Jurnal Pendidikan Bumi Persada P-ISSN: 2829 - 9000
Volume 4, Nomor 1, April 2025 E-ISSN: 2829 - 3622

AN ANALYSIS OF THE EFFECTIVENESS OF AI IN LEARNING ENGLISH GRAMMAR IN THE DIGITAL ERA

Ismuhu Nasai
Universitas Bumi Persada, Lhokseumawe, Indonesia
Corresponding Author Email: nasaithalib220690@gmail.com

ABSTRACT: This study aims to analyze the effectiveness of using Artificial Intelligence (AI) tools in English grammar learning in the digital era. The research was conducted at the Elfasi Short-Term Educational Institute in Banda Aceh in January 2025, involving 30 participants from the grammar class. A quantitative approach was employed using a one-group pretest-posttest design. The AI tools used in the learning process included Grammarly, ChatGPT, and QuillBot. The study's results showed a significant improvement in participants' grammar test scores following the AI-assisted learning intervention. Additionally, participants' perceptions of using AI tools were highly positive, with 90% stating that AI helped them learn grammar more efficiently. These findings suggest that AI can be a valuable support tool in English language learning, particularly in the area of grammar.

Keywords: AI Tools, Artificial Intelligence, Educational Technology, English Grammar, Experimental Study

INTRODUCTION

The development of digital technology has brought about significant transformations across various aspects of life, including the field of language education. In today's digital era, conventional approaches to language learning have gradually shifted toward the use of more adaptive, responsive, and AI-driven technologies. Students can learn and acquire the target language more naturally and spontaneously, and at a lower cost when they employ technology (Muslem et al., 2019). Along with the rapid advancement of Artificial Intelligence (AI), English language learning is undergoing a paradigm shift from traditional, one-way teaching methods to interactive, digitally based learning models.

One of the essential aspects of English language learning that often presents a challenge for students is grammar mastery. Grammar is a system of rules that forms the structure of a language, encompassing complex morphological and syntactic elements. According to Celce-Murcia and Larsen-Freeman (1999), mastering grammar is a critical foundation for accurate communication in English, both in spoken and written forms. However, for many learners, grammar is often perceived as difficult and confusing due to its complexity, irregularities, and structural differences compared to their native language (Nassaji & Fotos, 2011).

In this context, the emergence of various AI tools offers promising new opportunities to support grammar learning more effectively and engagingly. Tools such as Grammarly, ChatGPT, and QuillBot provide features like automatic corrections, contextual explanations, and instant feedback, benefits that were previously only available through direct interaction with a teacher. This technology enables personalized and adaptive learning tailored to individual needs and accessible anytime (Godwin-Jones, 2022). The integration of AI in language learning not only accelerates the feedback process but also helps students understand and correct their

mistakes through context-based guidance.

Responding to this dynamic, the Elfasi Short-Term Educational Institute in Banda Aceh, a non-formal institution specializing in English language training, has taken the initiative to implement AI tools in its grammar learning activities. In January 2025, the institution launched an experimental program that integrated various AI tools in its Grammar-A class, which consisted of 30 participants. The program aimed not only to modernize learning approaches but also to address a fundamental question regarding the effectiveness of AI technology in enhancing grammar comprehension.

Using an evidence-based approach, this study was designed to evaluate the impact of AI tools on improving participants' grammar competence, as well as to identify their perceptions and learning experiences with the use of such technologies. The findings of this research are expected to make a tangible contribution to English language teaching practices in the digital age, particularly in utilizing intelligent technologies as effective pedagogical partners.

LITERATURE REVIEW

AI in English Education

The advancement of Artificial Intelligence (AI) technology has brought significant transformation to the world of education, particularly in foreign language learning. In the context of language education, AI functions not only as a supportive tool but also as a pedagogical partner capable of delivering a more personalized, responsive, and adaptive learning experience tailored to students' needs (Li, 2022).

One of AI's primary contributions to language teaching is its ability to provide automatic corrections and instant feedback on student errors. This feature allows learners to gain immediate understanding of their mistakes while receiving specific and contextual suggestions for improvement. Tools such as Grammarly and Microsoft Editor, for example, can identify grammatical, spelling, and stylistic errors while offering structurally accurate sentence alternatives (Nagata, 2009; Kukulska-Hulme, 2020). This supports the form-focused instruction approach that has long been recommended in grammar teaching (Nassaji & Fotos, 2011).

Beyond simple corrections, AI also enables context-based dialogue simulations, allowing students to engage in interactive conversations with systems powered by Natural Language Processing (NLP). Technologies like ChatGPT, Google's Dialogflow, and Replika AI provide flexible, low-pressure language practice environments, particularly beneficial for beginners or introverted learners (Gayed et al., 2021). AI's ability to respond based on context and sentence semantics makes these interactions not only realistic but also educational.

According to Godwin-Jones (2022), the use of AI in language learning offers not only efficiency but also increases learners' motivation and sense of autonomy. Research by Hajar et al. (2024) shows that the use of technology plays a significant role in increasing students' motivation to learn English. AI tools allow students to access materials and exercises tailored to their proficiency levels, ultimately encouraging deeper engagement in the learning process. This aligns with the findings of Winke and Goertler (2008), who noted that technology-based learning can boost students' confidence in using a foreign language.

Furthermore, personalized learning is one of AI's key strengths in education. AI algorithms can analyze students' learning patterns, identify individual weaknesses, and present relevant content or exercises that address their specific needs (Popenici & Kerr, 2017). In a study by Wang and Vásquez (2012), English as a Foreign Language (EFL) learners who used AI-

based platforms demonstrated significant improvement in writing skills and grammar awareness, as the systems provided targeted practice and corrections aligned with their progressive development.

In addition, AI contributes to metacognitive aspects of learning by helping students recognize and reflect on how they learn languages. Some AI applications include tracking and log analysis features that allow learners to monitor their own learning progress, supporting a learner-centered approach (Boulton et al., 2022).

Nonetheless, several researchers caution that the success of AI implementation in education heavily depends on pedagogical context and the digital literacy of both teachers and students. Without proper guidance, the use of AI risks becoming merely a tool for automation, rather than a meaningful instrument for developing language proficiency (Zawacki-Richter et al., 2019).

Grammar

Grammar is a fundamental element of language systems, serving to regulate structure and the relationships between language units. In the context of English as a Foreign Language (EFL) learning, grammar is often regarded as a central pillar for building accurate and effective communication skills, both spoken and written. As stated by Celce-Murcia and Larsen-Freeman (1999), grammar forms the framework that supports language proficiency, as a solid understanding of grammar enables learners to construct logical, coherent sentences that align with the linguistic norms of the target language.

Grammar functions not only as a tool for sentence formation but also as a conduit of meaning that facilitates clear message delivery. Halliday and Matthiessen (2004) emphasized that grammar is part of a language's meaning-making system (meaning potential), rather than a set of rigid rules. Through grammar, speakers can express nuances of time, causality, emphasis, and a range of complex social meanings. Therefore, mastering grammar is crucial in all forms of communication, particularly in academic and professional contexts.

In the field of language pedagogy, grammar instruction has evolved through various approaches from the grammar-translation method and audio-lingual method to communicative language teaching (CLT). Although communicative approaches focus more on functional language use, researchers continue to affirm the importance of grammar as a tool for effective communication. Ellis (2006) argues that without a sufficient grasp of grammar, learners may struggle to express ideas accurately and run the risk of miscommunication.

Moreover, grammar proficiency has been shown to correlate with improvements in English writing skills. According to Hyland (2003), in academic writing, correct sentence structure and syntactic complexity are key indicators of advanced language ability. Writing consistently develops critical thinking abilities, creates cogent arguments, and pays attention to proper grammar and structure (Muntazar & Hajar, 2025). Thus, EFL learners with strong grammar skills have a distinct advantage in articulating logical and persuasive arguments. In addition, research by Sheen (2007) demonstrated that explicit grammar instruction, particularly through corrective feedback, can significantly improve the structural accuracy of students' writing.

Beyond writing, grammar also influences speaking skills. Thornbury (2005) notes that grammatical accuracy is one of the core components in assessing speaking ability, alongside fluency and meaningfulness. Learners who lack understanding of tenses, passive structures, or conditional forms, for instance, may struggle to convey ideas coherently, especially in formal or academic settings.

From the perspective of language learning psychology, grammar mastery contributes to enhanced language awareness and metalinguistic knowledge, the learner's conscious ability to reflect on the form and function of language (Andrews, 2007). This awareness empowers learners not only to use the language effectively but also to self-correct and acquire new linguistic patterns more efficiently.

Although some argue that grammar instruction may limit communicative spontaneity, research indicates that a balanced approach combining form-focused instruction with meaningful communication can produce optimal learning outcomes. Nassaji and Fotos (2011) concluded that learners who receive grammar instruction in meaningful contexts are more likely to retain structural accuracy in long-term communication.

In conclusion, grammar plays an essential role in the comprehensive development of English language skills. Mastery of grammar not only supports accurate speaking and writing but also strengthens overall linguistic competence and bridges learners toward effective communication.

AI Tools

Grammarly

Grammarly is an AI-powered application designed to help users write more accurately and effectively in English. First launched in 2009, Grammarly has grown into one of the most popular AI writing assistants, with over 30 million daily users worldwide (Grammarly Inc., 2023). The application can be integrated with various digital writing platforms such as Microsoft Word, Google Docs, email, and web browsers.

Grammarly's primary function is to provide automatic feedback on grammar, spelling, and writing style errors. Its underlying technology combines traditional linguistic approaches with machine learning, deep learning, and natural language processing (NLP). Grammarly's AI system is designed to analyze text in real time, identify structural and lexical errors, and suggest context-based corrections.

According to Li (2022), Grammarly can enhance the writing accuracy of EFL (English as a Foreign Language) learners by offering instant feedback, which is pedagogically valuable for accelerating revision and reinforcing grammar understanding. Features such as passive voice detection, word repetition alerts, confusing sentence structure identification, and tone suggestions allow users to not only correct technical mistakes but also improve the clarity and rhetorical precision of their writing.

A study by Ranalli (2018) found that using Grammarly in foreign language learning contexts significantly helped university students reduce grammatical errors in their academic writing tasks. The automated feedback, such as corrections for tenses, subject-verb agreement, and punctuation, functions as scaffolding in the writing learning process. In addition, Grammarly provides brief grammar explanations for each correction, enabling learners to not only correct mistakes but also learn from them.

From an educational technology perspective, Grammarly serves as a support tool for form-focused instruction (Ellis, 2006), an approach that emphasizes explicit attention to language form. In this regard, Grammarly can be an ideal complement for teachers managing writing instruction, particularly in contexts where time constraints limit the ability to provide individual feedback.

Furthermore, Grammarly includes features for analyzing writing style, such as suggestions to simplify phrases, enhance word precision, and maintain tone consistency. These features are especially relevant in academic and professional contexts, where clarity and cohesion are essential. Godwin-Jones (2022) describes Grammarly as a successful example of a personalized AI

tutor capable of tailoring writing suggestions to the purpose and audience of the text.

However, several studies have also noted that Grammarly is not without limitations. Its feedback loop remains largely rule-based, and in more complex cases, the application may fail to capture pragmatic nuances or cultural context in language use (Li & Hegelheimer, 2013). Therefore, the use of Grammarly should be complemented by pedagogical intervention from teachers or facilitators to ensure accurate understanding of the corrections provided.

ChatGPT

In the era of digital learning, Artificial Intelligence (AI)-based tools have evolved not only as correction aids but also as interactive tutors capable of explaining grammar concepts directly, complete with examples of their use in real-life contexts. This functionality provides adaptive, personalized, and contextual learning experience features that were previously available only through interaction with a human teacher.

According to Li and Hegelheimer (2013), AI tools such as Grammarly, ChatGPT, Write & Improve, and ELSA Speak offer a learning environment that allows students not only to recognize that they have made an error but also to understand why the error occurred. The grammar explanations provided are explicit and accompanied by example sentences, enabling learners to build a deeper conceptual understanding.

For instance, when a user writes a sentence with a subject-verb agreement error, Grammarly highlights the incorrect section and provides a brief explanation, such as, “Singular subjects take singular verbs.” This is often accompanied by a corrected version of the sentence. Additionally, AI-based chatbots like ChatGPT can be used interactively; learners may ask, “What is the difference between the present perfect and past simple?” and receive a comprehensive explanation complete with example sentences and a timeline illustration (Brown, 2023).

This functionality strongly supports the form-focused instruction approach, which emphasizes attention to specific linguistic forms within a communicative context (Ellis, 2006). Within the framework of constructivist theory, interaction with AI as a virtual tutor allows students to construct their understanding through active and sustained engagement (Vygotsky, 1978).

Beyond grammar explanation, AI tutors also excel in adjusting to learners’ proficiency levels and learning styles. According to Godwin-Jones (2022), AI technology in language learning tends to be personal and responsive, as it can analyze learners’ error patterns and provide explanations tailored to each individual's needs. This opens up significant opportunities in the development of intelligent tutoring systems (ITS), digital systems that simulate human teacher instruction with a high level of efficiency.

Research by Xie et al. (2019) showed that learners who used AI-enhanced feedback tools demonstrated significant improvement in grammar understanding, as they were able to explore concepts independently, ask questions, and receive instant responses based on linguistic data. In this context, AI tools function not only as correctors but also as teachers, enabling learners to gain long-term conceptual transfer.

QuillBot

QuillBot is an Artificial Intelligence (AI)-based tool specifically designed to assist writers and learners in paraphrasing or rephrasing sentences automatically. Utilizing Natural Language Processing (NLP) technology, QuillBot is capable of modifying sentence structure, word choice, and writing style without altering the original meaning. This core feature is highly relevant in English language learning, particularly in mastering

grammar and exploring sentence structure variation.

According to research conducted by Yao et al. (2021), automatic paraphrasing tools like QuillBot help second language (L2) learners explore a variety of sentence patterns in English. For example, QuillBot can transform passive sentences into active ones, rearrange clauses, replace words with contextually appropriate synonyms, and either simplify or enrich sentence structures depending on the user's needs. As a result, learners can see firsthand how a single idea can be expressed through different linguistic forms.

In the context of grammar learning, QuillBot is especially useful in helping students understand alternative syntactic structures. This aligns with the findings of Nation (2013), who asserted that mastering sentence structure variation enriches learners' syntactic competence and enhances flexibility in written communication. Through its paraphrasing feature, QuillBot enables learners to compare the original sentence with the restructured version, thereby reinforcing their metalinguistic awareness.

Moreover, QuillBot also plays a significant role in developing paraphrasing skills in academic writing. A study by Alharbi and Surajbali (2022) revealed that AI-powered paraphrasing tools assist students in avoiding plagiarism and developing the ability to rewrite information in their own words, a crucial skill in scholarly and academic writing.

From a pedagogical standpoint, tools like QuillBot support the principle of ***noticing*** in Second Language Acquisition (SLA) theory, as proposed by Schmidt (1990), which emphasizes the importance of learners' awareness of differences in linguistic form and structure in the input they receive. When students compare QuillBot's paraphrased output with their original writing, they engage in a cognitive process that deepens their understanding of grammar and sentence construction.

METHOD

Research Approach

This study employed a quantitative approach oriented toward hypothesis testing through numerical measurements and statistical analyses of the variables under investigation. The quantitative approach aims to obtain an objective, systematic, and generalizable picture of the phenomena being studied (Sugiyono, 2021). The research design adopted was a quasi-experimental design using a *pretest–posttest* model without a control group. In this design, the research subjects were given a specific treatment, followed by measurements before (pretest) and after (posttest) the treatment to observe the changes that occurred. Unlike a true experimental design, a quasi-experimental design does not involve full randomization or a control group as a comparison, yet it can still provide meaningful information regarding the effectiveness of an intervention (Sugiyono, 2021).

The *pretest–posttest without control group* model assumes that the difference in scores between the pretest and posttest within the same group reflects the impact of the treatment provided. Although this design has limitations in controlling threats to internal validity due to the absence of a control group, it is still widely used when field conditions do not allow for the formation of a control group or subject randomization (Shadish, Cook, & Campbell, 2002).

Research Subjects

The subjects of this study were 30 students from the Grammar-A class at the El Fasie English course center in Banda Aceh. These participants took part in an intensive grammar course held in January 2025. The subjects were selected using purposive sampling, meaning participants were chosen based on characteristics relevant to the

objectives of the study in this case, students enrolled in the Grammar-A class who actively participated in the intensive program (Sugiyono, 2021). A sample size of 30 is considered adequate in quantitative research as it meets the minimum requirement for conducting basic parametric statistical tests (Creswell, 2014).

The research procedures were carried out systematically according to the quasi-experimental pretest–posttest without control group design (Shadish, Cook, & Campbell, 2002). At the start of the program, all participants were given an initial grammar test (pretest) to measure their baseline grammar ability before receiving the intervention. The pretest is essential for identifying the participants' initial condition (Sugiyono, 2021).

Instructional Intervention Using AI Tools**.** Over two weeks (four class sessions), participants received grammar instruction supported by AI tools. These AI tools were integrated into classroom activities to enhance grammar comprehension in an adaptive and interactive manner. Previous studies have shown that the use of AI in language learning can provide automated feedback and accelerate grammar competence development (Fitria, 2023; Zawacki-Richter et al., 2019). After the intervention, participants were given a final grammar test (posttest) with items equivalent to those in the pretest to measure improvements in their grammar ability.

To complement the quantitative data, participants were also asked to complete a perception questionnaire designed to measure their experiences, attitudes, and views regarding the use of AI tools in grammar learning. This questionnaire was administered immediately after the posttest.

Research Instruments

Grammar Test Instrument

The grammar test instrument consisted of 25 multiple-choice items, designed based on the official syllabus of the Grammar-A class at El Fasie Banda Aceh. The test items referred to specific competency indicators listed in the syllabus, covering various grammar aspects such as tenses, parts of speech, sentence structure, and agreement rules. Each item was developed following the principles of good objective test construction, including clear stems, appropriate distractors, and the absence of double answers or misleading clues (Arikunto, 2019).

Content validity was ensured through expert judgment by consulting two English teaching experts and one senior instructor at El Fasie. They reviewed each item's alignment with the grammar content being taught, ensuring that the items accurately represented the intended content (Crocker & Algina, 2006). After confirming content validity, the instrument was piloted with participants who shared similar characteristics to the study sample. The pilot data were analyzed using Pearson's product-moment correlation to determine each item's discrimination power, retaining only items with a validity coefficient ≥ 0.30 (Arikunto, 2019).

Reliability was tested using the Kuder–Richardson (KR-20 or KR-21) formula, appropriate for dichotomous-scored multiple-choice items. The instrument was considered reliable if the reliability coefficient was ≥ 0.70 (Sugiyono, 2021). Through these procedures, the grammar test used in this study was ensured to be both valid and reliable for accurately measuring participants' grammar proficiency.

Perception Questionnaire

The second instrument was a perception questionnaire consisting of 10 statements in a five-point Likert scale format (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The items were developed to explore participants' attitudes, experiences, and views regarding the implementation of AI tools during grammar instruction.

Each statement was designed following sound instrument-construction principles. First, every item was clearly worded, specific, and unambiguous, ensuring that respondents could understand the meaning precisely without multiple interpretations. This was critical for maintaining content validity, as ambiguous items could compromise data accuracy (Azwar, 2016; Arikunto, 2019).

Second, the items included both positive and negative statements. This variation was intended to minimize response biases such as acquiescence bias (a tendency to agree with all statements) or response set bias. With this approach, respondents were encouraged to read and consider each statement carefully before answering (Azwar, 2016).

Third, the indicators measured in the questionnaire covered the main dimensions relevant to AI-assisted learning, namely: a). Perceived usefulness of AI tools, assessing how far participants considered AI tools helpful in understanding grammar; b). Perceived ease of use, assessing whether AI tools were considered easy to use without hindering learning; c). Learning experience, exploring how participants' interactions with AI tools affected their engagement and comfort in learning; d). Impact on learning motivation, measuring the extent to which AI tools encouraged participants' interest and internal drive to improve their grammar mastery.

These four indicators were developed based on conceptual frameworks in educational technology perception, such as the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness and perceived ease of use as predictors of technology adoption. The inclusion of learning experience and motivation adds depth to the measurement, aligning with findings that the success of educational technology implementation is also influenced by affective factors and learner experience (Zawacki-Richter et al., 2019).

Data Analysis

The data obtained in this study were analyzed using descriptive and inferential statistics. First, descriptive analysis was used to provide a general overview of the grammar test results and perception questionnaire data. This analysis included calculations of measures of central tendency (mean, median, and mode) as well as measures of dispersion (standard deviation and score range). The aim was to identify general trends and data distribution before conducting hypothesis testing (Sugiyono, 2021).

Second, to test the effectiveness of the AI-based instructional intervention, inferential analysis was conducted using a paired-sample t-test. This test was appropriate because the design was pretest–posttest without a control group, comparing two sets of data from the same subjects at different times (before and after the intervention). The paired t-test was used to determine whether there was a statistically significant difference between participants' pretest and posttest grammar scores. The significance criterion was set at a 95% confidence level ($\alpha = 0.05$) (Field, 2018).

In addition, data from the perception questionnaire were analyzed descriptively to identify participants' attitudes toward the application of AI tools in grammar instruction. The mean scores for each item were calculated and interpreted using the Likert scale categories, for example: 1.00–1.80 = strongly disagree; 1.81–2.60 = disagree; 2.61–3.40 = neutral; 3.41–4.20 = agree; and 4.21–5.00 = strongly agree (Azwar, 2016). Thus, the questionnaire analysis provided insights into the affective aspects and learning experiences of the participants after undergoing the instructional intervention.

RESULT AND DISCUSSION

The Result of Pretest and Posttest

Based on the results of the descriptive analysis**,** it was found that the participants' mean grammar ability scores increased after the learning intervention using Artificial Intelligence (AI) tools. The mean pretest score obtained from 30 participants was 61.8, while the mean posttest score after the intervention increased to 78.6. Thus, there was an improvement of 16.8 points, indicating a positive change in mastery of grammar material following the implementation of AI tools.

To test the significance of this difference, an inferential analysis was conducted using a paired sample t-test. The results showed a significance value (p) = 0.000, which is smaller than the predetermined significance level (α = 0.05). These findings indicate that the mean difference between the pretest and posttest scores is statistically significant. In other words, the implementation of AI tools in grammar learning has made a real contribution to improving participants' learning outcomes.

These results are consistent with the literature stating that the integration of AI-based technology can enhance the quality of language learning through fast feedback, a variety of interactive materials, and increased learner motivation (Zawacki-Richter et al., 2019). Therefore, the learning intervention applied can be considered effective in improving the grammar skills of course participants.

Results on Perceptions

The analysis of the questionnaire shows that, overall, participants have a very positive perception of the use of Artificial Intelligence (AI) tools in grammar learning. Most participants stated that this technology provided a tangible contribution to improving their understanding and skills. First, 90% of participants stated that using AI tools greatly helped their understanding of grammar. This finding shows that AI integration can provide explanations, feedback, and exercises relevant to participants' needs, thereby supporting the learning process more effectively.

Second, 83% of participants reported enjoying interactions with ChatGPT, as it was considered capable of explaining material in a simple and easy-to-understand manner. This aligns with the characteristics of conversational AI, which can provide adaptive and personalized responses, thus facilitating understanding of complex concepts through more communicative language (Zawacki-Richter et al., 2019).

Third, 87% of participants admitted feeling more confident in constructing sentences after using Grammarly. This confidence is presumed to arise because Grammarly provides real-time feedback on grammatical errors while offering alternative corrections, enabling participants to gain immediate understanding of correct sentence structures (Chen et al., 2020).

Fourth, 93% of participants even recommended the continued use of AI tools in the course. This very high recommendation rate indicates a strong level of acceptance toward the use of AI technology in language learning, as well as a positive indicator that the implementation of AI has provided a valuable learning experience worth maintaining.

Overall, these results reinforce previous findings that the use of AI in education can enhance learner engagement, motivation, and learning outcomes through more personalized interaction and continuous support (Zawacki-Richter et al., 2019).

Discussion

The findings of this study strongly support the argument that the integration of Artificial Intelligence (AI)-based technology can optimize the grammar learning process in the context of English as a Foreign Language (EFL). The use of various AI tools such as Grammarly, ChatGPT, and QuillBot

complements each other in creating a richer, more adaptive, and more effective learning experience. First, Grammarly provides immediate, specific, and contextual feedback on grammar, spelling, and punctuation errors made by participants. This real-time feedback enables participants to revise their sentences promptly, while also enhancing their metalinguistic awareness of correct language structures. According to the theory of form-focused instruction, such explicit feedback plays an important role in improving learners' language production accuracy (Ellis, 2009).

Second, ChatGPT, as a conversational AI, is able to directly answer specific questions, explain complex grammar concepts in simple language, and provide contextual examples. This interactive advantage creates a learning experience that resembles one-on-one tutoring, helping to overcome conceptual confusion and deepen participants' understanding. Previous research has shown that interaction with intelligent tutoring systems can increase motivation and learning effectiveness due to their responsive and adaptive nature (VanLehn, 2011).

Third, QuillBot plays a role in providing paraphrasing features, which not only help participants understand variations in language expression but also encourage the development of more flexible writing skills. The process of reviewing generated sentences, comparing the original structure with paraphrased versions, and selecting the most appropriate option offers significant cognitive practice in syntax and semantics.

These findings align with the study conducted by Li & Hegelheimer (2013), which found that technology-based learning can improve grammar accuracy and EFL learners' metalinguistic awareness. In that study, the use of technology-based tools allowed participants to receive more frequent and in-depth feedback compared to conventional methods, directly contributing to improvements in their linguistic competence.

Furthermore, these results support the perspective that integrating AI into language learning is not only a technical innovation but also an effective pedagogical strategy to enhance engagement, provide differentiated learning, and facilitate self-directed learning (Godwin-Jones, 2018). With AI tools, participants can access learning resources anytime, tailor exercises to individual needs, and receive personalized guidance, making the grammar learning process more dynamic and meaningful.

CONCLUSION AND SUGGESTIONS

Conclusion

Research findings indicate that the use of AI tools in grammar instruction in the Grammar A class at El Fasie has proven effective in improving participants' learning outcomes. This effectiveness is evident from the significant increase in posttest scores compared to pretest scores, indicating a clear improvement in the understanding and application of English grammatical structures after the intervention.

One of the key factors underlying this effectiveness is the responsive nature of AI tools. Applications such as Grammarly are able to provide real-time feedback on grammatical errors, spelling, and sentence structures produced by the learners. This instant feedback allows learners to make immediate revisions and understand the source of their errors, thereby strengthening their metalinguistic awareness (Li & Hegelheimer, 2013).

In addition, AI tools offer an engaging and interactive learning experience. ChatGPT, for instance, is able to answer learners' specific questions about grammar rules with simple explanations and relevant examples. This conversational AI characteristic resembles interaction with a personal tutor who can tailor explanations to the learners' level of

understanding, thereby increasing their engagement and motivation to learn (VanLehn, 2011).

Furthermore, the use of QuillBot as a paraphrasing tool provides a more personalized and flexible approach. Learners can explore various expressions and sentence structures according to their needs. By comparing paraphrased outputs with the original sentences, they develop a deeper understanding of English syntactic patterns while enhancing their ability to write more varied and complex sentences.

These findings align with Godwin-Jones (2018), who affirms that integrating technology, including AI, into language learning can create more meaningful, adaptive, and learner-centered experiences. Thus, the implementation of AI tools in the Grammar A class not only supports improved learning outcomes but also offers a modern and contextualized approach to grammar instruction.

Overall, it can be concluded that AI tools provide responsive, engaging, and personalized grammar learning, which positively impacts participants' English grammar competence. This supports the literature stating that AI-based technologies can optimize language learning through direct feedback, adaptive interaction, and support for self-directed learning (Zawacki-Richter et al., 2019).

Suggestions

The findings of this study carry practical implications: educational institutions should encourage the integration of AI technology into teaching in a more systematic and planned manner. A systematic integration means not only introducing technology as a temporary aid but also embedding it into the curriculum, lesson design, and structured evaluation strategies. In this way, the use of AI is not merely an add-on but becomes an integral part of the learning process that supports the sustainable achievement of language competencies (García Peñalvo & Corell, 2020).

The use of AI tools such as Grammarly, ChatGPT, and QuillBot has been proven to provide fast and context-rich feedback; however, teacher or instructor guidance remains crucial. While learners may receive corrections from AI, they may not fully grasp the underlying reasons for the corrections or how to apply them in different contexts. Therefore, teachers act as facilitators, helping learners interpret the AI-generated feedback, clarify grammar rules, and connect the feedback to broader conceptual knowledge (Hyland & Hyland, 2006).

Human guidance is also essential for building language awareness. With teacher intervention, learners do not merely rely on technology as a "provider of answers" but develop critical thinking about language structures and internalize correct grammar patterns. This aligns with the principles of blended learning, where the integration of technology and teacher involvement complement each other to create an optimal learning experience (Garrison & Vaughan, 2008).

Moreover, a deep understanding of AI-generated feedback can reduce the risk of over-reliance on technology. Learners will learn to use AI as scaffolding to enhance their independent abilities rather than as their sole source of correctness. In the long term, this approach helps learners build more autonomous and reflective learning strategies, which are crucial in mastering a second or foreign language (Oxford, 2017).

In conclusion, institutional support in the form of policies, teacher training, and curriculum planning, along with active teacher involvement in providing pedagogical guidance, will ensure that the integration of AI in grammar instruction not only improves short-term learning outcomes but also fosters learners' language awareness and long-term learning autonomy.

REFERENCES

Andrews, S. (2007). *Teacher Language Awareness*. Cambridge University Press.

Arikunto, S. (2019). *Prosedur penelitian: Suatu pendekatan praktik*. Jakarta: Rineka Cipta.

Azwar, S. (2016). *Reliabilitas dan validitas*. Yogyakarta: Pustaka Pelajar.

Boulton, A., Cobb, T., & Thomas, J. (2022). *Data-Driven Learning for the Next Generation: Corpora and AI in Language Education*. Routledge.

Brown, D. H. (2023). *Principles of Language Learning and Teaching* (7th ed.). Pearson Education. Alharbi, M. A., & Surajbali, P. (2022). The Effectiveness of AI-Based Paraphrasing Tools in Academic Writing: A Case Study of QuillBot. *International Journal of Education and Practice*, 10(1), 32–42.

Celce-Murcia, M., & Larsen-Freeman, D. (1999). *The Grammar Book: An ESL/EFL Teacher's Course* (2nd ed.). Heinle & Heinle.

Chen, C. M., Hsu, S. H., & Huang, C. T. (2020). Enhancing English grammar learning through a mobile game-based learning system. *Educational Technology & Society, 23*(3), 77–92.

Ellis, R. (2009). Corrective feedback and teacher development. *L2 Journal, 1*(1), 3–18.

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). London: SAGE Publications.

García-Peñalvo, F. J., & Corell, A. (2020). On micro-credentials and open badges: A systematic review of the literature. *International Review of Research in Open and Distributed Learning, 21*(1), 1–21.

Garrison, D. R., & Vaughan, N. D. (2008). *Blended Learning in Higher Education: Framework, Principles, and Guidelines*. San Francisco: Jossey-Bass.

Gayed, R., Luxton-Reilly, A., & Denny, P. (2021). Conversational Agents in Education: A Systematic Review. *Computers & Education*, 160, 104033

Godwin-Jones, R. (2018). Using mobile technology to develop language skills and cultural understanding. *Language Learning & Technology, 22*(3), 1–17.

Godwin-Jones, R. (2022). Artificial Intelligence in Language Learning: Opportunities and Challenges. *Language Learning & Technology*, 26(1), 1–10.

Grammarly Inc. (2023). *Company Overview*. https://www.grammarly.com

Hajar, I., Helmiyadi, H., Mawardi, M., & Muntazar, T. (2024). Strategies for Motivating Students to Learn English: Insights in Rural Areas. *Jurnal Pendidikan Bumi Persada*, *3*(2), 93-103.

Halliday, M. A. K., & Matthiessen, C. M. I. M. (2004). *An Introduction to Functional Grammar* (3rd ed.). Arnold.

Hyland, K. (2003). Second language writing. *Cambridge University Press*.

Hyland, K., & Hyland, F. (2006). Feedback on second language students' writing. *Language Teaching, 39*(2), 83–101.

Kukulska-Hulme, A. (2020). Mobile-Assisted Language Learning [MALL] and AI: Personalized Learning Beyond the Classroom. *ReCALL*, 32(3), 322–336.

Li, V. (2022). AI-Powered Language Learning and Pedagogical Implications. *Journal of Computer Assisted Learning*, 38(2), 401–412.

Li, Z., & Hegelheimer, V. (2013). Mobile-assisted grammar exercises: Effects on self-editing in L2 writing. *Language Learning & Technology*, 17(3), 135–156.

Muntazar, T., & Hajar, I. (2025). Training on Utilizing Technology in Writing and Publishing Poetry. *Jurnal*

Gramaswara: Jurnal Pengabdian kepada Masyarakat, *5*(1), 13-21.

Muslem, A., Zulfikar, T., Ibrahim, I. H., Syamaun, A., Saiful, & Usman, B. (2019). The Impact of Immersive Strategy with English Video Clips on EFL Students' Speaking Performance: An Empirical Study at Senior High School. *Teaching English with Technology*, *19*(4), 90-103.

Nagata, N. (2009). Robo-Sensei's NLP-Based Error Detection and Feedback Generation. *CALICO Journal*, 26(3), 562–579.

Nassaji, H., & Fotos, S. (2011). *Teaching Grammar in Second Language Classrooms: Integrating Form-Focused Instruction in Communicative Context*. Routledge.

Nation, I. S. P. (2013). *Learning Vocabulary in Another Language* (2nd ed.). Cambridge University Press.

Oxford, R. L. (2017). *Teaching and Researching Language Learning Strategies: Self-regulation in Context*. New York: Routledge.

Popenici, S. A. D., & Kerr, S. (2017). Exploring the Impact of Artificial Intelligence on Teaching and Learning in Higher Education. *Research and Practice in Technology Enhanced Learning*, 12(1), 1–13.

Ranalli, J. (2018). Automated Written Corrective Feedback: How Well Can Students Make Use of It?. *Computer Assisted Language Learning*, 31(7), 653–674.

Richards, J. C., & Schmidt, R. (2010). *Longman Dictionary of Language Teaching and Applied Linguistics*. Pearson Education.

Schmidt, R. (1990). The Role of Consciousness in Second Language Learning. *Applied Linguistics*, 11(2), 129–158.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.

Sheen, Y. (2007). The effect of focused written corrective feedback and language aptitude on ESL learners' acquisition of articles. *TESOL Quarterly*, 41(2), 255–283.

Sugiyono. (2021). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.

Thornbury, S. (2005). *How to Teach Speaking*. Longman.

VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist, 46*(4), 197–221.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.

Wang, S., & Vásquez, C. (2012). Web 2.0 and Second Language Learning: What Does the Research Tell Us? *CALICO Journal*, 29(3), 412–430.

Winke, P. M., & Goertler, S. (2008). Did We Forget Someone? Students' Computer Access and Literacy for CALL. *CALICO Journal*, 25(3), 482–509.

Xie, H., Chu, H. C., Hwang, G. J., & Wang, C. C. (2019). Trends and Development in Technology-Enhanced Adaptive/Personalized Learning: A Review of Journal Publications from 2007 to 2017. *Computers & Education*, 140, 103599.

Yao, Y., Qiu, Y., & Sun, X. (2021). Evaluating the Educational Impact of NLP-based Paraphrasing Tools on L2 Learners. *Computer Assisted Language Learning*, 34(8), 1001–1020.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – Where are the educators? *International Journal*

of Educational Technology in Higher Education, 16(39), 1–27.