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AI INTEGRATION IN FLIPPED EFL WRITING CLASSROOMS: LEARNERS' PRACTICES AND PEDAGOGICAL IMPLICATIONS IN THE MOROCCAN CONTEXT

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Abstract

This study investigates the integration of artificial intelligence (AI) tools in flipped classroom pedagogy and its implications for English as a Foreign Language (EFL) writing instruction in a Moroccan language institution. A total of 630 intermediate-level EFL learners responded to a survey combining quantitative and qualitative components. The survey examined students' frequency and purposes of AI use, perceived benefits, and concerns related to writing tasks within flipped learning environments. Findings reveal that nearly all respondents reported using AI in some form, primarily for idea generation, grammar correction, vocabulary development, and content organization. While respondents acknowledged the usefulness of AI in enhancing writing quality and supporting task completion, they also expressed concerns about overdependence, diminished authenticity reduced critical thinking, and ethical uncertainties. Thematic analysis of open-ended responses, from the survey, highlighted a strong need for teacher guidance and institutional training on ethical and effective AI use. The study concludes that AI integration in flipped EFL writing instruction poses opportunities and challenges: it can foster learner autonomy and improve writing outcomes, but it also risks undermining originality and academic integrity if not properly scaffolded. Pedagogical implications are discussed, emphasizing the importance of AI literacy, ethical guidelines, and teacher support to ensure responsible adoption of AI in technology-enhanced language education.

Keywords

Flipped classroom, artificial intelligence, EFL writing, language institution, academic integrity

Introduction

AI may not replace writing or language teachers, but it could replace writing or language learners, leaving teachers without students to teach. This prospect is simultaneously promising and concerning: the worry arises from risks of overdependence, diminished critical thinking, and academic integrity challenges, while the promise lies in AI's potential to expand access, foster engagement, and support personalized learning.

Previous research has confirmed this ambivalent role of AI in the learning of writing (Nazari et al., 2021; Aljuaid, 2024; Chen, 2024). This ambivalence is particularly evident in student-centered pedagogies such as the flipped classroom, where students assume greater responsibility for learning outside the classroom and may turn to AI tools - sometimes productively, but at other times in ways that hinder development. While the dual nature of AI in EFL writing has been widely acknowledged, its implications within flipped classroom contexts remain underexplored.

Accordingly, the present study investigates the effects of AI tools on EFL writing within the flipped classroom. Specifically, it aims to: (1) examine the challenges and opportunities Moroccan undergraduate students encounter when using AI tools for writing in flipped environments; and (2) explore the pedagogical implications of AI integration in flipped EFL writing instruction.

1 Review of the Literature

This section comprises three parts: the first explores flipped classroom pedagogy (FCP). The second examines the integration of AI tools in educational settings in general and in EFL education in particular. The third reviews the previous studies relevant to the application of FCP in connection with AI. The three parts are discussed within the context of EFL writing instruction.

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1.1 Flipped Classroom Pedagogy

FCP emerged as a learner-centered alternative to traditional instruction, shifting the focus from teacher-led delivery to student-driven engagement (Baker, 2000). This model operates in two stages: first, students engage with learning materials outside class; typically through online platforms, video-recorded lessons, or other forms of digital content to foster independent learning. Second, classroom time is devoted to active learning through activities such as class problem-solving, feedback giving, hands-on practice, pair work or group projects among other collaborative activities (Vidic, Clark, 2015; Martínez, Gómez, 2025**).**

Research highlights several pedagogical advantages of FCP. It promotes autonomy and responsibility for learning (Chaplin, 2009; Freeman et al., 2007), supports interactive and higher-order learning activities (Vidic, Clark, 2015), and aligns with digital learning trends where technology extends instruction beyond the classroom (Hussin, 2018). Moreover, studies suggest that FCP fosters positive learner attitudes and deeper engagement compared to lecture-based models (Hung, 2015).

Nevertheless, challenges persist. One major difficulty is the heavy workload required from teachers when designing content for their flipped lessons (Enfield, 2012). Indeed, developing high-quality video lessons, interactive tasks, and online resources requires significant time, technical expertise, and ongoing updates, which can be an added burden for teachers. A second challenge arises from students' resistance to the flipped model of teaching and learning. In other words, the "new" model requires greater responsibility, self-discipline, autonomy, and active engagement compared to traditional teacher-centered instruction (Abeysekera, Dawson, 2015). Last, other challenges emanates from students not having equal access to digital tools or stable internet connectivity, which may hinder the effectiveness of out-of-class learning (Bishop, Verleger, 2013).

Despite these challenges, FCP, particularly its learner-centered prospects, has the potential to stand out as a highly influential model to boost autonomous learning, student-centered education and active learning in contemporary education (Bishop and Verleger, 2013).

1.2 Artificial Intelligence Integration in EFL Education

The integration of technology in general, with AI in particular, is no longer a luxury, an accessory, or a matter of prestige that educational institutions may simply choose to adopt (Ouyang, and Jiao, 2021). As such, it has become a necessity for ensuring that educational systems remain aligned with contemporary developments and innovative teaching-learning practices. In foreign language pedagogy, the incorporation of AI tools is increasingly viewed as a critical component for enhancing instruction, fostering learner autonomy, and responding to the evolving needs of 21st-century learners. This is because it helps instructors deliver tailored instruction and feedback, adjusting instantly to each student's unique needs and learning pace (Luckin et al., 2016).

1.3 Previous Studies

FCP within EFL contexts has attracted the interest of many researchers. Some of these confirmed the worth of FCP in EFL classrooms compared to other traditional models (Al-Harbi, Alshumaimeri, 2016; Huang, Hong, 2016; Hung, 2018; Derakhshan et al., 2022). For instance, Huang and Hong (2016) found that Taiwanese university students in a flipped reading class achieved significantly higher comprehension scores and reported greater motivation than those in a lecture-based class. Similarly, Hung (2018) demonstrated that flipped instruction enhanced EFL learners' speaking proficiency and willingness to communicate. In Saudi Arabia, Al-Harbi and Alshumaimeri (2016) reported that high school students in a flipped grammar course showed better achievement and more positive attitudes toward learning. Abdelrahman (2020) further confirmed these benefits in Jordan, where flipped reading instruction improved undergraduates' comprehension and raised their metacognitive awareness. Extending beyond language skills, Derakhshan et al. (2022) found that flipped learning fostered academic resilience, self-directed learning, and learner autonomy among Iranian EFL students. These studies collectively illustrate the potential of FCP to strengthen both linguistic performance and affective-motivational aspects of learning, making it a viable alternative to traditional instruction.

Similarly, studies have found that FCP improves students' writing skills more effectively than traditional teaching-learning models (Leis et al., 2015; Ekmekçi, 2017; Hashemifardnia et al., 2018). For example, Leis et al. (2015), in an experimental study with Japanese undergraduates, reported that learners in the flipped classroom produced written texts with greater accuracy and complexity than those taught through lectures. In the Turkish context, Ekmekçi (2017) used a quasi-experimental design and found that university students in the flipped writing group significantly outperformed their peers in essay writing, while also expressing higher levels of motivation and satisfaction. Similarly, Hashemifardnia et al. (2018) investigated Iranian EFL learners' paragraph writing and demonstrated that flipped instruction enhanced organization, idea development, and overall writing quality

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compared to the traditional approach. Taken together, these studies suggest that the flipped classroom provides a more supportive environment for developing writing proficiency, as it allows learners to engage with content independently and use classroom time for feedback, practice, and collaborative improvement.

Despite this growing body of research, the intersection of FCP and AI-assisted writing remains largely unexplored, particularly in EFL contexts. To date, little empirical evidence exists on how EFL learners in Moroccan institutions actually employ AI tools in flipped writing tasks. Are these tools used to extend students' competencies or to bypass the pedagogical process? What benefits do these students perceive, and what challenges do they encounter?

Accordingly, this study seeks to address this gap by exploring the following objectives:

1. To examine the frequency and purposes of AI tool usage by EFL Moroccan students in flipped classroom writing tasks.

2. To identify the potential of AI integration in EFL writing within a flipped classroom model.

3. To investigate the challenges and concerns Moroccan students report regarding ethical, motivational and pedagogical dimensions of AI use.

By addressing these objectives, the current study is an attempt to contribute to a more nuanced understanding of how AI tools shape FCP, offering practical insights for students, teachers, institutions and policymakers.

Guided by these objectives, this research addresses the following questions:

1. How often do Moroccan EFL students use AI tools in flipped writing tasks, and for what purposes?

2. What benefits do these students perceive from integrating AI into their writing activities?

3. What challenges and ethical concerns do these students associate AI-assisted writing in the flipped classroom?

2 Material and Methods

This study employed a questionnaire-based survey that combined both quantitative and qualitative items to investigate Moroccan EFL students' experiences with AI-assisted writing in flipped classrooms. The instrument included Likert-scale items that generated measurable data on learners' use of AI in flipped writing tasks, alongside open-ended questions that allowed respondents to elaborate on their experiences and perceptions. While not a full mixed-methods design, this provided a mixed-approach for data collection with complementary perspectives: quantitative results revealed patterns of use, whereas qualitative responses enriched the interpretation with deeper insights into respondents' challenges and opportunities.

The participants were 630 EFL students enrolled in a well-established language institution in the city of Rabat, Morocco. At the time of the study, participants were placed at various proficiency levels according to the institution's internal placement system, with the majority ranging from lower-intermediate to upper-intermediate. Participation in the study was voluntary, informed consent was obtained, and all responses were collected anonymously. All participants were assured of confidentiality and could withdraw at any stage without consequence.

Before the administration of the survey, a piloting phase indicated that respondents needed approximately 20 minutes to complete all items, confirming the instrument's feasibility. The distribution was facilitated by a team of EFL instructors during the spring term of 2025. The team shared the survey link with learners and clarified the voluntary nature of participation. Eventually, a convenience sampling approach was adopted. Inclusion criteria required active enrollment in a flipped writing class and basic digital literacy to complete the online survey; while learners not enrolled in such classes were excluded.

3 Findings

This section presents the major findings of the study. The first part reports the results of the quantitative data analysis and illustrates them through descriptive statistics and graphs. The second part summarizes the main themes that have emerged from the qualitative data and provides illustrative examples to complement and enrich the quantitative findings.

3.1 Major Quantitative Findings

As shown in Table 1, all participants were placed at or above the intermediate level based on the institution's standardized placement system, which ensured comparability across groups. The distribution of proficiency levels

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indicates that nearly half of the sample (44.4%) was classified as lower-intermediate learners, while 41.3% were intermediate, and 14.3% were upper-intermediate. This distribution confirms that the dataset was dominated by learners with sufficient linguistic competence to engage meaningfully in flipped classroom activities and to provide informed reflections on the integration of AI tools into writing instruction.

Table 1: Participant distribution by proficiency level

Proficiency Level	Number of Students	Percentage
Lower-intermediate	280	44.4%
Intermediate	260	41.3%
Upper-intermediate	90	14.3%
Total	630	100%

Figure 1 presents the distribution of responses to the binary variable measuring whether learners reported using AI tools for writing tasks. The data reveal an overwhelmingly positive response, with 98.4% of participants indicating "Yes" and only 1.6% selecting "No." This outcome establishes a robust baseline, demonstrating that AI use for writing is not an isolated or peripheral behavior but a near-universal practice among learners in the context of this research. This reflects the global growing use of AI in EFL writing in particular and in education in general (Al-harbi, 2023).

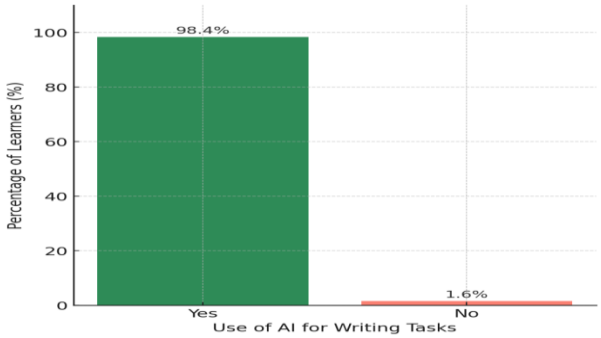

Figure 1 Use of AI for writing tasks among EFL learners

Figure 2 shows the distribution of responses to the ordinal variables on the frequency of using AI in flipped writing tasks among EFL learners. The results show a clear concentration in the higher-frequency categories, with 39.7% reporting "often" and 19% reporting "always". A further 28.6% indicated "sometimes", while 9.5% reported "rarely" and 3.2% "never." This distribution confirms that AI use is not incidental but a consistent feature of learners' writing practices.

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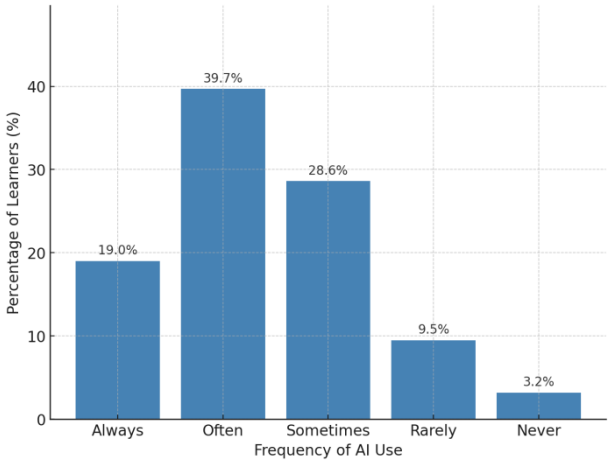

Figure 2 Frequency of AI use among EFL learners

Figure 3 presents the results of the binary variable assessing learners' use of AI tools in writing tasks, categorized by proficiency level. The figure shows three proficiency groups: lower-intermediate, intermediate, and upper-intermediate each divided into response options "yes" and "no." For the first group, 96% reported using AI tools while 4% indicated non-use of it. The second group, the respective proportions were 98% "yes" and 2% "no", whereas for the third group 99% confirmed AI use and only 1% did not.

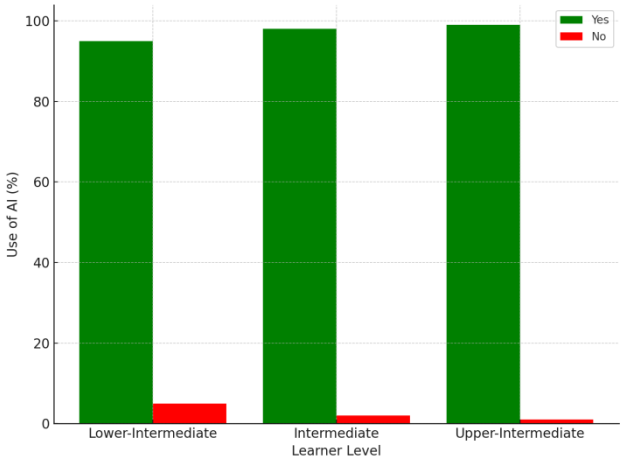

Figure 3 AI use for writing tasks in flipped-classrooms by proficiency level

As for writing tasks (see figure 4 below), the study found that students use AI in a variety of ways. The most common purposes are idea generation and grammar correction, each reported by 117 students. This is followed by vocabulary improvement (103 students) and content organization (88 students). By contrast, the least common use of AI is for producing complete drafts, reported by only about 15 of the 630 students surveyed. Though low the number might seem to be, it is still academically worrying considering the ethical issues it should instigate.

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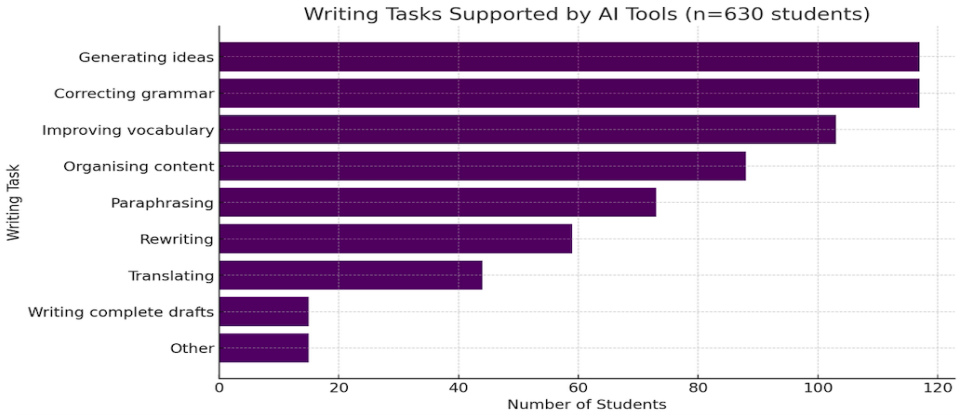

Figure 4 Students use of AI per writing tasks

The study also explored (see figure 5 below) some of the concerns students have with regards to the use of AI in writing. Among the surveyed questions, lack of guidance, received the highest average response which indicates it is the most strongly felt issue, followed by concerns over distinguishing original work from AI-generated content and a lack of motivation. Ethical confusion and AI dependence also garnered moderate agreement. In contrast, balancing ideas and particularly submitting without understanding were rated lower.

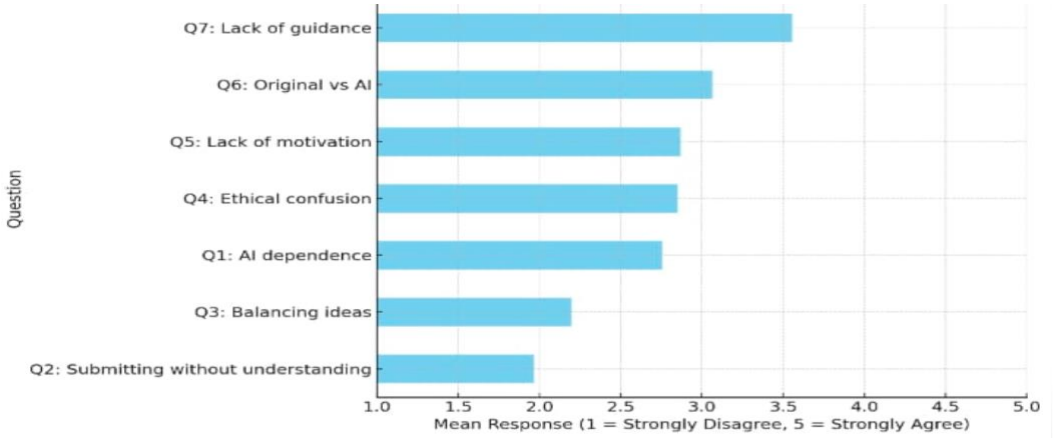

Figure 5 Concerns about AI-Assisted Writing

3.2 Major qualitative findings

The analysis of students' responses revealed three major themes related to the usefulness, challenges, and ethical integration of AI tools in flipped writing assignments.

3.2.1 Usefulness of AI in Flipped Writing

Students reported that AI tools were particularly helpful for *generating ideas and brainstorming*. As one student noted, *"It gives me inspiration,"* while another emphasized, *"It helps generate new and creative ideas when I'm stuck."* In addition, many learners highlighted *grammar and style enhancement* as a major benefit. For example, one student remarked that AI is useful for *"correcting mistakes (grammar, vocabulary);"* additionally, a student explained that it *"helps refine grammar, vocabulary, and clarity, making my writing sound better and more professional."* These responses illustrate that a number of students amongst others view AI as a supportive tool for both creativity and language accuracy.

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3.2.2 Challenges of Using AI for Writing

Despite the benefits, students also expressed concerns about the challenges of integrating AI into their writing. A recurring theme was *overdependence.* One participant admitted, *"We grow dependent on it, struggling to form our own ideas,"* while another observed, *"Relying too much weakens your critical thinking."* Another difficulty involved *balancing AI with human input*. As one respondent stated, *"It's difficult to balance AI-generated versus original content,"* and another explained, *"You lose your authenticity because of overwhelming AI suggestions."* A further concern was *maintaining originality and personal voice.* For instance, a student commented, *"It doesn't always portray the feeling I want to convey,"* while another noted, *"AI changes my writing style when correcting grammar. It's hard to keep a personal touch."*

3.2.3 Supporting Ethical Use of AI

When asked how teachers and universities could help, students emphasized the importance of *clear guidelines and rules*. As one participant suggested, *"Draw a line between what's allowed and what's not,"* while another added, *"Define what portion of a task can use AI."* Students also highlighted the need for *education and training*. One student explained, *"Teach us how to use AI effectively and ethically,"* while another recommended, *"Show how to use AI for idea generation, not full content."* Finally, students stressed the importance of *supporting ethical use over punishment.* For example, one participant argued, *"Instead of banning it, guide us to use it properly,"* while another requested professors to *"encourage honesty and self-awareness."*

4 Discussion

The findings of this study can be discussed from three perspectives. The first concerns the growing use of AI by Moroccan EFL students in writing within the EFL flipped classroom model. In fact, the survey shows the use of AI in EFL writing has increased significantly among Moroccan students that, as the findings show, more than 600 of the 630 surveyed students confirm they use AI somehow. This aligns with findings other studies have attained. For instance, Marzuki et. al (2023, 2) note, "the use of Artificial Intelligent (AI)-powered writing tools in English as a foreign language (EFL) in classrooms is increasing rapidly". This is not an exception if seen from a broad educational perspective since AI use has been growing in almost every aspect of formal teaching-learning processes. As a matter of fact, Reyes and Contractor (2025, 2) note, "over 80 percent of students use AI for academic purposes, up from less than 10 percent before Spring 2023."

The second highlights students' awareness of the benefits that AI provides for completing writing assignments. For instance, the students surveyed in this study strongly agree that AI helps them generate ideas, correct grammar, improve vocabulary, and organize the content of their written texts. Examples of these studies include Marzuki's (2023, 1) which has found "on the positive side, AI writing tools such as Grammarly, QuillBot, Wordtune, and Jenni have been found to significantly improve students' writing skills". Other studies, such as those by the Center for Educational Effectiveness (2023) and Eragamreddy (2024) support the findings of the current study arguing AI has a positive impact on students' writing proficiency, syntactic sophistication, and lexical range.

The third perspective, however, reveals the challenges and concerns students face when using AI to respond to writing tasks in a flipped classroom environment. When asked to rate their level of agreement on a scale from *strongly agree* to *strongly disagree*, participants highlighted four top concerns about using AI in writing. These were the lack of guidance on how to use AI tools appropriately, the challenge of maintaining originality as opposed to producing monotonous AI-generated texts, reduced motivation to write in the presence of ready-made content, and ethical uncertainty about where the boundaries of legitimate AI use begin and end. However, students expressed less concern about dependence and submitting without understanding. Several studies confirm these findings. For example, Gasymeh et al. (2023) found that originality and academic integrity are major concerns students have about their use of AI. Additionally, their study (ibid, 3) concluded, "Over-reliance on these tools could impede their ability to evaluate data independently, develop nuanced arguments, solve problems creatively, and achieve deep learning". Similarly, a study indicated, "Students' primary concerns included risks to academic integrity … loss of critical thinking skills, the potential development of overreliance, and ethical considerations such as data privacy …" (Pitts et al., 2025). The study highlighted "ethical considerations such as data privacy, system bias, environmental impact, and preservation of human elements in education" as other concerns students have in result of using AI to write."

Conclusion

The current study explores the opportunities and challenges EFL Moroccan students face when using AI tools in writing within flipped classroom model. It also investigates the pedagogical implications relevant to the use of AI tools in flipped writing instruction. The data suggest that Moroccan EFL students generally employ AI, although

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the extent of use varies across the different classes or levels. Also, there is a significant agreement among these students with regards to the need for the integration of AI tools in flipped writing classrooms. However, the findings indicate the explored students express some concerns about the negative impact the use of AI can have on their ability to develop authentic writing skills in English. Simultaneously, they emphasize the need for EFL instructors to train students on how to use AI tools effectively, ethically, and safely.

Beyond these findings, the study underscores the transformative potential of AI-enhanced flipped instruction for fostering learner autonomy and self-regulation. When AI tools are integrated thoughtfully, the shift in writing pedagogy from product-oriented to a more process-oriented model is then possible to achieve. This shift can potentially help learners, who are users of AI-enhanced flipped instruction, engage in iterative drafting, feedback and reflection. Nonetheless, the results pinpoint to the critical need for a balanced pedagogical approach where technology implementation does not overshadow the role of human, particularly instructors, insights and guidance. Furthermore, it is of paramount importance to set institutional policies about digital literacy and academic integrity in order to enable students and instructors with the competencies needed.

All in all, the current study is an attempt to add to the discourse on AI literacy in EFL pedagogy, providing empirical evidence from a Moroccan context. It also opens pathways for future research to examine long-term effects of AI integration on writing proficiency.

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