The Role of Technology-Enhanced Learning in Developing EFL Writing Academic

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Abstract

This study investigates the role of Technology-Enhanced Learning (TEL) tools in improving academic writing skills among EFL (English as a Foreign Language) learners. The research focuses on the impact of TEL platforms on students' writing performance, motivation, and confidence. A mixed-methods approach was employed, comprising pre- and post-test assessments to measure improvements in grammar, vocabulary, coherence, and organization, along with qualitative data collected through focus group discussions. The experimental group, which used TEL tools like Grammarly and Write & Improve, showed significant improvements in writing quality, with an average score increase of 28%, compared to a modest 12% improvement in the control group. The analysis revealed that TEL tools provided timely and personalized feedback, enhancing students' understanding of writing conventions and allowing for more efficient revisions. Participants also expressed greater self-efficacy and autonomy in their writing tasks, as TEL tools facilitated self-directed learning and increased engagement with the writing process. However, challenges related to digital literacy gaps and the risk of over-reliance on automated feedback were also identified. The study concludes that TEL tools offer a valuable complement to traditional teaching methods, improving academic writing in EFL contexts by fostering error correction, motivation, and independent revision. It recommends the integration of TEL tools into writing curricula, accompanied by training in digital literacy and strategies to promote critical thinking and self-editing skills.

Keywords: *academic writing; digital literacy; English as a foreign language; technology-enhanced learning; writing performance.*

1. INTRODUCTION

The rapid advancement of technology in the 21st century has profoundly reshaped educational practices across various disciplines, including English as a Foreign Language (EFL) instruction. As an integral skill, academic writing demands high levels of linguistic competence, critical thinking, coherence, and organizational skills (Teng & Yue, 2023). However, mastering academic writing remains one of the most challenging tasks for EFL learners, as it requires not only proficiency in English but also the ability to navigate academic conventions and stylistic nuances (Wei et al., 2024). Writing

academic content in a second language poses additional obstacles, such as limited vocabulary, cultural differences in rhetorical styles, and a lack of confidence (Javadi-Safa, 2018). These challenges are compounded in traditional learning environments, where students often face limited opportunities for individual guidance and interactive practice. Moreover, classroom constraints, such as large class sizes and insufficient time for personalized feedback, further exacerbate the difficulties encountered by EFL students (Alsahli & Meccawy, 2022). In this context, technology-enhanced learning (TEL) has emerged as a promising approach to address the unique demands of academic writing development, offering scalable, flexible, and learner-centered solutions that align with modern educational needs (Mandal, 2024).

TEL harnesses the power of digital technologies to create interactive, engaging, and adaptable learning experiences. By integrating tools such as learning management systems (LMS), collaborative writing platforms, automated feedback systems, and artificial intelligence (AI)-driven applications, TEL provides innovative solutions to the hurdles faced by EFL learners (Qazi et al., 2024). Unlike traditional classroom methods that heavily rely on teacher-centered instruction, TEL enables learners to take an active role in their writing journey. For example, online grammar tools, such as Grammarly or ProWritingAid, provide immediate suggestions to improve clarity, grammar, and style (Rejeki, 2023). These tools promote a sense of autonomy and encourage students to experiment with language and ideas, thereby enhancing their creative and analytical skills (Almusharraf, 2018). Additionally, TEL environments often include multimedia resources, interactive quizzes, and gamified content, which can make the process of learning academic writing more engaging and enjoyable. Such platforms cater to diverse learning preferences, allowing students to explore visual, auditory, and textual materials that best suit their needs (Afacan Adanır et al., 2020). The incorporation of TEL provides a holistic platform where learners can strengthen their foundational skills while progressing toward advanced academic competencies.

One of the significant benefits of TEL in EFL academic writing is its capacity to provide timely and constructive feedback. Traditional feedback processes in classrooms are often time-consuming and constrained by the limited availability of instructors (Ketchum et al., 2020). Teachers may require days or even weeks to review writing assignments thoroughly, leaving students without the immediate support they need to revise and improve (Link et al., 2022). Technology, on the other hand, bridges this gap by offering immediate feedback through grammar checkers, plagiarism detection tools, and AI-based writing assistants (Bahri, 2024). These tools not only correct errors but also help learners understand the reasoning behind the corrections, fostering a deeper awareness of language structures and academic writing conventions (Barrot, 2023). For instance, tools like Turnitin not only check for originality but also provide valuable insights into proper citation and paraphrasing techniques, essential elements of academic integrity (Mulenga & Shilongo, 2024). Automated scoring systems such as ETS Criterion can also evaluate essays and offer feedback on specific aspects such as coherence, vocabulary use, and argumentative strength, guiding students toward areas needing improvement. This real-time interaction ensures that learners remain motivated and engaged throughout the writing process.

Additionally, TEL supports collaborative learning, an essential aspect of academic writing. Online platforms enable students to participate in peer review activities, engage in virtual discussions, and co-author documents (Tolibovna, 2024). These activities simulate real-world writing environments where feedback and revisions are integral to producing quality work. Platforms such as Google Docs and Microsoft Teams allow multiple users to comment, suggest edits, and track changes in a seamless

digital space (Fasola & Abimbola, 2023). Peer collaboration not only develops a critical perspective on writing but also fosters a sense of community among learners, reducing the isolation often felt in writing tasks (Cutri, 2019). Moreover, the ability to share drafts with peers and instructors in a digital space enhances interaction and facilitates iterative improvements, which are vital for the development of advanced writing skills. Virtual writing workshops and forums can also be organized to address specific challenges, enabling students to learn from one another while benefiting from the expertise of instructors and moderators (Lima et al., 2019).

Furthermore, TEL offers unparalleled access to authentic materials, including academic journals, articles, and multimedia content, which serve as valuable references for EFL learners. Exposure to high-quality academic writing provides learners with models to emulate, enriching their understanding of argumentation, citation, and disciplinary discourse (Deane, 2018). In addition, these resources help students familiarize themselves with the conventions of different genres, such as research papers, case studies, and literature reviews. Such exposure not only strengthens linguistic skills but also cultivates a deeper appreciation for the cultural and contextual nuances of academic writing (Studies & Bilgiler, 2024). TEL tools, such as mind-mapping software, digital notebooks, and citation management applications, further assist students in organizing their ideas more effectively (Theodorio et al., 2024). This structured approach addresses common issues related to coherence and structure, enabling learners to present their arguments more persuasively. Tools like EndNote or Zotero, for instance, simplify the task of managing references, allowing students to focus on developing content rather than struggling with technical formatting.

Despite its potential, the successful integration of TEL in EFL academic writing development is not without challenges. Issues such as unequal access to technology, varying levels of digital literacy among learners and instructors, and the need for pedagogical alignment are significant barriers that must be addressed. In low-resource settings, limited internet connectivity or a lack of devices can hinder the adoption of TEL, creating disparities in learning opportunities (Jordan et al., 2024). Furthermore, the effectiveness of TEL depends on the ability of educators to incorporate these tools into their teaching strategies effectively. Instructors may require training to use advanced applications and to design TEL-based lessons that align with curriculum objectives. Additionally, reliance on automated tools raises questions about their ability to capture the nuances of language and context that human feedback can provide (Zaghlool et al., 2023). For example, while AI-driven grammar tools excel at identifying surface-level errors, they may struggle to offer meaningful feedback on more abstract elements like tone, style, and argumentation. Therefore, a balanced approach is essential, where technology complements, rather than replaces, traditional teaching methodologies.

This paper explores the transformative role of TEL in developing EFL academic writing skills, examining its advantages, challenges, and best practices. By delving into the innovative tools and pedagogical strategies that TEL offers, this study aims to shed light on its potential to empower learners with the skills and confidence necessary for academic success in an increasingly globalized and digitalized world. A detailed discussion on how technology can bridge the gaps in traditional EFL instruction while providing scalable and sustainable solutions will help educators and policymakers leverage TEL effectively for long-term educational benefits.

2. LITERATURE REVIEW

2.1. The Challenges of EFL Academic Writing

Academic writing in a second language, particularly English, poses unique challenges for learners, demanding a comprehensive command of language and cultural understanding. Numerous studies highlight that EFL students struggle with syntactic complexity, lexical diversity, and coherence in writing (Zaghlool et al., 2023). These issues often stem from limited vocabulary and insufficient exposure to authentic academic writing, which hinders the ability to produce grammatically and stylistically correct texts. Furthermore, cultural differences in rhetorical conventions often result in misalignment between learners' writing styles and academic expectations, leading to writing that may appear awkward or unnatural to native audiences (Salazar, 2024). Research also underscores the role of anxiety in academic writing; many students report feeling overwhelmed by the complexity of composing texts that meet both linguistic and disciplinary standards. The absence of individualized support in traditional classrooms compounds these challenges, as time and resource constraints often prevent instructors from providing the detailed feedback necessary for meaningful improvement (Ma et al., 2021). Consequently, EFL learners frequently experience a lack of confidence, which can deter them from engaging with writing tasks and limit opportunities for practice and growth.

2.2. Benefits of Technology-Enhanced Learning in EFL Academic Writing

Technology-Enhanced Learning (TEL) has been recognized as a powerful medium for addressing these challenges, providing scalable and adaptable solutions tailored to diverse learner needs. TEL offers flexibility, interactivity, and personalization, allowing students to practice at their own pace while accessing resources that cater to their specific areas of weakness (Nikitenko et al., 2024). Automated tools such as Grammarly, ProWritingAid, and Turnitin provide instant feedback on grammatical errors, stylistic inconsistencies, and issues of originality, making them indispensable for real-time learning. Such tools enhance students' autonomy by encouraging them to take ownership of their writing process, fostering independent problem-solving skills (Salem, 2022). Moreover, AI-driven software such as Write & Improve by Cambridge adjusts its feedback based on users' proficiency levels, providing a gradual and supportive environment for development (Kenshinbay & Ghorbandordinejad, 2024). TEL environments are further enriched by gamified elements, interactive quizzes, and multimedia content, which have been shown to significantly increase student motivation and engagement (Luo, 2024). These interactive features help combat the monotony often associated with traditional writing exercises, ensuring that learners remain actively invested in their academic improvement.

2.3. TEL and Collaborative Writing

Collaboration is a key feature of TEL that has been shown to significantly impact EFL academic writing, particularly in the development of critical thinking and audience awareness. Platforms such as Google Docs and Microsoft Teams facilitate real-time collaborative writing, enabling students to co-create documents, share feedback, and participate in virtual discussions. Through these platforms, learners are exposed to diverse perspectives, which helps refine their arguments and enhance textual coherence (Su et al., 2021). Collaborative learning activities encourage students to critically evaluate their own work and that of their peers, fostering a deeper understanding of effective writing practices. (Snell, 2019) emphasizes the importance of collaboration in fostering critical reflection and improving writing quality, noting that peer review activities can also help reduce feelings of isolation often associated with academic tasks.

Research by (Hilliard et al., 2020) highlights that working in groups builds confidence, lowers anxiety, and improves overall learning outcomes by providing a support network of peers who face similar challenges. Furthermore, the integration of collaborative tools into TEL platforms helps simulate the professional environments that many learners will encounter, preparing them for future workplace demands.

2.4. Use of Authentic Resources in TEL

Access to authentic materials through TEL platforms broadens learners' exposure to academic genres, discourse styles, and citation conventions, providing a foundation for developing higher-level writing skills (Linguistici, 2024). Online libraries, repositories, and academic databases grant learners access to research articles, case studies, and scholarly reports, which serve as exemplars of effective academic communication. Deane (2018) notes that such exposure enables learners to internalize the linguistic and structural features of academic texts, making it easier to emulate these conventions in their own writing. Interactive tools such as annotation software and e-reading applications further facilitate the exploration of these materials by allowing users to highlight, comment, and make notes directly within texts. Citation management tools, including Zotero and EndNote, streamline the integration of sources into written work, reducing the cognitive load associated with manual referencing and formatting (Asgary & Parhizkar, 2024). These tools not only improve accuracy in citation but also familiarize learners with the practices of academic integrity, an essential component of successful academic writing.

2.5. Feedback and Revision in TEL

Timely feedback is one of the most influential aspects of TEL in enhancing academic writing, as it bridges the gap often found in traditional learning environments. Automated feedback systems not only detect grammatical and stylistic errors but also provide detailed explanations and improvement suggestions, allowing learners to understand and correct their mistakes immediately (Shadiev & Feng, 2024). The immediacy of this feedback supports a continuous learning loop, where students can revise and refine their work iteratively. Hybrid feedback models that combine the precision of automated tools with the contextual insights of instructor input have been shown to deliver the most effective results (Shaik et al., 2022). These models address both surface-level errors and higher-order concerns such as argument structure, coherence, and critical analysis. TEL platforms also often integrate revision histories, enabling both students and instructors to track progress and identify recurring issues. This transparency in the writing process fosters a sense of accountability and encourages learners to approach their writing tasks with greater diligence.

2.6. Challenges in Implementing TEL

Despite its potential, the adoption of TEL faces several challenges that must be addressed to maximize its effectiveness. Digital inequalities persist, with students from low-resource regions often lacking access to the necessary hardware, software, and internet connectivity required to engage fully with TEL (Hennessy et al., 2021). Moreover, disparities in digital literacy among both learners and educators can limit the effective use of available technologies. Li (2020) argues that training programs for instructors are essential to ensure that TEL tools are used in pedagogically sound ways that align with curricular objectives. There is also the concern that over-reliance on automated feedback tools may lead to an overly formulaic approach to writing, as these tools often focus on grammatical correctness at the expense of stylistic and contextual considerations (Melliti, 2024). To address these challenges, blended learning approaches that integrate TEL with traditional methods have been recommended, as they provide

the flexibility and resources of technology while retaining the nuanced, human-centered aspects of education (Menshakova, 2023).

2.7. Future Trends and Innovations

Emerging technologies such as augmented reality (AR), virtual reality (VR), and natural language processing (NLP) hold great promise for the future of TEL in EFL academic writing. NLP-based tools are becoming increasingly sophisticated, capable of analyzing stylistic and rhetorical features to provide personalized and contextually aware feedback (Ranade et al., 2024). Virtual and augmented reality applications are being explored for immersive learning experiences that simulate real-world writing contexts, such as drafting research articles in a collaborative lab environment (AlGerafi et al., 2023). While these technologies are still in their early stages of adoption, they represent significant opportunities for creating more engaging and impactful writing instruction environments.

3. METHOD

3.1. Research Design

This study adopts a mixed-methods research design, integrating both qualitative and quantitative approaches to comprehensively explore the role of Technology-Enhanced Learning (TEL) in developing EFL academic writing skills. The qualitative component focuses on participants' experiences and perceptions of using TEL tools, while the quantitative component evaluates the measurable improvements in their writing performance. The integration of both methods ensures a holistic understanding of how TEL influences EFL learners' academic writing skills.

3.2. Participants

The participants in this study were EFL learners enrolled in undergraduate English Language Education programs at two universities. The sample consisted of 60 students, evenly divided into an experimental group (30 students using TEL tools) and a control group (30 students learning through traditional methods). The participants' proficiency levels were ranged from intermediate to upper-intermediate, as determined by a standardized English placement test. This stratified sampling ensures that the results are generalizable to similar educational contexts.

3.3. Instruments

a. Pre- and Post-Tests: To measure the development of academic writing skills, participants completed a writing test both before and after the intervention. The tests were evaluated five criteria: grammar, coherence, vocabulary, organization, and overall writing quality.

b. Technology-Enhanced Learning Tools: Participants in the experimental group used selected TEL tools, including Grammarly, Google Docs, and Write & Improve by Cambridge, to assist in their writing tasks.

c. Questionnaires: A structured questionnaire was distributed to assess participants' perceptions of TEL's usability, effectiveness, and impact on their motivation.

d. Focus Group Discussions (FGDs): Semi-structured FGDs was conducted to gather in-depth insights into learners' experiences with TEL tools.

e. Rubrics for Writing Assessment: An analytic scoring rubric was employed to standardize the evaluation of academic writing quality across groups.

3.4. Data Collection:

a. Quantitative data from pre- and post-tests were analyzed to determine statistical significance in performance differences between the groups.

   b. Qualitative data from FGDs and open-ended questionnaire responses were coded and thematically analyzed to identify recurring patterns and unique insights.

3.5. Data Analysis

   a. Quantitative Analysis: Paired sample t-tests and ANOVA were used to compare pre- and post-test scores across the experimental and control groups. Effect sizes was calculated to evaluate the magnitude of improvement attributable to TEL tools.

   b. Qualitative Analysis: A thematic analysis approach was employed to analyze FGD transcripts and open-ended survey responses. Key themes, such as learner autonomy, motivation, and perceived challenges were identified to complement quantitative findings.

4. RESULT

4.1. Quantitative Results

a. Pre- and Post-Test Comparison

The analysis of the pre- and post-test scores demonstrated a statistically significant improvement in academic writing performance for the experimental group compared to the control group. The experimental group, which utilized Technology-Enhanced Learning (TEL) tools, showed an average increase of 28% in writing scores, as measured by a comprehensive rubric assessing grammar, coherence, vocabulary, organization, and overall quality. This sharp increase in performance suggests that TEL tools provide a structured and engaging approach to academic writing instruction, catering to the diverse needs of learners. The control group, which relied solely on traditional writing instruction, displayed only a modest improvement of 12%. These findings clearly underscore the role of TEL tools in accelerating skill acquisition and enhancing writing outcomes.

Furthermore, the differences between the groups highlight the added value of interactive and immediate feedback mechanisms inherent in TEL tools. The improvement seen in the experimental group aligns with existing research that emphasizes the role of technology in providing individualized feedback, allowing learners to address errors in real time and refine their writing continuously (Hyland, 2019). The feedback from TEL platforms encourages iterative learning, enabling students to produce multiple drafts with fewer errors each time, which promotes deeper understanding and retention of writing principles.

A paired t-test confirmed the statistical significance of these differences, with $t(29)=7.85, p<0.01 t(29) = 7.85, p < 0.01 t(29)=7.85, p<0.01$. The robust statistical evidence further supports the transformative impact of TEL tools on students' academic writing development. Specific tools such as Grammarly and Write & Improve provided tailored recommendations for grammar, style, and structure, which significantly contributed to learners' progress. The data also revealed that students who regularly utilized TEL tools completed writing tasks more efficiently, as the platforms streamlined the revision process and minimized the time spent on recurring errors.

b. Performance by Writing Aspect

A detailed breakdown of results revealed specific areas where the most significant improvements were observed:

1) Grammar Accuracy: The experimental group improved by 33%, marking a substantial leap compared to the control group's 15% improvement. TEL tools provided detailed corrections and explanations for grammatical errors, enabling

students to not only correct mistakes but also understand the underlying rules. For example, students frequently cited the clarity of feedback regarding subject-verb agreement and tense consistency as critical to their progress.

2) Lexical Diversity: The experimental group achieved a 27% improvement in vocabulary usage, surpassing the 11% gain in the control group. This improvement can be attributed to features such as synonym suggestions and lexical variety prompts provided by TEL platforms. Exposure to diverse word choices allowed students to enrich their essays with more precise and sophisticated vocabulary, which is a crucial aspect of academic writing.

3) Coherence and Organization: A 24% improvement in coherence and organization was noted in the experimental group, compared to only 10% in the control group. TEL tools facilitated this improvement through structured templates and outlines, helping students to arrange their ideas logically. Students in the experimental group frequently noted that the use of tools to generate topic sentences and transitional phrases helped maintain the flow of their arguments.

Overall, the findings indicate that TEL tools offer an integrative approach to improving multiple aspects of writing. The synergy of grammar correction, vocabulary enhancement, and organization guidance provided a comprehensive support system for learners.

4.2. Qualitative Results

a. Perceptions of TEL Tools

The thematic analysis of focus group discussions (FGDs) revealed several positive perceptions among participants in the experimental group. Three dominant themes emerged:

b. Increased Writing Confidence

Participants reported greater confidence in tackling academic writing tasks, attributing this to the constant support and scaffolding offered by TEL tools. For example, one participant remarked, "Receiving instant feedback on my grammar errors made me less anxious about writing. I feel like I am improving with every draft." The immediate and precise feedback provided by TEL tools helped demystify complex writing conventions, making them more accessible to learners. Many students mentioned that the ability to revise drafts without fear of penalty encouraged them to take more risks in their writing, experimenting with new structures and ideas. Additionally, the visual progress indicators embedded in platforms like Write & Improve fostered a sense of achievement, motivating students to complete additional exercises and improve further.

c. Autonomy and Motivation

Students highlighted that the autonomy provided by TEL platforms encouraged them to engage more frequently with writing tasks. The self-directed learning approach facilitated by these tools allowed learners to schedule their practice sessions at their own convenience, making the writing process more flexible and manageable. One participant shared, "I could complete tasks during my free time and immediately see my mistakes. This flexibility made me want to write more often." This adaptability not only increased the frequency of practice but also enhanced the overall learning experience, as students could focus on areas they found most challenging. Gamified features, such as rewards and achievement badges, further motivated students to exceed their goals and continuously refine their skills.

d. Perceived Utility of Feedback

Most participants valued the precision and specificity of automated feedback, particularly regarding grammar and stylistic issues. One student noted, "The

explanations were clear, and the examples helped me understand how to avoid similar mistakes in the future." The comprehensive feedback mechanisms ensured that students received guidance tailored to their needs, making the revision process more effective. Additionally, some participants emphasized the importance of collaborative features, such as peer feedback within TEL tools, which added a layer of interpersonal learning. These interactions exposed students to diverse perspectives and enriched their understanding of academic conventions.

4.3. Challenges Identified

Despite the overwhelmingly positive feedback, several challenges were noted:

a. **Digital Literacy Gaps**

Some participants initially struggled with navigating the functionalities of TEL tools, requiring additional orientation and support. This issue was particularly evident among students who had limited prior exposure to technology, highlighting the need for more robust training during the early stages of TEL implementation.

b. **Over-Reliance on Automated Feedback**

A small subset of participants expressed concern about becoming too dependent on TEL tools for error identification and correction. These students worried that their reliance on technology might impede the development of their own editing and critical thinking skills. To address this, educators must emphasize the role of TEL as a supplementary tool rather than a replacement for manual efforts.

4.4. Integration of Quantitative and Qualitative Findings

The combined results provide strong evidence of the efficacy of TEL tools in enhancing EFL academic writing skills. Quantitative findings highlight significant improvements in key areas of writing, while qualitative insights provide a deeper understanding of how TEL tools affect learners' confidence, motivation, and autonomy. However, challenges such as digital literacy gaps and reliance on automated feedback must be addressed to optimize TEL integration. This dual perspective demonstrates the holistic potential of TEL in transforming academic writing education, offering both practical and theoretical implications for its continued implementation.

5. DISCUSSION

The findings of this study clearly highlight the substantial benefits of Technology-Enhanced Learning (TEL) tools in improving EFL (English as a Foreign Language) academic writing. The quantitative data demonstrated significant improvements in writing performance for the experimental group, while qualitative insights shed light on how TEL tools affected students' confidence, motivation, and overall learning experience. The combination of both objective and subjective results offers valuable insights into the effectiveness of TEL tools and provides direction for future integration into writing instruction.

5.1. TEL Tools and Writing Improvement

The significant improvement observed in the experimental group, with an average score increase of 28%, supports the notion that TEL tools significantly contribute to the enhancement of students' academic writing skills. These findings are consistent with previous research indicating that TEL platforms provide essential scaffolding that helps learners improve key aspects of writing such as grammar, vocabulary, coherence, and organization (Cheringuene, 2023). The use of TEL tools allowed students to receive timely, personalized feedback, which plays a pivotal role in error correction and in fostering better writing practices (Shadiev & Feng, 2024). The instant corrections provided by tools like Grammarly and Write & Improve empowered

students to engage with their errors actively, which is essential for reinforcing learning and achieving writing mastery.

Additionally, TEL platforms also facilitated more efficient revision cycles by allowing students to revise and refine their drafts easily and quickly. The study found that students who were able to access these tools for repeated revision exhibited a greater depth of understanding and improvement in writing quality compared to those who engaged in less frequent revision. This finding aligns with the cognitive theory of writing, which suggests that revision is an essential component of the writing process, fostering deeper reflection and engagement with the content (Cotos et al., 2020). By allowing learners to concentrate on refining their work without the constraints of limited teacher availability or slow feedback, TEL tools promote a continuous and efficient learning process.

5.2.   Perceptions of Confidence and Motivation

Another striking aspect of the study was the positive impact of TEL tools on students' confidence and motivation. The data revealed that students who used TEL platforms expressed higher levels of self-efficacy in their writing tasks, with many noting that the tools provided them with the confidence to take on more complex writing challenges. This is supported by social-cognitive theory, which emphasizes the role of self-confidence in learning and academic performance (Khuhro, 2024). Participants stated that the immediate, accessible feedback they received not only boosted their technical skills but also reassured them that they were progressing. This increasing self-confidence helped to create a positive feedback loop, motivating students to engage more deeply with their writing. In fact, several participants referred to the added motivation from gamified elements—such as rewards, progress tracking, and personalized suggestions—which encouraged them to push further and try harder at their writing tasks.

It is also important to note that the TEL tools allowed students to work autonomously, which was particularly appreciated by those juggling academic tasks with other personal commitments. This autonomy allowed students to practice writing at their own pace and convenience, a factor that likely contributed to the increased writing frequency and overall improvement. Previous studies have shown that autonomy in learning positively correlates with increased motivation and overall academic performance (AlGerafi et al., 2023). The tools gave students more control over their learning process and enabled them to identify areas they found difficult, helping them set personalized writing goals.

5.3.   The Role of Peer and Automated Feedback

In addition to the efficiency and precision of automated feedback, students also expressed the value of peer feedback as a complement to the TEL tools. This indicates that a blended approach, incorporating both technological feedback and human interaction, may be particularly effective. Students noted that the peer feedback process enhanced their critical thinking and awareness of different writing perspectives, which improved their ability to communicate ideas clearly and effectively. Moreover, peer review also instilled a sense of community and collaboration within the classroom, making the writing process feel more interactive and less isolating. Studies suggest that the combination of peer and automated feedback provides a balanced approach to writing instruction, allowing for both immediate correction and peer-based learning opportunities (Lam, 2021). This collaborative learning environment is vital in fostering a deeper understanding of academic writing conventions and preparing students for real-world writing tasks where feedback often comes from multiple sources.

5.4. Addressing Challenges: Digital Literacy and Over-Reliance

Despite the positive outcomes, the study also identified some critical challenges associated with the use of TEL tools. A key concern was the digital literacy gap observed among some students, which affected their initial interaction with the platforms. In particular, students with less exposure to technology had difficulty navigating the tools' functions, which slowed their adoption of TEL tools and may have hindered their ability to fully benefit from the resources provided. Previous studies have also highlighted that digital literacy is a critical factor influencing the effectiveness of TEL-based learning environments (Verma, 2020). These findings indicate that TEL tool implementation should be accompanied by proper training to help students develop the skills necessary to use technology effectively. Such training could include introductory tutorials on how to navigate the platforms and make the best use of the various features.

Another challenge highlighted by participants was the potential for over-reliance on automated feedback. A minority of students voiced concerns that frequent reliance on technology to identify errors might impede their development of critical thinking and self-editing skills. While TEL tools undoubtedly offer significant value in error correction, it is essential that their use be balanced with opportunities for independent learning. Educators must guide students to use these tools as a means of reinforcing their own analysis and revision abilities, rather than a substitute for the cognitive effort involved in the self-editing process. The concern of over-reliance is particularly pertinent in the case of advanced writers, where greater autonomy and self-reliance in revision are expected. Educators can address this by promoting reflective practices, such as having students first identify and correct errors independently before using TEL feedback.

5.5. Recommendations for Future Practice

Based on the results and discussions, it is clear that TEL tools have immense potential to enhance academic writing instruction, but to maximize their benefits, careful consideration should be given to their integration into the writing curriculum. Recommendations include providing students with sufficient training on the tools and digital literacy to ensure that they are able to utilize TEL features effectively. Additionally, educators could adopt a hybrid model of feedback, combining automated suggestions with peer and instructor feedback to foster a well-rounded learning experience. Furthermore, the over-reliance on automated feedback can be mitigated through explicit teaching strategies that guide students in building their self-editing and revision skills. By balancing the efficiency of TEL tools with the development of independent critical thinking, TEL can be a powerful catalyst for long-term academic growth.

6. CONCLUSION

This study highlights the positive impact of Technology-Enhanced Learning (TEL) tools on EFL (English as a Foreign Language) academic writing, demonstrating significant improvements in areas such as grammar, vocabulary, coherence, and organization compared to traditional methods. The integration of TEL tools also enhanced student motivation and confidence, as the immediate, personalized feedback provided by the platforms encouraged greater engagement and willingness to revise. Students reported higher self-efficacy and increased autonomy, benefiting from the flexibility and interactivity of TEL resources. However, challenges such as digital literacy gaps and potential over-reliance on automated feedback remain. To maximize the effectiveness of TEL tools, future implementations should include targeted training on digital literacy and strategies to encourage independent revision and critical

thinking. Overall, TEL tools offer a valuable complement to traditional writing instruction, providing essential support for error correction and fostering learner autonomy, making them a promising tool for improving academic writing skills in EFL contexts.

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