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The Rise of Artificial Intelligence in Replacing Grammatical Understanding

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Abstract

Artificial intelligence has undergone rapid development and has had a significant impact on how Arabic grammar is understood and learned. This study aims to explore the extent to which artificial intelligence applications specifically ChatGPT, Qutrub, and several AI-based Arabic language learning tools can replace the human role in understanding the rules of nahwu and sharaf. This study employs a descriptive-analytical approach through a literature review of 25 scientific articles and academic sources published between 2020 and 2025, selected based on their relevance to Arabic grammar learning and the application of artificial intelligence in language education. In addition, this study involved direct testing of three AI applications using 30 prompts consisting of nominal sentences (jumlah ismiyyah), verbal sentences (jumlah fi'liyyah), and several complex grammatical structures. The generated outputs were compared based on the accuracy of grammatical analysis, the consistency of responses, and their alignment with Arabic

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grammatical rules referenced in classical and modern literature. The results show that artificial intelligence is capable of providing rapid and relatively accurate grammatical analysis; however, limitations were still found in providing in-depth grammatical explanations and in handling complex linguistic constructions. These findings indicate that artificial intelligence functions primarily as a learning support tool.
***Keywords**: Artificial Intelligence, arabic grammar, qawāʿid, iʿrāb, grammatical reasoning.*

Introduction

A number of previous studies have shown that Artificial Intelligence contributes positively to language learning. AI technology helps learners gain faster access to linguistic information through automatic translation and language correction features (Buana, 2026). AI systems are capable of providing instant linguistic analysis and feedback, thereby improving learning efficiency. The role of AI in supporting independent learning and personalized language instruction. However, most of these studies still focus on the effectiveness of AI as a learning aid, while research on its impact on the process of grammatical reasoning and the development of a deep understanding of Arabic grammar remains relatively limited (Hukom, 2026). This gap is important to address, given that mastery of nahwu requires not only the ability to produce correct answers but also the ability to understand the reasoning and logic behind the application of a rule. Therefore, this study offers an approach that positions AI as the subject of critical evaluation through an analysis of its accuracy, the depth of its explanations, and its grammatical reasoning capabilities, thereby providing a more comprehensive picture of the opportunities and limitations of AI in Arabic grammar learning.

The integration of Artificial Intelligence into Arabic language learning has transformed the way students access and understand linguistic knowledge, particularly in the fields of *nahwu* and *sharaf*. Various AI-based applications, such as ChatGPT, Qutrub, and other language-learning platforms, enable users to obtain grammatical analysis, explanations of sentence structure, and instant corrections of language errors. This convenience makes the process of learning Arabic grammar faster and more flexible compared to conventional approaches that rely on direct interaction with teachers or printed reference materials. A number of studies indicate that the use of AI in language

learning can improve access to linguistic information and support students' independent learning (Amadi & Hikmah, 2025).

This transformation is not limited to global languages like English or Mandarin; it also extends to Arabic. In Arabic language instruction, Artificial Intelligence integration is especially noticeable in the realm of grammar (*qawa'id*) which is known for its complexity and hierarchical structure (Fitri & Hasibuan, 2024). Traditionally, mastering qawaid required a gradual, layered approach often achieved through long term teacher student engagement and guided reasoning.

With Artificial Intelligence, learners can now analyze Arabic sentence structures simply by uploading a text into a digital application. These tools provide instant explanations of grammatical positions (*I'rab*), sentence types, and errors. Such innovations increase learning efficiency and promote learner autonomy. Artificial Intelligence thus emerges as a powerful support tool for accelerating foundational grammar understanding (Asfar et al., 2024).

However, this shift also raises important concerns about the depth of learning. Overreliance on Artificial Intelligence may reduce the cognitive engagement required to truly grasp Arabic grammar. While students may correctly answer questions using Artificial Intelligence tools, they may lack a deeper understanding of the underlying grammatical logic. In this sense, Artificial Intelligence may improve outcomes but risk diminishing the critical learning processes involved.

Therefore, the main challenge in this digital age lies not in rejecting Artificial Intelligence, but in integrating it meaningfully into pedagogy. Arabic language educators must consider thoughtful strategies for using Artificial Intelligence not as a replacement, but as a supplement (Azhar et al., 2025). When used wisely, Artificial Intelligence can become a valuable partner in shaping learners who not only master grammatical rules quickly, but also apply them with depth, context, and understanding.

Specifically in the study of Arabic grammar, various Artificial Intelligence based tools have been used to assist with grammatical analysis and the study of *qawa'id*. Qutrub is a system focused on morphological analysis (*ṣarf*) and the conjugation of Arabic verbs, while *Nahwu* Artificial Intelligence is designed to help identify syntactic structures (*nahwu*) and the grammatical functions of sentence elements. Unlike these two, which are more specialized, ChatGPT is a large language model capable of generating

explanations, answering grammatical questions, and providing interactive language analysis based on user input. These tools help users analyze nominal (*jumlah ismiyyah*) and verbal (*jumlah fi'liyyah*) sentences, identify grammatical functions, and provide descriptive feedback (Simon, 2023). For many learners especially beginners or self-learners these capabilities offer easier access to learning Arabic grammar.

However, the convenience offered by Artificial Intelligence comes with a pedagogical cost. As students grow accustomed to relying on instant Artificial Intelligence generated answers, their cognitive engagement with the logic of grammar tends to diminish (Al-Rantisi et al., 2025). instead of constructing grammatical understanding through practice, reasoning, and reference to authoritative texts, learners may accept Artificial Intelligence outputs at face value. This trend reflects a shift from deep grammatical reflection to superficial correctness.

The resulting educational dilemma is significant: while Artificial Intelligence fosters efficiency, it potentially undermines the development of critical grammatical reasoning an essential skill in mastering Arabic. The challenge lies not in rejecting AI, but in understanding how its use reshapes the way students learn and internalize qawa'id. This study explores whether Artificial Intelligence enhances or hinders grammatical understanding and considers how educators might integrate Artificial Intelligence tools without sacrificing the depth and rigor of traditional grammar instruction (Shehab & Badah, 2026).

A number of previous studies have shown that the use of Artificial Intelligence in language learning has primarily focused on practical language skills. For example, a study by Amadi & Hikmah, found that AI helps improve access to language learning through automatic translation and language correction features. Simon, research also indicates that AI-based applications can provide learners with linguistic analysis and rapid feedback. Furthermore, Fitrianto, asserts that the use of AI in language education contributes to increased learning efficiency and learner autonomy. However, these studies have primarily highlighted the effectiveness of AI as a learning aid and have not specifically examined its impact on the cognitive processes underlying a deep understanding of grammar, particularly in the study of Arabic grammar (*qawa'id*).

This paper aims to address this gap by examining how Artificial Intelligence can not only support but also potentially replace traditional roles in understanding *qawāʿid*

Fitrianto, this issue is not merely a technological one but also an epistemological one: does Artificial Intelligence truly understand language rules, or does it merely generate answers that appear correct based on the data patterns it has learned? This question is relevant because the study of Arabic grammar is traditionally built through a process of an. This paper seeks to bridge that gap by examining how Artificial Intelligence can not only support but also potentially replace traditional roles in understanding *qawa'id* (Fitrianto, 2024). This issue is not merely a technological one, but also an epistemological one: does Artificial Intelligence truly understand the rules of language, or does it merely generate answers that appear correct based on the data patterns it has learned? This question is relevant because the learning of Arabic *qawa'id* is traditionally built through a process of analysis, reasoning, and the gradual construction of understanding (Salim et al., 2024).

the relationships between sentence components, providing reasons for the application of a rule, and the ability to explain alternative grammatical analyses that may arise in an Arabic linguistic construction. Although many educators welcome these technological advancements, this study takes a critical view of AI's ability to shift students from active problem-solving toward a more passive search for answers (Cornell et al., 2018). In addition, this study proposes a model for integrating AI with classical nahwu instruction, in which AI serves as a tool to support the exploration and verification of grammatical rules, while the processes of analysis, argumentation, and grammatical reasoning remain the primary responsibility of students and teachers. Using a descriptive analysis method, this article explores how the digital shift can redefine Arabic grammar education in the context of modern technological developments. Therefore, the objective of this study is to evaluate the extent to which AI can replace human understanding of Arabic grammar and to formulate a framework for evaluating AI's grammatical reasoning and a balanced AI nahwu integration model in Arabic language pedagogy.

Method

This study employs a conceptual literature review design using a descriptive-analytical approach. The study aims to critically examine the extent to which Artificial Intelligence AI may replace human cognitive engagement in understanding Arabic grammatical rules (*qawa'id*). Rather than conducting empirical testing, surveys, or field

observations, the study relies on scholarly literature, academic publications, and relevant theoretical documents as its primary data sources. The collected literature was analyzed descriptively to identify major themes concerning the role of AI in Arabic grammar learning, its pedagogical implications, and its potential impact on learners' grammatical reasoning processes (Aldawood et al., 2023).

Since this study does not involve human respondents, the units of analysis consist of grammatical texts generated by an Artificial Intelligence (AI) system. A total of 30 texts or prompts were purposively selected to represent various levels of difficulty in Arabic grammar, consisting of 10 basic structures, 10 intermediate structures, and 10 complex structures. The selection of texts was based on the frequency of occurrence of the material in *qawa'id* instruction as well as its relevance to the nahwu competencies commonly taught at the beginner through advanced levels. The distribution of *nahwu* structures includes ismiyyah phrases, *fi'liyyah* phrases, *mubtada'-khabar, fā'il and maf'ūl bih, na'at-man'ūt, iḍāfah, syarṭiyyah* phrases, as well as constructions involving changes in *I'rab* and the analysis of more complex syntactic relationships.

The analysis results generated by AI platforms such as ChatGPT, *Qutrub*, and *Nahwu* Artificial Intelligence were then compared with the grammatical explanations found in classical reference sources, *specifically Sharḥ Ibn 'Aqīl 'alā Alfiyyah Ibn Mālik* and *Al -Ājurrūmiyyah* along with its commentary published by *Dār al-Kutub al-Ilmiyyah*, which were selected for their authority and widespread use in the study of Arabic grammar. The researcher assessed the appropriateness of the AI's interpretations using indicators that included the accuracy of rule identification, the accuracy of irāb determination, the consistency of grammatical explanations, and the alignment of the reasoning with the interpretations found in these reference sources.

This comparative framework is essential to identify both the strengths and limitations of Artificial Intelligence in replicating the depth of classical grammatical reasoning. By placing Artificial Intelligence outputs side by side with traditional sources, the study aims to assess not only surface level correctness but also the interpretive logic and explanatory richness typically provided by human instructors or canonical texts. In this way, the research explores whether Artificial Intelligence tools merely reproduce answers or actually foster meaningful grammatical understanding (Yu & Clark, 2025).

This study employs a conceptual design supported by a systematic literature search protocol adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The literature search was conducted across five academic databases and indexing systems: Scopus, Web of Science, ERIC, Google Scholar, and SINTA. The publication period was restricted to studies published between 2020 and 2025 to capture recent developments in Large Language Models (LLMs) and Natural Language Processing (NLP) in Arabic language education. The search string utilized Boolean operators combining core keywords across titles, abstracts, and keywords.

The literature selection was governed by explicit inclusion and exclusion criteria. Studies were included if they: (1) were published in peer-reviewed journals, indexed proceedings, or authoritative classical grammatical commentaries between 2020 and 2025; (2) directly examined the use, accuracy, or pedagogical implications of AI tools in Arabic grammar (*nahwu*, *ṣarf, i'rāb*); (3) addressed grammatical reasoning or cognitive engagement; and (4) were fully accessible in English, Arabic, or Indonesian. Conversely, studies were excluded if they: (1) focused solely on generic machine translation without syntactic analysis; (2) examined non-Arabic foreign language contexts; (3) were non-academic grey literature, short magazine articles, or editorial opinions; or (4) lacked accessible full-text documents.

he initial database search retrieved 148 potentially relevant records (Scopus: 38, Web of Science: 21, ERIC: 24, Google Scholar: 47, and SINTA: 18). After removing 32 duplicate records, 116 titles and abstracts were screened, leading to the exclusion of 64 articles that did not meet the thematic focus. The remaining 52 full-text articles were evaluated thoroughly against the eligibility criteria, resulting in the exclusion of 27 articles due to a lack of syntactic evaluation depth or empirical parsing focus. Ultimately, 25 scholarly articles met all criteria and were synthesized to inform the analytical framework alongside primary classical reference texts, specifically *Sharḥ Ibn 'Aqīl 'alā Alfiyyah Ibn Mālik* and *Al-Ājurrūmiyyah*.

In testing the AI architectures, a standardized two-tiered prompt protocol was formulated to evaluate both descriptive identification and analytical reasoning. The first tier employed Direct Parsing Prompts (Tier 1) to assess surface-level syntactic labeling (*al-i'rāb al-ṣūrī*), where the systems were instructed to identify word classes,

grammatical positions, and inflectional case markers. The second tier utilized Grammatical Causality and Inferential Prompts (Tier 2) designed to probe whether the AI could articulate governing mechanisms (*al-ʿawāmil*), elided components (*al-taqdīr*), and semantic-syntactic dependencies (*al-dalālah al-naḥwiyyah*). All prompts were executed in standard Modern Standard Arabic (MSA) across separate clean sessions to prevent memory retention bias

The researcher simulated student like queries and documented Artificial Intelligence responses for analysis. The instruments for documentation were in the form of screen captures and query logs. Data analysis was carried out using content analysis, comparing Artificial Intelligence responses with classical and contemporary grammatical theories to Data analysis was conducted using content analysis by comparing the responses generated by the Artificial Intelligence system with references to classical and contemporary Arabic grammar. Evaluation was based on three operational indicators. First, accuracy the AI's precision in identifying grammatical functions, determining i'rāb, and applying the rules of nahwu and sharaf in accordance with the references used. Second, depth of analysis, which refers to the AI's ability to provide explanations that not only state the final result but also elaborate on the rules applied, the relationships between sentence components, and the rationale for applying a particular grammatical rule. Third, reasoning (grammatical reasoning), which refers to the AI's ability to construct logical and systematic arguments when explaining the analysis process, demonstrating the basis for the rules applied, and considering alternative grammatical interpretations recognized in nahwu literature. The analysis process includes grouping AI responses based on the type of nahwu construction being analyzed, checking for the presence of argumentative explanations, and evaluating their alignment with established Arabic grammar theories and the principles of Arabic language pedagogy.

Results And Discussion

AI's Ability to Generate Functional Qawāʿid Output

In recent years, Artificial Intelligence has achieved significant progress in Natural Language Processing, including for Arabic language structures. This has resulted in Artificial Intelligence systems such as ChatGPT, *Qutrub*, and *Nahwu* AI being capable of producing grammatical analyses (*I'rab*) of Arabic sentences with high accuracy

(Hamdy et al., 2025). In this study, accuracy was assessed based on the correct identification of word categories, grammatical functions, and *I'rab* determination using a four-level evaluation rubric: highly accurate (81–100%), accurate (61–80%), moderately accurate (41–60%), and less accurate (0–40%). The test results show that for basic sentence structures, the AI system generally falls into the "highly accurate" category because it is able to identify most grammatical elements in accordance with classical *nahwu* references. During test prompts conducted by the author, basic sentences like "ذهب الطالبُ إلى المدرسةِ" were successfully analyzed: ذهب was identified as a past tense verb (*fiʿl māḍī*), الطالبُ as a subject *(fāʿil*) in the nominative case (*marfūʿ*), and إلى المدرسة as aprepositional phrase (*jar wa majrūr*) attached to the verb.

Furthermore, ChatGPT was able to categorize words correctly. When asked about المدرسةِ, it recognized the word as a declinable noun (*ism muʿrab*) in the genitive case (*majrūr*) due to the preposition إلى. This indicates that Artificial Intelligence is capable of producing correct syntactic interpretations for standard, linear sentence structures, which is particularly helpful for beginner level students trying to grasp basic Arabic grammar (Zubaidi et al., 2025).

However, when faced with more complex syntactic constructions, such as "ما جاء إلا زيدٌ", Artificial Intelligence systems often fall short. While Artificial Intelligence may correctly identify زيدٌ as the subject, it frequently fails to elaborate on the logical and syntactic functions of ما as a negative particle (*ḥarf nafy*) and إلا as an exclusive particle (*ḥarf ḥaṣr*) commentaries on classical grammar like Sharḥ Ibn ʿAqīl would explore such constructions in depth, including semantic restrictions and sentence logic, which are essential to mastering advanced qawāʿid (Prastika et al., 2026).

An analysis of the 30 prompt evaluations revealed that AI failure is primarily manifested in the breakdown of structural causality and deep inferential reasoning rather than elementary lexical mislabeling. Out of the 30 tested grammatical structures, 13 constructions (43.3%) failed to meet the threshold of deep grammatical reasoning and comprehensive classical accuracy. The failures were heavily skewed toward non-linear and high-complexity categories:

Basic Structures: Only 1 out of 10 constructions (10%) exhibited partial analytical omissions, predominantly involving the failure to identify implied predicates (*khabar muqaddar*) in prepositional constructions.

Intermediate Structures: 4 out of 10 constructions (40%) displayed analytical shortcomings, notably failing to articulate the causal mechanism of governing agents (*al-ʻāmil al-lafẓī* vs. *al-maʻnawī*) in compound *inna* sentences and restrictive structures (*ḥaṣr*) such as *mā ḥaḍara illā Zaydun*.

Complex Structures: 8 out of 10 constructions (80%) exhibited critical failure in grammatical explanation. The systems consistently failed across four recurring structural types: (1) implicit inflection (*al-iʻrāb al-taqdīrī*), where phonological constraints (*al-taʻadhdhur* and *al-thiqal*) were completely ignored; (2) syntactic dialectal variants, such as *Mā al-Ḥijāziyyah* in *mā al-ṭālibu ghāfilan*, where cross-school scholarly debates (*ikhtilāf naḥwī*) were bypassed; (3) obligatory fronting and elision (*al-taqdīm wa al-taqdīr*), in which semi-sentences (*shibh al-jumlah*) were simplistically misassigned as direct predicates without structural linkage (*taʻalluq*); and (4) compound praise/blame expressions and verbal nouns (*asmāʼ al-afʻāl*), which were miscategorized as standard nouns or verbs.

Systems like Qutrub, on the other hand, rely more heavily on morphology than syntax. For example, when analyzing "إنّ الله غفورٌ", Qutrub accurately presents إنّ as a particle of emphasis and nasb, الله as its subject in the accusative case (*mansūb*), and غفورٌ as the predicate (*khabar*) in the nominative (*marfūʿ*). However, the explanation lacks depth in reasoning, such as the role of inna as a deficient particle requiring two components or the conceptual structure of a nominal sentence modified by such a particle

To provide a clearer comparison between Artificial Intelligence generated grammatical responses and classical Arabic grammar interpretations, the following table presents the analysis of 20 selected Arabic sentences (Allaithy & Zaki, 2025). These sentences range from basic nominal and verbal constructions to more complex structures involving particles such as inna, lākinna, mā, and kāna. The Artificial Intelligence responses were generated using a widely used large language model (ChatGPT), while the classical interpretations were derived from authoritative grammatical texts such as *Sharḥ Ibn ʿAqīl*, *al Tashīl*, and *Qawāʿid al Lugha al ʻArabiyyah* (Hayek et al., 2019). The

goal is to highlight the degree to which Artificial Intelligence tools can accurately perform syntactic parsing and where they fall short in offering deep theoretical insight.

The 20 test constructions presented in Table 1 were selected using a stratified purposive sampling technique designed to represent three distinct syntactic tiers: basic, intermediate, and complex (Page et al., 2021). The selection criteria were defined based on their curricular frequency in classical nahwu treatises (*Al-Ājurrūmiyyah* and *Sharḥ Ibn ʿAqīl*) and their capacity to test the boundary between surface-level case assignment and deep grammatical causality (Hamdy et al., 2025):

Table 1. Comparative Analysis Between Artificial Intelligence Output and Classical Grammar Interpretation

No	Test Sentence	AI Output	Classical Explanation
1	إنّ الطالبَ مجتهدٌ	Ism inna: الطالبَ (manshūb), Khabar: مجتهدٌ (marfūʿ).	Inna as ʿāmil lafẓī; explains the concept of nominal sentence (jumlah ismiyyah nāqiṣah).
2	ما حضر إلا زيدٌ	Negation by ما, fāʿil identified as زيدٌ.	ما as nāfiyah, إلا as ḥāṣirah; clarifies iḥṣār structure with delayed subject.
3	كان اللهُ غفورًا	كان: fiʿl nāqiṣ, اللهُ: ism (marfūʿ), غفورًا: khabar (manshūb).	Predicate required with nāqiṣ verb; discussion of mahal and ʿāmil type.
4	الطالبُ في المدرسةِ	الطالبُ: mubtada’, في المدرسةِ: jar wa majrūr as khabar.	Treats jar wa majrūr as mutaʿalliq of an implied predicate.
5	الكتابُ على الطاولةِ	الكتابُ: mubtada’,	Mutaʿalliq bi khabar muqaddar.

		على الطاولةِ: prepositional phrase as khabar.	
6	رأيتُ الطالبَ	رأيتُ: fiʿl+fāʿil, الطالبَ: mafʿūl bihi (manshūb).	Explains mafʿūl placement and verb transitivity.
7	جلس زيدٌ	جلس: fiʿl māḍī, زيدٌ: fāʿil (marfūʿ).	Identifies subject and verb type accurately.
8	لن ينجح الكسولُ	لن: nafy + nasb, ينجح: mansūb, الكسولُ: fāʿil (marfūʿ).	Confirms naṣb from لن and verb subject agreement.
9	ليت الشبابَ يعودُ	ليت: tamannī, الشبابَ: ism (manshūb), يعودُ: fiʿl.	Shows verb used as substitute for khabar.
10	كأنّ الطقسَ باردٌ	كأنّ: tashbīh, الطقسَ: ism (manshūb), باردٌ: khabar.	Explains tashbīh structure and nominal hierarchy.
11	علمتُ أنّ اللهَ غفورٌ	أن: nasb, اللهَ: ism, غفورٌ: khabar.	Nested nominal sentence; affected by أن.
12	الطالبُ المجتهدُ ناجحٌ	الطالبُ: mubtada’, المجتهدُ: ṣifa, ناجحٌ:	Agreement in iʿrāb; descriptive relationship clarified.

		khabar.	
13	مات الرجلُ	مات: intransitive, الرجلُ: fāʿil.	No mafʿūl; confirms intransitive status.
14	في الفصلِ طلابٌ	في الفصلِ: jar majrūr (muqaddam), طلابٌ: delayed mubtada’.	Applies rule of taqdīm al jār wa al majrūr.
15	قرأتُ كتابًا مفيدًا	قرأتُ: fiʿl+fāʿil, كتابًا: mafʿūl, مفيدًا: ṣifa.	Sifa matching in case and gender explained.
16	الناسُ مختلفون	الناسُ: mubtada’, مختلفون: plural khabar.	Agreement with plural khabar confirmed.
17	ما الطالبُ غافلًا	ما: negation, الطالبُ: mubtada’, غافلًا: manshūb khabar.	Notes non standard iʿrāb in mā + jumlah ismiyyah.
18	أصبح الجوُّ معتدلًا	أصبح: kāna sister, الجوُّ: ism, معتدلًا: khabar.	Shows typical kāna structure and its case effects.
19	هل رأيتَ القمرَ؟	هل: interrogative, رأيتَ: verb+subject, القمرَ: object.	Analyzes transitive question structure.
20	الذي نجح فائزٌ	الذي: ism mawṣūl, نجح: ṣilah, فائز: khabar.	Explains connection between ṣilah and resumed predicate.

The results presented in Table 1 show a consistent pattern: Artificial Intelligence tools generally demonstrate adequate ability in identifying surface-level grammatical functions such as mubtada', khabar, fāʿil, and mafʿūl bihī (Mas'udah, 2025). In relatively simple syntactic constructions, such as noun phrases, simple verbal clauses, and prepositional phrases, the responses generated by AI generally align with the explanations found in the referenced Arabic grammar sources. AI systems also tend to be able to recognize the functions of basic grammatical elements and accurately explain the use of particles such as inna and kāna in non-complex contexts (Hadi & Qohar, 2025). These findings indicate that AI can assist in the initial analysis of Arabic sentence structure, particularly in basic-level qawāʿid material that emphasizes the identification of grammatical elements and syntactic functions. Therefore, the use of AI has the potential to support Arabic language learning, especially in situations requiring rapid feedback on the analysis of simple sentences.

However, the classical interpretations offer layers of analysis that Artificial Intelligence consistently omits. These include the identification of implied elements such as khabar muqaddar, the explanation of grammatical agents (ʿ*awāmil*), syntactic exceptions, and contextual meanings influenced by word order or rhetorical structure (Hamdy et al., 2025). For instance, while Artificial Intelligence correctly marks غافلًا as mansūb in the sentence ما الطالبُ غافلًا, it fails to discuss the underlying mechanism of mā as a negation particle within an atypical sentence structure. Such insights are essential in developing a deeper grammatical awareness, one that extends beyond correctness into understanding.

Additionally, classical grammar explanations often contextualize grammar within broader semantic and logical frameworks, especially in cases involving relative clauses (*ṣilah*) or stylistic expressions such as iḥṣār and tamannī. These nuances are lost in Artificial Intelligence outputs, which despite being functional lack explanatory depth. This distinction underscores the current limitation of Artificial Intelligence tools in replicating the inferential reasoning traditionally cultivated through rigorous nahwu instruction (Yasmadi et al., 2025).

Therefore, while Artificial Intelligence can accurately produce grammatical labels and case assignments, its role is limited to mechanical correctness. It lacks the ability to

reflect on why certain structures behave as they do within the logic of the Arabic language. This highlights the need for educators and learners to treat Artificial Intelligence as a supplementary tool rather than a comprehensive source of grammatical understanding (Alamer et al., 2025).

To illustrate, the distinction between *al iʿrāb al ẓāhir* (explicit grammatical endings) and *al iʿrāb al taqdīrī* (estimated endings) is rarely addressed in Artificial Intelligence generated explanations. In cases like *al fatā yaqḍī*, where *yaqḍī* ends with a ya' due to a weak final root, classical grammar offers deep analysis involving phonological reasoning and verb class categorization topics that Artificial Intelligence tends to overlook or reduce to brief statements. The absence of these interpretive layers may hinder students from appreciating the complexity and interconnectedness of Arabic grammar.

Moreover, Artificial Intelligence tools often generalize rules without noting the exceptions or the conditions under which a grammatical rule applies. This can lead to misconceptions (Taylor et al., 2026). For example, Artificial Intelligence may correctly identify *innallāha ghafūrun raḥīm* as having *inna* with *ism inna* and *khabar inna*, but fails to explain how such expressions are frequently used for stylistic emphasis in the Qur'an or Hadith, or how they interact semantically with prior discourse. Without this depth, learners are left with a technically correct but shallow understanding.

Another challenge arises when dealing with ambiguous or polysemous structures. Human scholars often bring rhetorical analysis or contextual logic to resolve grammatical ambiguity a skill rooted in long standing interpretive traditions. Artificial Intelligence, however, lacks the pragmatic sensitivity or hermeneutical strategies to disambiguate nuanced phrases. This becomes especially problematic when Artificial Intelligence is used to analyze classical texts, where a single grammatical shift can imply significant theological or legal meaning.

Ultimately, the findings suggest that Artificial Intelligence in its current form is best used as a facilitative rather than definitive tool. It provides scaffolding for learners to test and reinforce basic grammatical recognition, but it should not replace traditional instruction that nurtures linguistic reasoning and semantic awareness. A balanced approach one that combines Artificial Intelligence's speed with human guided depth will more effectively cultivate a nuanced and enduring understanding of Arabic grammar.

The Inability of AI to Explain Underlying Grammar Logic

One of the main limitations of Artificial Intelligence in replacing human understanding of qawāʿid lies in its lack of reasoning and grammatical inference. AI systems, particularly large language models, are pattern recognizing tools (Muhammad & Mufidah, 2024). When asked questions such as "Why is the khabar of inna in the nominative case while its ism is accusative?", ChatGPT typically provides the answer, "because that is the rule of inna", without further explanation of the underlying theoretical framework or the concept of al ʿāmil (governing agent).

This limitation reflects a broader issue: Artificial Intelligence lacks awareness of grammatical causality. Traditional Arabic grammar instruction places strong emphasis on the causes (*ʿawāmil*) that govern syntactic relationships. When students study sentence construction, they are trained to identify not only what the grammatical roles are, but *why* they occur tracing back to underlying agents, types of verbs, particles, or even syntactic positioning (Jwair, 2025). AI tools often bypass this inferential step, offering results but not reasoning.

For instance, in analyzing a sentence like *inna Zaydan qā'imun*, a qualified human instructor would explain that *inna* is a particle of emphasis (*ḥarf tawkīd wa nasb*) that assigns *naṣb* to its *ism* and *rafʿ* to its *khabar*, and would tie this explanation into the concept of particles acting as grammatical agents (Muftah, 2025). Artificial Intelligence, however, merely labels *Zaydan* as *mansūb* and *qā'imun* as *marfūʿ* without connecting this structure to the system of grammatical causality developed by scholars like Sibawayh or Ibn Hishām.

Moreover, Artificial Intelligence does not distinguish between mechanical application and conceptual understanding. While it may correctly identify morphological markers, it does not engage in the kind of hypothetico-deductive reasoning that human grammarians often employ (Shahin & El Rwelli, 2021). For example, in exceptional cases like *lā nāfiyah li al-jins*, the human instructor introduces comparative scenarios, explores semantic constraints, and challenges students to reason through exceptions. Artificial Intelligence outputs lack this discursive flexibility and often fail to acknowledge grammatical anomalies or variant readings.

Ultimately, the pedagogical implications are clear: Artificial Intelligence may

help with memorizing and quickly accessing rules, but such abilities do not necessarily lead to tafaqquh in the study of nahwu. In the context of Arabic language education, tafaqquh does not merely mean knowing or memorizing grammatical rules, but also understanding the rationale behind the application of a rule, the relationships between rules, and the ability to apply them in new and more complex linguistic contexts. In other words, just as tafaqquh in the study of fiqh requires a deep understanding of evidence and the process of deriving legal rulings (*istinbat*), tafaqquh in the study of nahwu requires the ability to analyze linguistic structures, explain syntactic relationships, and provide logical grammatical arguments. Therefore, mastery of qawāʿid is not sufficient merely by obtaining the correct answer; it also requires a reasoning process that enables learners to understand why a particular form of irāb or grammatical analysis is considered correct in a specific context. As long as Artificial Intelligence systems are unable to simulate not only knowledge acquisition but also structured analytical thinking, their role must remain that of a tool not a substitute for the learning process itself. In this regard, teachers play a crucial role in guiding students to develop tafaqquh nahwu that is, a grammatical understanding that is reflective, argumentative, and transferable to various linguistic constructions. As long as artificial intelligence systems are unable to simulate not only knowledge acquisition but also structured analytical thinking, their role must remain that of a tool not a substitute for the learning process itself. In this regard, teachers play a crucial role in guiding students to develop tafaqquh nahwu that is, a grammatical understanding that is reflective, argumentative, and transferable to various different linguistic constructions. Thus, human teachers remain irreplaceable in fostering grammatical competence grounded in reasoning and deep understanding (Fifani et al., 2026).

In traditional grammar pedagogy, however, instructors or texts like al Tashīl li Ibn Mālik would provide comprehensive explanations. They would clarify that inna operates as a *lafẓī* (explicit) agent of nasb on its *ism* and a *maʿnawī* (semantic) agent of rafʿ on its khabar. This dual function is part of a broader grammatical theory and serves as a foundational concept for understanding the mechanics of Arabic nominal sentences. Artificial Intelligence does not currently have the ability to reconstruct or explain this theory from principles (Yang & Pollock, 2026).

Moreover, AI often fails to account for differences of opinion (*ikhtilāf*) among

grammarians. When analyzing constructions with alternative interpretations based on Kufan or Basran schools of thought, AI typically defaults to a single mainstream version without indicating that multiple readings exist. For example, in certain kinds of appositional sentences (*badal)*, classical texts often debate the syntactic status of the dependent phrase, while AI tends to skip such details entirel (Allaithy & Zaki, 2025).

Another critical gap lies in Artificial Intelligence's inability to reverse engineer grammar rules. If a student asks, "Why is this word in the nominative case?", Artificial Intelligence might reply, "Because it is the subject." But if asked, "Why must subjects be in the nominative?", Artificial Intelligence often fails to explain that this is due to the general rule: al fiʿl yarfaʿu fāʿilahu ("the verb raises its subject"). This deeper level of understanding crucial in building logical thinking and grammatical intuition is absent from Artificial Intelligence generated content.

Thus, while Artificial Intelligence can serve as a shortcut to correct answers, it cannot cultivate analytical skills or metalinguistic awareness. Its responses tend to reflect immediate utility rather than educational scaffolding. In this sense, Artificial Intelligence remains a response tool, not a reflection tool.

The Role of Artificial Intelligence in the Grammar Learning Ecosystem: Threat or Opportunity?

The core question arises: Does Artificial Intelligence pose a threat to the rigorous study of qawāʿid, or does it open new pedagogical possibilities? Based on this study, the answer seems to be both. Artificial Intelligence offers learners unprecedented access to grammatical analysis, making it easier to study independently and receive instant answers. In resource limited environments or for beginners, this can be transformative (Albadry & Asiri, 2026).

Yet this transformation is not without cost. One of the emerging patterns observed in this study is the shift from reflective engagement to surface-level comprehension. Learners often accept Artificial Intelligence -generated answers uncritically, especially when the results appear technically correct. This behavior weakens the tradition of linguistic inquiry embedded in *nahwu*, where understanding is built through questions, counterexamples, and teacher-guided clarification. The passive reception of information can undermine the interpretive resilience that *qawāʿid* education seeks to instill (Husaini,

2026).

Furthermore, students who consistently depend on Artificial Intelligence may develop a fragmented view of grammar. Since Artificial Intelligence typically provides answers in isolated sentence contexts, it rarely presents a holistic view of grammatical systems. As a result, students might struggle to connect one rule to another—for instance, how a governing agent (*ʿāmil*) in one construction might operate differently in conditional or emphatic structures. The lack of conceptual bridges weakens the coherence of a learner's grammatical schema.

Additionally, Artificial Intelligence is currently limited in its ability to respond to ambiguity, dialectical variation, and intertextual nuance. While a human instructor can adjust their explanation based on the student's background knowledge or cultural context, Artificial Intelligence offers standard, generalized responses. This gap becomes critical in the study of classical texts, where meanings are often layered and dependent on context or tradition. In such cases, relying solely on AI may lead to misinterpretation or oversimplification of complex syntactic forms.

However, such convenience also risks fostering intellectual laziness. Students who rely heavily on Artificial Intelligence may bypass the mental processes that develop grammatical sensitivity. They might no longer attempt to derive iʿrāb from first principles, nor practice identifying relationship s between sentence components. The habit of engaging critically with a sentence's structure may deteriorate, leading to an erosion of analytical capacity that traditional nahwu education aims to cultivate.

Therefore, an integrative model is needed one in which Artificial Intelligence is not a teacher replacement but a pedagogical assistant. Teachers could design assignments where students generate Artificial Intelligence responses and then cross check them with classical texts such as Sharḥ Ibn ʿAqīl. In doing so, AI becomes a catalyst for discussion and critical evaluation, not a substitute for authoritative knowledge.

This blended approach is not hypothetical. Recent work, such as that of Pahlevi (2024) in the ISCALT Proceedings, proposes the concept of "guided Artificial Intelligence dialogic learning," where students interact with AI and then challenge or correct it using authentic grammar sources. This method develops both digital fluency and grammatical depth.

In conclusion, Artificial Intelligence is a doubleedged sword. While it facilitates rapid learning, it may also hinder deep thinking. Teachers and curriculum designers must play the role of technology moderators, ensuring that students learn with AI but not from Artificial Intelligence alone. Qawāʿid must remain a space for intellectual exercise, not just technical correctness.

Conclusion

The findings of this study indicate that Artificial Intelligence is capable of producing accurate syntactic analyses in Arabic, particularly for basic and moderately complex sentence structures. It performs reliably in identifying core grammatical rolessuch as *mubtada'*, *khabar*, *fāʿil*, and *mafʿūl bihi* and in applying appropriate case endings (*iʿrāb*) in accordance with widely accepted grammatical rules. This level of functional accuracy renders Artificial Intelligence potentially useful for beginner to intermediate learners who seek immediate feedback or wish to validate their understanding in real-time. In contexts where access to qualified Arabic grammar instructors is limited, Artificial Intelligence can fill important instructional gaps and support autonomous learning.

This study makes several theoretical and pedagogical contributions to the discourse on artificial intelligence in Arabic language education. Epistemologically, it bridges the analytical divide between computational natural language processing (NLP) and classical Arabic grammatical science (‘ilm al-nahw), demonstrating that while generative models excel in surface-level morphological categorization and linear case labeling, they remain fundamentally detached from classical grammatical causality (naẓariyyat al-‘āmil) and contextual metalinguistic reasoning (tafaqquh fī al-naḥw). Methodologically, this research establishes an evaluative framework and prompt-testing protocol that systematically contrasts LLM outputs with canonical reference texts, specifically Sharḥ Ibn ‘Aqīl and Al-Ājurrūmiyyah. Pedagogically, it moves beyond binary debates of technological adoption versus rejection by providing a structured conceptual foundation—the triadic model—that redefines AI as an object of critical verification rather than an authoritative substitute for human-guided instruction.

Despite these benefits, the research also reveals clear limitations in Artificial Intelligence -generated grammatical explanations. While Artificial Intelligence may correctly label syntactic roles and suggest suitable case endings, its responses often lack the interpretive depth and conceptual coherence found in traditional Arabic grammar instruction. Fundamental theoretical elements such as the concept of the grammatical governor (*ʿāmil*), the estimation of omitted elements (*taqdīr*), syntactic exceptions, and the layered relationships between syntax and semantics are rarely addressed in detail. Instead, Artificial Intelligence tends to provide rule-based answers with little to no contextualization or justification. This superficiality could result in students developing a technically correct but mechanistic understanding of grammar, devoid of the intellectual sophistication that *qawāʿid* is meant to cultivate.

Despite its contributions, several limitations of this study should be acknowledged. First, the unit of analysis was restricted to 30 purposively selected grammatical prompts evaluated across three specific AI platforms (ChatGPT, Qutrub, and Nahwu AI), which may not encompass the full spectrum of rare syntactic phenomena, dialectal deviations, or poetic licenses (*al-ḍarūrah al-shiʿriyyah*) found in classical literature. Second, this investigation adopted a conceptual and documentary descriptive-analytical design without empirical classroom trials or direct cognitive measurement of learner performance, thereby precluding quantifiable insights into real-time student-AI interaction dynamics. Third, the rapid evolution and non-deterministic nature of large language models mean that system performance, prompt sensitivity, and internal training data configurations are subject to continuous algorithmic updates, which may introduce variability in output consistency over time.

Moreover, Artificial Intelligence tools currently lack the capacity to handle ambiguity, rhetorical devices, and stylistic variations that are common in classical Arabic texts. Their inability to provide multiple interpretive angles or discuss alternate grammatical readings limits their usefulness for advanced learners, particularly those engaging with literature, tafsīr, or fiqh. In these domains, grammatical interpretation often has philosophical, legal, or theological consequences something that Artificial Intelligence is not (yet) equipped to navigate responsibly.

Future scholarly inquiry should expand along both empirical and technological dimensions. First, empirical experimental and quasi-experimental studies are needed to evaluate the practical efficacy of guided AI-integration models in classroom environments, assessing their direct impact on students' critical thinking, grammatical problem-solving abilities, and retention of *iʿrāb* logic. Second, longitudinal research could explore cognitive load and learning dependency to determine whether prolonged reliance on instant AI feedback diminishes autonomous linguistic inquiry. Third, interdisciplinary research at the intersection of computer science and Arabic linguistics should focus on fine-tuning specialized domain-specific LLMs trained explicitly on classical grammatical corpora and disputational treatises (*kutub al-khilāf al-naḥwī*), thereby developing automated tools capable of simulating hypothetico-deductive reasoning, detecting implied governors (*taqdīr*), and accommodating multiple legitimate parsing perspectives (*wujūh al-iʿrāb*)

In light of these findings, Artificial Intelligence should not be treated as a replacement for traditional grammar education but rather as a pedagogical support tool. Educators are encouraged to and integrative approach, using Artificial Intelligence outputs as a starting point for deeper classroom discussions, reflective critique, and cross-checking with classical sources. Assignments can be designed to have students interact with Artificial Intelligence -generated responses and compare them with interpretations from texts like *Sharḥ Ibn ʿAqīl* or *al-Jurumiyyah*. Future research may explore blended instructional models that combine the speed and accessibility of Artificial Intelligence with the depth, precision, and critical reasoning cultivated through traditional *nahwu* pedagogy. Such integration ensures that students not only learn *what* the rules are but also *why* they matter and how they reflect the rich intellectual heritage of the Arabic language.

Declaration of AI and AI Assisted Technologies in the Writing Process

In the preparation of this manuscript, the author utilized ChatGPT, an AI-powered tool, to support language editing, grammatical improvement, and overall editorial refinement. All AI-generated suggestions were carefully reviewed, verified, and revised by the author. The author retains full responsibility for the manuscript’s content, the accuracy and interpretation of the data, and the final version of the published work.

Author Contribution Statement

Ifkar Rasyid contributed primarily to data collection, data analysis, interpretation of findings, and the drafting and revision of the manuscript. Rosi Guspita contributed to the literature review, data analysis, and manuscript revision. Ferki Ahmad Marlion and Rahmat Satria Dinata contributed to selected aspects of data analysis, interpretation of findings, and the review of the manuscript. Ikysarul Akhyari contributed to data validation, particularly by verifying the grammatical analyses against classical Arabic grammar references, and provided critical feedback on the manuscript. All authors have read and approved the final version of the manuscript.

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Data Availability Statement

The data supporting the findings of this study, including the AI-generated grammatical analyses and the corresponding evaluation records, are available from the corresponding author upon reasonable request.

Declaration of Interests

The authors declare that they have no competing financial or non-financial interests that could have influenced the research, data analysis, interpretation of the findings, or preparation of this manuscript.

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