricate language structures. A significant breakthrough emerged in the 2010s with the advent of neural network-based methodologies, particularly the development of word embeddings like Word2Vec and GloVe, alongside sequence-to-sequence models augmented by attention mechanisms.

The introduction of the Transformer architecture in 2017 marked a pivotal turning point in the field. This innovation enabled models to process language in a parallel fashion and to capture more profound contextual relationships. The contemporary era of Large Language Models (LLMs) commenced around 2018 with the advent of models such as OpenAI's GPT-1 and Google's BERT. These models exemplified the efficacy of large-scale pre-training and fine-tuning, thereby setting new benchmarks in the industry. The subsequent iterations, GPT-2 in 2019 and GPT-3 in 2020, further amplified the scale of parameters, showcasing exceptional few-shot and zero-shot learning capabilities. By 2022, models like ChatGPT, grounded in the GPT-3.5 architecture, integrated reinforcement learning from human feedback (RLHF), thereby enhancing their interactivity and alignment with human preferences.

In recent years, the pace of advancement has accelerated with the emergence of models like GPT-4, Google's Gemini, and Meta's LLaMA. These cutting-edge models are characterized by their focus on multimodality, efficiency, and ethical alignment, representing the forefront of language model development. According to Zimotti (2024), large language models (LLMs) are defined as "computational models that possess the capability to comprehend and generate human language, exhibiting a transformative potential to predict the likelihood of word

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sequences or generate novel text based on a given input" (p. 2). The evolution of LLMs, particularly in the realm of AI-generated content encompassing images, texts, films, music, and beyond, has precipitated a profound transformation within the landscape of language education. These models are redefining pedagogical paradigms by providing innovative tools and methodologies. LLMs are instrumental in creating learner-centric educational materials, streamlining teaching processes, and delivering personalized language instruction (Bonner, Lege, & Frazier, 2023). In higher education, they facilitate autonomous, collaborative, and interactive learning environments (Peláez-Sánchez, Velarde-Camaqui, & Glasserman-Morales, 2024). Their applications span across various domains, including machine translation, creative writing, and paraphrasing tasks (Hamaniuk, 2021). Furthermore, LLMs are being deployed as English learning assistants, content generators for medical education, and tools for academic research and test evaluation (Dong, Bai, Xu, & Zhou, 2024).

Despite these advancements, challenges persist. There is an imperative need for human oversight to ensure the quality and accuracy of content generated by LLMs (Peláez-Sánchez et al., 2024). Additionally, there are concerns regarding potential impediments to the development of critical thinking skills and ethical considerations (Dong et al., 2024). The responsible and ethical integration of LLMs into educational settings is paramount to uphold academic integrity while harnessing their benefits (Hamaniuk, 2021; Peláez-Sánchez et al., 2024). Given these considerations, the question of how to judiciously implement LLMs and AI technology in language education has become a pressing issue for educators and institutions of higher learning.

The relationship between humans and technology has historically been characterized by a paradoxical tension, wherein technology is simultaneously perceived as a liberating force and a potential source of harm. The integration of AI technology into the educational sphere has exacerbated this paradox, ushering in a new dimension of complexity. On one hand, educators have benefited from the deployment of large language models (LLMs) and AI technologies, which have been shown to enhance student engagement and motivation (Kasneci, et al., 2023). On the other hand, there exists a concurrent concern regarding the potential detrimental effects on students' cognitive development and critical thinking abilities (Kasneci, et al., 2023). Philosopher Martin Heidegger, in his seminal work *The Question Concerning Technology* (1977), posits that modern technology transcends the status of a mere instrument, instead compelling phenomena into a paradigm of existence that is quantifiable and manipulable through the concept of "Gestell", or "enframing" (20). This suggests that advanced technologies, such as LLMs and AI, may subtly "coerce" social practices, including education, into conforming to a paradigm of efficiency maximization. Amidst the relentless progression of technology, a significant pedagogical shift or revolution is imperative in this digital era. Therefore, this paper will delve into two empirical case studies that exemplify a cognitive approach to teaching English writing, thereby illustrating a potential pathway for navigating the complexities of integrating AI technology into education.

2. Literature Review

This section will delineate the literature review into two distinct, yet interconnected, domains of inquiry. The first domain will focus on the students' perceptions of AI-generated writing produced by large language models (LLMs), while the second domain will investigate the teachers' perspectives on this emerging phenomenon. This bifurcated approach aims to provide a comprehensive understanding of the multifaceted implications of AI writing within the educational context.

2.1 Students' Perceptions of AI-Writing

Recent scholarly inquiries have investigated the perceptions and utilization of AI-driven writing instruments among university students in the context of English language acquisition. Empirical evidence suggests a predominantly favorable disposition towards these technologies, with students commending their accessibility, adaptability, and potential to augment writing proficiency (Phan, 2023; Sumakul, Sukyadi, & Hamied, 2022). While self-reported familiarity with AI writing tools is moderate, students acknowledge their capacity to cultivate creativity and innovation (Gasaymeh, Beirat, & Qbeita, 2024). Nevertheless, misgivings persist concerning the propagation of misinformation, data security vulnerabilities, and the potential for detrimental effects on skill development (Gasaymeh et al., 2024; Bensalem, Harizi, & Boujlida, 2024). Notwithstanding these reservations, AI-powered tools are widely and consistently employed for the composition of written assignments (Bensalem et al., 2024). To optimize the pedagogical benefits of these instruments, researchers advocate for enhancing students' technical acumen, addressing ethical considerations, and fostering AI literacy (Gasaymeh et al., 2024).

2.2 Teachers' Perceptions of AI-Writing

A prevalent sentiment among teachers reveals a generally positive outlook, acknowledging the potential of these tools to bolster student engagement and enhance writing quality, particularly concerning content development and structural organization (Marzuki, Widiati, Rusdin, Wiwin, & Indrawati, 2023; Nazim, 2024). Notably, pre-service teachers have been observed to rate AI-generated texts more favorably than their human-crafted counterparts, especially in terms of linguistic parameters such as text structure (Navío-Inglés, Tirado-Olivares, Olmo-Muñoz, & Mora, 2024). Furthermore, STEM educators have recognized the superiority of AI as a scaffolding resource for scientific writing instruction (Kim & Kim, 2022).

However, this optimism is tempered by concerns regarding potential pitfalls, including overreliance, inherent biases within AI systems, and the evolving role of educators in this new paradigm (Nazim, 2024; Kim & Kim, 2022). Compounding these issues is the challenge of authenticating student work. Frontline teachers report difficulties in discerning the authenticity of assignments. While some novice teachers demonstrate competence in identifying AI-generated texts using linguistic and content-related cues, others encounter significant difficulties (Wilde, 2024). Moreover, both human evaluators and AI detection technologies grapple with accurately identifying machine-generated content, leading to concerns regarding false positives (Fisk, 2024), thus further complicating the teacher's role as a detector. Empirical studies on AI-based detection models, such as RoBERTa classifiers, reveal potential for identifying machine-generated texts, yet their accuracy rates remain inconsistent (Ibrahim, 2023). In light of these multifaceted challenges, experts advocate for a judicious approach to AI detection, prioritizing educational growth and development over punitive measures (Fisk, 2024).

These studies argue that current software struggles to accurately detect the utilization of Large Language Models (LLMs) in university-level work, thereby posing novel challenges to both educators and institutions. Consequently, there arises an imperative for these stakeholders to formulate strategies for addressing student use of LLMs and AI technologies. Kasneci and other scholars (2023) have proposed practical recommendations to enhance both students' and educators' understanding of AI's limitations and to foster a critical approach to deploying these tools in educational settings, including integrating AI literacy modules into the curriculum, implementing ethical guidelines for AI use, etc. However, these suggestions predominantly concentrate on the operationalization of specific pedagogical strategies while arguably underemphasizing the cultivation of uniquely human cognitive faculties. The shared concern across these studies regarding education in the AI era underscores an urgent need for a paradigmatic shift in English writing.

3. Research Design in AI-Writing

3.1 Research Questions

This research will explore the following core issues:

1) Discerning Authorship in the Age of AI: How can we effectively distinguish between text generated by AI and text authored by students themselves? This encompasses the exploration of methodologies and tools for identifying the subtle nuances that differentiate machine-generated from human-crafted writing.

2) Problematics of AI-Generated Writing: What are the inherent limitations, ethical concerns, and potential pitfalls associated with the use of AI writing tools in an educational context? This involves a critical examination of the current capabilities and shortcomings of Large Language Models (LLMs).

3) Pedagogical Approaches to AI-Written Text: What should be the pedagogical focus when encountering AI-generated text in student work; how can educators effectively guide students in developing a critical and nuanced understanding of LLMs, fostering responsible and ethical use of these technologies? These entail exploring strategies for both addressing the challenges posed by AI-writing and leveraging its potential for educational enrichment.

3.2 Research Process

This research is grounded in the "*Thinking Model of English Reading and Writing*" which is a writing training course, designed for first-year undergraduate students in the School of Foreign Studies at the University of Science and Technology Beijing. The study specifically focuses on a designated writing task within this course framework: the writing of an expository essay informed by the three-color principle. To address the core research questions

delineated previously, this paper employs a qualitative case study approach, selecting two student-generated essays as exemplars (**The two essays featured in the appendix of the paper**) for in-depth analysis and critical examination.

4. Research Analysis of Two Case Studies

4.1 The Macro-thinking Approach

These two articles exhibit common limitations: a lack of logical coherence in their organizational structure and a dearth of representative evidence in their selection of supporting grounds. The first article, *A Red Rose in Our Dormitory*, exhibits linguistic patterns that strongly suggest AI authorship. Scholars have observed that instructors, particularly in lower-division undergraduate courses like the one under investigation, often discern AI-generated text based on syntactic anomalies (Zimotti et al., 2024). However, they concurrently acknowledge the "difficulty of distinguishing between text generated by LLMs or with other forms of assistance (Zimotti et al., 2024, p. 12). Furthermore, as Kasneci (2023) and others have demonstrated, students' motivations for employing LLMs vary considerably, yet a prevailing instructor belief persists that nearly all students currently utilize LLMs and other tools in their academic pursuits. Amidst these developments, the imperative to differentiate between AI-generated and student-authored text necessitates immediate pedagogical intervention. In response to this critical need, a novel approach is proposed.

The macro-thinking approach, a cognitive framework, offers a potential solution. It posits that humans possess an inherent cognitive capacity to synthesize a holistic understanding from discrete experiential instances. It facilitates the construction of academically rigorous and systematically structured texts, while concurrently cultivating critical thinking competence---a faculty notably absent in AI-assisted writing (Shen & Chen, 2024), through the development of interconnected logical reasoning within the text. In the context of reading, a macro-thinking approach enables rapid comprehension of the main ideas; similarly, in writing, it serves as a foundational framework. To illustrate this framework, the paper adopts the metaphor of a rainbow's color spectrum, represented by the three-color principle.

Following precipitation of rain, the appearance of a rainbow is a common occurrence. Its aesthetic appeal largely stems from its incorporation of the full spectrum of visible colors found in nature, ranging from the deepest reds to the most subtle blues. However, the precise delineation of each individual hue within this spectrum proves challenging due to their seamless blending. As Berlin and Kay elucidate in their seminal work, *Basic Color Terms: Their Universality and Evolution (1991)*, human visual perception exhibits greater sensitivity to certain distinct colors, leading to the tendency to categorize and name these prominent hues, including red, yellow, green, blue, purple, and etc. and leave other colors to be defined in terms of these well-recognized colors, say dark red, greenish-blue, or to be named by less popular names like vermilion, indigo, turquoise, and etc.

The continuous spectrum of the rainbow is often discretely categorized for convenience, typically into distinct hues as shown in Figure 1.

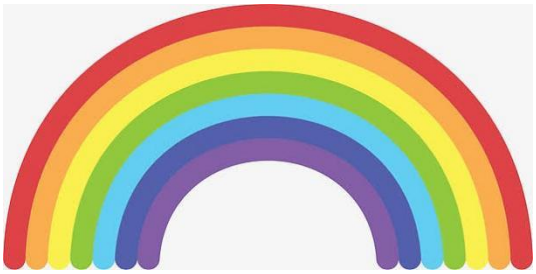

Figure 1: The Continuous Spectrum of the Rainbow

However, this is a simplification of the actual continuum, which encompasses an infinite gradation of colors. For instance, the red portion of the spectrum alone contains a multitude of shades, ranging from dark red to ruby red and vermilion. Perceptually, the human eye tends to discern three primary hues as being particularly salient within this continuum. These are commonly designated as red, yellow, and blue, and they serve as the foundational basis for the vast majority of colors perceivable in the natural world.

In reality, the rainbow encompasses a continuous and effectively limitless gradation of colors. For instance, within

the red portion of the spectrum alone, one can discern a multitude of shades, including dark red, ruby red, and vermilion. This diversity underscores the continuous nature of color. Nevertheless, within this continuum, three hues are generally acknowledged as primary, being evenly distributed across the color wheel. These primary colors---red, yellow, and blue in the subtractive model---are fundamental to the generation of the extensive array of colors observed in the natural world. They serve as the foundational basis for understanding color mixing and perception. However, they cannot be produced by mixing other colors. Within the subtractive color model, red, yellow, and blue are conventionally recognized as the three primary colors, particularly in the context of pigment mixing as illustrated in Figure 2.

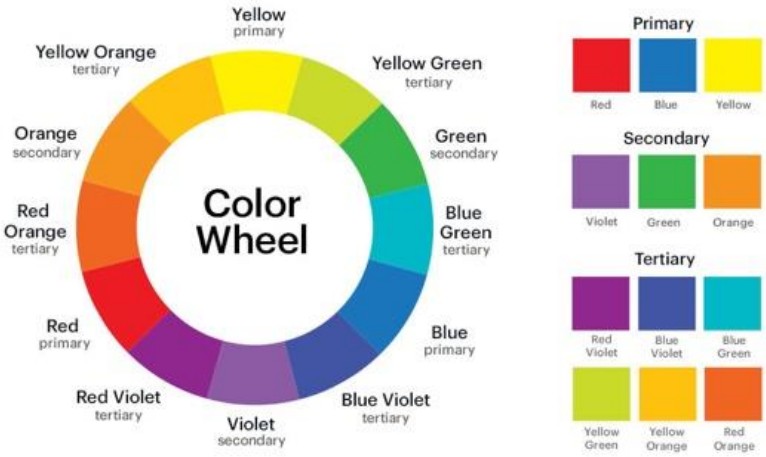

Figure 2: The Color Wheel

As illustrated by Figure 2, these hues serve as foundational reference points within the color wheel. For instance, orange emerges from the combination of red and yellow, purple from red and blue, and green from blue and yellow. This model underscores the interrelation of these primary colors and their capacity to generate a comprehensive gamut of hues through various combinations. The circular arrangement further emphasizes the continuous nature of the color spectrum and the perceptual relationships between different hues. This framework reflects a fundamental organizational principle for understanding color, influencing how hues are categorized and analyzed within various fields. Similarly, this can be also our way of thinking in our arrangement of an article when we are going to explain something.

Conceptualizing an object or phenomenon as a spectrum of colors arrayed in a circular configuration, analogous to a rainbow, facilitates the selection of three equidistant, prominent points for detailed elaboration. This tripartite approach often strikes the most effective balance between breadth and depth. However, the optimal number of focal points may vary depending on the specific context. For instance, a binary framework, such as the dichotomy of white and black, can, from a certain perspective, encompass a broader range of hues. Conversely, certain topics may warrant a more complex, multi-faceted analysis. In most cases, however, three focal points constitute the most common and effective approach. By incorporating an introduction and a conclusion, the paper could establish the structure for an expository article, as illustrated in the Figure 3.

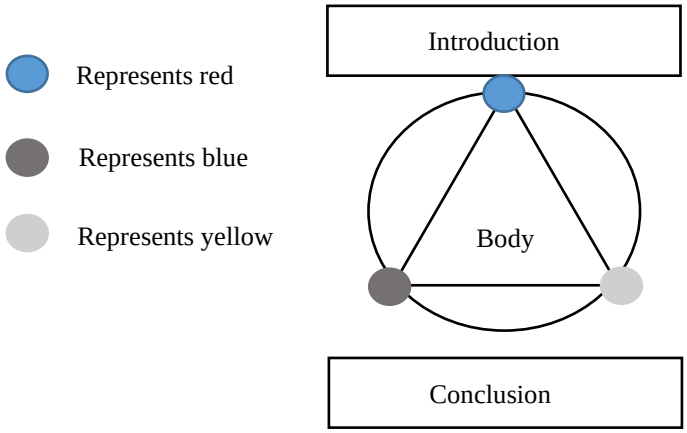

Figure 3: The Structure for an Expository Article

4.2 The Macro-thinking Approach in Organization

As previously observed, the first article exhibits a pronounced dependence on AI, as evidenced by its syntactic sophistication, which is atypical for a first-year undergraduate composition. However, an alternative analytical framework, predicated on a macro-thinking approach, reveals further insights. Specifically, a scrutiny of the article's overarching organizational schema proves instructive. The article, *A Red Rose in Our Dormitory*, adopts a tripartite structural framework, delineating "Appearance and Growth", "Symbolism and Emotional Connection", and "A Unique Addition to Our Dorm". Superficially, this structure appears coherent, with the central thesis --- that the rose serves as an emblem of warmth and companionship --- seemingly substantiated by three supporting arguments, replete with specific details. Nevertheless, a re-evaluation of the article through a macro-thinking approach exposes a critical limitation. The tripartite structural framework fails to comprehensively encompass the full spectrum of the rose's symbolic resonance, thus undermining their efficacy in corroborating the thesis statement. When compared with a second article, *How I Use 'Deep Study' in My Learning*, which demonstrates a more circumspect utilization of AI, the organizational deficiencies of the first article are thrown into sharper relief. While the second article may lack the linguistic polish of the first, its logical structure is demonstrably more robust, outlining a systematic three-step methodology for enhancing academic performance. The second article's tripartite structure --- "Focus on the Big Stuff," "Plan Your Steps Like a To-Do List," and "Don't Get Obsessed with One Thing" --- establishes a more cohesive and linear argumentation than the first. In the second article, the three delineated steps exhibit a clear interdependence, collectively contributing to an exploration of the core theme: the practice of deep study. These three points progressively build upon one another, culminating in a unified thematic expression. Conversely, in the first article, the three principal points lack this synergistic relationship. Furthermore, a closer inspection of *A Red Rose in Our Dormitory* reveals additional organizational weaknesses. While the initial paragraph advances a thesis positing the rose as a symbol of companionship and warmth, paragraphs two and five both address the process of caring for the rose. These two paragraphs should logically be consolidated into a single, cohesive section. Their current separation across disparate sections of the article underscores a fundamental shortcoming in the AI's capacity for effective macro-level organizational planning. To conclude, by applying macro-thinking approach, it's clear that while the article resembles an expository structure, it lacks inherent logic regarding AI technology.

4.3 The Macro-thinking Approach in Selection of Supporting Points

Through the macro-thinking approach, a critical flaw in AI-generated text emerges: the selection of supporting points often lacks both coherence and representativeness. In the first article, the three key points, "Appearance and Growth", "Symbolism and Emotional Connection", and "A Unique Addition to Our Dorm", are neither interconnected in a meaningful way nor sufficiently representative of the broader symbolic meaning of a rose. As the aforementioned three-color principle posits, supporting points should be both interdependent and independent, creating a cohesive and comprehensive argument. Compared to the second article, the logical connection between these points is tenuous at best. Only the second point, "Symbolism and Emotional Connection", directly relates to the overarching theme of the rose's symbolic meaning. The first and third points, concerning the rose's physical attributes and its presence in the dormitory, respectively, lack a clear connection to this central theme. In contrast, the second article's three steps, despite some overlap between the second and third, are demonstrably linked to its core argument: the methodology of deep study. The overall structure of the second article effectively communicates its central message, whereas the supporting points in the first article obfuscate the author's intended meaning. Thus, through the application of the macro-thinking approach, the limitations of AI in developing coherent and representative supporting details are laid bare; the first article, despite its superficial three-part structure, lacks the inherent cohesion necessary for a compelling argument.

4.4 The Macro-thinking Approach in the Revision

While the second article exhibits a lesser degree of reliance on AI, it is not without its own set of issues. This study demonstrates how to refine both AI-generated text and the student's own writing through the application of the macro-thinking approach. The expository structure, akin to the color gamut's balanced distribution into three primary parts with three interconnected points within the body, provides a useful framework. An effective expository article should effectively convey a central idea, with the body paragraphs elaborating on this idea in detail. Typically, each body paragraph should contain a clear topic sentence supported by relevant examples and details to enhance clarity. Analogous to the color scheme of the rainbow, the three points within the body should be representative, interconnected, and, most crucially, function as a unified system to illuminate the main idea.

To summarize, the parallels between the color scheme of a rainbow and the structure of expository writing illuminate a fundamental principle that governs our understanding of both mundane phenomena and complex academic discourse. This principle, when adopted as the macro-thinking approach, allows us to unify our cognitive processes into a holistic framework when describing intricate phenomena. However, this higher-order cognitive ability remains beyond the grasp of AI, as its learning is fundamentally rooted in data processing. Consequently, employing the macro-thinking approach in English writing pedagogy is highly beneficial. It enables teachers to rapidly assess the authenticity and logical coherence of written work, while simultaneously empowering students to construct a coherent macro-structure with well-defined key points when engaging in discussion or description.

As previously discussed, the expository writing structure, characterized by its clarity and the prevalence of the three-part organizational model (introduction, three supporting points, and conclusion), is readily learnable by AI through the analysis of vast quantities of human-generated text. This contributes to the difficulty faced by many novice teachers and students in distinguishing between AI-generated and human-authored texts, as both often adhere to this conventional three-stage structure. However, the macro-thinking approach, particularly when coupled with a three-color analogy to analyze the interconnectedness and representativeness of supporting points, facilitates a deeper understanding of both the formal characteristics and the inherent cohesiveness of textual structures.

The three-color principle, simply put, is a practical application of the macro-thinking approach in writing. The three primary colors --- red, yellow, and blue --- serve as metaphors for the three main points in a text. Just as these three primary colors are used to describe the entire spectrum of colors in nature, so too should writers of expository articles employ three "primary points" to elucidate their central idea. Each point should correspond to a distinct "color," with no overlap within the text. For example, when discussing the societal impact of AI technology, one might choose to examine economic, political, and cultural aspects. The economic impact represents red, the political represents yellow, and the cultural represents blue. These three aspects collectively encompass the totality of society and form a parallel structure with no redundancy. However, AI-generated or AI-assisted writing often falls short, failing to avoid redundancy and frequently generating non-essential or irrelevant information. In essence, while AI-generated works may superficially adhere to the structure of the three-color principle --- employing three points to illustrate – they often fail to provide three representative points for in-depth exploration. The macro-thinking approach provides a cognitive framework for apprehending a broad, overarching view of a phenomenon, establishing a clear formal structure at the initial level. Conversely, the three-color principle offers a more granular perspective, delineating how to illustrate a phenomenon with interconnected logic at a secondary level. In English writing, while form is undoubtedly necessary, the inherent cohesiveness of a text is equally crucial when a writer aims to effectively convey meaning to the reader. The interplay of these two levels, the macro and the micro, is essential for creating both structurally sound and logically coherent written work. Therefore, the macro-thinking approach provides a cognitive framework for apprehending a broad, overarching view of a phenomenon, establishing a clear formal structure at the initial level. Conversely, the three-color principle offers a more granular perspective, delineating how to illustrate a phenomenon with interconnected logic at a secondary level. In English writing, while form is undoubtedly necessary, the inherent cohesiveness of a text is equally crucial when a writer aims to effectively convey meaning to the reader. The interplay of these two levels, the macro and the micro, is essential for creating both structurally sound and logically coherent written work.

In the first article, *The Red Rose in Our Dormitory*, the initial presentation of three points fails to adequately explicate the symbolic meaning of the rose, with only the second point marginally addressing this central theme. The discussion of caring for the rose should be explicitly linked to the theme of symbolism, creating a more rational and logical connection. For instance, the act of caring for the rose, encompassing plant maintenance, can be interpreted as a metaphor for the value of patience. Furthermore, the act of planting a rose in a dormitory setting might symbolize the blossoming of friendship and love among its inhabitants. Finally, the rose's daily transformations could be seen as representing its vital energy. Consequently, a new triad of points emerges: patience, love, and energy. These points clearly correspond to the overarching theme---the symbolic meaning of the rose---and are representative of the range of symbolic meanings attributable to the rose, thereby adhering to the principles of macro-thinking approach.

The segment originally categorized under "Symbolism and Emotional Connection" has been recontextualized within a more fitting section that addresses the care and maintenance of the rose. These two sections can be effectively integrated under a unified theme: The care and maintenance of the rose have taught us the value of patience. This restructuring enhances clarity by logically grouping related concepts. The newly formulated three main points---patience, love, and energy---are now representative, balanced in their level of abstraction, and evenly

distributed across the broader theme of *The Red Rose in Our Dormitory*. This adjustment ensures greater logical consistency and provides a more comprehensive and nuanced analysis of the topic, demonstrating a more profound understanding of both the subject matter and the principles of effective writing.

In the macro-thinking approach, the three main points should be meticulously chosen to serve as representative exemplars of the broader phenomenon or object under discussion. For example, the three primary colors—red, yellow, and blue—are not only foundational to the entire spectrum of rainbow colors but also the most visually prominent, due to their purity, originality, and universality. These primary colors serve as the essential basis for describing all other colors within the rainbow. Similarly, the three principal points in an article must embody these same qualities. They should be representative enough to effectively convey the main idea and distinct enough to avoid redundancy. While the first article, "*The Rose in Our Dormitory*" suffered from an excess of non-relevant information regarding the rose's symbolism, leading to redundancy, while in the second article, *How I Use 'Deep Study' in My Learning,* the three points are mainly focusing on one aspect of studying, which created an effect of repetition redundancy. The main points in this article focus solely on the time planning involved in learning but fail to convey a unifying theme through different explanatory perspectives. For instance, there is an overlapping between the second rule and the third rule, since both of them focus time.

According to the macro-thinking approach, which utilizes a color-based metaphor, illuminates the deficiency: just as the three primary colors---red, yellow, and blue---should be distinct and equally distributed to support a main idea, the main points in an article should similarly represent distinct yet complementary aspects of the central theme. In this instance, the second and third rules fail to achieve this differentiation; if the second rule could be represented as yellow, the third is merely a pale yellow---a variation of the same hue, not a separate color. They only partially address the theme of time management in study, rather than encompassing the broader concept of managing the entire learning process. This is a common pitfall of AI-generated text, as language models often prioritize data collection and analysis over critical and cohesive text generation. To rectify this, the second point could be reframed as “Absorb the Main Ideas”, emphasizing a connection with the first point while also establishing a clear distinction, thus creating two distinct colors. The third point could then be revised to “Balance the Coverage of Ideas”, which follows logically from the first two and creates a parallel structure. This revised structure outlines a progression from understanding to application, akin to a spectrum formed by three primary colors: “Focus on the Big Ideas”, “Absorb the Main Ideas”, and finally, “Balance the Coverage of Ideas”. These three points now construct a coherent process, moving from comprehension to practical application, and illustrate the theme using three distinct and representative colors. This logical progression enhances both the depth and overall coherence of the discussion. Furthermore, the original title, *How I Use 'Deep Study' in My Learning* is somewhat mechanical. A more evocative and insightful title could be "Secrets of Deep Learning," which better complements the article's content by highlighting a learning approach that transcends conventional methods, advocating for a deeper and more thorough mastery of knowledge. This new title employs reverse thinking, resulting in a more engaging, creative, and distinctly human cognitive approach, further enhancing the article's impact. This approach helps address some of the limitations commonly associated with AI-generated content (Liang, Huang, & Wang, 2024).

4.5 Summary

Through an analysis of these two articles, it becomes evident that AI-generated text, when examined through the lens of the macro-thinking approach, often exhibits two prominent deficiencies: a lack of logical coherence and unrepresentative supporting points. A well-crafted text should possess internal cohesion and a logical structure that guides the reader. While an AI might successfully mimic the superficial appearance of a three-part essay structure, it frequently falls short in ensuring that the content within each section is logically interconnected and meaningfully contributes to the overall argument. Although AI writing tools offer advantages such as increased efficiency and facilitating idea generation (Cardon, Fleischmann, Aritz, Logemann, & Heidewald, 2023); Lin, 2025), they also pose challenges, including the potential to diminish critical thinking and compromise authenticity (Cardon et al., 2023; Shibani, Knight, Kitto, Karunanayake, & Shum, 2024). Both faculty and students acknowledge the dual nature of these tools, recognizing their potential benefits while also understanding their limitations in the context of teaching and learning (Bimpong, Atsise, & Owusu, 2024). To optimize the use of AI in academic writing, researchers have proposed frameworks for human-AI collaboration, emphasizing the importance of effective prompting and maintaining rigorous scholarly standards (Lin, 2025). However, these discussions often overlook the crucial role of macro-cognition in writing. This is an inherent human ability that AI currently lacks. The macro-thinking approach can empower students and teachers to cultivate critical thinking skills, a capability that technology, in its current form, cannot fully provide. While utilizing AI as a tool to assist

students and teachers in writing and teaching offers numerous advantages, current interactions with AI during the writing process often lack depth, underscoring the need for more sophisticated task and tool design to cultivate critical thinking within human-AI partnerships (Shibani et al., 2024). A robust understanding of the macro-thinking approach is thus beneficial for both writing development and interactions with AI. By adopting the macro-thinking approach, teachers and students can gain a more profound understanding of how to leverage AI as a tool to enhance their writing, rather than passively accepting a less coherent text generated by the technology. They can use this cognitive ability to guide AI to generate a more logical and representative article.

5. Conclusion

This article posits that the macro-thinking approach can equip teachers with a comprehensive framework for identifying the limitations of AI-generated or AI-assisted writing and provide a more effective pedagogical approach for teaching English composition. The macro-thinking approach, as a universal cognitive framework, enables individuals to rapidly apprehend the main idea and inherent logic of a text. It empowers instructors to critically evaluate both AI-generated and student-produced writing by focusing on the interplay between the macro-organization and the micro-level supporting points. Much like how one can easily identify the seven or twelve colors of the rainbow, writers of expository articles should maintain a clear mental map of the main idea and its supporting details. The macro-thinking approach can also guide instructors in revising both AI-generated and student-authored texts, transforming them into more cohesive and logically sound pieces. While an AI-generated or AI-assisted text might adhere to the formal structure of an essay, akin to the arc of a rainbow, it often lacks the logical connectivity of content found in the distinct and representative colors of a rainbow. AI technology can undoubtedly be advantageous in searching, collecting, and analyzing vast amounts of information during the pre-writing stage. Nevertheless, it falls short in producing an outstanding article with a clear structure and cohesive logic, which is where the strength of human cognitive abilities, guided by the macro-thinking approach, becomes paramount.

Recent studies have delved into the capabilities and limitations of AI-generated writing within academic and scientific spheres. While AI demonstrates proficiency in producing contextually relevant content with grammatical accuracy and structural coherence, it often falls short in achieving the specificity, depth, and accurate source referencing that characterize human-authored texts (Amirjalili, Neysani, & Nikbakht; Rahmi, Amalina, Andriansyah, & Rodgers, 2024). Furthermore, AI-generated scientific text is not only prone to redundancy but also exhibits a higher propensity for factual errors (Ma, Liu, & Yi, 2023; Ma, et al., AI vs. human–differentiation analysis of scientific content generation, 2023). These studies underscore a persistent "writing style" gap between AI and human-authored content, with AI struggling to capture the nuances of complex authorship and maintain a distinctive voice (Amirjalili et al., 2024; Ma, Liu, & Yi, 2023). This research suggests that AI-generated text cannot truly rival human-written text, as it can only mimic writing rather than genuinely create it. While some scholars argue that AI can produce high-quality essays that often surpass human-written ones (Herbold, Hautli-Janisz, Heuer, Kikteva, & Trautsch, 2023), researchers have identified significant shortcomings, including a lack of logical coherence, critical thinking, and ethical reasoning (Kleebayoon & Wiwanitkit, 2023). AI-generated texts also exhibit issues such as information repetition, nonfactual inferences, fabricated references, and hallucinations (Albuhairy, AI-Garaady, & Alblwi, 2023). These findings underscore the imperative for educators to adapt their pedagogical approaches and develop new pedagogical concepts that integrate AI tools while simultaneously emphasizing the cultivation of fundamental skills (Herbold et al., 2023).

The advent of artificial intelligence has profoundly impacted the field of education, particularly in the realm of English writing instruction. AI-assisted or AI-generated writing has become the predominant technique employed by students on language model platforms such as Kimi, ChatGPT, Doubao, and DeepSeek when learning a new language. This trend presents significant pedagogical challenges, as AI-generated text often lacks critical thinking and authenticity (Cardon et al., 2023). However, a prevalent belief in the efficacy of AI among students and even novice teachers in this era may lead to further complications. These include students relying solely on AI to complete writing assignments, teachers struggling to distinguish between AI-generated and human-authored text, or both parties mistakenly considering AI-generated work as exemplary within a classroom context. Consequently, the AI era necessitates a fundamental shift in teaching strategies for English writing. The macro-thinking approach provides a valuable pedagogical framework for English writing instruction, enabling teachers to readily identify issues within students' AI-assisted writing and offer targeted guidance. While AI demonstrates potential as a writing tool, its current limitations highlight the need for further development in instructing the use and teaching of this technology, rather than solely relying on it for idea generation. Therefore, the macro-thinking approach is essential for educators navigating the complexities of writing instruction in the digital age. It not only assists in

discerning the authorship of student work (human vs. AI) but also provides a comprehensive framework for teaching writing effectively. In another word, by employing the macro-thinking approach, educators can mitigate the limitations inherent in AI-generated text. Drawing upon the analogy of the three primary colors, this theory can enhance the cohesion of writing, ensuring a unified and interconnected whole. This method of thinking also serves to prevent the discontinuities that may arise in AI-generated compositions, fostering a more coherent and logically sound argument.

Appendix

Article one:

The Red Rose in Our Dormitory

In the corner of our dormitory, near the window where sunlight pours in every morning, stands a small but vibrant red rose. This delicate plant has become more than just a decoration—it is a symbol of warmth and companionship in our shared space.

Appearance and Growth

Our red rose is planted in a simple white ceramic pot, which contrasts beautifully with its deep red petals. The flower's velvety petals curl gently at the edges, creating a perfect bloom that catches the eye. Its dark green leaves, smooth and slightly glossy, add to its elegant charm. Though still young, the rose has already grown several buds, promising more blossoms in the future.

Caring for the rose requires patience and attention. Every morning, we water it with just the right amount—neither too much nor too little—to keep the soil moist. Since roses love sunlight, we place it near the window where it can receive enough natural light. Occasionally, we trim the dried leaves and loosen the soil to help its roots breathe.

Symbolism and Emotional Connection

This red rose is not merely a plant; it holds a special meaning for all of us. In literature and culture, red roses often symbolize love, passion, and courage. In our dormitory, however, it represents something more—friendship and shared memories. Whenever we see it bloom, we are reminded of the warmth of our dorm life and the bond we share.

Taking care of the rose has also taught us valuable lessons. It reminds us to be patient, just as a rose takes time to grow and bloom. It teaches us responsibility, as neglecting it even for a few days could lead to withered leaves. Most importantly, it shows us the beauty of life, how something small can bring great joy.

A Unique Addition to Our Dorm

Unlike other decorations, such as posters or fairy lights, our rose is alive. It changes day by day, sometimes showing new buds, sometimes shedding old leaves. It responds to our care, making us feel a sense of accomplishment when we see it thrive.

At times, when we feel stressed or homesick, simply looking at the rose brings comfort. Its beauty and quiet presence remind us that no matter how busy or difficult life gets, there is always something peaceful and beautiful to appreciate.

Conclusion

The red rose in our dormitory is more than just a plant—it is a symbol of growth, friendship, and responsibility. It brightens our room, brings us closer together, and teaches us to appreciate the small joys in life. Though it may seem fragile, its ability to bloom despite challenges is a quiet reminder that, like the rose, we too can grow and flourish in our own time.

Article two:

How I Use "Deep Study" in My Learning

(Introduction)

Today I want to share how I use "deep study" to tackle tough subjects like math or English. In my opinion, It is not magic, but is about three simple rules “focus on the big ideas”, “keep your steps organized”, and “balance your time”. Let me show you how it works!

(Body)

First Rule: Focus on the Big Stuff

Deep study means “ignoring useless details” and “chasing the core ideas”. For example, When I learn history, I don’t memorize every date. Instead, I ask: *“Why did Thatcher take the power?” or “How did it change polity?” Just like writing an essay, if I cram too many random facts, my brain gets stuck. But if I focus on key events (like the House of Commoms role in the goverment), everything connects better.

Second Rule: Plan Your Steps Like a To-Do List

I always use “the same pattern” for every study session to avoid chaos. Here’s a routine for online class: Step 1: Watch a 15-minute video. Step 2: Draw a mind map to link ideas. Step 3: Do 5 practice questions designed by AI to test myself. This “video + notes + practice” pattern works like parallel sentences in writing—it keeps my learning smooth and logical.

Third Rule: Don’t Get Obsessed with One Thing

I split my time fairly to avoid burnout. This week, I spent 40% reading textbook theories (e.g., how grammer works),40% doing practice (e.g., finding some grammer topic to do), 20% fixing mistakes (e.g., redoing failed task). This balance stops me from being a “textbook stone” who only reads but never practices.

(Conclusion)

Deep study isn’t about working harder—it “s about working smarter. By focusing on what matters, following a clear plan, and keeping things balanced, I spend less time but learn more. We might surprise ourself by trying these rules in the next time we study

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