

Arabic for AI Purposes: Promoting AI as a Cognitive Partner in Arabic Text Analysis

Bahasa Arab untuk tujuan AI: Mendorong AI sebagai mitra kognitif dalam analisis teks Arab

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The rapid development of Artificial Intelligence (AI) has created new opportunities for Arabic language education, particularly in supporting Arabic text analysis based on syntactic principles (nahwu). However, the increasing use of AI also raises pedagogical concerns regarding learners' dependence on automated analysis and the potential decline of independent grammatical reasoning. This study aims to formulate an implementation model of AI as a cognitive partner in Arabic text analysis learning. The research employed a qualitative case study design using task-based analysis involving manual grammatical analysis, AI-assisted analysis, and interactional data between learners and AI. Data were analyzed through thematic analysis guided by the Cognitive Partnership Theory framework. The findings reveal that AI functions not merely as an automated analytical tool but as a cognitive partner that facilitates learners' grammatical reasoning through interaction, comparison, reflection, and conceptual reconstruction. The study proposes a five-stage implementation model consisting of input provision, human initial analysis, AI-assisted analysis, cognitive comparison and evaluation, and cognitive revision. This model demonstrates that effective AI integration should prioritize learners' independent grammatical reasoning before introducing AI-supported analysis, thereby promoting reflective learning rather than passive reliance on automated outputs. The study contributes to Arabic language education by extending AI utilization from a technology-oriented perspective to a pedagogically grounded implementation framework that supports cognitive engagement, analytical autonomy, and sustainable grammatical competence in Arabic syntax learning.

Keyword: Artificial Intelligence; Cognitive Partner; Arabic Text Analysis; Nahwu Learning; Arabic Language Education.

Abstrak:

Perkembangan pesat *Artificial Intelligence* (AI) telah membuka peluang baru dalam pembelajaran bahasa Arab, khususnya dalam mendukung analisis teks berdasarkan kaidah sintaksis (*nahwu*). Namun, meningkatnya penggunaan AI juga memunculkan tantangan pedagogis berupa ketergantungan peserta didik terhadap hasil analisis otomatis yang berpotensi melemahkan kemampuan penalaran gramatikal secara mandiri. Penelitian ini bertujuan merumuskan model implementasi AI sebagai **mitra kognitif** dalam pembelajaran analisis teks Arab. Penelitian menggunakan pendekatan kualitatif dengan desain studi kasus melalui analisis berbasis tugas yang melibatkan analisis gramatikal secara manual, analisis berbantuan AI, serta data interaksi antara peserta didik dan AI. Data dianalisis menggunakan analisis tematik dengan berlandaskan **Cognitive Partnership Theory**. Hasil penelitian menunjukkan bahwa AI tidak hanya berfungsi sebagai alat analisis otomatis, tetapi juga sebagai mitra kognitif yang memfasilitasi penalaran gramatikal peserta didik melalui proses interaksi, perbandingan, refleksi, dan rekonstruksi konsep. Penelitian ini menghasilkan model implementasi yang terdiri atas lima tahapan, yaitu penyediaan teks, analisis awal oleh peserta didik, analisis berbantuan AI, perbandingan dan evaluasi kognitif, serta revisi kognitif. Model tersebut menunjukkan bahwa integrasi AI yang efektif perlu memprioritaskan penalaran gramatikal peserta didik sebelum pemanfaatan

analisis berbantuan AI sehingga pembelajaran tetap berorientasi pada refleksi dan konstruksi pengetahuan, bukan pada ketergantungan terhadap hasil analisis otomatis. Penelitian ini memberikan kontribusi berupa kerangka implementasi pedagogis yang memperluas pemanfaatan AI dari sekadar teknologi analisis menjadi mitra kognitif yang mendukung keterlibatan kognitif, kemandirian analitis, dan penguatan kompetensi gramatikal dalam pembelajaran bahasa Arab.

Kata Kunci: *Artificial Intelligence; Mitra Kognitif; Analisis Teks Arab; Pembelajaran Nahwu; Pendidikan Bahasa Arab.*

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INTRODUCTION

The rapid advancement of Artificial Intelligence (AI) has significantly influenced various dimensions of human life, including the field of language education. In the context of Arabic language learning, the integration of AI-based technologies such as Natural Language Processing (NLP) and large language models has transformed traditional approaches to language analysis, particularly in syntactic interpretation and the application of grammatical rules (nahwu). Conventionally, Arabic text analysis requires learners to engage in a systematic and step-by-step process involving sentence component identification, word classification, and the application of grammatical rules, which collectively foster analytical and critical thinking skills. However, the emergence of AI systems capable of performing automatic and real-time syntactic analysis, ranging from part-of-speech identification to i'rāb determination, has partially shifted these cognitive processes. While this technological development offers significant benefits in terms of efficiency and accessibility in language learning, it simultaneously raises pedagogical concerns regarding learners' increasing dependence on automated systems and the potential decline of independent grammatical reasoning abilities.

In line with these developments, a growing body of research in Natural Language Processing (NLP) has demonstrated significant progress in Arabic language processing across morphological, syntactic, and semantic levels. Previous studies have developed various computational linguistic resources and models, such as Arabic dependency treebanks grounded in traditional nahwu theory to support syntactic analysis (Halabi, 2020), as well as syntactic analyzers used to evaluate the accuracy and limitations of Arabic structural processing systems (Saadiyeh et al., 2025). Furthermore, pipeline-based frameworks such as the Noor framework have improved the processing of Classical Arabic through hybrid approaches (Nashir et al., 2025), while transformer-based models have been applied to Arabic grammatical error correction to enhance the detection of syntactic inaccuracies (Ismail et al., 2025). The integration of AI into Arabic language learning has also expanded into adaptive learning systems, intelligent tutoring systems, and automated language assessment. However, most of these studies remain focused on algorithmic development and system performance, while research that addresses AI from a pedagogical perspective—particularly as a cognitive partner in Arabic text analysis learning—remains limited.

Despite the rapid progress in Natural Language Processing (NLP) and the integration of Artificial Intelligence in Arabic language education, a significant research gap remains in studies that specifically address the pedagogical dimension of AI use in Arabic syntactic analysis. Most existing studies focus primarily on computational model development, algorithmic accuracy improvement, and AI applications in linguistic tasks such as machine translation, morphological analysis, and grammatical error correction (Halabi, 2020; Ismail et al., 2025; Saadiyeh et al., 2025). In contrast, research that examines how AI can be positioned as a cognitive partner in Arabic text analysis learning remains limited. Furthermore, there is a lack of systematic synthesis regarding the strengths and weaknesses of AI utilization in Arabic grammar instruction, particularly in balancing technological efficiency with the development of learners' independent grammatical reasoning skills. This gap indicates an urgent need for studies that move beyond a purely technological orientation toward a more holistic pedagogical perspective in Arabic language education.

Based on this gap, this study aims to formulate implementation procedures for Artificial Intelligence (AI) as a cognitive partner in Arabic text analysis learning. This study emphasizes how AI should not merely be positioned as an instant analytical tool but pedagogically integrated

into the learning process to support the development of learners' grammatical reasoning skills in understanding Arabic syntactic structures (*nahwu*). This study contributes to the development of Arabic language education in the era of Artificial Intelligence by proposing an implementation-oriented approach for using AI as a cognitive partner in Arabic text analysis. Theoretically, it extends the pedagogical perspective of Arabic language teaching by repositioning AI from a mere technical tool to a grammatical reasoning support system. Pedagogically, the study offers directions for integrating AI into Arabic syntax learning (*nahwu*) that balance automated analysis with the strengthening of learners' analytical thinking skills. Practically, the findings are expected to serve as a reference for educators and instructional designers in developing structured and purposeful AI integration strategies that preserve the essence of traditional Arabic grammar learning while leveraging the benefits of AI technologies.

RESEARCH METHODS

This study employed a qualitative research approach using a qualitative case study design to explore the implementation of Artificial Intelligence (AI) as a cognitive partner in Arabic language text analysis, particularly in the study of syntactic structures (*nahwu*). This approach was selected because it allows an in-depth investigation of the interactional and cognitive processes that occur between learners and AI during Arabic grammatical analysis, rather than focusing solely on outcome-based evaluation (Yin, 2018).

The study adopted an instrumental case study design, which is used to gain broader insights into the implementation pattern of AI as a cognitive partner in Arabic language learning through specific real-world cases. This design is appropriate for examining how AI-assisted Arabic syntactic analysis is practiced in authentic learning situations and how it contributes to learners' grammatical reasoning development (Stake, 1995).

The data sources in this study consisted of Arabic textual materials used in learning activities, learners' manual syntactic analysis based on traditional *nahwu* rules, AI-generated analytical outputs produced by tools such as ChatGPT or NLP-based systems, and interactional data between learners and AI during the analytical process. These interactions included questioning, clarification, revision, and iterative reasoning processes that reflect cognitive engagement between human learners and AI systems.

Data collection was conducted through a task-based analysis approach, in which participants were assigned Arabic text analysis tasks using two methods: manual grammatical analysis and AI-assisted analysis. All outputs, including learners' responses, AI-generated results, and interaction logs, were systematically documented for analysis purposes.

Data analysis was carried out using thematic analysis guided by the Cognitive Partnership Theory framework. The analysis process included data reduction, coding, and categorization. Initial coding focused on patterns such as analytical accuracy, types of grammatical errors, dependency on AI assistance, and the development of grammatical reasoning processes. These codes were then grouped into broader themes, including AI effectiveness in *nahwu* analysis, the role of AI as a cognitive partner, comparative reasoning patterns between humans and AI, and the pedagogical implications for learners' grammatical thinking skills. Finally, the findings were synthesized to formulate an implementation model of AI as a cognitive partner in Arabic text analysis learning.

RESULTS

The findings of this study indicate that Artificial Intelligence (AI) can be implemented as a cognitive partner in Arabic text analysis learning through a collaborative interaction pattern

between learners and AI systems. In this context, AI does not merely function as an automated analytical tool, but also as a facilitator of grammatical reasoning processes that support learners in understanding Arabic syntactic structures (*nahwu*) in a more systematic and structured manner. These findings suggest that text analysis activities are no longer entirely individual processes; rather, they evolve into a distributed cognitive process between humans and artificial intelligence, in which both entities complement each other in constructing linguistic understanding.

Based on these findings, the implementation of Artificial Intelligence (AI) as a cognitive partner in Arabic text analysis learning can be elaborated into several procedural stages forming a collaborative learning cycle. These stages demonstrate that the process of *nahwu* analysis does not occur in a purely linear and individual manner, but rather through iterative interaction between human cognitive abilities and AI system support.

Table 1. Stages of Implementing Artificial Intelligence (AI) as a Cognitive Partner in Arabic Text Analysis Learning

No	Stage	Implementation Description	Learners' Role	AI Role
1	Input Provision Stage	Provision of Arabic text as the object of <i>nahwu</i> analysis	Receiving and understanding the text	Providing system access and analytical response
2	Human Initial Analysis Stage	Manual analysis based on Arabic grammatical rules (<i>nahwu</i>)	Identifying sentence structure, word categories, and <i>i'rāb</i> functions	Not involved at this stage
3	AI-Assisted Analysis Stage	Text analysis using AI-based NLP systems	Inputting text and reviewing AI output	Producing automated syntactic analysis
4	Cognitive Comparison and Evaluation Stage	Comparison between human and AI-generated analysis	Evaluating accuracy, differences, and consistency	Providing alternative analytical outputs
5	Cognitive Revision Stage	Revision and reconstruction of grammatical understanding based on comparison results	Revising analysis and strengthening grammatical reasoning	Providing additional feedback when required

The results presented in the table 1 illustrate that the implementation of Artificial Intelligence (AI) as a cognitive partner in Arabic text analysis learning unfolds through five interconnected stages that form a collaborative learning cycle. The first stage, the *input provision stage*, involves the presentation of Arabic texts as the object of *nahwu* analysis, where learners are introduced to the linguistic data supported by AI in terms of accessibility and readiness. The second stage, the *human initial analysis stage*, emphasizes the dominant role of learners in conducting manual grammatical analysis based on Arabic syntactic rules, including sentence structure identification, word classification, and *i'rāb* determination without AI intervention. The third stage, the *AI-assisted analysis stage*, marks the integration of AI into the analytical

process, where the system provides automated syntactic outputs that learners examine as comparative input. The fourth stage, the *cognitive comparison and evaluation stage*, represents a critical phase in which learners compare their manual analysis with AI-generated outputs to assess accuracy, interpretative differences, and alignment with grammatical rules, thereby fostering reflective and critical thinking processes. The fifth stage, the *cognitive revision stage*, serves as the final phase in the cycle, where learners revise and reconstruct their understanding based on prior comparisons, leading to strengthened grammatical reasoning through iterative reflection. Overall, these stages demonstrate that AI functions not merely as an analytical tool but as a cognitive partner that contributes to a dialogic, reflective, and meaning-oriented learning process in Arabic syntactic analysis.

Overall, the findings of this study confirm that the implementation of Artificial Intelligence (AI) as a cognitive partner in Arabic text analysis learning not only enhances the efficiency of the analytical process but also contributes to strengthening learners' grammatical reasoning skills through iterative, reflective, and continuous processes of interaction, evaluation, and revision. Accordingly, AI can be positioned as an integral component of Arabic *nahwu* instruction that supports a more collaborative, adaptive, and cognition-enhancing learning environment.

DISCUSSION

The findings of this study demonstrate that the pedagogical use of Artificial Intelligence (AI) in Arabic text analysis extends beyond employing technology as an automated instrument for producing syntactic analyses. The findings indicate that AI can function as a cognitive partner when its use is embedded within a structured sequence of analytical, comparative, and reflective activities. In this configuration, the educational value of AI is constituted not primarily by its capacity to generate syntactic analyses rapidly, but by its capacity to create additional opportunities for learners to examine, question, and refine their grammatical reasoning. Interaction with AI-generated outputs enables learners to encounter alternative syntactic interpretations, examine the consistency of grammatical explanations, and reconsider their initial analyses in relation to established principles of Arabic syntax (*nahwu*). The learning process therefore represents a form of distributed analytical activity in which learners retain responsibility for grammatical judgment while AI contributes computationally generated information and alternative perspectives. This finding is particularly relevant to Arabic text analysis because grammatical competence involves more than identifying a syntactic function or producing an appropriate *i'rāb*; it also involves explaining the relationship among linguistic elements and providing a principled justification for a grammatical interpretation. Accordingly, the contribution of AI is most educationally meaningful when technological assistance strengthens the learner's engagement with these processes rather than displacing them.

This interpretation is consistent with the concept of cognitive partnership, which conceptualizes technology as an intellectual resource that can complement human cognitive activity rather than simply automate it (Luckin, 2018). From this perspective, effective learning does not require the learner and technology to perform identical cognitive functions. Instead, the educational value of technology emerges from an appropriate distribution of cognitive responsibilities. This proposition is also compatible with the broader perspective of distributed cognition, which conceptualizes cognition as emerging through interactions among individuals, tools, and environmental resources (Pea, 1993; Salomon, 1993). In Arabic text analysis, such distribution is evident in the complementary functions of learners and AI. AI can efficiently generate preliminary syntactic analyses, identify possible grammatical relationships, or provide

alternative interpretations, whereas learners remain responsible for determining whether those outputs are consistent with relevant *nahwu* principles. The distinction is important because computational output does not possess pedagogical meaning independently of the learner's activity. An automatically generated syntactic analysis becomes educationally valuable when it becomes an object of examination, comparison, and justification. Thus, the cognitive partnership proposed in this study does not imply an equal substitution of human and artificial cognition. Rather, it represents a pedagogical arrangement in which computational capabilities are employed to expand the learner's analytical environment while grammatical judgment remains a central human responsibility.

The five-stage implementation model developed in this study provides a concrete pedagogical mechanism for operationalizing this cognitive partnership. The model deliberately places learners' independent grammatical analysis before direct interaction with AI. This sequence is theoretically consistent with the importance of activating prior knowledge and connecting new information with learners' existing conceptual structures (Bransford et al., 2000). In the first stage, learners examine Arabic texts and formulate an initial syntactic analysis using previously acquired *nahwu* knowledge. This stage establishes an initial cognitive position against which subsequent AI-generated information can be evaluated. In the second stage, AI is introduced to generate an alternative syntactic analysis or provide relevant grammatical feedback. The third stage requires learners to compare their initial analysis with the AI-generated output. The fourth stage focuses on grammatical justification, in which learners examine the reasons underlying similarities or differences between the two analyses and relate them to relevant grammatical principles. The fifth stage involves revision and reflection, through which learners reconstruct their initial understanding and articulate the basis for their final grammatical interpretation. The model therefore does not place AI at the beginning or end of learning but positions it within an iterative process of human analysis and technological feedback. The five stages can be summarized as follows.

Table 2. Five-Stage AI-Supported Cognitive Partnership Model for Arabic Text Analysis

Stage	Learner Activity	AI Function	Cognitive Process	Expected Outcome
Initial Analysis	Analyzing Arabic text independently using <i>nahwu</i> principles	Not yet introduced or minimally used	Activation of prior knowledge and initial reasoning	Preliminary syntactic interpretation
AI Feedback	Examining AI-generated analysis	Generates syntactic analysis, feedback, or alternative interpretation	Exposure to alternative information	Additional analytical evidence
Comparison	Comparing personal analysis with AI output	Provides a reference for comparison	Evaluation and identification of discrepancy	Recognition of agreement and divergence
Grammatical Justification	Explaining why an analysis is accepted, modified, or	Provides supplementary analytical information when	Reasoning, argumentation, and rule application	Evidence-based grammatical judgment

	rejected	required	
Revision and Reflection	Revising analysis and reflecting on the reasoning process	the Functions as a supplementary resource	Metacognition and knowledge reconstruction
			Strengthened independent grammatical reasoning

Source: Developed by the authors based on the findings of the present study and the synthesis of relevant theoretical perspectives.

The sequence presented in Table X indicates that the pedagogical contribution of AI is located primarily in the interaction between learner-generated reasoning and machine-generated information. The model distinguishes itself from technology-centered approaches in which AI is introduced as the first source of grammatical interpretation. When AI provides the initial answer, learners may have limited opportunities to formulate an independent hypothesis before encountering the technological solution. In contrast, the proposed sequence establishes learners' own analyses as the starting point and AI-generated analysis as a subsequent object of comparison. This arrangement changes the function of AI from an answer-generating endpoint into a resource for cognitive elaboration. The comparison stage becomes particularly important because discrepancies between learner and AI analyses can create opportunities for learners to investigate why two interpretations differ. Such discrepancies can stimulate the application of grammatical rules, examination of syntactic relationships, and reconsideration of initial assumptions. The model therefore treats disagreement between human and AI analysis not simply as an error-correction problem but as a potential learning opportunity. The pedagogical objective is not to ensure that learners always agree with AI, but to enable them to provide a defensible grammatical justification for the position they ultimately adopt.

The findings further indicate that the proposed model addresses an important tension between technological efficiency and grammatical reasoning. AI can reduce the time required to obtain syntactic information and can provide learners with immediate access to computationally generated feedback. Such efficiency may be particularly useful in Arabic text analysis, where learners may encounter complex syntactic structures and require repeated opportunities for analysis. However, efficiency becomes pedagogically problematic when it removes the analytical activity through which grammatical knowledge is developed. From a constructivist perspective, meaningful learning requires learners to actively construct knowledge through interpretation, problem-solving, reflection, and interaction with information rather than merely receiving completed solutions (Bransford et al., 2000). The proposed model therefore preserves an important distinction between obtaining grammatical information and learning to reason grammatically. AI may accelerate the first process, but the second requires sustained learner engagement. The model responds to this distinction by requiring learners to generate an initial analysis before consulting AI and to justify their subsequent decisions after receiving AI-generated information. In this sense, the model seeks to use computational efficiency to create conditions for deeper cognitive engagement rather than allowing efficiency to replace such engagement.

This finding also contributes to the discussion of cognitive offloading in AI-supported learning. External technological resources can reduce cognitive demands by allowing learners to delegate certain operations to tools, and such delegation may be productive when it enables learners to allocate greater attention to higher-order processes. However, excessive offloading can become problematic when learners delegate the very cognitive operations that an instructional activity is intended to develop. In Arabic syntax learning, for example, using AI to

check a completed analysis may represent productive support, whereas relying on AI to determine the syntactic function of every word without attempting independent analysis may limit opportunities to develop grammatical reasoning. The proposed five-stage model addresses this issue by controlling the timing and function of AI assistance. AI is introduced after an initial learner-generated analysis, thereby ensuring that the learner has already engaged in the target cognitive activity before technological assistance is provided. The subsequent comparison, justification, and revision stages further require learners to remain cognitively engaged with the output. AI consequently functions as an external analytical resource without becoming the sole locus of grammatical decision-making.

The findings also extend previous research on Artificial Intelligence and Arabic language processing by shifting attention from computational capability toward pedagogical implementation. Existing studies have made substantial contributions to Arabic NLP through the development of dependency treebanks, syntactic parsers, hybrid processing frameworks, and transformer-based models for grammatical error correction (Halabi, 2020; Saadiyeh et al., 2025; Nashir et al., 2025; Ismail et al., 2025). This body of research has strengthened the technological capacity to identify, represent, and correct linguistic structures in Arabic. However, computational performance and educational effectiveness constitute different analytical dimensions. A parser may produce a highly accurate syntactic representation without necessarily producing an equally effective learning experience. The present study extends this technological literature by examining how AI-generated syntactic information can be incorporated into an instructional process that preserves learner reasoning. The contribution therefore lies not in proposing another computational method for Arabic parsing, but in specifying how computational outputs can be pedagogically positioned within the learning process. This distinction is important because it redirects attention from the question of whether AI can analyze Arabic text toward the pedagogically more consequential question of how learners should engage with AI-generated analyses to develop independent grammatical competence.

The pedagogical implications of this perspective extend to the role of teachers in AI-supported Arabic grammar instruction. The integration of AI does not eliminate the need for teacher mediation; rather, it changes the nature of the teacher's instructional responsibility. Teachers become responsible for selecting appropriate texts, designing analytical tasks, determining when AI assistance should be introduced, and creating opportunities for learners to justify and defend their grammatical decisions. They also need to help learners recognize that AI-generated outputs constitute potentially useful analytical resources rather than unquestionable grammatical authorities. Such a role is consistent with learner-centered approaches that emphasize feedback, active engagement, and reflective learning (Hattie & Timperley, 2007; Holmes et al., 2019). In the proposed model, the teacher therefore functions as a designer and mediator of cognitive activity. The teacher's task is not simply to verify whether the learner's final answer matches the AI output, but to evaluate the quality of the learner's reasoning and the evidence used to support the grammatical decision. This shift is particularly important in Arabic syntax because more than one interpretation may sometimes require examination before a grammatically defensible conclusion can be established.

The proposed framework also has implications for the assessment of AI-supported Arabic grammar learning. If the educational objective is limited to obtaining correct syntactic answers, conventional accuracy measures may be sufficient to evaluate immediate performance. However, if the objective includes grammatical reasoning, assessment should also examine learners' ability to explain, justify, evaluate, and transfer syntactic knowledge. Accordingly,

future assessment instruments should distinguish between at least four dimensions: syntactic accuracy, grammatical explanation, evaluation of AI outputs, and independent transfer. Syntactic accuracy concerns whether the learner identifies the appropriate grammatical structure. Grammatical explanation concerns whether the learner can articulate the principles underlying the analysis. Evaluation of AI outputs concerns whether the learner can identify agreement, disagreement, or potential limitations in machine-generated analyses. Independent transfer concerns whether the learner can apply the acquired reasoning to unfamiliar texts without technological assistance. Such an assessment orientation would provide a more comprehensive indication of whether AI-supported learning contributes to durable grammatical competence rather than merely improving performance on AI-mediated tasks.

The conceptual contribution of this study therefore lies in connecting the technological affordances of AI with the cognitive demands of Arabic text analysis. The proposed AI as a Cognitive Partner perspective does not suggest that AI and learners should perform interchangeable roles. Instead, it establishes a complementary relationship in which AI contributes computational speed, alternative analysis, and immediate feedback, while learners retain responsibility for interpretation, evaluation, justification, and final grammatical judgment. The five-stage model makes this relationship operational by sequencing these activities rather than allowing AI assistance to occur without pedagogical regulation. In this respect, the novelty of the study is located in the instructional architecture of human–AI interaction: learners first construct an analytical position, AI subsequently provides an alternative source of information, and learners then engage in comparison, justification, revision, and reflection. The framework consequently moves beyond the general claim that AI should support learning and specifies a mechanism through which such support can be organized in Arabic syntactic instruction.

Nevertheless, the implementation of AI as a cognitive partner involves several conditions and limitations. The effectiveness of the model depends partly on learners' prior knowledge of *nahwu*. Learners with insufficient grammatical foundations may lack the conceptual resources required to evaluate AI-generated analyses and may consequently treat machine output as authoritative. The quality and contextual sensitivity of AI-generated analyses also remain important considerations, particularly for Arabic, where syntactic interpretation may depend on morphology, lexical ambiguity, contextual relations, and textual genre. In addition, teachers require sufficient pedagogical and technological competence to design activities in which AI supports rather than substitutes learner reasoning. These conditions indicate that the implementation model should not be interpreted as a universally applicable sequence independent of learner characteristics, teacher expertise, or technological quality. Rather, it represents a pedagogical framework whose effectiveness requires empirical validation across different proficiency levels, learning contexts, Arabic text types, and AI systems.

Future research should therefore examine the proposed model through empirical intervention studies rather than relying solely on conceptual validation. Experimental and quasi-experimental studies could compare conventional Arabic syntactic instruction, AI-assisted answer-oriented instruction, and the proposed cognitive-partnership model to determine differences in immediate performance and longer-term grammatical competence. Research should also investigate whether the five-stage sequence improves learners' ability to detect erroneous AI outputs, justify syntactic decisions, transfer grammatical principles to unfamiliar texts, and maintain performance when AI assistance is withdrawn. Qualitative studies could further examine learners' reasoning processes during the comparison and justification stages to identify how interaction with AI changes their understanding of grammatical rules. Such research would provide evidence regarding not only the effectiveness of AI-supported Arabic

grammar learning but also the conditions under which cognitive partnership produces meaningful educational outcomes.

The findings indicate that the educational significance of Artificial Intelligence in Arabic text analysis is constituted by the quality of interaction established between technological assistance and human reasoning. AI provides substantial opportunities to increase access to syntactic analysis, accelerate feedback, and expand the resources available to learners. However, these affordances acquire pedagogical value when they are embedded within instructional processes that require learners to analyze, compare, justify, revise, and reflect. The proposed five-stage model consequently positions AI neither as a replacement for the teacher nor as a substitute for the learner's grammatical reasoning. It represents AI as a complementary cognitive resource whose effectiveness depends on deliberate pedagogical design. The central implication is that the future of AI-supported Arabic grammar education should not be evaluated solely according to how accurately machines can analyze Arabic texts, but also according to whether learners become increasingly capable of understanding, questioning, explaining, and independently justifying those analyses. In this sense, the transition from AI as an Answer Provider to AI as a Cognitive Partner represents a pedagogical reorientation in which technological intelligence is used to deepen, rather than diminish, human grammatical reasoning.

CONCLUSION

This study concludes that Artificial Intelligence can be effectively implemented as a cognitive partner in Arabic text analysis learning through a structured five-stage implementation model comprising input provision, human initial analysis, AI-assisted analysis, cognitive comparison and evaluation, and cognitive revision. The findings demonstrate that AI contributes not only by improving the efficiency of syntactic analysis but also by facilitating learners' grammatical reasoning through iterative processes of comparison, reflection, and conceptual reconstruction. Accordingly, the educational value of AI lies in its capacity to support learners' active engagement in grammatical decision-making rather than replacing their analytical thinking. The proposed implementation model therefore provides a pedagogically grounded framework for integrating AI into Arabic syntax (nahwu) instruction while maintaining the central role of learners in constructing grammatical understanding.

This study contributes to Arabic language education by extending the discourse on Artificial Intelligence from a predominantly technological perspective to a pedagogically oriented framework that emphasizes cognitive partnership between learners and AI. Nevertheless, the findings are derived from a qualitative case study and therefore should be interpreted within the context of the investigated learning environment. Future research is encouraged to examine the effectiveness of the proposed implementation model across diverse educational contexts, learner characteristics, and AI technologies through comparative and longitudinal research designs. Such investigations will strengthen the empirical foundation for developing sustainable AI-supported Arabic language learning that balances technological innovation with the cultivation of independent grammatical reasoning.

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