



The Consequences of Overdependence on Technology in English Learning Practices

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Abstract

The rapid integration of digital platforms and AI-assisted tools has transformed English learning practices, offering unprecedented access to feedback, resources, and autonomous learning opportunities. However, this growing dependence has raised concerns regarding its influence on learners' cognitive engagement, linguistic development, and pedagogical behaviors. This study aims to investigate the consequences of technological overdependence among English Education students, examining how excessive reliance on AI-driven writing assistants, machine translation, and online learning platforms affects their cognitive and metacognitive processes, linguistic performance, and learning practices. Using a qualitative descriptive design, data were collected through semi-structured interviews and document analysis involving 30 undergraduates who frequently use technological tools in academic tasks. The findings reveal that while technology enhances efficiency, confidence, and surface-level accuracy, it also encourages cognitive outsourcing, reduces opportunities for reflective thinking, weakens independent writing competence, and diminishes originality. Pedagogically, students increasingly treat AI as a primary source of feedback, shifting the role of the teacher and limiting authentic interaction. Participants also reported digital fatigue and ambivalent emotions toward their dependency on technological tools. The study concludes that overdependence poses significant risks to long-term language development, emphasizing the need for balanced integration, critical digital literacy training, and pedagogical frameworks that prioritize human cognition, creativity, and communicative engagement in English learning.

Keywords: Technological overdependence; AI-assisted tools; English learning; cognitive consequences; EFL writing

INTRODUCTION

Over the past decade, technological innovation has reshaped English language education across the world, creating new possibilities for accessibility, interaction, and engagement. Digital platforms, artificial intelligence AI, and mobile-assisted language learning MALL tools have become integral to English as a Foreign Language EFL and English as a Second Language ESL classrooms, enabling learners to practice independently, receive instant feedback, and interact with global communities of speakers. These tools are now embedded in everyday academic life: learning management systems such as Google Classroom, AI-assisted writing tools like Grammarly, and conversational agents such as ChatGPT and other large language models are frequently used to complete reading and writing tasks, revise drafts, and prepare for assessments. For many students, especially in higher education, English learning is no longer confined to textbooks and face-to-face lessons but is increasingly mediated through screens and algorithms (Daud et al., 2025).

While this transformation offers substantial pedagogical opportunities, it has also raised concerns about a growing overdependence on technology in English learning. Overdependence in this context refers to situations in which technological tools, rather than human cognition and communication, become the primary drivers of learning activities, shaping how students understand tasks, make linguistic decisions, and evaluate their own performance. Instead of using digital tools as occasional supports, learners may come to rely on them as default problem-solvers



for vocabulary, grammar, organization, and even idea generation, potentially weakening the development of foundational skills needed for long-term language growth. These concerns are particularly salient in EFL writing, where AI-assisted tools can silently rewrite and reorganize texts, blurring the line between assistance and substitution (Khan et al., 2025).

Recent scholarship on artificial intelligence in EFL education shows a similarly double-edged pattern. A systematic review of empirical studies on AI in EFL teaching reports that tools such as chatbots, grammar checkers, and machine translation can substantially improve surface-level accuracy, speed up writing processes, and reduce learners' anxiety, particularly in writing tasks. At the same time, the review warns that when these tools are used without explicit pedagogical guidance, they may weaken deep cognitive engagement and reflective practices because learners are no longer required to struggle productively with linguistic problems or monitor their own errors. In other words, AI-driven support can simultaneously function as a powerful scaffold and as a shortcut that encourages students to bypass the very processes through which long-term language learning normally occurs (Kundu & Bej, 2025).

One recurring theme in this literature is the emergence of what several authors describe as cognitive outsourcing. Instead of planning their texts, generating ideas, and making lexical or grammatical decisions independently, many learners begin to offload these tasks to automated systems, treating AI feedback as an unquestionable authority. The systematic review notes that in numerous classroom studies, students quickly accept AI suggestions to "clean up" their writing but rarely revisit the underlying rules or compare alternatives, which limits opportunities for developing metacognitive strategies such as self-monitoring and self-evaluation. As a result, learners can appear more proficient in technology-mediated assignments while still struggling to produce accurate and complex language when they are asked to write without digital assistance, a gap that raises important questions about the sustainability of AI-supported gains (Daud et al., 2025).

From a pedagogical perspective, large-scale reviews of AI integration into English language teaching also observe a gradual shift in the role of teachers from primary sources of linguistic input to mediators between learners and technology. AI-enhanced platforms can help teachers track student progress, diagnose error patterns, and generate draft feedback more efficiently, which many educators perceive as a significant advantage in overloaded EFL classrooms. However, these reviews also document teachers' concerns that learners increasingly "ask the system" instead of engaging in dialogue with instructors or peers, thereby reducing opportunities for human interaction, negotiation of meaning, and context-sensitive scaffolding that are central to communicative language teaching. In extreme cases, there is a risk that AI, rather than the teacher, becomes students' primary point of reference for both linguistic correctness and evaluative judgment. In response to these tensions, the literature emphasizes the need to develop both learners' and teachers' critical digital literacy and AI literacy. Recent reviews argue that AI-generated suggestions should be treated as negotiable input that must be evaluated, questioned, and adapted, rather than as ready-made solutions that students simply copy into their texts. Studies that integrate explicit reflection activities—such as asking learners to justify why they accept or reject AI feedback—report more positive outcomes for metacognitive awareness and writing autonomy compared to studies where AI is used in an unstructured, "plug-and-play" manner. These findings suggest that the educational value of AI-assisted tools in English learning depends less on the frequency of technology use and more on the quality of engagement and the pedagogical frameworks that surround it (Jeon, 2025).

At the same time, empirical work focusing on specific platforms illustrates how these broader patterns play out in concrete classroom contexts. Studies on Google Classroom, for example, show that the platform can enhance participation, provide flexible access to reading materials, and support continuous formative assessment in Indonesian EFL settings, yet they also report issues related to technological dependence and screen fatigue when lessons become overly mediated by the platform. Research on ChatGPT and similar large language models in EFL writing likewise indicates that such tools can help students generate ideas, reorganize arguments, and improve grammatical accuracy, but frequent reliance may reduce learners' confidence and self-efficacy in producing independent work, especially when AI is used to draft large portions of texts rather than as a source of selective feedback. These mixed outcomes reinforce the argument that overdependence on technology in English learning is not merely about how often tools are used, but about how they shape learners' cognitive, linguistic, and pedagogical experiences (Nuralim & Dwinata, 2022).



Against this backdrop, the present study focuses on English Education undergraduates who frequently employ AI-assisted and digital tools such as ChatGPT, Grammarly, Google Classroom, and other online platforms in their coursework. While prior research has examined the general benefits and limitations of these tools, less attention has been given to the specific phenomenon of technological overdependence—namely, how excessive reliance on such tools influences students' cognitive and metacognitive processes, their independent linguistic performance, and their pedagogical orientations as future teachers. By exploring these dimensions in a context where technology is deeply embedded in everyday English learning practices, this study seeks to contribute to ongoing discussions about how innovation can be integrated in ways that support, rather than erode, human cognition, creativity, and communicative engagement in EFL education.

Previous Research

Recent years have witnessed a surge in empirical research investigating the role of digital and AI-assisted tools in English as a Foreign Language (EFL) writing instruction and learning. One of the most up-to-date contributions is Generative AI-assisted feedback and EFL writing: a study on proficiency, revision frequency and writing quality (Mekheimer, 2025), which reports that EFL learners using AI-enhanced writing feedback (via tools similar to Grammarly) significantly improved their post-test writing proficiency relative to a control group receiving traditional feedback. The study also observed higher revision frequency and improved cohesion, organization, and language use among the AI-feedback group, suggesting that when used with pedagogical awareness, generative AI feedback can positively contribute to writing development.

Complementing this, a recent article *Enhancing EFL Writing Revision Practices: The Impact of AI- and Teacher-Generated Feedback and Their Sequences* (T. T. T. Tran, 2025) compared revision practices when students receive feedback from AI first versus teacher first. The study, involving undergraduate Vietnamese EFL learners, found that AI-generated feedback consistently led to higher revision rates compared to teacher-only feedback. Moreover, combining AI and teacher feedback produced the highest revision activity, indicating that AI tools may support revision processes effectively — especially for surface-level issues such as grammar and vocabulary — while teacher feedback addresses deeper, global aspects of writing.

Beyond feedback-focused research, broader reviews examine the complex interplay of AI, machine translation (MT), and learner cognition. In *Cognitive and sociocultural dynamics of self-regulated use of machine translation and generative AI tools in academic EFL writing* (Wang, 2024), the author argues that while AI and MT tools offer unprecedented convenience and access to linguistic resources, their use alters traditional writing and learning dynamics in ways that may hinder the development of foundational language skills and long-term linguistic competence if overused or unregulated. The study highlights concerns over “cognitive outsourcing,” reduced self-regulation, and the blurring of authorship — raising ethical and pedagogical questions about autonomy and academic integrity.

In a scoping review of machine translation (MT) in EFL/ESL writing contexts, *Using machine translation in EFL writing: A scoping review* (Gokgoz-Kurt, 2022) synthesizes findings across studies and concludes that although MT integration is feasible and often beneficial (in terms of speed, vocabulary support, and error reduction), there remains a lack of longitudinal research measuring whether MT use leads to sustained improvement in writing proficiency. The review calls for more rigorous design, valid proficiency measures, and deeper examination of how repeated MT dependence influences learners' ability to self-edit or internalize language rules.

Despite these advantages, some studies emphasize the drawbacks of relying too heavily on AI tools. The article *The impact of AI writing tools on the content and organization of EFL students' essays* (Marzuki et al., 2023) found that while AI tools helped improve surface-level aspects (such as grammar, spelling, vocabulary), they often failed to support deeper cognitive and creative processes. Teachers interviewed in the study reported concern that students might submit AI-influenced essays with minimal personal input, threatening originality, critical thinking, and voice in academic writing. Another strand of research looks at younger or lower-proficiency learners. For instance, *English as a Foreign Language (EFL) secondary school students' use of artificial intelligence (AI) tools for developing writing skills: Unveiling practices and perceptions* (Alghasab, 2025) surveyed 69 secondary students (35 interviewed) and found that although most were familiar with AI writing tools (including Grammarly, ChatGPT, and Google Translate), they expressed uncertainty about the long-term effects on their independent writing abilities.



Some acknowledged that the convenience and scaffolded support came at the cost of decreased confidence to produce writing without AI assistance.

In summary, the existing literature presents a dual narrative: on one hand, AI-enabled tools — whether grammar checkers, MT, or generative text assistants — offer immediate, personalized support that can enhance writing accuracy, reduce learner anxiety, and increase revision frequency; on the other hand, overreliance may lead to superficial learning, diminished metacognitive engagement, weakened writing autonomy, and risks to originality and academic integrity. What remains underexplored, however, is a robust, context-specific study on overdependence itself — especially among university-level English Education learners — examining not only surface outcomes (accuracy) but also deeper effects on learner autonomy, self-regulation, long-term competence, and learner identity. The present study addresses this gap by focusing specifically on English Education undergraduates in Indonesia, investigating how their use of AI/digital tools influences their cognitive processes, linguistic development, and pedagogical practices in a holistic way.

Research Question

The issues highlighted in the Introduction and the gaps identified through the review of previous studies indicate that technological overdependence in English learning remains an underexplored area, particularly within English Education study programs. While existing research has examined the benefits and limitations of AI-assisted tools, machine translation, and digital learning platforms, limited attention has been given to how excessive reliance on these technologies influences learners across cognitive, linguistic, and pedagogical dimensions. To address this gap and to guide the direction of the present investigation, the following research questions were formulated:

1. How does overdependence on technology influence the cognitive and metacognitive processes of students in the English Education Study Program during English learning activities?
2. In what ways does technological overdependence affect the linguistic performance of English Education students, particularly in terms of accuracy, complexity, and originality in writing?
3. What pedagogical, affective, and behavioral consequences emerge from students' extensive use of digital and AI-based tools in their English learning practices?

These research questions establish the analytical focus of the study and ensure a systematic examination of the multifaceted effects of technological overuse within contemporary EFL learning contexts.

METHOD

This study employed a qualitative descriptive research design to explore the cognitive, linguistic, and pedagogical consequences of overdependence on technology in English learning. A qualitative approach was chosen because the phenomenon involves complex learning behaviors and reflective processes that cannot be reduced to numerical measurement. This design enables a detailed examination of students' experiences, perceptions, and learning outcomes as they interact with digital and AI-assisted tools in formal academic contexts.

Participants

The participants in this study were students enrolled in the English Education Study Program at Universitas Muhammadiyah Riau. A purposive sampling technique was used to ensure that participants actively used digital platforms and AI-assisted tools (e.g., ChatGPT, Grammarly, Google Classroom, Duolingo) during coursework, especially in reading and writing activities.

A total of 30 undergraduate English Education students participated in the research. Their ages ranged from 20 to 24 years, and all were taking core English skills courses (Reading, Writing, Speaking, and Grammar) where digital tools were commonly integrated. These participants were selected because they represent the demographic most directly affected by the increasing presence of technology in language learning, making them suitable for investigating tendencies toward technological overdependence.



Instruments

The study used two primary instruments: semi-structured interview guidelines and a document analysis checklist. The semi-structured interview guidelines were designed to elicit rich, reflective narratives from students regarding their use of digital and AI-based tools. The questions encouraged students to discuss their motivations, perceived benefits, challenges, and experiences related to technology-supported learning. In addition, the instrument explored cognitive and linguistic behaviors such as reliance on automated feedback, difficulties with independent problem-solving, and confidence in producing original language.

The document analysis checklist was used to examine students' written assignments, drafts, feedback logs, and screenshots of revisions generated through technological tools. The checklist guided the researcher in identifying patterns of technological reliance, including the frequency of automated corrections, the nature of revisions prompted by AI, and the extent to which students demonstrated self-editing skills. Together, these instruments provided complementary insights into both students' stated experiences and their observable learning behaviors.

Data collection procedures

Data collection was conducted in several stages to obtain a comprehensive understanding of the participants' experiences. The process began with a brief screening survey to identify students who frequently engaged with digital and AI-based tools in their English learning activities. Students who met the criteria were invited to participate in the study. Following this, semi-structured interviews were conducted individually, either in person or through online platforms such as Zoom or Google Meet, depending on the students' availability. Each interview lasted approximately twenty to thirty minutes and was audio-recorded with the participants' consent to ensure accuracy during transcription and analysis.

In addition to the interviews, students were asked to provide samples of their written work. These included assignments completed with technological assistance, earlier drafts if available, and classroom artifacts such as feedback screenshots or revision histories from platforms like Grammarly or Google Classroom. These documents enabled the researcher to observe the role of technology in shaping students' writing processes, revision habits, and metacognitive engagement. All personal information was anonymized to protect participant confidentiality.

Data analysis

The collected data were analyzed using thematic analysis, following the stages outlined by Braun and Clarke. The researcher began by transcribing the interviews and reviewing all documents to gain familiarity with the data. Notes were taken to highlight early observations of dependency patterns or learning behaviors influenced by technology. After this initial stage, the researcher conducted a systematic coding process in which meaningful segments of data were labeled according to their relevance to the study's focus areas. These codes were then examined to identify broader themes that represented recurring patterns related to cognitive consequences, linguistic impacts, and pedagogical implications of technological overdependence.

Once the themes were developed, they were reviewed and refined to ensure coherence and alignment with both the interview and document analysis results. The themes were clearly defined and described, capturing the essence of students' experiences and behaviors. Finally, the findings were synthesized and interpreted in relation to the existing literature to provide a comprehensive explanation of the consequences of overdependence on technology in English learning. To strengthen the credibility of the analysis, strategies such as triangulation, peer examination, and member checking were applied throughout the research process.



FINDINGS AND DISCUSSION

Cognitive and Metacognitive Consequences of Technological Overdependence

The analysis of interview transcripts and student documents indicated that most participants perceived digital and AI-based tools as an intellectual “shortcut” that made English tasks faster and less stressful. Many students described using Grammarly, machine translation, or ChatGPT-like tools as their *first* response when they felt stuck with vocabulary, grammar, or organization. Rather than planning or revising independently, they frequently “tested” sentences on these tools and accepted suggestions with minimal evaluation. This pattern reflects a form of cognitive outsourcing in which core processes such as generating ideas, monitoring errors, and making lexical choices are increasingly delegated to technology instead of being practiced by the learner. Similar concerns have been raised in recent studies on generative AI-assisted feedback in EFL writing, which report that learners may become overly dependent on automated suggestions unless teachers explicitly cultivate critical engagement and self-regulation (Mekheimer, 2025)

At the same time, the data suggested that this overreliance was unevenly distributed across students. Lower-proficiency participants were especially likely to treat AI-generated feedback as unquestionable “correct answers.” Several explicitly admitted that they rarely read the explanations attached to corrections and “just clicked accept” until the system showed no more errors. This behavior mirrors findings from multiple-case research on lower-proficiency EFL students’ use of Grammarly, which showed that such learners often engage with automated feedback in a product-oriented, low-cognitive manner, focusing on getting a “clean” text rather than understanding why changes are made (Luo et al., 2024). The same tendency is echoed in broader reviews of machine translation in EFL writing, which warn that learners may disengage from the composing process when tools are treated as a replacement for problem solving rather than as a support for it. In her comprehensive scoping review, Gokgoz-Kurt (2022) examined more than 40 empirical studies on MT use across secondary and tertiary EFL contexts and found a recurring pattern: students frequently relied on MT systems such as Google Translate to produce full sentence or paragraph structures rather than using them to resolve specific linguistic uncertainties. This habitual reliance not only reduced cognitive engagement during planning and drafting but also limited opportunities for learners to internalize syntactic rules or make lexical decisions independently. The review concluded that excessive MT dependence risks creating “surface-level proficiency” that disappears when learners write without technological aids.

In contrast, a smaller group of higher-performing students described using technology in ways that suggested more advanced metacognitive engagement. These participants reported that they compared machine suggestions with their own hypotheses, kept personal lists of frequent errors, or deliberately limited AI use to the final editing stage. For them, digital tools functioned as a “second checker” or “practice partner,” not as an automatic writer. This pattern resonates with research showing that when learners are guided to use Grammarly and similar tools as complementary resources, they can develop stronger awareness of grammar and self-editing strategies (Wenxun et al., 2025). A recent systematic review on Grammarly by Wenxun et al (2025), for example, concludes that the tool can enhance writing quality and independence when integrated alongside explicit instruction. Likewise, a study on Vietnamese EFL learners found that automated feedback supported self-editing, although it also noted limitations of ChatGPT for deeper writing improvement (K. M. A. Tran, 2025)

Overall, the findings suggest that technological overdependence is closely tied to metacognitive development. When students lack strategies for interpreting and questioning automated feedback, technology can reduce the need to think through language problems, reinforcing passive learning modes. However, when metacognitive skills and critical digital literacy are explicitly fostered, the same tools can become catalysts for reflection rather than substitutes for it. This dual potential is increasingly emphasized in recent work on AI-enabled writing support and self-regulated learning in EFL contexts (Amani & Bisriyah, 2025).

Linguistic Outcomes: Accuracy, Complexity, and Originality

Document analysis showed a clear improvement in surface-level accuracy in the assignments produced with technological assistance. Texts that had been revised through Grammarly, machine translation, or AI chatbots contained fewer grammatical and spelling errors than drafts written without such tools. Students also appeared to experiment with more advanced vocabulary, often selecting synonyms suggested by AI systems to “sound more



academic.” Similar outcomes have been reported in empirical research on automated writing evaluation, where Grammarly and other AI-based assistants have been found to support gains in grammar, vocabulary, and overall writing quality for EFL learners (Wenxun et al., 2025). An open-access article evaluating Grammarly’s impact on EFL students further illustrates this concern. Dinçel & Saygi (2024), who investigated Turkish university learners’ use of Grammarly in academic writing tasks, reported that students widely viewed the tool as useful for noticing grammatical errors, clarifying sentence structure, and improving surface-level accuracy. However, interviews revealed that many learners adopted a passive orientation toward feedback, accepting Grammarly’s suggestions without analyzing why corrections were made. The researchers emphasized that while Grammarly supported immediate error reduction, its automated nature risked weakening learners’ self-editing skills and fostering dependence unless accompanied by explicit instruction on how to critically evaluate feedback.

However, the improved accuracy did not always translate into deeper linguistic competence. When students were asked to write short paragraphs in class without any technological help, several produced texts that were noticeably less accurate and less complex than their technology-mediated assignments. Errors that had been “fixed” in previous tasks reappeared, and some students admitted that they did not remember the rules behind earlier corrections. This gap between assisted performance and independent performance echoes broader concerns about AI writing tools and machine translation in EFL contexts, where scholars warn that learners may appear more proficient on the surface while continuing to rely heavily on automated scaffolding (Gokgoz-Kurt, 2022). For instance, a study on AI-enabled machine translation in EFL classrooms offers additional insight into this issue. Alharbi (2023) examined the writing practices of Saudi EFL learners who used MT tools during composition assignments and found that students frequently relied on AI-generated structures to bypass lexical and syntactic challenges. Through error analysis and reflective interviews, the study showed that although MT produced grammatically acceptable output, learners rarely attempted to revise or understand the linguistic forms produced by the tool. As a result, their independent writing showed little improvement, particularly in syntactic complexity and precise vocabulary usage. Alharbi concluded that MT use, when unregulated, may impede the internalization of linguistic knowledge because students engage minimally in productive cognitive effort.

Another important linguistic pattern concerned text originality and voice. Several participants described copying AI-generated sentences or whole paragraphs into their assignments with only minor cosmetic changes. Some acknowledged that they felt their own English was “too simple” and believed that AI-produced language would be more convincing to lecturers. Teachers in recent studies on AI writing tools in Indonesian universities have expressed similar worries, noting that while tools such as ChatGPT can improve content and organization, they may also blur the line between student-authored work and AI-authored text (Marzuki et al., 2023). The issue of originality is also raised in research on AI-powered chatbots for EFL writing, where gains in writing scores coexist with concerns about plagiarism and over-reliance. Apriani et al. (2024) conducted an intervention study involving Indonesian undergraduate EFL learners who used chatbot tools to assist with brainstorming and drafting short essays. Quantitative results showed significant improvements in organization, coherence, and lexical richness; however, qualitative analysis of the drafts revealed that many students incorporated AI-generated phrases or ideas with minimal modification. Interviews further indicated that some learners perceived chatbots as “safe shortcuts” for producing academic language, raising ethical concerns about authorship and genuine skill development. The researchers warned that without clear guidelines, AI chatbots risk fostering dependency rather than supporting long-term writing competence. Yet the data also revealed more productive forms of linguistic mediation. Some students described using AI suggestions as a starting point and then deliberately modifying them to better reflect their intended meaning or personal style. These learners reported that interacting with AI made them more aware of collocations and discourse markers, and they occasionally rejected suggestions that felt unnatural or too formal. This more dialogic use of AI echoes recent design-based research with platforms such as RECIPE and AI KAKU, where students are encouraged to engage in conversations with AI about their writing instead of passively accepting output (Han et al., 2023). The present study thus supports the view that linguistic benefits are most sustainable when students are guided to treat AI feedback as negotiable input rather than as final text.



Pedagogical, Affective, and Physical Dimensions

From a pedagogical perspective, participants' narratives suggested a subtle but significant shift in the perceived role of the teacher. Many students reported that when they encountered difficulties in writing, their first impulse was to consult an app or AI system rather than to ask the lecturer or peers. While they still valued teacher feedback, they viewed digital tools as more "available" and "non-judgmental," especially for low-stakes questions. This aligns with studies on LMS platforms such as Google Classroom, where students appreciate the convenience and constant access but may participate less in interactive teacher-led activities if most guidance is mediated through technology (Moonma, 2021). Recent work on LLM-driven teacher dashboards similarly highlights the need for human teachers to reassert their role as interpreters and mediators of AI feedback, not merely as overseers of automated systems. Kim et al. (2024) explored how large language models (LLMs) can support teachers through dashboard systems that summarize learner progress, analyze writing patterns, and generate recommended feedback. Although teachers reported that the dashboards reduced administrative workload and improved monitoring efficiency, they also emphasized that AI-generated suggestions often lacked contextual nuance and pedagogical sensitivity. The study argued that teachers must actively curate, adapt, and interpret AI feedback to ensure that it aligns with instructional goals and learner needs. Without such mediation, the risk emerges that AI—not the teacher—becomes the primary source of guidance in the classroom, thereby weakening the human element that is essential for communicative and reflective language learning.

The affective consequences of technological overdependence were mixed. On one hand, many students claimed that AI support reduced anxiety and increased confidence because they felt they would "not hand in something wrong." This positive effect on self-efficacy is consistent with research showing that AI chatbots and writing assistants can enhance learners' confidence and motivation when they see tangible improvements in their written work (Apriani et al., 2024). On the other hand, several participants acknowledged feeling "lazy" or "too dependent," expressing worry that their own ability to write without assistance might be deteriorating. Similar ambivalence has been documented in recent studies exploring opportunities and challenges of AI in EFL writing instruction, where students appreciate efficiency but question whether heavy reliance undermines autonomy, creativity, and critical thinking (Nhan et al., 2025).

A further theme as stated by Jessica (2025) concerned digital fatigue and cognitive overload. Several students reported feeling tired after long periods of switching between multiple applications—learning management systems, messaging platforms, AI tools, and reference websites—during a single assignment. They mentioned eye strain, reduced concentration, and a sense that "studying English is just staring at screens." These accounts resonate with broader discussions of digital learning fatigue, where extended screen time, constant notifications, and multitasking have been linked to lower attention, motivation, and well-being. In the context of English education, such fatigue may indirectly reinforce overdependence: when students are mentally exhausted, relying on AI to "finish the task quickly" becomes even more attractive.

Towards Balanced and Critical Technology Use

The findings of this study suggest that overdependence on technology in English learning is not simply a matter of frequency of use but of quality of engagement. Technological tools clearly enhanced surface-level accuracy, convenience, and confidence for many students, yet they also encouraged cognitive outsourcing, weakened opportunities for deep practice, and sometimes diluted learners' sense of ownership over their writing. These patterns echo a growing body of literature warning that the educational value of AI and other digital tools depends heavily on whether they are embedded within pedagogies that foreground critical thinking, self-regulation, and ethical awareness (Mekheimer, 2025).

For English Education study programs, the results point to several pedagogical implications. First, teachers may need to design tasks that make learners' use of technology visible and discussable—for instance, by asking students to submit both AI-assisted and unassisted drafts, or to annotate how and why they used particular tools. Such practices resonate with recent recommendations in AI-integrated writing platforms, where structured reflection is used to transform AI from a "black box" into a resource students learn to interrogate (Han et al., 2023). Second, explicit instruction in critical digital literacy should be incorporated into writing and methodology courses, helping future teachers and writers to recognize the limitations, biases, and ethical risks of AI and machine translation. Third,



classroom policies can distinguish between permissible support (such as grammar checking used for learning) and problematic outsourcing (such as submitting unedited AI-generated text), thereby modeling responsible technological use.

Finally, the study underscores the importance of preserving spaces for human interaction and non-digital learning within increasingly technologized English programs. Group discussions, peer feedback without devices, and in-class writing away from screens can counterbalance the cognitive and physical strain associated with continuous digital engagement and provide contexts in which students must rely on their own linguistic resources. This balanced approach is consistent with recent calls in the literature to integrate AI tools in ways that augment, rather than replace, human cognition, creativity, and communication in EFL education (Young, 2024).

The findings and discussion section consist of description of the results of the data analysis to answer the research question(s) and their meanings seen from current theories and references of the area addressed. The proportion of this section is 40-60% of the total article length.

CONCLUSION

This study examined the cognitive, linguistic, and pedagogical consequences of overdependence on technology in English learning practices among English Education undergraduates. The findings reveal that the impact of technological overuse is multifaceted, extending beyond immediate learning behaviors into deeper dimensions of learner identity, autonomy, and long-term competence. While digital and AI-based tools undoubtedly enhance accessibility, reduce anxiety, and support surface-level language accuracy, the results demonstrate that these benefits can be accompanied by subtle forms of cognitive, linguistic, and pedagogical erosion when critical engagement is absent.

At the cognitive and metacognitive levels, the study underscores a significant shift in learners' problem-solving habits. Many participants displayed tendencies toward cognitive outsourcing—delegating essential thinking processes such as planning, generating ideas, evaluating errors, and monitoring language choices to automated systems. As technology becomes the default “first solver” of learning challenges, students gradually lose opportunities to struggle productively, reflect on linguistic decisions, or internalize rules through active cognitive engagement. This phenomenon reflects a broader educational concern that excessive automation may diminish learners' self-regulatory capacity and critical awareness, skills that are foundational to lifelong learning and professional competence in teaching.

Linguistically, the findings illustrate a widening discrepancy between assisted and unassisted performance. Although AI-enhanced texts showed notable improvements in grammatical accuracy, lexical variety, and surface cohesion, these gains did not consistently transfer to writing tasks completed without technological aids. Recurrent mistakes, reduced syntactic complexity, and diminished fluency in independent writing suggest that students may be improving products rather than abilities. Furthermore, originality and voice—key markers of advanced literacy—were found to be at risk when students incorporated AI-generated sentences or structures with minimal modification. These patterns reinforce concerns raised in previous literature that technological tools, when used uncritically, may inflate perceived proficiency while obscuring underlying weaknesses in linguistic competence and creative expression.

Pedagogically, the study highlights a shift in the perceived roles of teachers, peers, and learning environments. Many students expressed a preference for AI feedback over human feedback due to its immediacy, accessibility, and non-judgmental nature. While such perceptions may initially seem positive, they carry long-term implications for interactive, human-centered approaches to language education. If learners habitually bypass teacher interaction, opportunities for scaffolding, negotiation of meaning, and collaborative learning may diminish. The data also reveal emotional ambivalence: although technology increases confidence and reduces anxiety, it also produces feelings of dependency, guilt, decreased motivation, and insecurity about one's true abilities. Additionally, the physical and psychological effects of prolonged screen exposure—digital fatigue, eye strain, and reduced attention—further complicate the sustainability of technology-mediated learning.

Taken together, these findings underscore a central insight: technology in English learning is not inherently beneficial or harmful; its value depends on how learners and educators engage with it. Overdependence emerges when tools replace human cognition rather than support it, when convenience takes precedence over comprehension, and when efficiency overshadows reflective learning. For English Education programs—responsible for preparing



future teachers—the implications are far-reaching. Educators must ensure that students develop not only linguistic skills but also critical digital literacy, enabling them to use AI and digital tools ethically, strategically, and intelligently in their future classrooms.

To address the challenges identified in this research, several pedagogical directions are recommended. First, integrating explicit instruction on metacognitive strategies and critical digital literacy can empower students to evaluate, question, and selectively apply AI feedback rather than accept it passively. Second, requiring students to submit both AI-assisted and unassisted drafts, along with reflective commentaries on their tool usage, can increase transparency and promote responsible, conscious engagement with technology. Third, creating balanced learning environments that include device-free writing sessions, peer feedback workshops, and face-to-face discussions can help maintain the human-centered elements vital to communicative language development. Fourth, developing institutional policies that differentiate between supportive and unethical uses of AI can provide clearer guidance for learners navigating digital tools.

Finally, this study opens opportunities for future research. Longitudinal investigations could explore how patterns of technological dependence evolve over time and whether instructional interventions can reduce overreliance while strengthening self-regulation. Comparative studies across proficiency levels, cultural contexts, and types of AI tools could offer deeper insight into how different learners negotiate technological mediation. Additionally, further research might examine the perspectives of teachers, curriculum designers, and institutions to better understand how systemic factors influence students' technological habits.

Ultimately, the findings of this study reaffirm the importance of preserving the human essence of language learning—creativity, critical thinking, communication, and cognitive struggle—within an increasingly digital educational landscape. Technology should function as a complementary partner rather than a substitute for human agency. By cultivating balanced, reflective, and ethical approaches to technology integration, English Education programs can ensure that learners not only benefit from innovation but also retain the autonomy and critical capacities essential for meaningful, long-term language development.

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