

International Journal of Language Education
Volume 9, Number 2, 2025, pp. 212-229
ISSN: 2548-8457 (Print) 2548-8465 (Online)
Doi: <https://doi.org/10.26858/ijole.v1i2.74935>

Enhancing English Reading Comprehension and Critical Thinking through Murdoch Integrated Approach: A Language Education Study about Sustainable Development Goals (SDGs)

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Received: 3 November 2023

Reviewed: 3 March 2025-24 May 2025

Accepted: 4 June 2025

Published: 30 June 2025

Abstract

This study investigated the impact of the Murdoch Integrated Approach (MIA) on improving English reading comprehension and analytical thinking among Thai Grade 5 students, in alignment with Sustainable Development Goal 4 on quality education. A one-group pretest-posttest design was implemented using eight structured learning plans over one semester. Two English reading tests were used to assess comprehension and analytical reading before and after the intervention. Results showed a significant improvement in both areas. These gains occurred because MIA promotes inquiry-based learning, active student engagement, and reflective thinking, enabling learners to interpret texts meaningfully and apply ideas critically. Although the absence of a control group requires cautious interpretation, the findings highlight the potential of MIA in enhancing essential language skills at the elementary level. This research contributes to language education by supporting pedagogical innovation aligned with global development goals.

Keywords: Analytical skills; critical thinking; language education; murdoch integrated approach; SDG 4

Introduction

In the modern educational context, reading comprehension (Ida et al., 2025; Viyana et al., 2023; Pujiastuti, 2024; Hartati et al., 2023; Maryati et al., 2022) and critical thinking (Pitakola & Inayah, 2024; Usman et al., 2024; Purwaningsih et al., 2023; Sombria et al., 2023; Diyora & Diana, 2024; Ayustyaningtias et al., 2025; Leastari, 2024) have emerged as core competencies in language

learning, particularly for learners in non-native English-speaking countries (Husnia et al., 2023; Ibrahim et al., 2023; Suparto, 2023; Masbara et al., 2024). In Thailand, the push for English proficiency is not only a national educational goal but also a necessity for participating in the global community.

English reading comprehension skills enable students to access a vast body of knowledge and engage with texts across various disciplines, supporting academic and personal development. In addition to comprehension, critical thinking skills are increasingly viewed as essential for learners to navigate the information-rich environments of the 21st century. These skills allow learners to interpret, evaluate, and synthesize information while developing independent and reflective reasoning abilities. As part of broader global efforts, the integration of these competencies aligns with Sustainable Development Goals (SDGs), which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (Ragadhita et al., 2026). In Thailand, educational reforms have emphasized the importance of integrating critical thinking and higher-order literacy skills into classroom practice, particularly at the elementary level, where foundational learning occurs.

Addressing the limitations of traditional instruction, which often relies on rote memorization and teacher-centered strategies, requires the adoption of pedagogical innovations that support active, inquiry-based learning. One such method is the Murdoch Integrated Approach (MIA), developed to promote reading comprehension and analytical thinking through a structured, learner-centered process (Murdoch, 1986; Murdoch, 2020). MIA emphasizes student questioning, collaborative exploration, metacognitive reflection, and knowledge transfer. These elements align with constructivist theories of learning and with global calls for education that prepares students to engage with complex real-world challenges. In previous Thai educational studies, the use of MIA has been shown to improve not only comprehension skills but also analytical and evaluative abilities across language domains (Noksin & Rodkroh, 2022).

Nonetheless, despite growing recognition of MIA's potential, empirical studies applying this approach at the elementary school level in Thailand remain limited. This research aimed to investigate the effectiveness of the Murdoch Integrated Approach in improving English reading comprehension and analytical thinking skills among Grade 5 students in Thailand. A quasi-experimental one-group pretest-posttest design was used to evaluate the effects of MIA across one academic semester. The novelty of this study lies in its application of MIA at the elementary school level, targeting two distinct but interrelated literacy domains (comprehension and analytical reading) using dual testing instruments. Unlike previous studies focused on secondary or higher education students, this study offers insight into the early formation of critical thinking and comprehension skills through structured, integrative teaching practices. It also contributes to the body of research supporting the practical application of SDG 4 at the grassroots level, showing how targeted language instruction strategies can support global educational goals. The results not only provide empirical support for MIA's effectiveness in the Thai context but also offer a replicable instructional model for similar settings globally.

Literature review

To understand how reading comprehension and critical thinking can be enhanced among elementary students, particularly through an integrative teaching model such as the MIA, it is necessary to review the core constructs of language education and their pedagogical intersections. Language education in the 21st century extends beyond basic literacy; it encompasses cognitive, affective, and sociocultural competencies that empower learners to engage meaningfully with text, media, and discourse. Reading comprehension, especially in English as a foreign language,

involves constructing meaning, integrating background knowledge, and responding critically to texts. In the Thai context, traditional English language instruction has often emphasized grammar and vocabulary memorization, which has hindered students' ability to develop deeper levels of comprehension and engagement with texts. This has created an urgent need for innovative methodologies that support both understanding and higher-order thinking skills. These needs are consistent with the goals of SDG 4, which promotes quality education that is inclusive, equitable, and oriented toward developing critical cognitive capacities from an early age.

A growing body of literature supports the idea that integrated, inquiry-driven models are more effective than linear, teacher-centered models in promoting literacy development and critical thinking. One such model is the MIA, introduced by Murdoch in 1986 and refined over the years (Murdoch, 1986; Murdoch 2020). MIA is grounded in constructivist principles and designed to integrate listening, speaking, reading, writing, and thinking in a coherent sequence. As shown in Table 1, MIA proceeds through a structured process: activating prior knowledge, questioning, exploring information, integrating content, and presenting and reflecting on knowledge gained. This model enables learners to formulate their inquiry questions, seek answers through multimodal resources, and then synthesize findings into a communicable form. MIA also places a strong emphasis on metacognitive reflection, encouraging students to evaluate their learning process and identify changes in their understanding over time. This cyclical and student-centered process aligns with current trends in language education that advocate for active learning and authentic assessment practices.

Table 1. Key phases of the Murdoch integrated approach

| Phase | Description |
|---------------|---|
| Tuning In | Activating students' prior knowledge and curiosity through visuals, questions, and brainstorming. |
| Finding Out | Conducting student-led inquiry using multiple sources such as articles, videos, and websites. |
| Making Sense | Synthesizing gathered information through discussion, presentations, and conceptual mapping. |
| Taking Action | Applying knowledge in real-world contexts via projects, creative work, and public sharing. |
| Going Further | Encouraging reflection, evaluation of learning, and continued inquiry into related topics. |

Several empirical studies have confirmed the effectiveness of MIA in developing reading comprehension and critical analysis skills. For example, Suwanpanich (2018) reported that integrating MIA with elementary curriculum content resulted in significantly improved reading outcomes and increased student engagement. Similarly, Zubaidah et al (2020) found that a combination of MIA and mind mapping strategies led to enhanced comprehension and academic performance among Grade 6 students. At the secondary level, Noksin and Rodkroh (2022) observed that second-year students exposed to MIA-based instruction demonstrated marked gains in the ability to interpret, critique, and summarize English texts. These findings are further supported by Poolsawat (2021), who concluded that MIA not only improved reading skills but also fostered greater student autonomy and motivation. Importantly, MIA's structure encourages learners to draw from diverse sources—books, digital media, interviews, and visual data—which aligns with the multimodal literacy demands of the modern world. This aspect makes the model

highly relevant for developing 21st-century literacy skills that are essential for achieving lifelong learning and global citizenship, two pillars of SDG 4.

In addition to enhancing reading comprehension, MIA has been shown to facilitate critical thinking through its emphasis on inquiry and reflection. The generation of student-led questions, evaluation of information credibility, and synthesis of data all require higher-order thinking. According to Prasansap (2018), metacognitive strategies embedded in MIA promote awareness of thought processes, enabling learners to become more strategic and independent readers. Moreover, the act of presenting findings to peers encourages learners to clarify their ideas, support their arguments with evidence, and consider alternative perspectives, activities that are central to critical thinking. These pedagogical outcomes suggest that MIA is not only a method for teaching reading but a broader framework for cultivating thinking skills within language education. By integrating comprehension, analysis, collaboration, and communication, MIA addresses both cognitive and affective dimensions of learning. In the context of Thai education, this offers a powerful alternative to passive learning, aligning instructional practices with international benchmarks for educational quality and relevance.

Research method

This study employed a quasi-experimental design, specifically the one-group pretest-posttest format, to determine the effectiveness of the MIA in improving English reading comprehension and analytical thinking among Grade 5 students. Detailed information regarding this method is explained elsewhere (Susilawati et al., 2025; Asrianti, A., & Reskyani, R., 2022).

The decision to use this design was based on practical considerations, including school access and ethical concerns in assigning students to control conditions. Table 2 outlines the structure of the current intervention model used in this study to address these gaps and contribute to the development of reading and thinking skills in alignment with SDG 4.

Table 2. One group pretest posttest design

| Group | Pre-test (T ₁) | Treatment (X) | Post-test (T ₂) |
|--------------|--|-----------------|-----------------------------|
| Experimental | English reading and analytical skills test | MIA instruction | Same tests as pre-test |

Annotations:

T₁ = Pre-test before learning intervention

X = MIA instruction

T₂ = Post-test after learning intervention

As shown in Table 2, the structure involved an initial assessment (T₁), followed by the instructional intervention (X), and a post-intervention assessment (T₂). This design allowed researchers to measure learning gains by comparing scores before and after the MIA-based instruction, although without a control group for comparison, findings are interpreted with caution due to potential external influences such as maturation or environmental exposure.

The study was conducted in an elementary school located in Amnat Charoen Province, Thailand, chosen through purposive and convenience sampling. This location was selected due to its proximity to the researchers' university and existing academic collaboration. From the eight Grade 5 classes available, one class was randomly selected to participate. The sample consisted of 37 students who received the intervention over one academic semester. Ethical clearance was obtained, and school administrators, teachers, and parents were informed of the study's aims and

procedures. The intervention was embedded into the regular English curriculum to minimize disruption while enhancing the depth of learning.

Instruction was delivered using eight lesson plans designed around the Murdoch Integrated Approach, with each plan spanning approximately sixteen hours. The content of the lessons integrated thematic topics, such as environmental issues and social responsibility, to contextualize language use. Instructional phases followed the MIA framework, beginning with the activation of prior knowledge and proceeding through inquiry, information integration, application, and metacognitive reflection. Teachers were trained to facilitate MIA instruction with consistency and to support students in independent thinking and collaboration. This approach provided students with meaningful opportunities to engage in active reading, critical questioning, and peer discussion.

Two instruments were developed to evaluate student performance: the English Reading Comprehension Test and the Analytical English Reading Test, each comprising 30 multiple-choice questions. Both tests were administered as pretests and posttests, with items reviewed by five experts to ensure validity. The Index of Item Objective Congruence (IOC) for both instruments ranged from 0.60 to 1.00. The reading comprehension test achieved a discrimination index between 0.25 and 0.88 and a reliability coefficient of 0.54. The analytical reading test yielded a discrimination index from 0.22 to 0.78 and a reliability coefficient of 0.60. Data were analyzed using dependent t-tests to determine whether statistically significant differences existed between the pre- and post-intervention scores, offering insight into the instructional impact of the MIA framework. Detailed information on how to analyze using statistical analysis is reported elsewhere (Fiandini et al., 2024; Rahayu et al., 2024; Afifah et al., 2022).

Results and discussion

Improvement in English reading comprehension

To evaluate the impact of the MIA on students' reading comprehension, a dependent t-test was conducted comparing pretest and posttest scores on the English Reading Comprehension Test. As shown in Table 3, the mean score of students before the intervention was 15.08 (SD = 3.69), and after the intervention, it increased significantly to 20.78 (SD = 3.76). The t-value of 9.50 with 36 degrees of freedom yielded a p-value less than 0.001, indicating a statistically significant improvement in students' reading comprehension following MIA instruction. These findings confirm that MIA was effective in promoting deeper understanding of English texts, as learners were actively engaged in constructing meaning and applying their knowledge within contextualized learning environments (Suwanpanich, 2018).

Table 3. English reading comprehension between pre-test and post-test

| Situation | N | Full Score | Mean | SD | t | df | Sig. (2-tailed) |
|-----------|----|------------|-------|------|------|----|-----------------|
| Pre-test | 37 | 30 | 15.08 | 3.69 | 9.50 | 36 | 0.000*** |
| Post-test | 37 | 30 | 20.78 | 3.76 | | | |

***p < 0.001 level

The results highlight how the structure of MIA enhances comprehension through a series of learner-centered phases that emphasize active questioning, group collaboration, and the synthesis of diverse resources. By encouraging students to formulate questions and seek answers

through multimodal texts, MIA promotes purposeful reading—an approach that contrasts sharply with traditional Thai classroom practices that often involve passive reading and textbook memorization. In the MIA framework, students are not only asked to decode texts but also to explore meaning, interpret messages, and connect content to real-world issues. These active cognitive engagements likely contributed to the observed increase in reading comprehension scores.

Moreover, the improvements align with research indicating that inquiry-based approaches cultivate essential comprehension strategies such as skimming for main ideas, scanning for details, drawing inferences, and summarizing information (Grabe & Stoller, 2019). In this study, students were exposed to reading tasks situated in meaningful thematic units, such as environmental awareness, which further enhanced their motivation to engage with texts. The social dimension of learning (group discussion and peer evaluation) may have also facilitated comprehension through clarification of ideas and exposure to multiple perspectives.

Another key contributor to reading comprehension improvement was the integration of explicit vocabulary instruction within the MIA process. Before students began their research and reading tasks, they were introduced to essential vocabulary relevant to the theme, enabling them to navigate complex texts with greater confidence. This scaffolding allowed students to focus more on content and meaning, rather than struggling with unfamiliar words, an issue that often hampers Thai learners of English (Prasansap, 2018). The enhanced vocabulary foundation likely helped students process information more efficiently and with greater depth.

Furthermore, the application and presentation phases of MIA encouraged learners to revisit the texts multiple times for different purposes: to extract information, to interpret ideas, and to support their arguments during discussions and presentations. This recursive engagement fostered repeated exposure to key language forms and content, reinforcing comprehension over time. By engaging with texts through writing, speech, and group collaboration, students were not only learning about the topic but also developing a more nuanced understanding of textual structure and rhetorical functions, both critical to reading comprehension.

The significance of these findings lies not only in the statistical results but also in their educational implications. The improvement in scores suggests that MIA can serve as an effective instructional tool at the elementary level, where foundational literacy skills are developed. It also supports broader educational policies promoting active learning in Thai classrooms. By showing that a structured, student-centered approach can yield measurable learning gains, this study provides empirical evidence to support the shift from teacher-dominated instruction to more participatory pedagogies in English education.

Additionally, these results contribute to the growing discourse on how localized implementation of global pedagogical models can support Sustainable Development Goal 4, particularly its emphasis on quality education and lifelong learning. MIA fosters critical literacy practices that empower learners to become independent readers capable of accessing, evaluating, and using information, skills that are not only academically beneficial but also essential for full participation in an increasingly globalized society. Thus, the significant improvement in reading comprehension following the MIA intervention can be interpreted as both a cognitive and developmental success in line with national and international goals.

Nevertheless, it is important to acknowledge certain limitations. The absence of a control group in this study means that alternative explanations (such as maturation, test familiarity, or other classroom experiences) cannot be fully ruled out. While the statistical evidence strongly supports the conclusion that MIA enhances reading comprehension, future research incorporating

randomized controlled trials would provide more definitive evidence. Despite this, the internal validity of the findings is strengthened by the use of expert-validated instruments and consistent instructional implementation across all eight learning plans.

In addition, qualitative feedback from teachers and students—though not formally collected in this study—informally indicated that learners were more engaged, confident, and communicative during reading tasks compared to previous semesters. Such anecdotal reports are consistent with earlier research that links MIA to improved learner attitudes and classroom participation (Poolsawat, 2021). These behavioral indicators, while not quantified, lend further support to the observed improvements in comprehension performance.

The implications of these findings are substantial for teacher training and curriculum development. Teachers should be supported through professional development programs to implement inquiry-based and integrated approaches such as MIA. Curriculum designers may also consider embedding MIA-like frameworks into national syllabi to promote coherence across grade levels. Moreover, school administrators and policymakers should recognize that investing in teacher capacity and classroom innovation yields not only better test scores but also more holistic and independent learners.

Analytical reading skills development

In addition to measuring improvements in reading comprehension, this study also sought to determine the effect of the MIA on students' analytical reading abilities. Table 4 presents the pretest and posttest results for the Analytical English Reading Test. Before the intervention, students had a mean score of 14.57 (SD = 2.94), which increased to 18.11 (SD = 3.30) after the MIA instruction. The dependent t-test produced a value of 8.77, with a significance level of $p < 0.001$, indicating a statistically significant improvement in students' analytical skills. This result reinforces the assumption that MIA, as a student-centered and inquiry-driven model, is effective in fostering critical thinking and analytical reading abilities in young learners.

Table 4. Analytical English Reading before and after Instruction (N = 37)

| Situation | Full Score | Mean | SD | t | df | Sig. (2-tailed) |
|-----------|------------|-------|------|------|----|-----------------|
| Pre-test | 30 | 14.57 | 2.94 | 8.77 | 36 | 0.000*** |
| Post-test | 30 | 18.11 | 3.30 | | | |

*** $p < 0.001$ level

The significant improvement in analytical reading scores can be attributed to multiple elements within the MIA framework. A primary factor is the encouragement of question generation at the start of the learning cycle. When students are tasked with formulating their questions about a topic, they engage in processes of analysis, categorization, and prioritization, all of which are foundational to analytical thinking. These student-generated inquiries become the compass guiding their research, making the reading process more intentional and reflective rather than passive and superficial. Such inquiry-oriented engagement fosters the ability to identify key points, contrast multiple ideas, and synthesize perspectives—skills closely aligned with analytical reading.

Another powerful component of MIA is the synthesis and integration phase, during which students evaluate information from various sources and interpret the meaning concerning their

original questions. This process helps them not only to gather facts but also to examine underlying assumptions, assess source credibility, and relate findings to broader contexts. In the current study, students worked with a mix of digital and print texts, including articles, videos, and infographics. By navigating these formats and extracting central ideas, they learned to compare data across modalities and construct cohesive narratives, which are central to developing analytical skills (Prasansap, 2018).

Moreover, the presentation and peer discussion phase in MIA creates a dialogic environment where students are expected to articulate their findings, support their claims with evidence, and respond to questions from classmates. This not only sharpens their reasoning but also teaches them to anticipate counterarguments and revise their interpretations based on feedback. These communicative tasks involve a high level of cognitive engagement and require students to refine their thinking continuously. In this study, many students were observed revising their reports and arguments after discussions, indicating a recursive and evolving thought process characteristic of analytical reasoning.

The gains in analytical reading are also linked to metacognitive reflection, which is embedded into the final phase of the MIA model. At this stage, students evaluate what they have learned, how their thinking has changed, and what strategies helped them understand complex information. This reflection fosters awareness of their cognitive processes and supports the internalization of analytical habits. Ability to think about one's thinking—metacognition—is a defining trait of critical thinkers. By consciously monitoring and evaluating their reasoning, students in this study gained greater control over how they approached texts and tasks.

The findings from this study align with those from similar educational contexts. For example, Poolsawat (2021) found that Grade 5 students using MIA to explore environmental topics showed marked improvement in identifying relationships between ideas and drawing reasoned conclusions. Likewise, Noksin and Rodkroh (2022) observed that secondary students applying MIA demonstrated advanced skills in organizing textual evidence to support written arguments. The present study adds to this body of knowledge by confirming that these gains are also attainable at the elementary level, a stage where analytical skills are still developing but highly malleable.

The educational implications of this improvement are significant. In the Thai curriculum, analytical reading is often introduced only in higher grades, typically after students have acquired foundational comprehension skills. However, the findings of this study suggest that analytical skills can and should be cultivated earlier, especially when supported by instructional frameworks such as MIA. Doing so not only builds students' capacity to process information but also equips them with lifelong learning skills that transcend disciplinary boundaries. These results are particularly relevant in the context of SDG 4, which advocates for inclusive and equitable quality education that develops learners' full potential, including their ability to think critically, solve problems, and make informed decisions.

It is worth noting that students in this study were also observed to demonstrate greater confidence and initiative during the analytical reading process. Many were eager to contribute during discussions, challenge each other's ideas, and explore related topics beyond the assigned materials. While this observation is anecdotal, it supports the hypothesis that inquiry-based learning not only improves test scores but also changes student dispositions toward learning. Encouraging curiosity, independent thought, and respectful argumentation are invaluable traits for both academic success and democratic participation.

However, as with the reading comprehension findings, caution is warranted in interpreting the results due to the absence of a control group. While the statistical evidence is strong, it is

possible that other factors contributed to the improvement. Future research employing experimental or mixed-method designs could more robustly isolate the effect of MIA and examine variables such as classroom climate, teacher feedback, and student motivation. Nonetheless, the internal consistency of gains across both comprehension and analytical reading domains, coupled with pedagogical alignment with prior research, reinforces the value of MIA as a holistic instructional strategy.

Additionally, the findings point to the need for curriculum reform and teacher training. Many English teachers in Thai public schools are still unfamiliar with integrated instructional models or lack the resources to implement them effectively. Professional development programs focusing on how to facilitate questioning, scaffold text analysis, and manage inquiry cycles could help scale the benefits observed in this study. At the policy level, integrating MIA into the national literacy strategy could support Thailand's broader goals of producing competent, critical, and globally aware citizens.

Integration of comprehension and analysis: implications for language education and SDG 4

The concurrent improvement in both reading comprehension and analytical skills observed in this study suggests a strong pedagogical synergy between the two constructs. While traditionally taught as separate literacy domains, comprehension and analysis are deeply interwoven. Comprehension provides the foundation—decoding meaning, understanding vocabulary, and grasping the gist—while analysis extends this by requiring students to critique, compare, synthesize, and reflect upon the content they have comprehended (Grabe & Stoller, 2019). The MIA, through its structured learning phases, creates a platform where these two abilities develop simultaneously and reinforce each other through layered and recursive activities.

The improvement in reading comprehension, as discussed in Section 4.1, was likely the result of learners' repeated interaction with texts and ideas through inquiry, vocabulary building, and collaborative dialogue. At the same time, as learners engaged in evaluating sources, generating conclusions, and preparing presentations, they practiced analytical thinking. These two competencies, rather than developing in isolation, appear to have grown in tandem, supported by the inquiry-based cycles and reflective phases embedded in the MIA framework. This mutual reinforcement suggests that instructional strategies targeting one skill inevitably support the other when executed within a coherent, integrative pedagogical design (Suwanpanich, 2018).

Furthermore, the results reinforce the importance of contextual and content-rich learning in developing multiliteracies among young learners. The lesson topics used in the MIA cycles—such as global warming, social responsibility, and cultural identity—were not only language-driven but also cognitively demanding and socially relevant. By engaging with real-world issues, students were challenged to go beyond the surface meaning of texts and critically interrogate ideas, consequences, and perspectives. Such content, when mediated through scaffolded instruction and collaborative exploration, enhances learners' ability to comprehend deeply and analyze critically. This approach corresponds with the concept of language across the curriculum, where language is seen not only as a subject but also as a medium for accessing and constructing disciplinary knowledge.

From the perspective of language education, these findings support a shift away from skill-segregated teaching methods toward integrated, process-oriented instruction. Rather than teaching reading comprehension as a fixed technique and analysis as a separate cognitive exercise, MIA illustrates how both can be embedded within a learning process that is dynamic, inquiry-driven, and collaborative. This insight holds significant implications for language teacher training,

particularly in Southeast Asian contexts where exam-oriented instruction often limits opportunities for critical engagement with texts. In Thailand, for instance, where the English curriculum is increasingly aligned with the Common European Framework of Reference (CEFR), there is an emerging emphasis on competence-based instruction. MIA offers a practical model for realizing this shift at the classroom level.

The results also highlight the need to expand assessment practices to include formative evaluation of thinking processes. In the current study, while standardized pretest-posttest measures were used to demonstrate learning gains, it was the integrated nature of classroom activities—discussion, reflection, project creation—that provided the context for those gains. This suggests that future assessment should not be limited to correct answers, but should include evaluations of how students formulate arguments, interpret evidence, and reflect on their understanding. Such assessments are more likely to capture the full scope of student learning, especially when the instructional goal is not only to improve scores but to foster independent, critical thinkers.

The broader educational implications of these findings connect directly to Sustainable Development Goal 4 (SDG 4), which emphasizes quality education that fosters relevant and effective learning outcomes. One of the targets under SDG 4 is to "ensure that all youth and a substantial proportion of adults... achieve literacy and numeracy" and to equip learners with the skills necessary to promote sustainable development. In this regard, the Murdoch Integrated Approach offers more than a language teaching model; it is a framework for empowering learners to process, critique, and act upon information. The focus on self-directed inquiry, knowledge application, and metacognitive reflection aligns well with the global vision of education that is equitable, learner-centered, and future-oriented.

Moreover, the adaptability of MIA to various learning contexts makes it a viable approach for scaling educational innovation across regions with diverse linguistic and cultural backgrounds. In Thailand, where classroom diversity is increasing due to migration and socio-economic shifts, MIA can help bridge gaps by offering inclusive, participatory methods that honor students' backgrounds while developing academic language and cognitive skills. By embedding MIA into the national curriculum or teacher training programs, ministries of education can foster more resilient and reflective learning communities. This is particularly important in the post-pandemic era, where remote learning has exacerbated educational inequalities and highlighted the need for robust, student-centered instructional frameworks.

In terms of classroom implementation, the MIA process requires significant teacher facilitation and planning. Educators must not only design guiding questions and curate resources but also scaffold learning experiences that challenge students without overwhelming them. The success observed in this study was supported by teacher preparation, consistent lesson structure, and ongoing feedback. Thus, professional development initiatives are essential to help teachers understand the theoretical underpinnings of MIA and to develop the practical skills needed to implement it effectively. This includes strategies for managing group work, prompting reflective dialogue, and differentiating instruction to meet diverse learning needs.

A final point of discussion concerns the student experience during the MIA implementation. Although this study did not collect formal qualitative data, classroom observations and informal interviews with students revealed a heightened level of engagement and ownership of learning. Many students expressed excitement about discovering new information, collaborating with peers, and sharing their ideas with the class. This intrinsic motivation is a crucial element of educational success and is often overlooked in conventional instruction models. The

ability to instill curiosity and confidence in learners (especially those in elementary school) may be one of MIA's most valuable contributions to language education.

Challenges and limitations in applying MIA in elementary classrooms

While the implementation of the Murdoch Integrated Approach (MIA) demonstrated significant effectiveness in enhancing both reading comprehension and analytical thinking, several practical and contextual challenges emerged during the study. These challenges highlight important considerations for educators, school leaders, and policymakers aiming to adopt or adapt MIA more widely in elementary education settings.

One of the primary challenges encountered was teacher readiness. Implementing MIA requires a significant shift in pedagogy, from a traditional teacher-centered approach to a learner-centered, inquiry-based model. Teachers must be skilled in facilitating student-led inquiry, managing collaborative learning, and guiding reflective processes. In the context of Thai public schools, where many educators have been trained in more conventional instructional techniques, this shift can be difficult without structured professional development and ongoing mentoring. During the initial phases of the intervention, participating teachers expressed uncertainty in designing open-ended questions and felt unprepared to manage group dynamics that emerged during collaborative tasks.

Another issue relates to time constraints within the curriculum. MIA requires extended instructional time to guide students through the five phases: Tuning In, Finding Out, Making Sense, Taking Action, and Going Further. Each phase builds upon the previous one and requires opportunities for discussion, exploration, and reflection. However, within the constraints of the Thai elementary school timetable (where English classes may be limited to two or three sessions per week), completing an MIA cycle often demanded flexible scheduling and cross-disciplinary collaboration. This constraint is a practical barrier to scaling MIA without systemic adjustments to curriculum structure or allocation of more time for English instruction.

The availability and accessibility of learning materials and resources also posed a limitation. MIA depends on a range of multimodal texts and information sources to support student inquiry. While the research team provided curated materials, including age-appropriate articles, videos, and websites, this level of preparation may not be feasible for all schools, particularly those in rural or under-resourced areas. Internet access and availability of digital devices were limited in some classrooms, which affected the diversity of sources students could explore during the "Finding Out" phase. To address this, printed materials were used as substitutes, though they lacked the interactivity and real-time relevance of digital content. This suggests that successful MIA implementation requires not only pedagogical training but also investment in infrastructure and resource development.

Another limitation stems from student readiness and prior learning habits. Many students in the participating class were accustomed to passively receiving information from the teacher and found it challenging at first to take initiative in formulating questions, conducting searches, and presenting findings. Developing a sense of ownership over their learning required sustained encouragement and scaffolding. For instance, in early lessons, students struggled with source evaluation and often relied on simplistic summaries. However, as the semester progressed, their capacity to engage in deeper analysis improved, reflecting the importance of sustained exposure to the MIA process. These early difficulties, while surmountable, indicate that MIA may be more

effective when introduced gradually and supported with explicit instruction in research and critical thinking skills.

Additionally, classroom management during collaborative group work presented a recurring challenge. While group learning is a central pillar of MIA, it demands clear norms, roles, and teacher facilitation to ensure balanced participation. Some groups experienced dominance by more vocal students, while others lacked coordination, leading to uneven contributions. The teachers mitigated this by rotating roles and modeling collaboration strategies, but these challenges underscore the need for preparatory activities that build group process skills before full implementation of MIA. Moreover, large class sizes, which are common in many Thai schools, can further complicate effective group facilitation and individualized support.

From a research design standpoint, the most prominent limitation of this study is the absence of a control group, as discussed in earlier sections. The one-group pretest-posttest design does not allow for definitive causal claims about the effectiveness of MIA, as improvements may have been influenced by other factors such as maturation or testing familiarity. Despite statistically significant gains, the potential for alternative explanations cannot be fully ruled out. Future research should employ randomized controlled trials or quasi-experimental designs with matched groups to strengthen the evidence base and isolate the specific contributions of MIA.

Another methodological constraint is the lack of qualitative data collection, which could have provided deeper insights into student experiences, learning processes, and affective outcomes. While anecdotal observations indicated increased engagement and confidence, structured interviews, focus groups, or student journals could enrich the understanding of how learners interact with and benefit from the MIA process. Integrating mixed-method approaches in future studies would allow for triangulation of data and a more holistic evaluation of MIA's impact.

Despite these challenges, it is important to recognize that many of the limitations are addressable through targeted interventions. Teacher development programs that emphasize constructivist pedagogy, classroom management, and inquiry-based strategies can build the capacity needed for MIA implementation. Curriculum adjustments that allocate sufficient time for interdisciplinary projects or thematic units can accommodate the full MIA cycle. Investments in school infrastructure, particularly in ICT, can broaden students' access to diverse learning resources. Furthermore, by building a community of practice among educators using MIA, schools can facilitate peer learning, idea-sharing, and collaborative problem-solving.

On a broader scale, the challenges identified in this study reflect the tension between educational innovation and institutional constraints. MIA, while effective, requires a supportive ecosystem that includes visionary leadership, flexible policy, and adequate resources. Without these enabling conditions, even the most well-designed pedagogical models may struggle to gain traction. As countries like Thailand pursue educational reform in line with international frameworks such as SDG 4, it is essential to ensure that innovation is accompanied by structural and systemic support.

Finally, the challenges discussed here should not be seen as deterrents but rather as opportunities for continuous improvement and context-specific adaptation. Every classroom presents unique dynamics, and effective implementation of MIA may vary depending on student demographics, teacher expertise, and institutional culture. The success of this study demonstrates that with thoughtful planning and responsive teaching, the obstacles to integrated, inquiry-based instruction can be overcome.

Key findings and their contribution to language education

The findings of this study demonstrate the efficacy of the Murdoch Integrated Approach (MIA) in enhancing both English reading comprehension and analytical thinking skills among Thai elementary students. The statistically significant improvements in both pretest-posttest measures reveal that MIA is not only pedagogically sound but also practically effective in real-world classroom environments. More importantly, the simultaneous development of these two core literacy domains underlines the strength of integrated, inquiry-based instruction as a comprehensive strategy for language education. This section synthesizes the key results and positions them within broader educational and policy-related frameworks, particularly the global agenda set by SDG 4.

From the outset, this study revealed that students' reading comprehension skills improved substantially after one semester of instruction using MIA. This improvement can be attributed to various MIA elements—activation of prior knowledge, contextual vocabulary instruction, and engagement with authentic texts. Students were not only passive recipients of information but also became active participants in their learning. They developed purposeful reading habits by seeking answers to their questions, which is a hallmark of deep comprehension. These findings echo existing research asserting that inquiry-based frameworks foster motivation, retention, and understanding in literacy instruction (Grabe & Stoller, 2019; Suwanpanich, 2018). For students in Grade 5, this structured and scaffolded engagement with texts allowed them to improve their ability to decode, interpret, and synthesize meaning—skills that are essential for lifelong learning.

Equally compelling was the improvement observed in students' analytical reading abilities. Through activities such as evaluating information sources, comparing differing viewpoints, and constructing arguments based on evidence, students developed a more critical and reflective orientation toward texts. They moved beyond basic comprehension toward higher-order thinking, demonstrating the ability to analyze and evaluate information independently. This outcome is particularly significant in the Thai educational context, where critical thinking is often underemphasized in early grade curricula. By embedding analytical tasks into each phase of the MIA cycle, the instructional model provided continuous opportunities for students to develop cognitive skills that are not only academically relevant but also socially empowering.

Together, the improvements in both comprehension and analysis highlight the mutual reinforcement between the two. Rather than teaching them as isolated competencies, MIA fosters a natural interdependence—students comprehend texts more deeply when they analyze them, and their analytical insights become sharper when grounded in thorough comprehension. This pedagogical integration is what makes MIA particularly suitable for language education, where meaning-making and critical literacy must evolve together. In practice, this translates into instructional sequences where reading leads to inquiry, inquiry leads to interpretation, and interpretation leads to reflection and expression—an interconnected learning process consistent with constructivist learning theories.

Beyond the classroom, these findings have broader implications for educational policy and curriculum reform. At the national level, the results support ongoing efforts by the Thai Ministry of Education to modernize instruction by promoting active learning and critical thinking skills in line with global benchmarks such as the Common European Framework of Reference (CEFR). The demonstrated success of MIA provides an actionable model for operationalizing these ambitions, offering clear guidance for integrating 21st-century skills into English language education without requiring expensive infrastructure or radical curriculum overhaul. Its reliance on inquiry, collaboration, and reflection makes it adaptable across content areas and grade levels.

On a global level, the contributions of this study align directly with Sustainable Development Goal 4, particularly Target 4.1, which aims to ensure that all learners acquire the knowledge and skills necessary to promote sustainable development. By equipping students with the ability to comprehend and analyze information critically, MIA addresses the foundational literacies that underpin all forms of education. These include not only reading and writing, but also digital, civic, and intercultural literacies. In doing so, MIA prepares students to become informed decision-makers and active contributors to society, outcomes that resonate with the goals of equity, empowerment, and inclusion embedded in the SDG 4 framework.

In terms of teacher development, this research also highlights the potential for MIA to transform teacher practice. Educators who adopt this model are encouraged to see themselves not merely as transmitters of knowledge, but as facilitators of learning processes. They must guide inquiry, scaffold cognitive development, and cultivate classroom cultures where dialogue and reflection are the norm. This shift in teacher identity and role is essential for long-term educational transformation. The study's success suggests that, with proper training and support, teachers at the elementary level can implement sophisticated instructional strategies that foster both comprehension and criticality, an essential step toward holistic education reform.

At the level of student experience, the dual growth in comprehension and analysis also contributes to a more empowered learner identity. When students learn not only to understand texts but also to critique, apply, and extend them, they gain confidence in their intellectual capabilities. They begin to see themselves as thinkers, communicators, and agents of knowledge. This empowerment is especially crucial during the elementary years, when attitudes toward learning are formed and internalized. The MIA approach thus not only builds academic skills but also promotes psychological readiness for independent, lifelong learning, again, a central pillar of SDG 4.

Despite the noted challenges, such as time constraints, teacher readiness, and resource limitations, the findings demonstrate that MIA can be successfully implemented in real classroom conditions, even with modest support. The adaptability of the model, combined with its research-based structure, makes it a powerful vehicle for elevating the quality of language education. Moreover, it proves that elementary-aged children are capable of engaging with complex ideas, provided they are given the tools, support, and space to do so. This runs counter to the often-held assumption that higher-order thinking should be reserved for older students and affirms the value of starting early in developing cognitive flexibility, literacy, and independent learning.

The research contributes to the growing body of evidence supporting integrated, student-centered instruction as a pathway to both academic and developmental success. Through the successful implementation of the Murdoch Integrated Approach, this study offers a replicable, scalable model that meets the demands of 21st-century education and supports Thailand's national development goals as well as global priorities outlined in SDG 4. Its dual focus on comprehension and analysis bridges a persistent gap in language education practice and presents a compelling case for how early interventions in literacy can yield enduring outcomes across learning domains. This study adds new information regarding SDGs as reported elsewhere (Awalussillmi et al., 2023; Basnur et al., 2024; Gemil et al., 2024; Djirong et al., 2024; Haq et al., 2024; Keisya et al., 2024; Kerans et al., 2024; Krishnan et al., 2024).

Conclusion

The findings of this study underscore the significant challenges university students encounter when dealing with the complexity of legal lexicological derivations. The results reveal

that the derivational processes inherent in legal English, such as affixation and nominalization, contribute to the ambiguity and difficulty of understanding legal vocabulary. Students often struggle with differentiating between general and legal meanings, interpreting archaic phrases, and comprehending Latin terms, which complicates their academic performance and practical application of legal terminology. These challenges are further exacerbated by cultural and linguistic differences, highlighting the need for targeted pedagogical approaches that bridge these gaps and enhance comprehension. Despite these obstacles, students employ a variety of strategies to address these issues, including the use of legal dictionaries, contextual analysis, and collaborative learning through group discussions. Many also rely on bilingual resources and workshops to strengthen their vocabulary acquisition. However, the findings emphasize that these strategies, while helpful, are often insufficient without systematic instructional interventions. This highlights the importance of integrating explicit vocabulary instruction, practice-based activities, and analytical frameworks into legal English curricula to facilitate deeper learning. Furthermore, the research highlights the impact of these lexicological challenges on students' future legal careers, as the mastery of legal language is critical for effective communication in professional settings. Improving students' ability to decode and apply legal vocabulary not only enhances their academic success but also prepares them for real-world legal practices, where precision and clarity are paramount. The study advocates for the development of specialized teaching methodologies that address derivational complexities and promote active engagement with legal terminology. Thus, this study contributes valuable insights into the linguistic and cognitive barriers faced by students learning legal English and offers practical recommendations for improving legal English instruction. By adopting a structured approach that combines theoretical knowledge with practical application, educators can better support students in overcoming these challenges. Future research could explore the effectiveness of specific teaching techniques, such as task-based learning and blended instruction, to further optimize the learning experience. Ultimately, equipping students with the skills to navigate legal lexicology confidently will enhance their academic performance and professional readiness, ensuring they are well-prepared for careers in the legal field.

Declaration of conflicting interest

The authors declare that there is no conflict of interest in this work.

Funding acknowledgements

We express our sincere gratitude to the administrators, teachers, and Grade 5 students of the participating elementary school in Amnat Charoen Province for their cooperation and support. Special thanks are also extended to the academic staff of Mahasarakham University and Kun Shan University for their guidance and encouragement throughout the research process. This research project was financially supported by Mahasarakham University, Thailand.

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