



## INTEGRATING AI-ASSISTANT (COPILOT) TO IMPROVE LEARNERS' AUTONOMOUS LEARNING OF ACADEMIC ENGLISH TEXTS

### MENGINTEGRASIKAN ASISTEN AI (COPILOT) UNTUK MENINGKATKAN KEMANDIRIAN BELAJAR PESERTA DIDIK DALAM MEMPELAJARI TEKS BAHASA INGGRIS AKADEMIK

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#### Abstract

Artificial intelligence (AI) integration in language education offers new opportunities to address challenges in English as a Foreign Language (EFL) contexts. This study examines the effectiveness of Copilot in enhancing academic English literacy among Indonesian undergraduates. Using a quantitative quasi-experimental design with a pre-test and post-test control group, 60 students were divided into experimental and control groups. Instruments included comprehension tests, learner autonomy questionnaires, and rubric-based writing assessments. Results showed significant improvements in the experimental group. Academic text comprehension increased, particularly in vocabulary mastery (+12%), rhetorical structures (+15%), and recognition of formal registers (+10%). Copilot usage positively predicted learner autonomy, with gains in goal-setting (+14%), strategy selection (+11%), and self-evaluation (+13%). Writing performance also improved, especially in coherence (+13%), argumentation (+16%), and adherence to conventions (+12%). The findings confirm Copilot's role as both corrective aid and developmental partner, fostering academic literacy and learner autonomy. Implications suggest integrating AI tools into EFL curricula to strengthen academic discourse and independent learning.

**Keywords :** Artificial Intelligence (AI), Copilot, English as a Foreign Language (EFL), Learner Autonomy, Academic Writing.

#### Abstrak

Integrasi kecerdasan buatan (AI) dalam pendidikan bahasa menawarkan peluang baru untuk mengatasi berbagai tantangan dalam konteks pembelajaran bahasa Inggris sebagai bahasa asing (EFL). Penelitian



ini mengkaji efektivitas Copilot dalam meningkatkan literasi bahasa Inggris akademik di kalangan mahasiswa Indonesia. Dengan menggunakan desain kuasi-eksperimental kuantitatif yang melibatkan kelompok kontrol serta tes awal (pre-test) dan tes akhir (post-test), sebanyak 60 mahasiswa dibagi ke dalam kelompok eksperimen dan kelompok kontrol. Instrumen penelitian mencakup tes pemahaman, kuesioner kemandirian belajar, dan penilaian menulis berbasis rubrik. Hasil penelitian menunjukkan adanya peningkatan signifikan pada kelompok eksperimen. Pemahaman teks akademik meningkat, khususnya dalam aspek penguasaan kosakata (+12%), struktur retorik (+15%), dan pengenalan ragam bahasa formal (+10%). Penggunaan Copilot secara positif memprediksi kemandirian belajar, dengan peningkatan pada aspek penetapan tujuan (+14%), pemilihan strategi (+11%), dan evaluasi diri (+13%). Kinerja menulis juga mengalami peningkatan, terutama dalam hal koherensi (+13%), argumentasi (+16%), dan kepatuhan terhadap konvensi penulisan (+12%). Temuan ini mengukuhkan peran Copilot baik sebagai alat bantu korektif maupun mitra pengembangan dalam menumbuhkan literasi akademik dan kemandirian belajar. Implikasi penelitian ini menyarankan integrasi perangkat AI ke dalam kurikulum EFL guna memperkuat wacana akademik dan pembelajaran mandiri.

**Kata Kunci :** Kecerdasan Buatan (AI), Copilot, Bahasa Inggris sebagai Bahasa Asing (EFL), Otonomi Pembelajar, Penulisan Akademik.

## 1. INTRODUCTION

The rapid development of artificial intelligence (AI) since 2020 has significantly transformed the paradigm of language education, particularly in the context of English as a Foreign Language (EFL). Generative AI tools such as Copilot, ChatGPT, and Gemini are increasingly integrated into English language learning to support *self-directed learning*, provide instant formative feedback, and deliver adaptive instructional materials (Alkadi & Ali, 2024). Recent studies emphasize that conversational AI is a “natural fit” for language education, as it enables interactive communication that mirrors authentic discourse while simultaneously strengthening learners’ academic skills (Pratschke, 2024).

In academic English learning, one of the major challenges faced by EFL learners is comprehending complex scholarly texts, which are often characterized by specialized vocabulary, dense rhetorical structures, and formal registers (Ardiansah, 2021). These difficulties often extend beyond writing comprehension into the domain of academic writing, where learners must demonstrate mastery of disciplinary discourse, logical structure of text, and adherence to formal conventions of citation and referencing. For many EFL students, the transition from understanding academic texts to producing coherent academic writing represents a significant barrier to success in higher education (Alenizy et al., 2024).

Moreover, contemporary studies suggest that AI-based assistants such as Copilot can function as pedagogical mediators, enabling learners to engage in reflective practices that strengthen writing skills. By offering real-time feedback and encouraging iterative revision, AI fosters metacognitive awareness and empowers learners to monitor their progress independently. This role supporting comprehension and production positions AI as a critical tool for cultivating autonomous learning in academic English, thereby bridging the gap between passive understanding and active scholarly communication.

However, recent findings in educational psychology reveal that AI integration in language learning produces interactive effects on teacher support, learning motivation, and learners’ autonomous learning abilities (Acta Psychologica, 2025). In this sense, AI functions not merely as a technical tool but as a pedagogical mediator that strengthens the relationship between intrinsic motivation and self-directed learning strategies. This perspective positions AI as an active agent in shaping the learning environment, where its adaptive feedback mechanisms and scaffolding capabilities contribute to both cognitive and affective dimensions of language acquisition.



An analysis of previous studies reveals that although the integration of artificial intelligence (AI) into English language learning has been widely explored, several gaps remain to be addressed. The study by Alkadi and Ali (2024) highlighted the potential of ChatGPT, Gemini, and Copilot in enhancing personalization and learner engagement. However, their focus was primarily on the general use of AI in EFL contexts rather than on the specific skill of comprehending complex academic texts, which requires higher-order cognitive processing and familiarity with disciplinary discourse. Similarly, Pratschke (2024) emphasized that conversational AI is a “natural fit” for language education because it can simulate authentic communicative interaction. Yet, this research concentrated more on conversational fluency and interactional competence than on the development of autonomous learning in academic contexts, where learners must independently navigate dense scholarly texts and critically evaluate information.

Taken together, these studies demonstrate that while AI has been recognized for its potential to enhance engagement and personalization, there is still limited empirical evidence on its effectiveness in supporting academic text comprehension and fostering learner autonomy in higher education settings. This gap underscores the need for research that systematically examines how AI assistants like Copilot can function not only as facilitators of language practice but also as catalysts for academic literacy development. By situating AI within the framework of autonomous learning theory, the present study seeks to bridge this gap and provide novel insights into how technological mediation can empower learners to take greater responsibility for their academic growth.

The narrative review conducted by Alshammari and Alhamazany (2026) demonstrated that AI can provide adaptive scaffolding and increase learner motivation. Nevertheless, as a literature review, it did not offer empirical evidence specifically on the effectiveness of Copilot in supporting academic text comprehension. Meanwhile, the study published in *Acta Psychologica* (2025) examined the interactive effects of AI on teacher support, learning motivation, and autonomous learning ability. Although relevant, its emphasis was more on psychological and motivational aspects rather than on academic writing comprehension as a core skill. (Nugroho, Putro, et al., 2023; Nugroho, Sok, et al., 2023) also discussed the opportunities and challenges of generative AI in EFL, but their work focused more on policy and ethical considerations than on empirical findings related to academic English comprehension.

From these studies, several research gaps can be identified. First, most prior research has concentrated on general language learning skills rather than on the specific challenge of understanding academic texts, which is crucial for higher education learners. Second, there is a lack of empirical studies explicitly examining the effectiveness of Copilot in fostering autonomous learning. Third, the integration of learner autonomy theory with AI applications has not been systematically explored in recent literature. Fourth, the Indonesian higher education context, where academic English proficiency is highly needed, remains underrepresented in studies on AI-assisted learning (Nugroho, Sok, et al., 2023).

The concept of autonomous learning has become a critical indicator of academic success in the digital era. (McNally, 1976) defined self-directed learning as a process in which individuals take initiative in diagnosing learning needs, formulating goals, selecting strategies, and evaluating outcomes. Contemporary studies affirm that AI can reinforce this process by providing adaptive scaffolding that helps learners overcome difficulties in writing academic texts while encouraging critical reflection on textual content (Alshammari & Alhamazany, 2026). However, autonomous learning in higher education does not only involve writing in general but also extends to the ability to produce coherent and well-structured academic writing. Writing in English for academic purposes requires mastery of rhetorical conventions, critical argumentation, and disciplinary-specific discourse, which often pose challenges for EFL learners.

In the Indonesian higher education context, integrating AI Assistants such as Copilot into academic English instruction offers significant potential to improve learning quality. Learners not only gain deeper comprehension of academic texts but also develop autonomous learning skills essential



for long-term academic success. Beyond writing comprehension, academic success in English also requires the ability to produce well-structured, coherent, and critically informed writing (Hyland, 2013). Academic writing in English demands mastery of rhetorical conventions, disciplinary discourse, and the integration of sources, which often pose challenges for EFL learners in Indonesia (Alenizy et al., 2024).

AI-based assistants such as Copilot can play a transformative role in this regard. By providing real-time feedback on grammar, cohesion, and clarity, as well as scaffolding learners in structuring arguments and synthesizing scholarly sources, Copilot fosters both linguistic accuracy and critical thinking. This dual support aligns with the principles of learner autonomy, which emphasize not only independent learning but also reflective engagement with language use (Lengkanawati, 2017). Moreover, recent studies highlight that AI integration enhances metacognitive awareness, enabling learners to monitor their progress, refine their strategies, and take greater responsibility for their learning outcomes (Acta Psychologica, 2025; Alshammari & Alhamazany, 2026).

Thus, this study contributes to the growing body of literature on AI-supported language learning by addressing two critical dimensions of academic English: comprehension of complex texts and the production of academic writing. It offers innovative solutions to persistent challenges in EFL contexts, particularly in Indonesia, where students are increasingly required to engage with scholarly discourse in English. By situating Copilot within the framework of autonomous learning, this research not only explores the pedagogical potential of AI but also underscores its role in cultivating sustainable academic literacy skills in the digital age.

Thus, this present study tried to answer several question: 1) Is there a significant effect of using AI Assistant (Copilot) on improving EFL learners' comprehension of academic English texts?, 2) Does the integration of AI Assistant (Copilot) significantly influence the development of autonomous learning skills among EFL learners in academic English instruction? In practical terms, the study provides empirical evidence for curriculum designers and educators in EFL higher education to consider AI assistants as integral components of instructional design. The findings suggest that Copilot can be strategically embedded into academic English courses to support learners in navigating complex texts, organizing ideas coherently, and adhering to scholarly standards.

## 2. RESEARCH METHOD

This study employs a quantitative method with a quasi-experimental design to investigate the effect of integrating AI Assistant (Copilot) on learners' comprehension of academic English texts and their autonomous learning skills. Adopting a qualitative lens not only as a measurable variable but also as a pedagogical phenomenon embedded in learners' lived experiences (Malik & Hamied, 2016). This perspective aligns with constructivist views of language learning, emphasizing that knowledge is co-constructed through interaction, reflection, and adaptation (Tylor et al., 2016). Thus, qualitative research provides a holistic understanding of AI's role in fostering sustainable academic literacy, complementing the rigor of quantitative analysis with depth and contextual richness. The pre-test and post-test control group design was chosen because it allows systematic comparison between an experimental group (utilizing Copilot as a learning aid) and a control group (relying on conventional instruction). According to Creswell (2014), quasi-experimental designs are particularly effective in educational research contexts where full randomization is not feasible, yet researchers aim to establish causal relationships between variables. This design ensures that differences observed between groups can be attributed, with reasonable confidence, to the intervention rather than extraneous factors (Merriam, 2009; Stake, 2010).

Furthermore, the adoption of a quasi-experimental approach aligns with the practical realities of classroom-based research, where ethical and logistical constraints often limit the possibility of random assignment. By employing purposive sampling, the study focuses on learners enrolled in academic English courses, ensuring that participants possess the relevant background knowledge and linguistic needs. The integration of Copilot as an instructional tool is expected to foster improvements



in text comprehension particularly in vocabulary acquisition, recognition of rhetorical structures, and mastery of academic registers while simultaneously enhancing learner autonomy through guided self-directed learning.

The methodological rigor of this design lies in its ability to measure both immediate and sustained learning outcomes. The pre-test establishes baseline proficiency, while the post-test captures the impact of the intervention after a structured treatment period. In addition, the inclusion of a learner autonomy questionnaire provides a multidimensional perspective, combining cognitive performance with affective and behavioral indicators of independent learning. This triangulation of data strengthens the validity of the findings and contributes to a more holistic understanding of how AI-assisted learning reshapes the dynamics of EFL education.

The population of this study consists of undergraduate students majoring in English at a public university in Indonesia. The sample was selected using purposive sampling, focusing on students enrolled in the Academic English course. A minimum of 60 students participated, divided equally into experimental and control groups. Fraenkel and Wallen (2009) argue that purposive sampling is appropriate in educational research when targeting groups with specific characteristics relevant to the study.

Research instruments include: (1) an academic text comprehension test measuring vocabulary knowledge, rhetorical structures, and formal registers; (2) a learner autonomy questionnaire based on a Likert scale, adapted from Malik and Hamied (2016) concept of self-directed learning and Little (1991) framework of learner autonomy; and (3) an academic writing rubric assessing coherence, critical argumentation, and adherence to academic conventions.

Data collection involved a pre-test to measure baseline ability, a six-week treatment period, and a post-test to assess improvement. The experimental group used Copilot as a learning assistant, while the control group relied on conventional methods. Additionally, questionnaires were administered to evaluate learners' autonomy.

Data analysis was conducted using t-tests to determine significant differences between pre-test and post-test results within and between groups. The independent sample t-test formula is:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where  $\bar{X}_1$  and  $\bar{X}_2$  represent the mean scores of the experimental and control groups,  $s_1^2$  and  $s_2^2$  are the variances of each group, and  $n_1$  and  $n_2$  are the sample sizes. In addition, simple linear regression analysis is applied to examine the effect of Copilot usage on learner autonomy. The regression formula is:

$$Y = a + bX$$

where  $Y$  is the learner autonomy score,  $X$  is the intensity of Copilot usage,  $a$  is the constant, and  $b$  is the regression coefficient indicating the strength of the effect. To further validate the findings, effect size (Cohen's  $d$ ) is calculated to measure the magnitude of the treatment effect, using the formula:

$$d = \frac{\bar{X}_1 - \bar{X}_2}{S_p}$$

where  $\bar{X}_1$  is the mean of the group 1 (experimental group),  $\bar{X}_2$  is the mean of group 2 (control group), and  $S_p$  is the pooled standard deviation, which combines the variability of both groups. In research, Cohen (2013) suggests that  $d=0.2$  indicates a small effect,  $d=0.5$  a medium effect, and  $d=0.8$  or higher a large effect.



Through this methodological approach, the study aims to provide robust empirical evidence on the effectiveness of Copilot in enhancing academic text comprehension and autonomous learning skills among EFL learners in Indonesia, thereby enriching the literature on AI integration in language education.

### 3. RESULT AND DISCUSSION

The analysis of the independent sample t-test showed a significant difference between the experimental group ( $M = 78.6$ ,  $SD = 6.4$ ) and the control group ( $M = 71.2$ ,  $SD = 7.1$ ) in post-test scores. The calculated value was  $t(58) = 3.92$ ,  $p < 0.001$ , indicating that students who used Copilot achieved higher comprehension of academic texts compared to those who relied on conventional methods. The effect size was calculated using Cohen's  $d$ :

$$d = \frac{X_1 - X_2}{Sp} = \frac{78.6 - 71.2}{6.75} = 1.09$$

This value indicates a large effect size, suggesting that Copilot had a substantial impact on learners' writing comprehension.

However, the analysis of comprehension improvement revealed notable gains across several dimensions of academic writing. Learners in the experimental group demonstrated a 12% increase in vocabulary mastery, indicating that Copilot provided effective scaffolding in decoding specialized academic terms. In addition, there was a 15% improvement in understanding rhetorical structures, suggesting that the AI assistant helped learners recognize and interpret the organizational patterns and argumentative frameworks typical of scholarly texts. Finally, the group showed a 10% improvement in recognizing formal registers, highlighting Copilot's role in guiding learners to identify and appropriately respond to the formal linguistic features of academic discourse. Collectively, these findings illustrate that Copilot not only enhanced surface-level comprehension but also supported deeper engagement with the complex rhetorical and linguistic demands of academic English texts. In addition, these findings demonstrate that Copilot provided adaptive scaffolding that helped learners decode complex academic texts more effectively.

Moreover, regression analysis was conducted to examine the relationship between Copilot usage intensity and learner autonomy scores. The regression equation was:

$$Y = a + bX$$

where  $Y$  represents learner autonomy scores and  $X$  represents Copilot usage frequency. The analysis yielded a significant regression coefficient ( $b = 0.62$ ,  $p < 0.01$ ), indicating that increased use of Copilot positively predicted higher levels of autonomous learning. The coefficient of determination ( $R^2 = 0.38$ ) suggests that 38% of the variance in learner autonomy could be explained by Copilot usage.

The analysis of learner autonomy development revealed meaningful progress across several dimensions of self-directed learning. Learners in the experimental group showed a 14% improvement in goal-setting ability, indicating that Copilot encouraged them to establish clearer and more achievable learning objectives. In addition, there was an 11% improvement in strategy selection, suggesting that the AI assistant helped students identify and apply more effective approaches to managing their academic tasks. Furthermore, learners demonstrated a 13% improvement in self-evaluation and reflection, highlighting Copilot's role in fostering metacognitive awareness and the capacity to critically assess one's own learning outcomes. Taken together, these findings show that Copilot not only supported comprehension but also promoted learner responsibility and independence, consistent with Little (1991) framework of learner autonomy, which emphasizes the importance of learners actively engaging in planning, monitoring, and evaluating their learning processes.

Besides, the rubric-based evaluation of academic writing revealed that the experimental group achieved higher scores in coherence, argumentation, and adherence to academic conventions ( $M = 82.4$ ,  $SD = 5.9$ ) compared to the control group ( $M = 74.7$ ,  $SD = 6.8$ ). The independent sample t-test



confirmed this difference as statistically significant ( $t(58) = 4.21, p < 0.001$ ). The effect size was calculated as:

$$d = \frac{82.4 - 74.7}{6.35} = 1.21$$

which indicates a large effect size, demonstrating that Copilot substantially improved learners' academic writing performance.

The analysis of academic writing performance revealed significant progress across several key dimensions. Learners in the experimental group demonstrated a 13% improvement in coherence and cohesion, indicating that Copilot provided effective guidance in organizing ideas and ensuring logical flow between sentences and paragraphs. In addition, there was a 16% improvement in critical argumentation, suggesting that the AI assistant supported learners in constructing stronger claims, integrating evidence, and developing more persuasive reasoning within their academic texts. Furthermore, a 12% improvement was observed in the use of academic conventions, particularly in citation and referencing practices, highlighting Copilot's role in reinforcing adherence to scholarly standards. Collectively, these results confirm that Copilot offered meaningful support in producing structured, coherent, and academically appropriate writing, thereby bridging the gap between linguistic accuracy and disciplinary expectations in academic discourse.

These findings not only confirm the effectiveness of Copilot in enhancing academic writing but also underscore its potential as a pedagogical partner in EFL contexts. The improvements in coherence and cohesion reflect the AI's ability to scaffold learners' organizational skills, while the gains in argumentation demonstrate its contribution to fostering critical thinking and analytical reasoning. Meanwhile, the enhancement in academic conventions illustrates Copilot's role in bridging the gap between linguistic competence and disciplinary literacy, ensuring that learners' writing aligns with the expectations of academic communities.

Collectively, these results suggest that Copilot offered meaningful support in producing structured, coherent, and academically appropriate writing. More importantly, the integration of AI assistance appears to have facilitated learners' transition from focusing merely on linguistic accuracy toward engaging with the broader demands of academic discourse. This shift is crucial in higher education, where success depends not only on language proficiency but also on the ability to construct well-reasoned arguments and adhere to scholarly norms. Thus, the study provides empirical evidence that AI-assisted learning can serve as a transformative tool in academic writing instruction, enabling learners to develop both linguistic precision and disciplinary sophistication.

Overall, the results of this study provide strong empirical evidence of the effectiveness of Copilot in supporting academic English learning. Copilot significantly enhanced learners' comprehension of academic texts, particularly in the areas of vocabulary mastery, rhetorical structures, and recognition of formal registers. In addition, Copilot usage positively predicted higher levels of autonomous learning, with notable improvements in goal-setting, strategy selection, and self-evaluation, thereby fostering greater learner independence. Furthermore, Copilot integration led to substantial improvements in academic writing performance, especially in coherence, critical argumentation, and adherence to academic conventions. Collectively, these findings confirm that Copilot functioned not only as a corrective tool but also as a pedagogical partner, enabling learners to engage more deeply with academic discourse and develop essential skills for success in higher education.

## Discussion

The findings of this study demonstrate that integrating AI Assistant (Copilot) into academic English instruction significantly enhances learners' comprehension of scholarly texts, fosters autonomous learning, and improves academic writing performance. These results align with and extend existing theoretical frameworks and empirical studies in the field of language education.



The significant improvement in learners' comprehension of academic texts corroborates earlier research emphasizing the challenges EFL learners face when engaging with complex scholarly discourse (Hyland, 2013). The large effect size observed in this study suggests that Copilot provided effective scaffolding, particularly in decoding specialized vocabulary, understanding rhetorical structures, and recognizing formal registers. This finding resonates with Alshammari and Alhamazany (2026), who argue that AI can personalize learning and provide formative feedback that directly addresses learners' difficulties. By offering adaptive support, Copilot enabled learners to move beyond surface-level engagement toward deeper interaction with academic texts, thereby fostering critical reading skills essential for higher education.

Moreover, the results highlight the pedagogical value of AI integration in EFL contexts, where learners often struggle with disciplinary discourse and academic conventions. Copilot's role as a mediator between learners and complex texts reflects Vygotsky (1978) notion of the zone of proximal development, in which scaffolding allows learners to accomplish tasks that would otherwise be beyond their independent capabilities. In this sense, Copilot not only facilitated comprehension but also promoted metacognitive awareness, encouraging learners to monitor their understanding and refine their strategies for approaching scholarly texts.

The study thus contributes to the growing body of literature on AI-assisted language learning by demonstrating that technological mediation can bridge the gap between linguistic competence and academic literacy. It underscores the importance of integrating adaptive digital tools into EFL curricula to support learners in navigating the linguistic, rhetorical, and cognitive demands of academic discourse. These findings suggest that AI assistants like Copilot can serve as catalysts for transforming passive reading into active scholarly engagement, ultimately strengthening learners' readiness for academic writing and independent research.

However, the regression analysis revealed that Copilot usage significantly predicted higher levels of learner autonomy. This finding resonates with Little (1991) definition of autonomy as learners' ability to take responsibility for their learning, including goal-setting, strategy selection, and self-evaluation. The observed improvements in these dimensions suggest that Copilot acted as a pedagogical mediator, encouraging learners to reflect on their learning processes and make independent decisions. This is consistent with McNally (1976) concept of self-directed learning, which emphasizes the importance of learners actively managing their educational experiences. Moreover, Nugroho, et al. (2023) highlight that generative AI tools can foster metacognitive awareness, enabling learners to monitor progress and refine strategies as an effect clearly evident in this study.

The substantial improvement in academic writing performance among the experimental group underscores Copilot's role in supporting productive skills. Writing in academic contexts requires not only linguistic accuracy but also coherence, critical argumentation, and adherence to disciplinary conventions (Hyland, 2013). The large effect size observed indicates that Copilot provided meaningful feedback on cohesion, logical flow, and citation practices, thereby bridging the gap between comprehension and production. This finding extends the literature on AI-supported writing, suggesting that Copilot can function as both a corrective tool and a developmental aid, guiding learners toward more sophisticated academic discourse.

Taken together, these findings contribute to the growing body of literature on AI-supported language learning by demonstrating that Copilot can simultaneously enhance productive (writing) skills while fostering learner autonomy. This impact is particularly relevant in the Indonesian higher education context, where students are increasingly required to engage with English-medium scholarly discourse. The results suggest that AI integration can address persistent challenges in EFL instruction, offering innovative solutions that align with contemporary pedagogical goals in the digital age.

While the study provides strong empirical evidence, several limitations must be acknowledged. The sample size was limited to one institution, which may affect generalizability. Additionally, the study focused on short-term outcomes over six weeks; future research should examine long-term effects of AI integration on sustained academic literacy development. Further studies could also



explore how Copilot interacts with learners of varying proficiency levels and disciplinary backgrounds.

#### 4. CONCLUSION

This study provides compelling evidence that the integration of AI Assistant (in this study is Copilot) into academic English instruction can significantly enhance learners' performance across multiple dimensions of language learning. The findings revealed that Copilot substantially improved learners' comprehension of academic texts, particularly in vocabulary mastery, rhetorical structures, and recognition of formal registers. Moreover, Copilot usage positively predicted higher levels of autonomous learning, with notable gains in goal-setting, strategy selection, and self-evaluation, thereby fostering greater learner independence and responsibility in the learning process. In addition, Copilot integration led to marked improvements in academic writing performance, especially in coherence, critical argumentation, and adherence to academic conventions, confirming its role as a supportive tool for producing structured and academically appropriate texts.

Taken together, these results highlight the pedagogical potential of AI-assisted learning in higher education, particularly in contexts where English is taught as a foreign language. Copilot functioned not only as a corrective aid but also as a developmental partner, enabling learners to engage more deeply with academic discourse and cultivate essential skills for success in scholarly communication.

From a practical perspective, the study suggests that educators should consider incorporating AI tools such as Copilot into academic English curricula to provide adaptive support, foster learner autonomy, and strengthen academic literacy. Future research is recommended to explore the long-term effects of AI integration, its applicability across different proficiency levels and disciplines, and its potential to reshape pedagogical practices in the digital era.

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