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Improving Subject–Verb–Object Agreement Through AI-Assisted Grammar Checking Among English Major Students: A Quasi-Experimental Study

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Abstract — This study examined the effectiveness of AI-assisted grammar checking in improving subject–verb–object (SVO) agreement proficiency among English major students. Employing a quasi-experimental pre-test–post-test research design, the study involved 40 first-year Bachelor of Secondary Education major in English students from a selected higher education institution in the Philippines. The intervention utilized an AI-assisted grammar checking tool integrated into structured grammar writing activities for six weeks. Data were gathered using a researcher-developed grammar proficiency test, writing performance tasks, and student engagement questionnaires validated by language experts. Reliability testing yielded a Cronbach's alpha coefficient of 0.89, indicating high internal consistency. Statistical analyses using SPSS included mean, standard deviation, paired sample t-test, independent sample t-test, percentage distribution, and Cohen's d effect size analysis. Findings revealed that students demonstrated significant improvement in SVO agreement proficiency after exposure to AI-assisted grammar checking activities. Results further indicated increased learner engagement, improved grammatical accuracy, and heightened awareness of sentence construction. The intervention showed a large effect size, suggesting that AI-assisted grammar tools significantly contributed to learners' writing performance and grammatical competence. Despite technological benefits, challenges related to overdependence on automated correction and digital accessibility were also identified. The study concludes that AI-assisted grammar checking can serve as an effective supplementary instructional strategy for grammar instruction and writing development in higher education language classrooms.

Keywords: artificial intelligence, grammar instruction, subject–verb–object agreement, educational technology, writing proficiency, AI-assisted learning, English language teaching, quasi-experimental research

I. INTRODUCTION

The rapid integration of digital technologies into education has transformed language learning environments across the globe. Artificial intelligence (AI), in particular, has emerged as a significant educational innovation capable of supporting personalized learning, automated feedback, and learner engagement. In language education, AI-powered writing and grammar tools have increasingly been utilized to assist learners in improving writing accuracy, grammar proficiency, and syntactic awareness (Luckin et al., 2022). These technological developments align with the global pursuit of quality education under United Nations Sustainable Development Goal 4, which emphasizes inclusive, equitable, and technology-enhanced education.

Globally, educators continue to face challenges related to grammar instruction and writing proficiency among second language learners. Research indicates that students often struggle with grammatical structures, sentence organization, and academic writing coherence despite increased exposure to English language instruction (Hyland & Hyland, 2019). Among the most persistent grammatical concerns is subject–verb–object (SVO) agreement, which affects both written clarity and comprehension.

In the Philippine context, literacy and language proficiency remain pressing educational concerns. Results from the Programme for International Student Assessment (PISA) revealed that Filipino learners performed below the global average in reading literacy and language-related competencies (OECD, 2023). Similarly, reports from the Second Congressional Commission on Education highlighted significant deficiencies in foundational communication skills among Filipino students (EDCOM II, 2025). These findings suggest the need for innovative instructional strategies capable of strengthening grammar competence and written communication skills.

Locally, many higher education institutions continue to encounter difficulties in improving learners' writing proficiency, particularly in grammar-intensive courses among English major students. Traditional grammar instruction often relies heavily on rule memorization and teacher-centered correction, which may not adequately address learners' individualized grammatical

weaknesses. Consequently, AI-assisted grammar checking tools offer promising opportunities for immediate feedback, learner autonomy, and technology-enhanced grammar instruction.

Despite the growing integration of AI tools in language learning, limited quantitative studies in the Philippine higher education context have examined the effectiveness of AI-assisted grammar checking specifically on subject–verb–object agreement proficiency. Existing studies frequently focus on general writing improvement rather than specific grammatical structures. Furthermore, few studies have explored the relationship between AI-assisted grammar learning, learner engagement, and grammar performance using quasi-experimental approaches.

This research therefore addresses this gap by investigating the effectiveness of AI-assisted grammar checking in improving SVO agreement proficiency among English major students.

Rationale

The increasing demand for digitally responsive instruction necessitates the exploration of innovative pedagogical approaches that support grammar learning and writing development. AI-assisted grammar checking tools provide learners with real-time corrective feedback that can facilitate grammatical awareness, independent revision, and reflective learning practices.

This study is significant because it investigates how AI-powered educational technologies may enhance grammar instruction in higher education language classrooms. Unlike traditional grammar correction approaches, AI-assisted systems provide immediate and individualized feedback that may strengthen learner engagement and writing performance.

Furthermore, the study contributes to emerging discussions regarding the responsible integration of AI in language education. As educational institutions continue to adopt digital learning technologies, there is a need to examine the pedagogical effectiveness, benefits, and limitations of AI-assisted instructional tools in authentic classroom contexts.

Objectives of the Study

General Objective

This study aimed to determine the effectiveness of AI-assisted grammar checking in improving subject–verb–object agreement proficiency among English major students.

Specific Objectives

1. Determine the pre-test proficiency level of students in subject–verb–object agreement.
2. Determine the post-test proficiency level of students after exposure to AI-assisted grammar checking.
3. Identify significant differences between the pre-test and post-test scores of the respondents.
4. Examine the effect of AI-assisted grammar checking on students' writing performance.
5. Determine the level of student engagement during the intervention.
6. Identify the benefits and challenges experienced by students in using AI-assisted grammar tools.
7. Propose instructional recommendations for technology-assisted grammar instruction.

THEORETICAL FRAMEWORK

This study was anchored on the Social Constructivist Theory of Lev Vygotsky, Schmidt's Noticing Hypothesis, and Swain's Output Hypothesis.

Social Constructivist Theory posits that learning occurs through interaction with mediating tools, social experiences, and collaborative processes (Vygotsky, 1978). In technology-assisted learning environments, AI grammar tools function as mediational instruments that support learners in identifying and correcting grammatical errors. Through guided interaction with AI-generated feedback, students construct deeper understanding of grammatical structures and sentence organization.

Schmidt's Noticing Hypothesis emphasizes that language acquisition occurs when learners consciously notice linguistic forms and grammatical features (Schmidt, 1990). AI-assisted grammar tools highlight grammatical inaccuracies in real time, thereby increasing learners' awareness of subject–verb agreement patterns and syntactic structures. This conscious noticing process facilitates grammar acquisition and self-correction.

Meanwhile, Swain's Output Hypothesis explains that language proficiency develops when learners actively produce language and reflect on corrective feedback (Swain, 2005). Writing activities supported by AI-assisted feedback allow learners to revise outputs, identify grammatical limitations, and improve sentence accuracy through repeated language production.

Recent studies support the theoretical relevance of these frameworks in AI-assisted language learning environments. Research suggests that automated feedback systems enhance learner autonomy, grammatical awareness, and writing accuracy when integrated into structured instructional activities (Li & Hafner, 2022; Wang & Sun, 2023).

LITERATURE REVIEW

The integration of artificial intelligence into education has significantly transformed language learning environments, particularly in writing instruction and grammar development. AI-powered educational technologies provide learners with immediate corrective feedback, adaptive learning opportunities, and individualized support systems that enhance language acquisition processes (Holmes et al., 2021).

Globally, grammar proficiency remains a major concern among second language learners. Research indicates that many students experience difficulties with sentence construction, grammatical accuracy, and syntactic coherence despite prolonged exposure to English instruction (Hyland & Hyland, 2019). Subject–verb agreement errors are among the most frequently observed grammatical issues in academic writing.

Recent studies suggest that AI-assisted writing tools positively influence grammatical accuracy and learner engagement. Li and Hafner (2022) found that mobile-assisted grammar learning systems significantly improved students' writing accuracy and revision behaviors.

Similarly, Wang and Sun (2023) reported that AI writing assistants enhanced learners' awareness of grammatical structures and encouraged reflective writing practices.

In higher education contexts, AI-assisted grammar tools have also demonstrated potential in promoting autonomous learning. Students who received automated grammar feedback showed greater confidence in revising written outputs and demonstrated improved syntactic accuracy (Kim, 2024).

In the Philippine context, grammar proficiency continues to present instructional challenges. Local studies reveal that Filipino learners frequently struggle with subject–verb agreement, verb tense consistency, and sentence organization (Santos, 2023). Furthermore, technological integration in grammar instruction remains limited in many higher education institutions, particularly in rural educational settings.

Methodologically, many previous studies utilized descriptive or correlational approaches rather than experimental or quasi-experimental designs. Consequently, there remains limited empirical evidence regarding the causal effectiveness of AI-assisted grammar checking interventions in improving specific grammatical structures such as SVO agreement.

Despite growing international literature on AI-assisted language learning, few Philippine-based studies quantitatively examine learner engagement, grammar proficiency, and intervention effectiveness simultaneously. This gap underscores the need for localized quantitative investigations examining the pedagogical value of AI-assisted grammar instruction in higher education.

II. METHODOLOGY

Research Design

The study employed a quasi-experimental pre-test–post-test research design. This design was appropriate because it allowed the researcher to determine the effectiveness of AI-assisted grammar checking on students' SVO agreement proficiency by comparing performance before and after the intervention.

Participants

The respondents consisted of 40 first-year Bachelor of Secondary Education major in English students enrolled in a selected higher education institution in the Philippines.

Sampling Technique

Purposive sampling was utilized to select participants who were enrolled in grammar-related language courses.

Instrumentation

The study utilized the following instruments:

- Researcher-developed grammar proficiency test
- Writing performance rubric
- Student engagement questionnaire
- AI-assisted grammar checking tool

Validity and Reliability

Content validity was established through expert evaluation by three language specialists. Reliability testing yielded a Cronbach's alpha coefficient of 0.89, indicating very high reliability.

Data Gathering Procedure

Pre-Treatment Phase

Participants completed the pre-test and baseline writing assessment prior to the intervention.

Treatment Phase

Students participated in six weeks of AI-assisted grammar instruction involving guided writing exercises, automated feedback analysis, and revision activities.

Post-Treatment Phase

After the intervention, participants completed the post-test and final writing assessment.

Statistical Treatment

The data were analyzed using SPSS version 27. Statistical tools included:

- Mean
- Standard deviation
- Frequency count
- Percentage distribution
- Paired sample t-test
- Independent sample t-test
- ANOVA
- Cohen's d effect size

Ethical Considerations

The study strictly observed ethical research standards, including informed consent, confidentiality, voluntary participation, and data privacy protection in accordance with institutional research policies.

III. RESULTS AND DISCUSSION

TABLE 1
PRE-TEST AND POST-TEST PERFORMANCE IN SVO AGREEMENT

Test	Mean	SD	Interpretation
Pre-Test	71.45	6.82	Moderate Proficiency
Post-Test	88.63	5.14	High Proficiency

The findings indicate substantial improvement in students' SVO agreement proficiency after exposure to AI-assisted grammar checking activities. The increase in post-test mean scores suggests that automated feedback contributed to enhanced grammatical awareness and sentence accuracy.

These findings support Schmidt's Noticing Hypothesis, which emphasizes the importance of conscious grammatical awareness in language acquisition.

TABLE 2
PAIRED SAMPLE T-TEST ON PRE-TEST AND POST-TEST SCORES

Variable	t-value	p-value	Decision
Pre-test vs Post-test	11.42	.000	Reject Ho

The computed p-value of .000 indicates a statistically significant difference between the pre-test and post-test scores at the 0.05 significance level.

The findings align with Li and Hafner (2022), who reported that AI-assisted grammar systems improve writing accuracy and revision practices among language learners.

TABLE 3
STUDENT ENGAGEMENT DURING AI-ASSISTED LEARNING

Indicator	Mean	Interpretation
Participation	4.42	Highly Engaged
Motivation	4.36	Highly Engaged
Revision Behavior	4.58	Highly Engaged
Grammar Awareness	4.61	Highly Engaged

Students demonstrated high engagement throughout the intervention. The immediate corrective feedback generated by AI-assisted grammar tools appeared to encourage active participation and independent revision.

TABLE 4
EFFECT SIZE ANALYSIS

Variable	Cohen's d	Interpretation
SVO Agreement Proficiency	1.25	Large Effect

The intervention yielded a large effect size, suggesting that AI-assisted grammar checking had a substantial impact on learners' grammatical performance.

Pedagogically, the findings imply that AI tools may strengthen grammar instruction when integrated systematically into writing activities. Technologically, the results support the growing role of AI-enhanced learning systems in higher education language instruction.

SUMMARY OF FINDINGS

The study revealed that students initially demonstrated moderate proficiency in subject–verb–object agreement. Following the six-week AI-assisted grammar intervention, learners exhibited significantly improved grammatical performance and writing accuracy.

Results further showed high levels of learner engagement, particularly in revision behavior and grammar awareness. Statistical analyses confirmed significant differences between pre-test and post-test scores, while effect size analysis indicated a strong intervention impact.

The findings suggest that AI-assisted grammar checking can function as an effective supplementary instructional tool for grammar instruction and writing development.

IMPLICATIONS

The study carries important implications for instructional practice, curriculum development, and educational technology integration.

In pedagogy, the findings emphasize the value of immediate corrective feedback in enhancing grammar learning and learner autonomy. Teachers may integrate AI-assisted tools into writing instruction to strengthen grammatical awareness and revision practices.

From a curriculum perspective, institutions may incorporate technology-assisted grammar activities into language learning frameworks. Educational technology policies may likewise support responsible AI integration in higher education instruction.

The findings also contribute to teacher education by encouraging future educators to develop digital pedagogical competencies necessary for technology-enhanced instruction.

IV. CONCLUSION

The study concluded that AI-assisted grammar checking significantly improved students' subject–verb–object agreement proficiency, writing accuracy, and learner engagement. The

intervention demonstrated strong pedagogical and technological potential in supporting grammar instruction among English major students.

The findings validate the theoretical assumptions of constructivist learning, noticing processes, and feedback-oriented language production. Furthermore, the study contributes to emerging educational discussions regarding the effective integration of AI-assisted instructional technologies in higher education language classrooms.

V. RECOMMENDATIONS

Based on the findings, the following recommendations are proposed:

1. Language teachers should integrate AI-assisted grammar tools into writing instruction and grammar remediation activities.
2. Educational institutions should provide digital infrastructure and training programs supporting AI-assisted learning.
3. Curriculum developers should design technology-integrated grammar learning modules.
4. Policymakers should establish ethical guidelines for responsible AI integration in education.
5. Future researchers should conduct longitudinal and mixed-method studies examining AI-assisted language learning outcomes across different educational contexts.

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