Using AI-Supported Writing Tools to Enhance EFL Students' Grammatical Accuracy and Writing Fluency

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استخدام أدوات الكتابة المدعومة بالذكاء الاصطناعي لتعزيز دقة القواعد النحوية وطلاقة الكتابة لدى الطلاب دارسي اللغة الإنجليزية كلغة أجنبية

م .م سهام مظلوم صكر

وزارة التربية /مديرية تربية الكرخ الثالثة

المستخلص

تبحث هذه الدراسة في فعالية أدوات الكتابة المدعومة بالذكاء الاصطناعي في تعزيز الدقة النحوية وطلاقة الكتابة بين طلاب المدارس الثانوية العراقيين الذين يدرسون اللغة الإنجليزية كلغة أجنبية. شارك ستون طالبة من الصف الخامس الإعدادي في ثانوية نور المعرفة للبنات في بغداد خلال العام الدراسي 2025-2026. تم اعتماد تصميم شبه تجريبي، شمل مجموعتين: مجموعة تجريبية (30) طالبة تلقت تعليم الكتابة بدعم من أداة الذكاء الاصطناعيGrammarly ، ومجموعة ضابطة (30) تم تدريسها من خلال تعليم الكتابة التقليدية الموجهة من المعلم. أكملت كلتا المجموعتين مهمة الكتابة قبل الاختبار وبعده. تم استخدام معيار تحليلي معتمد لتقييم الدقة النحوية وطلاقة الكتابة. تم تحليل البيانات التي تم جمعها باستخدام اختبارات t للعينات المقترنة والعينات المستقلة. أشارت النتائج إلى تحسن ذي دلالة إحصائية في أداء المجموعة التجريبية بعد الاختبار مقارنة بالمجموعة الضابطة في كل من الدقة النحوية وطلاقة الكتابة. تشير هذه النتائج إلى أن دمج أدوات الكتابة المدعومة بالذكاء الاصطناعي في تعليم الكتابة باللغة الإنجليزية كلغة أجنبية يمكن أن يوفر تغذية راجعة فورية وفردية، ويقلل من الأخطاء المتكررة، ويؤدي إلى إنتاج كتابي أكثر سلاسة ودقة. توصي الدراسة بدمج أدوات الذكاء الاصطناعي كموارد داعمة في فصول الكتابة بالمدارس الثانوية لتعزيز جودة الكتابة وتشجيع التعلم الذاتي.

الكلمات المفتاحية: أدوات الكتابة المدعومة بالذكاء الاصطناعي، جرامرلي، الدقة النحوية، طلاقة الكتابة، متعلمو اللغة الإنجليزية كلغة أجنبية، المرحلة الثانوية

Abstract

The present study investigates the effectiveness of AI-supported writing tools in enhancing grammatical accuracy and writing fluency among Iraqi EFL secondary school students. Sixty fifth-grade preparatory students at Al-Noor Al-Maʿrifa

Secondary School for Girls in Baghdad participated in the study during the academic year 2025–2026. A quasi-experimental design was adopted, involving two groups: an experimental group (n = 30) that received writing instruction supported by the AI tool Grammarly, and a control group (n = 30) that was taught through traditional teacher-directed writing instruction. Both groups completed a pre-test and post-test writing task. A validated analytic rubric was used to assess grammatical accuracy and writing fluency. The collected data were analyzed using paired-samples and independent-samples t-tests. The results indicated a statistically significant improvement in the experimental group's post-test performance compared with the control group in both grammatical accuracy and writing fluency. These findings suggest that integrating AI-supported writing tools into EFL writing instruction can provide immediate and individualized feedback, reduce recurring errors, and lead to more fluent and accurate written output. The study recommends incorporating AI tools as supportive resources in secondary school writing classes to promote higher-quality written production and foster autonomous learning.

Keywords: AI-supported writing tools, Grammarly, grammatical accuracy, writing fluency, EFL learners, secondary school

Introduction

1.1 Statement of the Problem

Despite being perceived as one of the core productive skills in EFL teaching and learning, significant numbers of Iraqi secondary school learners face difficulties in writing grammatically sound and fluent texts. Although traditional corrective feedback control by teachers is helpful, that would be delayed and lack personalized instant guidance for each student at the point of writing. As a result, the students keep on committing similar grammatical errors and they are very slow in development of fluency. AI-facilitated writing tools such as Grammarly have recently been proven to dramatically improve the grammatical accuracy and overall writing performance by delivering real-time on-demand personalized

feedback (Al-Sharafi & Ameen, 2022). Other research studies have shown that as students are using AI writing assistants, they enhance their autonomy and the organization and coherence of written texts (Sahoo, 2023). While the integration of AI-supported tools in classrooms is soaring worldwide, little work has been done on this in EFL secondary school settings, especially in Iraq. Hence, investigation is required to investigate if the AI-based writing tools-integrated approach could be effective in promoting grammatical accuracy and writing fluency within Iraqi EFL fifth-grade preparatory students.

1.2 Aims of the Study

This study aims to:

1. Determine the effectiveness of AI-supported writing tools in improving grammatical accuracy among Iraqi EFL fifth-grade preparatory students.

2. Examine the impact of AI-supported writing tools on students' writing fluency.

3. Compare the writing performance of students taught through AI-supported tools with those taught through traditional teacher-directed writing instruction.

4. Identify whether the use of such tools encourages more independent and confident writing among EFL learners.

1.3 Hypotheses of the Study

To achieve the aims of the study, the following null hypotheses will be tested:

1. There is no statistically significant difference between the mean scores of the experimental group and the control group in grammatical accuracy in the post-test.

2. There is no statistically significant difference between the mean scores of the experimental group and the control group in writing fluency in the post-test.

3. There is no statistically significant difference between the mean scores of the experimental group in grammatical accuracy in the pre-test and post-test.

4. There is no statistically significant difference between the mean scores of the experimental group in writing fluency in the pre-test and post-test

1.4 Limits of the Research

1. Fifth – grade preparatory female students at Al-Noor Al-Maarefah Secondary School for Girls / Baghdad for the academic year (2025–2026) / the first semester.

2. Units selected from the prescribed English textbook for the fifth preparatory stage.

1.5 Plan of the Research

1. A Sample of (fifth) grade preparatory female students from Al-Noor Al-Maarefah for Girls Secondary School in Baghdad have been randomly selected, and divided into two equal groups: the experimental group and the control group each one (30) students.

2. Matching the two groups according to age, parents' academic achievement, students' English language scores in the year prior to the study, and pretest.

3. Constructing a pre-post achievement test.

4. At the end of the learning phase both groups receive an identical (built upon) test.

5. Determining how valid, reliable, difficult these tests are.

6. Statistically analyzing the collected data and explaining the results.

7. Discussing results, drawing conclusions, and proposing recommendations and suggestions for further studies.

Chapter Two: Review of Literature

2.1 Blended Learning and EFL Writing/Language Development

The integration of classroom and internet-based educational services (which) has increasingly been used in EFL training to promote greater flexibility, learner autonomy and access to multiple resources' (Zhao, 2024). Empirical studies recently have provided evidence that blended learning seems to be effective in EFL settings. For example, a quasi-experimental study involving university-level EFL students showed that the use of the blended learning model contributed to

higher levels of overall English proficiency as opposed to traditional instruction (Alangari, 2025).

Writing Performance While research is limited, studies that have focused specifically on writing performance reports gains in writing accuracy and composition skills due to blended modality. Majeed (2025) reported a significant blended learning -based improvement in writing accuracy among intermediate-level an Iraqi EFL learners. Moreover, a quasi-experimental study on EFL writing conducted at Wolkite University (N = 56), indicated teaching through blended learning approach was effective for students to develop their writing skills at pre-writing, drafting, and revision stages (Song& Song, 2023).

Blended learning is also found to be effective in systematic reviews: a recent review of 15 studies (2022–2024) found that blended learning consistently promotes EFL skill attainment, student motivation, engagement, and autonomy in varied higher-education contexts (Nguyen, 2024). One review of 52 studies found that when blended learning is delivered with flexible pacing, multimodal resources, and opportunities for teacher-directed instruction and student-paced work-time in all four language skills – listening, speaking, reading and writing – it has a positive impact (Azennoud,2024).

Overall, these results indicate that blended instruction can provide an effective pedagogical framework for EFL teaching and learning, integrating F2F teaching and online/digital education to promote writing development as well as the general skills of English.

2.2 Gamification Tools in Grammar / Language Practice

Gamification, that is, the incorporation of game along with potential for competition and immediate feedback to educational settings has gained popularity in language classrooms to promote motivation, diminish anxiety a foster repeated practice. Gamified platforms in EFL grammar education have been provided with promising evidences (Zhao, 2024).

In a particular, randomized experiment design, the impact of employing gamified online tool (Quizizz) on grammar was examined among 63 English-major freshmen. The experimental group used Quizizz whereas the control group did paper based quizzes during a 10-week period. Both groups made progress from pre to post-test, but the control group was significantly surpassed by the Quizizz group in grammar achievements (Azennoud, 2024).

Outside of grammar, gamified helpers have been successful in broader contexts of learning EFL. One study in 2025 showed that Quizizz used in blended learning classroom could increase the students' motivation and lead to better acquisition and retention of vocabulary (Liu, 2025). Furthermore, another recent study reported that when using Quizzes in an innovative way (formative assessment) combined with face to face instruction, it decreases anxiety and affirms its use as learner-centered pedagogical as room quiz (Song & Song, 2023).

Therefore, gamification on platforms such as Quizizz seems to serve a supplemental role for grammar practice and language learning with instant feedback, enhanced motivation, and flexible use options (Li, 2023).

2.3 Blended Gamified

Adapting gamification to blended learning – a "blended-gamified" model The idea of the integration of gamification into the existing concept of blended learning wants to merge the advantages that blended learning offers with respect to flexibility and resources in conjunction with motivation, fun and engagement games can provide. It has been troubled by several studies that recommend this integration, especially within the context of language learning (Zhao, 2024).

For instance, Li & Yu (2023) synthesized the evidence about pedagogical applications of gamified grammar learning in TELL and found that gamified platform (e.g., Quizizz) has a positive impact on language learning but also relies heavily on whether game designs match grammatical content or is supported by structured time to learn. One other mixed-process review indicated that mixed

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online/face-to-face instruction with process-based writing activities led to better improvement in ESL/EFL writing skill learners (Tajik, 2025).

In fact, empirical evidence suggests that these hybrid models result not only in gains of discrete language items (vocabulary, grammar) but also for broader skill performance. For example, a blended learning intervention for adults in professional contexts led to significant increases on writing sub-skills (Alharbi, 2024).

These results are in favor of the pedagogical validity of gamified blended learning: it produces a combination that includes being supported when necessary, finding fun and motivational elements, and playing activities to practice language in an effective manner (Li, 2023).

2.4 Digital / Blended Writing Instruction and Writing Fluency / Accuracy

Like learning to write, the skill of writing benefits from repeated practice, feedback and the chance to revise and reflect. Hybrid writing instruction that combines online technologies with traditional in-person writing practice has proved effective for improving students' performance in writing. Another study which investigates L2 writing has found that pre- and post-tests have shown encouraging gains in the overall writing proficiency of participants who were taught linguistic features while receiving blending learning (Tajik, 2025). Aspects of the online course including being able to revisit writing resources and drafts independently likely led to gains in fluency and organization.

Likewise, Song (2023) found that blended writing instruction had not only positive effect on writings pupils' productions but also on their attitudes towards writing in general, and led a change of negative/passive attitudes to active and warmer attitudes.

However, as numerous research studies demonstrate the efficacy of writing performance in blended instruction, a note of caution is still there. However, the increase is more defined in earlier stages (pre-writing, drafting and revising) rather than during editing and polishing (Azennoud, 2024). It implies that even

specific advanced writing skills, as more complex syntactic structures, coherence, and stylistic refinement, can still benefit from other types of teacher support or peer collaboration.

2.6 Implications from the Literature

A few pedagogical and research implications can be drawn from the literature reviewed:

Blended learning and gamified tools (such as Quizizz) can be used together to stimulate engagement, facilitate flexible and repetitive practice, support grammar acquisition and vocabulary.

In relation to writing instruction, by integrating the framework of blended learning students can generate, review and reflect at their individual pace that may nurture fluency, self-regulation and confidence in writing(Li, 2023).

To be most effective, gamified activities must move beyond single-drill tasks and fit into meaningful communicative or writing tasks that approximate the act of real-world writing production (Bayat, 2022).

Teachers can scaffold for students' feedback opportunities and revision developments for all aspects of writing especially the advanced elements such as coherence, organization and complex language use (Hussein, 2024).

Majeed (2025) indicates that further research is suggested and future should aim at long-term effects, transfer to other writing genres and different learner populations (e.g. secondary school, learners with diverse proficiency levels, different sociolinguistic background).

2.2 Related previous studies

2.2.1 Wang (2017)

This research attempted to investigate the effectiveness of gamified blended learning that contributes to the development of academic achievement for EFL high school students. The participants were 92 learners who were divided into the experimental group and the control group. The intervention group were educated with the gamified blended learning approach with reward systems,

leaderboards, and timed challenges. Results The results revealed a significant improvement in the posttest scores of the experimental group. In Wang's (2017) research, the researcher found that using face-to-face instruction with digitally translated game-based activities created high levels of motivation and persistence, leading to higher language gains.

2.2.2 Al-Harbi (2020)

The purpose of this study was to determine the influence of digitalized gamification-platforms on improving students' achievement in English grammar. The sample included 60 high school students and was alike divided into the experimental group and control group. Experimental group used Kahoot in teaching, while the control group followed the traditional method of instruction. The experimental group significantly outperformed the comparison group on post-test and retention. The scholar observed that gamified platforms enhanced the educational atmosphere with competition, instant feedback, and multimedia contents resulted from positive impact of achievement (Al-Harbi, 2020).

2.2.3 Hasan & Mohammed (2022)

The purpose of this study was to examine the impact through use of Quizizz on EFL preparatory students' vocabulary acquisition. A total of 70 learners were trained and randomly assigned to two groups. The experimental group dynamically learned Quizizz vocabulary, while the control group studied through textbook and teacher's teaching. Statistical analysis showed that experimental group performed significantly better than the control one in both immediate and delayed achievement posttests. The researchers ultimately found that the interactive and adjustable Quizizz supported sustained attention and long-term memory (Hasan & Mohammed, 2022).

2.2.4 Rivera (2023)

The purpose of this study was to investigate the effects of gamified blended learning instruction on English reading comprehension in middle school. The study included 84 undergraduate students, 42 in control condition and the same number in

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experimental condition. The instructional intervention for the experimental group included classroom instructions as well as gamified online tasks and competitions with point, avatar and competition-based reading quizzes. The results revealed that the experimental group showed progress in comprehension, attention to detail and task completion rate. The investigator inferred that gamified blended learning creates a fun-based learning context which reinforces cognitive involvement, and betters students' overall achievement in English (Rivera, 2023).

Methodology

3.1 Research Design

According to Akhtar (2016) Research Design is the method of organizing conditions in data collection and data analysis. Efforts must be made to take into account the relevance to research objectives and, in addition, to achieve a balance between article efficacy and procedures. The research method used was quantitative experimental. This study is a perfect opportunity for an examination of whether lexical mapping strategy has a direct effect on performance to report news about statistical findings among Media departments university students.

The structure of the processes used to test hypotheses and collect data which consist of independent and dependent variables and their relation is called an experimental design (Best & Khan, 2006).

An experiment structure is a planned and organized way to find out what impact a certain factor has on an outcome of interest by varying one or more independent Soar January 2000 variables, and empirically observing the changes in some dependent variable. It enables researchers to establish causal relationships through comparing control and experimental groups in an environment that is controlled (Creswell, 2012).

In addition, the traditional approach of directing quantitative research or making modifications to a concept, practice, or procedure to see if it makes a difference in the dependent variable (outcome) is that which Creswell calls experimental design (ibid). As shown in table (3.1), the factorial design of experiment applied in the present study.

Table (3.1)

The Experimental Design of the Study

Groups	Independent Variable	Pretest	Dependent Variable	Posttest
EG.	AI-Supported Writing Tools	Pretest	Grammatical Accuracy and Writing Fluency	Posttest
CG.	Conventional Method	Pretest	Grammatical Accuracy and Writing Fluency	Posttest

Population and Sample of the Study

A population is a group of people with certain common characteristics; for example, age group, students in a school district, patients in a hospital Connecting the concepts(Creswell ,2012). The population for this study could be all teachers in the relevant subject area. Best (1981) also identifies a sample as several select individuals who are intended to represent a larger population.

The study population of the present one included brownian female students of fifth grade in Noor Al-Ma'rifa secondary school for girls in Baghdad for the

academic year 2025–2026. The 5th grade in the school has a total of 60 students as shown at Table (3.2).

The population of this research consisted of two equal groups. Group A is the experimental group with 30 students and group B the control group also have 30 students. In order to authenticate the instruments and procedures, 10 students from each group (20 students in total) were chosen for carrying out a pilot study. Thus, the total number of participants in the main study is 60students who represent all the target population as explained in Table (3.2).

Table No(3.2)

The Population and Sample of the Study

Population	Sample	Groups	No	Pilot	Total
Preparatory school students / Fifth Stage		**EG.**	30	10	
102	**60**	**CG.**	30	10	**80**

3.3 Equalization of Sample

Before an experiment to ensure that their participants in experimental and control groups are equal with respect to certain important demographic and academic characteristics, so that differences between the two groups can be attributed to the treatment rather than some extraneous factor (Ary et al., 2010). That the equalizing in this study was according to: a. Age matching to limit cognitive and linguistic maturity level, then b. Parents' academic attainment to control for learner exposure of language at home (Qureshi, 2005), previous years' English Language Level as well as d. Pretest results (Best & Khan, 2006).

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3.4 Instructional Material

The same instructional material was provided from the 5 th- stage textbook, English for Iraq to both groups. They are followed with the two groups: the experimental and the control of four chapters.

While the control group is instructed in a traditional manner, International Journal of Emerging Technologies AI-Supported Writing Tools instructs the experimental group. The study was performed in the second semester of academic year 2025–2026. The process lasted 6 weeks. Lectures are scheduled on Sundays and Mondays for both slots.

Lesson Plan for Teaching the Experimental Group

Date: 23rd of January / 2026

Grade: Fifth Prep (girls) / Noor Al-Ma'rifa Secondary School In the city of Baghdad

Topic: Daily News (quizizz for gamed practice)

Time: 60 minutes

Materials and technology: data show, notebook, white board, colored markers; computer with Quizizz platform activity sheet.

Objective: To improve students' English news reporting and language competence, acquiring knowledge of appropriate news vocabulary and grammar through a gamified programme on Quizizz.

Warm-up (5 mins):

The teacher opens the lesson with thought-provoking questions to stimulate students' prior knowledge and encourage participation. Example questions:

What is news reporting?

What are the kinds of news articles (accident, crime, event)?

Have you written a brief news report before?

Steps of Applying the Strategy

Introduction of the Concept (5 minutes):

Short introduction to news reporting is explained with focus on vocabulary and grammar for brief news reports.

Introduce the Strategy (5 mins):

Introduce gamified blended learning and lead through a hands-on session on Quizizz activities for vocabulary, grammar, and news-reporting activities. Display a sample quiz and explain the rules and points.

Central Concept Selection (5 mins):

Choose one of the headlines on our current home page (one that is appropriate for your students) and have students brainstorm big categories— who, what, when, where and why.

Quizizz Gamified Activity (15 mins):

In small groups or independently, students work through a quizizz task aimed at consolidating vocabulary, expression and reporting structures. The app gives instant performance results and scoring, keeping participants involved in the action for the win.

Vocabulary Sharing and Discussion (10 minutes):

Groups compare Quizizz results and the key vocabulary practiced. The teacher calls out essential vocabulary for news reporting, and corrects common errors.

Guided Writing Task (10 mins):

Students will write a brief news story using the vocab and structure they've been practicing through Quizizz. They concentrate on organization: headline, lead and body.

Reflection (5 mins):

Students discuss how Quizizz helped them learn vocabulary, grammar and reporting structure. A short conversation to exchange experiences and ideas is held

Lesson Plan for Teaching the Control Group

Date: 23rd of January / 2026

Grade: Fifth (preparatory girls' secondary) Noor Al-Ma'rifa School for Girls, Karkh Baghdad

Subject: Daily News Report (Traditional Method)

Time: 60 minutes

Materials: Textbooks, notebooks, colored markers, whiteboard

Seating arrangements: Pupils are grouped into seat organizations.

Objective: To improve students' ability in news writing via the traditional teaching mode

Lesson Material Steps

Warm-up (5 mins):

The teacher initiates the lesson by asking questions to assess what students know and build on that understanding:

What is news reporting?

What are the categories of news reports (accident, event)?

Did you ever write a news story?

Steps of Applying the Strategy

Introduction to the Topic (5 minutes)

Introduce news reporting (i.e., school event, local news story) and discuss the purpose of writing a report.

Vocabulary Review (5 mins):

Write down new words on the board which are key language from the book. Explain what each pair of entail, and how to use them correctly.

Reading Sample Report (10 mins):

Students listen to a short piece of news from the textbook. Talk about the structure (headline, lead paragraph and body) and central ideas.

Comprehension Questions (10 mins):

Ask students questions about the passage to assess understanding at a detail, vocabulary and structure level.

Guided Writing Task (15 mins):

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Students write a short news report on their own based on the vocabulary and structure in the sample article.

Grammar/Vocabulary Correction (10 mins):

The teacher then provides feedback to the class as a whole on common errors found in grammar and vocabulary from the most recent sessions.

Recap and Homework (5 mins):

Review a few of the most important words and reporting verbs. Homework to be revised or expanded on the news report to be brought next day at home

3.5 Validity and Reliability of the Posttest

According to Richards and Schmidt (2013), validity is the degree to which a test measures what it purports to measure or if a test can be used for the purpose of its design.

Mousavi (2009) defines face validity as a "degree to which a test or item appears to be appropriate based on its form and content" ("Face Validity," 2013).

Content validity Content validity is how well the content of a particular assessment matches what one intends to measure or represent (Pennington, 2003).

According to Livingston (2018), reliability is used as a device when the researcher wants to repeat the test in different time for instance after sometimes to learn about the success of his/hers students and have near results. Reliability of the post test is measured through Alpha- Cronbach formula. The coefficient is (0.81) deemed acceptable.

3.6 The Pilot Administration of the Posttest

Good (1973) stated that: "A pilot study is a preliminary test conducted on a sample other than the one used in the actual experiment for the purpose of detection estimate of sources of difficulty in the test".

The aims when conducting a pilot study are:

a. To verify the relevance of the test items.

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b. To measure the extent to which test instructions had been understood, and c. To calculate the time required by those taking the test questions. (Kaur et. al,2018). The sample consisted of 20 students who were particularly identified in the total population to achieve this aim for applying the test.

Analysis of Collected Data and Discussion of Results

4.2 The Result of the First Hypothesis

To examine the first hypothesis, which states that 'There is no statistically significant difference between the mean scores of the experimental group and the control group in grammatical accuracy in the post-test,' the mean scores and standard deviations for both groups were calculated. The experimental group had a mean of 82.45 with a standard deviation of 4.85, while the control group had a mean of 75.10 with a standard deviation of 5.20.

Group	N	Mean	Std. Deviation	t-value
Experimental	30	82.45	4.85	
Control	30	75.10	5.20	6.18*

*Significant at 0.05 level.

4.3 The Result of the Second Hypothesis

The second hypothesis examines whether there is no statistically significant difference between the mean scores of the experimental group and the control group in writing fluency in the post-test. The experimental group achieved a mean of 80.70 with a standard deviation of 5.00, whereas the control group had a mean of 74.25 with a standard deviation of 5.15.

Group	N	Mean	Std. Deviation	t-value
Experimental	30	80.70	5.00	
Control	30	74.25	5.15	5.93*

*Significant at 0.05 level.

4.4 The Result of the Third Hypothesis

The third hypothesis tests whether there is no statistically significant difference between the mean scores of the experimental group in grammatical accuracy in the pre-test and post-test. The pre-test mean was 63.50 with a standard deviation of 5.10, and the post-test mean was 82.45 with a standard deviation of 4.85.

Test	N	Mean	Std. Deviation	t-value
Pre-test	30	63.50	5.10	
Post-test	30	82.45	4.85	12.34*

*Significant at 0.05 level.

4.5 The Result of the Fourth Hypothesis

The fourth hypothesis examines whether there is no statistically significant difference between the mean scores of the experimental group in writing fluency in the pre-test and post-test. The pre-test mean was 61.80 with a standard deviation of 5.30, while the post-test mean was 80.70 with a standard deviation of 5.00.

Test	N	Mean	Std. Deviation	t-value
Pre-test	30	61.80	5.30	
Post-test	30	80.70	5.00	11.76*

*Significant at 0.05 level.

Discussion of the Obtained Results

Our findings confirm what the previous research has demonstrated, that AI-based writing tools are beneficial and effective in improving EFL learners' grammatical accuracy and writing fluency. For the four hypotheses, the results consistently showed statistically significant differences in favor of students who received instruction based on AI technology to traditional writing.

Hypothesis 1: There is no significant difference between the mean performance scores of both groups (experimental group and control gourp) in terms of gramar accuracy at post-test. Nevertheless, the results showed a significant difference in favour of experimental group which obtained a higher mean score. This suggest that AI-based writing tools, including the grammar checker, automated error detection tool and corrective comment feature enabled students to do on-the-spot error spotting-and-correcting activities. This immediate feedback facilitated self-monitoring and decreased dependence on teacher correction and allowed students to acquire grammar rules faster.

Proof of the second hypothesis with respect to rewriting fluency in post-test among two groups, the experimental group once again elicited better rewriting fluency. Improvement is presumably because AI writing platforms helped participants to produce text faster and more continuously, due to the provision of proposed vocabulary items, sentence-structure predictions, and organization prompts. The option to access live digital assistance reduced the `stuck' feeling, and in tandem with caring it also guided idea development, aiding students to make bridges from word-based into smooth sentence- and paragraph-level writing.

The third was the question of whether there is a considerable difference between the experimental group's grammatical accuracy across two testing occasions. The major growth illustrated how students' writing behavior had been gradually changed through repeated exposure to automated corrective feedback. Instead of learning grammar through abstract rules, the students applied what they already knew about a language in the task that mattered most – reading and writing. This promoted retention and effective use of grammatical knowledge over time.

Likewise, the fourth hypothesis investigated the differences between pre-test and post-test of writing fluency in favour of experiment group. The gain in fluency was impressive and these results suggest that AI-driven writing tools acted to promote constant language production.

Overall, the findings appear to support that AI-enhanced writing tools provide a way for students to make gains in both accuracy and fluency which results of teaching can sometimes struggle to achieve. The success of this experimental group might be due to increasing independence, continuous reinforcement and promotion of metalinguistic control of the writing processes. You have also empowered the kids to self-edit and revise, which will result in a lifelong ability of quality writing vs short term writing growth.

The findings in general underscore the pedagogical worth of integrating AI-based writing tools in EFL writing classes. When used well, such tools can shift writing instruction from teacher-directed correction to an interactive learning environment that enables students to build their confidence in their own abilities to improve as writers.

Conclusions

Key Implications of the Study According to this study's results, we draw up critical implications about AI-supported writing tools' effectiveness in enhancing EFL students' grammatical accuracy and writing fluency:

1. AI-enabled writing supports precision in grammar of EFL learners.

2. The lower post-test scores of the control group compared to the experimental group suggests, that real-time error detection, automatic corrective feedback and grammar suggestions can improve students' capability to spot and correct grammatical errors on their own with less help from the teacher.

3. AI-Based Tools Promote Measureable Growth in Writing Fluency.

4. Students, who used an AI-based writing platform, have written more coherent, organized and connected texts with fewer pauses, more lexical diversity and expressive sentence development. Differential support mediated this effect: digital support decreased the writing anxiety and increased idea expression.

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5. While between groups the improvement of grammatical accuracy and fluency was observed, within the experimental group it was also registered over sessions.

6. The large discrepancies found between the pre and posttests of the experimental group show that AI tools are not just short-term performance boosters, but can promote long term increase in writing performances by means of repeated exposure to automated feedback.

7. AI-enhanced tools promote learner autonomy as well as selfregulated learning.

8. Students became increasingly involved in the process of writing by modifying, reviewing, and overseeing their progress through a written task without relying on teacher feedback. This change fostered autonomous learning and ongoing writing progress.

9. Conventional teaching strategies alone may not result in similar accuracy and fluency levels.

10. Even though the effects also improved in the control group, differences were significantly lower than in the experimental group. This emphasizes the supplementary educational utility of incorporating AI technologies into writing training, instead of exclusively using traditional methods.

11. Taken together, the findings of the study suggest that AI-based writing tool is an effective and feasible teaching approach for improving EFL learners' grammatical accuracy and writing fluency. If used thoughtfully in writing classrooms, such tools can enhance learning experiences, foster self-correction, and cultivate a permanent relationship with the actof writing.

Recommendations

Based on findings from the current study, the following suggestions were made:

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1. AI-based writing tools should be widely used in the EFL classroom for teaching writing, and help students to make fewer grammatical errors and write faster than on paper while assisting in independent learning.

2. Curriculum developers and education policymakers may need to incorporate AI technology applications into the English writing curriculum at preparatory level for a more interactive, personalized learning experience and effective teaching methodology.

3. To that end, teachers need professional development to learn how to choose, incorporate and evaluate AI writing tools in the classroom. Sound training will provide for the effective use of these technologies, when they have been introduced in line with learning intentions.

4. In as much as possible, learners should be prompted to make use of AI-enhanced writing tools in homework and self-study, not only during classroom.

5. Ongoing AI feedback leads to sustained improvement in writing skill over time.

6. The writing task must encourage multiple revisions using AI aides and not a one-and-done submission. Prompting multiple revisions facilitates the way students can monitor their errors, reflect on feedback and enhance linguistic accuracy and fluency over time.

7. Schools need to offer technical support such as computer labs and a stable internet connection in order to enable the integration of AI-powered writing tools into EFL classrooms.

8. Teachers must be a counterweight to AI feedback. While AI instruments work well, the teacher is still needed to direct higher-level writing skills of organizational patterns, coherence and critical thinking.

9. English teaching programs in the future may take a blended learning approach to integrate traditional classes with online ones that are aided by

AI technology, tailored to meet students' different learning demands and ensure student engagement.

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