# The impact of artificial intelligence use on students' autonomous writing

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## Article Info

## Abstract

This research investigates the impact of Artificial Intelligence (AI) tools on students' independent writing skills, specifically in preparing for the IELTS test in Iran, in light of the growing reliance on artificial intelligence in education. This study employs a mixed-methods research design, supplementing quantitative data from a 29-item Likert-scale questionnaire targeting 103 students with qualitative data from semi-structured interviews with 23 students and 11 teachers. The results indicate that, although artificial intelligence tools contribute largely to the organization, creativity, and self-confidence of the students' writing, most still depend on the teachers for the content. The students have demonstrated increased motivation and versatility in their thinking, with artificial intelligence serving as both an enhancement of their writing skills and a potential threat in the form of unfair criticism or over-reliance. Clearly, teachers can effectively and ethically integrate artificial intelligence into writing instruction to maximize its benefits and minimize its drawbacks. This, in turn, enhances the understanding and appreciation of the potential applications of artificial intelligence in education.

## Introduction

In contemporary society, artificial intelligence has permeated almost everything, including the construction of our entertainment and healthcare systems. Education has not been left behind in this global technological change (Mohammadkarimi, 2024; Rudolph et al., 2023). Technology, especially AI, is transforming the way people learn languages and even write. Several AI-focused technologies and tools, including grammar-checking software, writing assistant tools, and AI tutors, are becoming common in schools and even among self-learners. As much as most of these tools are for the good of the students, the debates on whether they are encouraging or undermining the students' autonomous writing skills continue (Nazari et al., 2021).

The ability to engage in autonomous writing is a key component that assists students in making sense of the content without writing incoherent, unclear, and ineffective ideas. It is made up of many different cognitive processes, like critical cognitive processes and creative and problem-solving activities (Toufaha, 2024). The concern is that while it is beneficial for students to use these tools, particularly in areas like grammar and style, over-reliance could hinder their ability to develop their own writing voice, a crucial skill in critical thinking (Cardon et al., 2023; Ogunleye et al., 2024; Washington, 2023).

This study employs a mixed-methods research design to explore how AI tools impact students' independent writing skills, particularly in preparation for the IELTS test in Iran. Quantitative data were collected through a 29-item Likert-scale questionnaire completed by 103 students, complemented by qualitative insights from semi-structured interviews with 23 students and 11 teachers. The findings suggest that AI tools enhance students' writing organization, creativity, and self-confidence while exposing a reliance on teacher input for content. Moreover, AI tools foster student motivation and versatile thinking but also pose risks such as over-reliance and susceptibility to unfair criticism.

However, the research acknowledges limitations, including its focus on a single educational context (IELTS preparation in Iran) and reliance on self-reported data, which may affect the generalizability of findings. Despite these constraints, the study contributes to understanding the balance needed to integrate AI tools into writing instruction effectively. By maximizing the benefits of AI while minimizing its drawbacks, this research aims to guide educators and policymakers in leveraging AI for educational advancement.

## Research questions

1. How do students perceive the impact of AI tools on their ability to write autonomously in academic settings?

2. What are students' perceptions of how AI-based writing tools influence their confidence and motivation in developing independent writing skills?

3. According to students, to what extent does the integration of AI in the writing process affect their critical thinking and creativity during autonomous writing tasks?

4. What challenges and limitations do students perceive when using AI tools for autonomous writing instruction?

## Literature review

The use of AI in education and its various dimensions has become one of the issues attracting attention and debates. One domain, which even more recently has shown the importance and power of AI, is in literary and writing skills. One aspect, however, that has raised concern is the emergence of collateral technologies that assist in writing, such as grammar checkers, writing assistants, and even AI tutors, and how they will affect students' ability to write independently (Laredj & Mebarek, 2024).

In looking at the evidence on the influence of AI tools on writing, the findings have not been conclusive. Indeed, several other authors (Lee et al., 2024; Marzuki et al., 2023; Wei et al., 2023) have demonstrated that such tools help develop students' grammar, punctuation, and writing skills. For example, students can use grammar checkers, which help monitor the changes and errors in their writing and give them feedback on the mistakes at each stage. Moreover, AI-based applications that assist in writing can provide guidance on how to rephrase a sentence, use better words, or write more coherently.

A number of other research papers (Osasona et al., 2024; Stahl et al., 2023; Wach et al., 2023) have expressed some skepticism regarding the implications of increasing dependency on AI tools. It is feared, for instance, that such students will use less and less of their own brains and critical thinking skills in coming up with ideas (Malik et al., 2023). Other scholars (e.g. Barrot, 2023; Mohammadkarimi, 2023) also point out that such tools as AI might have limitations in that it might not be able to structure the language as finely as a human can write, thereby defeating the purpose of improving students' writing.

In addition, sometimes the effectiveness of AI tools is determined by a more complex set of variables, such as the tool itself, its appropriateness to the students, and the purposes of using the tools. For instance, students who are experiencing challenges with the use of basic grammar and punctuation might benefit from the aid of AI tools in their written compositions; however, for students wanting to advance to a higher level where they can integrate writing style with logical argumentation, these tools might not be very helpful (Alshumaimeri & Alshememry, 2024; Grájeda et al., 2024; Owan et al., 2023).

As much as the tools are likely to boost the students' writing abilities, they may also affect other aspects, such as the students' writing motivation as well as engagement. According to some researchers (Huang et al., 2023; Silitonga et al., 2023; Song & Song, 2023), the AI tools were found to be helping students motivationally and the formation of self-

confidence through instant stimulation and reinforcement. In contrast, other studies (Ivanov, 2023; Parsakia, 2023) have shown that overuse of AI tools results in demotivation and diminish the creativity of the students as they depend too much on the props' recommendations and feel inactive in the creation process.

To add, there have been conversations on the ethics of educational tools that employ artificial intelligence (Klimova et al., 2023; Kooli, 2023). It has been argued that such tools may facilitate bias and discrimination, especially when the materials used to train them are unbalanced across genders and ethnic groups (Farahani & Ghasemi, 2024; Roshanaei, 2024). In addition, using artificial intelligence devices in learning environments creates issues such as compromised privacy and security of students' information and data (Konidena et al., 2024; Li, 2024; Modi, 2023).

A sizable body of literature has emerged on using AI writing applications in learning English, examining the quality of writing, the degree of autonomy, and academic dishonesty tendencies (e.g. Ahmad et al., 2024; Sullivan et al., 2023; Van Wyk, 2024). Marzuki et al. (2023) investigated QuillBot and Chat-GPT as AI writing tools for EFL learners and found that content and organization improved substantially. This study also reinforced the positive view of these tools when it comes to the enhancement of student autonomy. It seemed that AI could assist in self-learning by encouraging doing away with teachers for simple writing tasks. Alharbi (2023), on her part, performed a meta-analysis of AI writing applications and examined different classes of these applications, including feedback-based and text-generation applications. While AI tools provide gains, Alharbi highlighted some mixed pictures in the literature, especially about the impact of AI on students' self-sufficiency and analytical skills in the long run.

Conversely, Gayed et al. (2022) deliberated on the cognitive challenges encountered by EFL learners in the course of writing. They demonstrated how their AI tool, named "AI KAKU", enabled students to free their minds and concentrate on higher-order cognitive tasks such as looking for information and structuring it, which facilitates independent writing. Similar sentiments focused on cognitive relief were captured by Nazari et al. (2021), who carried out a randomized trial with postgraduate students in which it was shown that writing processes when enhanced by AI tools, improved behaviour and cognition engagement. These findings were important in showcasing the beneficial role of AI with regard to self-efficacy among students, as it enabled them to write without external assistance.

Nevertheless, even with all these, apprehensions are raised about the excessive dependence on AI tools and how it may affect the creativity and critical thinking of the students. Godwin-Jones (2022) expressed the potential ethical concerns regarding employing AI to produce textual content automatically, as such a task could diminish the requirement for inventiveness and original thought in discovering solutions and writing assignments. His observations explained why the use of AI tools needed to be managed by the instructor so that the students do not completely depend on technology in their interaction with the information.

Furthermore, Mohammadkarimi (2023) elaborated on some of these ethical issues, particularly those regarding AI-written papers and the propensity for academic misconduct. However, his investigation into teachers' views on the integration of AI in education showed ambivalence with suspicions that AI could facilitate cheating and mushroom the problem of students' disengagement with scholarly activities. It was noticed by teachers that the use of AI writing support systems is convenient but has every prospect of complicating the issue of plagiarism detection and the concept of students' free will in writing in the first place. In this regard, it was noted that the very resolution of ethical concerns is largely dependent on teachers, but also their proper training and availability of anti-plagiarism software for effective integration of AI are essential.

Responding to these concerns, Liu et al. (2023) proposed the model of a reflective thinking promotion mechanism to be integrated into AI writing supportive tools so as to promote cognitive engagement among users. A quasi-experiment performed by their team indicated that environments that allow for AI-assisted writing can also enhance one's capacity for self-directed learning without over-exerting the mental effort, hence stimulating creativity and critical analysis as long as there are teaching methods in place intended for the learners on the utilization of AI tools.

There are many studies that have explored the intersection of writing and artificial intelligence, but not much attention is drawn to the effect that the use of AI tools over time has on students' ability to write autonomously. The research works focused on such tools demonstrated their efficiency in improving students' writing performance. However, this performance-enhancing approach needs more longitudinal studies that focus on the impact of the tools over time. Lastly, there is a need to conduct more research addressing how effective writing instruction and AI-based scarce resources can work in developing independent writers.

## Methodology

### Research design

This study employs a mixed-methods approach, combining both quantitative and qualitative methods to gather a comprehensive understanding of the impact of AI tools on students' autonomous writing abilities. The quantitative aspect involves a Likert-scale questionnaire to assess students' perceptions of AI's effect on their writing, confidence, motivation, critical thinking, and creativity. The qualitative component includes semi-structured interviews with both students and teachers to explore their experiences with AI tools in writing instruction more deeply. The combination of quantitative and qualitative data offers both broad insights and deep personal experiences, contributing to the growing field's role in education.

## Participants

The research includes 103 students from six classes and 19 instructors at an IELTS training center in Iran. The learners were enrolled in an IELTS course. Convenience sampling has been used to choose participants based on their accessibility and desire to engage in the research. It is noteworthy that certain learners had previously undertaken the IELTS examination, while others had not. They are categorized into three categories according to their prior IELTS examinations or institutional placement tests. Tables 1 and 2 provide more information on these individuals.

Table 1. Learners' demographic information.

| No | Male | Female | IELTS bound | Age (average) |
|---|---|---|---|---|
| 103 | 44 | 59 | 4-5= 29 | 29 years |
| | | | 5-6= 41 | |
| | | | 6-6.5= 33 | |

Table 2. Teachers' demographic information.

| No | Female | Male | Age (average) | Teaching experience (average) |
|---|---|---|---|---|
| 19 | 11 | 8 | 35 | 12 |

## Data collection

The participant students received a Likert-scale questionnaire with 29 items in both English and Persian, their first language. The questionnaire was designed by the researcher, and its reliability was 0.86, which was identified by Cronbach's Alpha measure. The questionnaire addresses aspects such as the impact of AI on students' independent writing abilities, motivation, confidence, critical thinking, and creativity. The procedure for distributing and collecting the questionnaire took about two weeks. Respondents were presented with several statements about their use of AI tools in writing and asked to rate their level of agreement on a 5-point Likert scale ranging from strongly disagree to strongly agree. A purposive sampling of 23 students and 11 teachers conducted semi-structured interviews. For low-level students (based on their exam levels), the Persian language was used, while other interviews were conducted in English. The interviews probed the experiences of the participants with autonomous writing using AI tools: in particular, problems, advantages, and scope of use. The semi-structured format permitted the inclusion of responses to oral questions as well as essays, including questions on the exploration of the effects of AI tools.

## Data analysis

In order to give a general overview of the students' responses, trends about their opinions on AI and self-writing tendencies among students were described using descriptive statistics for the Likert-scale questionnaire data collected. Interview transcripts were reviewed and analyzed according to thematic analysis. The core themes discovered in the analysis were centered on the impact of AI tools on automatic writing, the enhancement of critical and creative thinking skills, and the issues, if any, concerning the students and the educators. Coding was employed to manage identical responses, leading to a deeper insight into the use of AI writing among the users.

## Ethical considerations

Participation in the study was voluntary, and informed consent was obtained from all participants. Students and teachers were assured that their responses would remain anonymous and confidential. Participants had the right to withdraw from the study at any point without penalty. Additionally, ethical approval was sought from the institution before data collection began.

## Results

### Questionnaire

Table 3. AI tools and autonomous writing ability.

| Item | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree |
|---|---|---|---|---|---|
| 1. I rely less on my teacher for writing support when I use AI tools. | 6% | 9% | 2% | 52% | 31% |
| 2. AI tools help me structure my writing independently. | 20% | 39% | 0% | 39% | 2% |
| 3. The use of AI tools allows me to generate original content without external help. | 22% | 52% | 2% | 24% | 0% |
| 4. I feel more comfortable tackling writing assignments on my own due to AI feedback. | 46% | 52% | 0% | 4% | 0% |
| 5. AI has made me more independent in revising and editing my work. | 46% | 54% | 0% | 2% | 0% |
| 6. I often find it hard to write without using AI tools after relying on them for a while. | 7% | 17% | 0% | 63% | 13% |

Based on Table 3, the results of the "AI Tools and Autonomous Writing Ability" section indicate that while AI tools enhance students' ability to structure, generate content, and revise independently, a significant number still rely on teacher support (83% either disagree or strongly disagree). Most students (around 70%) find AI beneficial for structuring their work and generating original content, and nearly all feel more comfortable and independent with assignments due to AI feedback. However, despite these gains, students do not feel overly dependent on AI, with most able to continue writing without its help (76% disagree with reliance concerns).

The results from Table 4 reveal that AI tools have a positive impact on students' confidence and motivation. A significant majority (85%) report increased confidence in their writing skills, with a similar percentage (91%) feeling more motivated to improve their writing when using AI tools. AI feedback also boosts self-esteem for 85% of students and enhances confidence in self-editing for 87%. Additionally, 74% feel encouraged to take on more challenging writing tasks due to AI, although a small minority remains neutral or disagrees with this point.

Table 4. AI tools and student confidence and motivation.

| Statement | | | | | |
|---|---|---|---|---|---|
| 7. AI tools have increased my confidence in my writing skills. | 24% | 61% | 2% | 11% | 2% |
| 8. I feel more motivated to improve my writing when using AI tools. | 28% | 63% | 0% | 9% | 0% |
| 9. Receiving feedback from AI tools boosts my self-esteem as a writer. | 24% | 61% | 2% | 11% | 2% |
| 10. I am more confident in my ability to self-edit because of AI feedback. | 24% | 63% | 0% | 11% | 2% |
| 11. AI-based writing tools encourage me to take on more challenging writing tasks. | 17% | 57% | 9% | 13% | 4% |

Table 5. AI integration and critical thinking/creativity.

| Statement | | | | | |
|---|---|---|---|---|---|
| 12. AI tools help me think critically about the structure of my writing. | 26% | 63% | 0% | 7% | 4% |
| 13. The use of AI tools has enhanced my ability to analyze arguments in my writing. | 26% | 61% | 2% | 7% | 7% |
| 14. AI-based suggestions inspire me to be more creative in my writing. | 24% | 61% | 2% | 11% | 2% |
| 15. The feedback from AI tools challenges me to think deeper about the content of my writing. | 26% | 65% | 0% | 7% | 2% |
| 16. AI tools encourage me to explore new and creative ideas in my writing assignments. | 26% | 63% | 2% | 11% | 0% |
| 17. AI tools help me identify flaws or weaknesses in my arguments during writing. | 24% | 63% | 2% | 9% | 2% |

The results from Table 5 show that AI tools positively impact students' ability to think critically and creatively during the writing process. A majority of students (89%) feel that AI helps them think critically about their writing structure, and 87% believe AI enhances their ability to analyze arguments. Additionally, AI-based suggestions inspire creativity for 85% of respondents, with 91% stating that AI feedback encourages deeper thought about content. Moreover, 89% of students report that AI tools help them identify weaknesses in their arguments, further supporting critical thinking development. These findings suggest that AI tools not only improve the technical aspects of writing but also foster higher-order thinking skills, such as critical analysis and creativity.

Table 6. Challenges and limitations of AI tools in writing.

| Statement | | | | | |
|---|---|---|---|---|---|
| 18. I sometimes feel too reliant on AI tools for writing feedback. | 39% | 54% | 0% | 7% | 0% |
| 19. AI tools often fail to understand the deeper context of my writing. | 13% | 22% | 13% | 39% | 13% |
| 20. AI feedback is sometimes too generic to address the specific issues in my writing. | 11% | 28% | 7% | 35% | 19% |
| 21. I have experienced difficulty adapting AI suggestions into my personal writing style. | 2% | 15% | 4% | 70% | 9% |
| 22. AI tools limit my ability to experiment with creative writing approaches. | 0% | 11% | 7% | 63% | 19% |
| 23. I worry that using AI too much will reduce my ability to write without assistance. | 13% | 15% | 7% | 46% | 19% |
| 24. I worry that using AI tools might affect my long-term writing skills negatively. | 13% | 15% | 7% | 46% | 19% |

The results from Table 6 highlight several key concerns students face when using AI tools. A large proportion (93%) feel somewhat reliant on AI for feedback, and 35% believe AI often fails to grasp deeper context, indicating limitations in understanding complex or nuanced writing. Around

39% find AI feedback too generic for specific issues, while 70% have little difficulty adapting AI suggestions to their writing style. Most respondents (63%) disagree that AI limits creativity, but some (28%) worry that over-reliance on AI may negatively affect long-term writing skills. This indicates that while AI tools are helpful, students are concerned about dependency and the tools' contextual limitations.

Table 7. General perceptions of AI in writing.

| Statement | | | | | |
|---|---|---|---|---|---|
| 25. AI tools make the writing process faster and more efficient. | 22% | 74% | 0% | 4% | 0% |
| 26. I find AI feedback more objective than feedback from human instructors. | 19% | 56% | 13% | 15% | 7% |
| 27. AI tools have positively impacted my overall writing experience. | 54% | 46% | 0% | 0% | 0% |
| 28. I believe AI tools are useful, but they should not replace teacher feedback. | 20% | 56% | 0% | 13% | 11% |
| 29. AI feedback helps me better understand grammatical and stylistic mistakes. | 28% | 70% | 0% | 2% | 0% |

According to Table 7, the results from the "General Perceptions of AI in Writing" section indicate that students have a positive view of AI tools. A significant majority (96%) feel that AI makes the writing process faster and more efficient, while 72% believe that AI feedback is more objective than human instructors, although a minority (22%) prefer human feedback. All respondents agree that AI has positively impacted their overall writing experience, but 76% believe AI should complement rather than replace teacher feedback. Additionally, 98% found AI helpful for identifying grammatical and stylistic mistakes. Overall, AI is seen as beneficial, though not a replacement for human input.

**Interviews**

The interview questions aligned with the study's key research questions, particularly the impact of AI tools on students' autonomous writing. The responses demonstrate a wide range of experiences, which indicate different levels of reliance on AI for autonomy.

For instance, Student 19 stated that while AI simplified the process of organizing essays, it still made them dependent on teachers for in-depth assessment: "I'm more independent, but not entirely." In the same vein is Student 2, who talked of being more independent with the use of AI: "I feel more confident writing on my own ever since I started using AI, more so in organizing ideas." While these advancements promoted self-efficacy in the learners, the teachers presented slightly different views. Teacher 4 observed that "There is less teacher reliance on the part of the student for grammatical correctness, but they still seek guidance for deeper content." This observation highlights that AI has the potential to enhance learning, albeit to a limited degree, which could potentially benefit students. Teacher 9 echoed this, believing that while AI assisted students in achieving some degree of independence in their revision, the teacher's input was still necessary for writing, which is both creative and analytical.

These instances highlight a bimodal phenomenon. As previously mentioned, AI does not completely remove the teacher's role in guiding students through intricate tasks. Such enabling conditions existed, but they lacked the lived experience necessary for complete autonomy.

In terms of AI's influence on motivation and confidence, all students generally reported positive experiences. Student 3 added, "I positively receive AI feedback because it helps me locate errors quicker and I become confident." In the same way, Student 18 reported motivation to engage in difficult challenges as a result of the AI improving her task performance almost instantly. Teachers also reported similar results, with Teacher 11 stating that while students had increased confidence, they remained cautious when faced with more challenging tasks. Teacher 5 elaborates on this, suggesting that relying on AI for credentials could potentially degrade the quality of written work, posing a challenge in promoting self-directed writing.

The use of AI in the enhancement of reasoning and creativity tendencies was received rather differently. For instance, while Student 10 was a fan of AI help with essay outlines, "the suggestions are too brief and common, which almost inhibits creativity." However, Student 6 asserts that while AI tools encourage the use of imagination, crafting arguments outside of their context is necessary. For instance, Teacher 8 observed that students using AI improved their critical thinking skills, but some students became so creative that they forgot discipline. Teacher 1 made the same note, explaining that students "obey the instructions of AI authors too well," which stifles any creative processes.

Student 7, in turn, spoke about challenges and limitations, presenting the concern of possible excessive dependence on AI, which creates a situation where one cannot effectively write without external help: "It's difficult to strike a balance." Also, Student 16 pointed out that the feedback from AI lacks a personal touch, stating, "It is difficult to convert AI ideas into my own style." Teachers, too, pointed out some challenges associated with AI; Teacher 6, for instance, said that "AI lacks the appreciation of the context that is more profound."

In this regard, there is a constructive appreciation of the advantages of AI tools: they offer clear benefits, particularly in terms of independence, self-assurance, and analytical skills, but they also come with drawbacks such as dependency, a lack of creative expression, and a lack of context understanding. However, teachers must address these issues to foster a more balanced approach to writing with AI tools.

## Discussion

It is undeniable that the introduction of various artificial intelligence tools in educational settings, especially in boosting students' skills in writing, has both advantages and disadvantages. The current study aimed at examining the extent to which students' capacity for writing—that is, their level of ability to put down their thoughts independently, their confidence and motivation, the effects on their level of

critical thinking and creativity, and the possible difficulties involved concerning teaching writing with the help of AI—is affected by AI technologies. Employing a mixed-methods methodology that consisted of a survey and interview, aspects concerning the extent to which the use of AI technology affects students' writing experience were discussed.

The first research question was directed at finding out the effect of using AI tools on students' writing independence in academic contexts. The findings pointed out that students' writing performance improved significantly, especially in organizing and composing their pieces of work. Agreed by most students, several tools, such as grammar checkers and writing help apps, facilitated idea organization, which is similar to the results of Marzuki et al. (2023), who showed that EFL students' use of AI tools had beneficial results on content organization. Many of the students, however, confessed that a large portion of them still needed teacher support for better content backing than that offered by fellow students. This phenomenon means that there is a degree of independence that is fostered, but it also means that it is not all the time that one can do without the instructor.

Interestingly, the feedback from teachers also confirms this finding, as a great number of them noted higher levels of independence from the learners while using AI for revision or grammar check. Teacher responses pointed out that in as much as students' technical writing skills are supplemented by the use of AI tools, the students still want the instructors either to engage them critically or assist them in creative writing. This relates to the wider argument in the literature, which argues that there is potential for the use of AI to promote self-directed learning; however, there should be a healthy ratio of technology and human being management (Lee et al., 2024; Godwin-Jones, 2022). The varied 'I can' statements about the use of AI tools reinforce the argument for a way of teaching that positions AI as an adjunct for use by students who are active in the making of texts and are able to be sustained as active writers free from intervention. The second research question focused on how the use of AI-based writing tools contributes to the students' self-efficacy and writing motivation to produce written work autonomously. The current data in his study revealed that most participants declared enhancement of their confidence and motivation through the use of AI tools. For example, many students said that due to the speed at which they could get any correction through AI tools, they became more confident in identifying their errors. This is in line with a study by Huang et al. (2023), which implies that students are likely to write more and better with less time between the task and the feedback.

In addition, the interviews showed that, in the opinion of the students, completing the difficult writing tasks was easier with the use of the AI tools. At the same time, some of the teachers also indicated that even if the students are encouraged to write by the use of AI applications, the latter does not completely dispel the fright that students experience when faced with high order writing tasks. This observation poses an interesting dilemma, which is, how to provide timely guidance without undercutting the students' readiness to work on difficult writing tasks on their own.

The implication of the overall findings is that AI instruments are useful in boosting students' morale and encouraging them to write. However, this finding also suggests the danger of over-reliance on such tools, which may hamper writing progress for the learners. For instance, Ivanov (2023) posits that students lose their writing competence because they have gotten accustomed to using AI to enhance their work and provide feedback without mastering the skills. This necessitates a writing curriculum that incorporates the use of these AI tools strategically to enhance students' writing while also aiming to build coping skills and confidence in the students.

The third research question sought to explore how far the inclusion of AI in the writing process enhances or inhibits students' creativity and critical thinking while doing the writing task on their own. The findings showed that the use of AI tools was positively correlated with the critical thinking skills of students. A number of students stated that they thought more about the organization of their writing and the arguments they made, thanks to AI tools. Nonetheless, negative aspects were also mentioned in regard to AI sources, especially in terms of the worries that some students had regarding the limits of AI inputs, which they believed were too basic and not challenging enough.

This supports the findings of Godwin-Jones (2022), who noted that while the use of AI tools may aid the critical thinking processes of individuals, it can also kill their creative faculties, especially when students become dependent on unsolicited input. Teachers were also concerned, arguing that while such AI aids are meant to help students with the analysis of their writing, some students might be losing creative engagement as a risk of following the advice of AI. This suggests that such tools must be used with the understanding that AI feedback is only a surface-level understanding of that portion of the essay or work that needs attention and more needs to be done instead of just incorporating it.

In addition, the reactions show that AI applications should assist proper writing by the students but not completely take over the creative dimension of writing. Educators will be very important in this respect, as they will motivate and encourage students to be wary of AI tools, even as they employ technology to enhance creativity and critical thinking. These are very much in line with Liu and colleagues (2023), who described the importance of developing AI critical engagement teaching models.

The last research question examined the possible impediments and shortcomings of the adoption of AI tools in independent writing instruction. The results demonstrated the presence of a mix of apprehensions among the students and the teachers regarding the excessive use of AI tools. Several students pointed out that their occasional need for an AI tool affected their ability to create and edit written work independently, which represents a huge barrier to integrating new technologies in education. Additionally, a very real worry exists about the issue of dependability: in particular, how much AI technology can be used without compromising the independent writing of students.

Furthermore, both pupils and educators emphasized the disadvantages of AI tools in grasping the context and finer details associated with various forms of writing. A considerable number of students encountered problems with the AI appraisal as it was too standard for addressing individual writing preferences, thus making it difficult to make changes to their writing. This is consistent with previous findings that have expressed worries over the gap existing in the representation of languages by AI technologies (Klimova et al., 2023; Godwin-Jones, 2022). The educators pointed out that students tended to submit work devoid of substance as a result of the use of AI, hence the need to control the use of AI tools when teaching students how to write.

On the other hand, some instructors accepted that AI is beneficial in enhancing literacy skills development but cautioned that there is a need for continuous training of teachers so that they can teach with the application of AI effectively. This showcases how crucial the training of the teachers is when it comes to the challenges that the AI tools present and the use of such tools to facilitate the writing process instead of impeding it.

To conclude, this study demonstrates the multifaceted relationship that exists between the writing skills of students and AI tools. It can be argued that the use of AI tools can lead to improvements in technical writing skills, as well as increases in self-confidence and motivation. However, the downsides of this approach include overreliance and the challenges associated with independence. Moreover, the distinction between the students at different levels was not significant. This could be attributed to their similar assignments and goals. Hence, the policy should also look for an appropriate way to use AI to ensure that it does not interfere too much with conventional teaching approaches and still allows the students to write independently. In this regard, the present research contributes to the existing literature by discussing AI and education, opening a channel of comprehension for practitioners and scholars eager to understand the impending growth of AI in the context of language acquisition.

## Conclusion and implications of the study

### Implications

The results of the study regarding the use of AI and its effect on students' autonomous writing skills would be useful for educators and language curriculum policymakers. The implications are:

1. Integration of AI tools in curriculum: As the research shows, applications of AI writing tools enable students to write better and more confidently, and this has prompted an appeal to teachers to include them in the administration. However, such tools should be used alongside conventional methods, giving students the writing process as much focus as possible without the need to use them.

2. Balanced approach: There is no doubt that AI tools provide a shortcut route towards achieving

better writing standards for students. However, overdependence on such facilities may impede the growth of independent thinking among the students. Therefore, while it is possible to use AI so that students get feedback fast, teachers need to be careful to avoid situations where students do not internalize the writing process and practice autonomous writing. This means that students' levels of writing skills have to be continuously monitored.

3. Professional development for teachers: In this regard, the research calls for effective in-service training of teachers to understand the role of technology in teaching writing clearly. Programs offered should orient teachers on how to properly direct students in the use of AI tools to maintain their imagination and thinking. Most of this would be directed towards assisting the teachers to appreciate the role of AI and its limitations in ensuring a conducive environment for the students.

4. Promoting critical thinking and innovation: Since AI tools can sometimes avert creativity, leading to approximated responses, instructors need to stress the need for out-of-the-box thinking and creativity when it comes to writing. Rather, the use of AI in this process should be that of input which enhances critical thinking and creativity. This may come in the form of assignments that require students to disagree with the AI responses and build their own arguments.

5. Considering social responsibility: It is also important to address the social responsibility of the use of AI in education. The universities and the teachers have to discuss the problem of cheating and the way that artificial intelligence can encourage such activities. There is a need to ensure the responsible use of AI, and such measures may include discussions on the use of AI to commit plagiarism and training on the critical use of AI-created content by the users.

6. Directions for further research: In this respect, the study demonstrates all the gaps existing in the examined literature about the development of students' writing skills for the long-term period after the incorporation of AI tools into the learning process. Additional studies are necessary that will assess the long-term outcomes of the implementation of woven AI tools and strategies, focusing on different contexts and target students. Apart from that, if time-controlled research is performed, it might be feasible to comprehend which AI instruments are appropriate to increase independence in writing when learning processes are coupled with specific methodologies of work for the students.

7. Engaging students in evaluation: Finally, this would be the last consideration that students' engagement in the work related to the evaluation of the AI instruments and their role in improving writing would be beneficial. Gathering students' feedback on their use and perception of AI for writing instruction will help educators improve their methods and solve new issues as they arise. This will make the students active as well as give them that sense of ownership.

The findings of this research call for proper consideration and a strategic approach while designing curricula that more actively incorporate AI writing tools. Depending on the situation and by seeking student independence without losing the advantages of AI, it is possible to optimize the writing process for the students and further cultivate their critical and creative faculties.

**Conclusion**

The present research has examined the role of space technology in facilitating autonomous writing among students, outlining the pros and cons of its use in education. The study shows that AI technologies are beneficial in improving writing abilities among students and building their self-esteem to take on more difficult assignments. At the same time, the results show that students also have a tendency to overuse such devices, which can be detrimental to their self-writing and analytical skills. It should be mentioned that there were no significant differences between the responses of the students at different levels.

The advantage is significant because algorithms are capable of assisting at almost every step of the writing endeavor, including formatting, editing, and composing. However, while students have largely claimed to have improved both the quality of their writing and the level of their participation, there are still concerns over AI's feedback, where it is often construed as bland and lacking recognition of subtle context. The inputs from the learners and teachers alike warrant careful consideration on the aspect of the use of AI, suggesting that it helps to enhance learning but cannot be used as a substitute for teaching where there is a need for creativity and critical thinking.

To these ends, the research also emphasizes the need for formulating pedagogical policies that will take into account the consequences of the use of artificial intelligence. In the process of using AI for teaching purposes, however, many educators are at a loss as to how to ensure that academic honesty is upheld and that students do not become dependent on technologies. It is important to provide teachers with training as part of their professional development in order to help them teach children how to use AI tools without suppressing autonomy and original thinking.

This study adds to the existing corpus of literature by examining the use of AI as a tool that can help students develop their writing abilities. It advocates for longitudinal studies focused on the use of AI tools and their remediation.

More specifically, the research indicates that there is a need for teaching approaches that consciously promote the students' growth as independent authors. Considering the strengths and weaknesses of AI tools, teachers will be in a better position to prepare the students for writing effectively in some time to come.

This research has multiple limitations, which will be worthwhile for further investigations. To begin with, the population size was small, comprising only 103 EFL learners from one IELTS training institute. In order to make the findings of the present research applicable in other settings, more varied sampling should be carried out in future studies from all groups in the educational spectrum. Participants should include different ages and levels of proficiency and, of course, races and ethnicities.

In addition, carrying out the research in such a short time or in a span limited the research to the short-term effects of AI tools on writing skills. It is suggested that longitudinal types of studies be carried out to look at the long-term effect of the AI tools; this will allow the researchers to go beyond the writing skills at a given time.

In addition to this, solutions for different writing challenges were discussed, which were limited to a few chosen AI writing tools; therefore, future studies could focus on many more tools to determine how effective and user-friendly they are. Including qualitative aspects such as classroom dynamics and the reactions of teachers will help provide better clarity of the application of AI tools in teaching writing.

Last but not least, an examination of training across schools regarding the use of AI tools is highly suggested. Teacher ideas and encounters about using AI tools could give perspective regarding AI tool use and its relation to students and their learning. These limitations and suggestions can be modified and adopted in future work to enhance the understanding of the role of technology in the autonomous writing of EFL students.

## References

Ahmad, M., Subih, M., Fawaz, M., Alnuqaidan, H., Abuejheisheh, A., Naqshbandi, V., & Alhalaiqa, F. (2024). Awareness, benefits, threats, attitudes, and satisfaction with AI tools among Asian and African higher education staff and students. *Journal of Applied Learning and Teaching, 7*(1), 57-64.https://doi.org/10.37074/jalt.2024.7.1.10

Alharbi, W. (2023). AI in the foreign language classroom: A pedagogical overview of automated writing assistance tools. *Education Research International, 2023*(1), 4253331. https://doi.org/10.1155/2023/4253331

Alshumaimeri, Y. A., & Alshememry, A. K. (2024). The extent of AI applications in EFL learning and teaching. *IEEE Transactions on Learning Technologies, 17*, 653–663. https://doi.org/10.1109/tlt.2023.3322128

Barrot, J. S. (2023). Using ChatGPT for second language writing: Pitfalls and potentials. *Assessing Writing, 57*, 100745. https://doi.org/10.1016/j.asw.2023.100745

Cardon, P., Fleischmann, C., Aritz, J., Logemann, M., & Heidewald, J. (2023). The challenges and opportunities of AI-assisted writing: Developing AI literacy for the AI age. *Business and Professional Communication Quarterly, 86*(3), 257-295. https://doi.org/10.1177/23294906231176517

Farahani, M., & Ghasemi, G. (2024). *Artificial intelligence and inequality: Challenges and opportunities*. Qeios. https://doi.org/10.32388/7HWUZ2

Gayed, J. M., Carlon, M. K. J., Oriola, A. M., & Cross, J. S. (2022). Exploring an AI-based writing assistant's impact on English language learners. *Computers and Education: Artificial Intelligence, 3,* 100055. https://doi.org/10.1016/j.caeai.2022.100055

Godwin-Jones, R. (2022). Partnering with AI: Intelligent writing assistance and instructed language learning. *Language Learning & Technology, 26*(2), 5–24. http://doi.org/10125/73474

Grájeda, A., Burgos, J., Córdova, P., & Sanjinés, A. (2024). Assessing student-perceived impact of using artificial intelligence tools: Construction of a synthetic index of application in higher education. *Cogent Education, 11*(1), 2287917. https://doi.org/10.1080/2331186X.2023.2287917

Huang, A. Y., Lu, O. H., & Yang, S. J. (2023). Effects of artificial intelligence–enabled personalized recommendations on learners' learning engagement, motivation, and outcomes in a flipped classroom. *Computers & Education, 194*, 104684. https://doi.org/10.1016/j.compedu.2022.104684

Ivanov, S. (2023). The dark side of artificial intelligence in higher education. *The Service Industries Journal, 43*(15-16), 1055-1082. https://doi.org/10.1080/02642069.2023.2258799

Klimova, B., Pikhart, M., & Kacetl, J. (2023). Ethical issues of the use of AI-driven mobile apps for education. *Frontiers in Public Health, 10*, 1118116. https://doi.org/10.3389/fpubh.2022.1118116

Konidena, B. K., Malaiyappan, J. N. A., & Tadimarri, A. (2024). Ethical considerations in the development and deployment of AI systems. *European Journal of Technology, 8*(2), 41-53. https://doi.org/10.47672/ejt.1890

Kooli, C. (2023). Chatbots in education and research: A critical examination of ethical implications and solutions. *Sustainability, 15*(7), 5614. https://doi.org/10.3390/su15075614

Laredj, H., & Mebarek, F. N. E. (2024). *Investigating the dynamic interaction between human language and artificial intelligence tools: AI writing assistants as a case study* [Unpublished doctoral dissertation]. Ibn Khaldoun University-Tiaret.

Lee, Y. J., Davis, R. O., & Lee, S. O. (2024). University students' perceptions of artificial intelligence-based tools for English

writing courses. *Online Journal of Communication and Media Technologies, 14*(1), e202412. https://doi.org/10.30935/ojcmt/14195

Li, Z. (2024). Ethical frontiers in artificial intelligence: Navigating the complexities of bias, privacy, and accountability. *International Journal of Engineering and Management Research, 14*(3), 109-116. https://doi.org/10.5281/zenodo.12792741

Liu, C., Hou, J., Tu, Y. F., Wang, Y., & Hwang, G. J. (2023). Incorporating a reflective thinking promoting mechanism into artificial intelligence-supported English writing environments. *Interactive Learning Environments, 31*(9), 5614-5632. https://doi.org/10.1080/10494820.2021.2012812

Malik, A. R., Pratiwi, Y., Andajani, K., Numertayasa, I. W., Suharti, S., & Darwis, A. (2023). Exploring artificial intelligence in academic essay: Higher education student's perspective. *International Journal of Educational Research Open, 5,* 100296. https://doi.org/10.1016/j.ijedro.2023.100296

Marzuki, Widiati, U., Rusdin, D., Darwin, & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education, 10*(2), 2236469. https://doi.org/10.1080/2331186X.2023.2236469

Modi, T. B. (2023). Artificial intelligence ethics and fairness: A study to address bias and fairness issues in AI systems, and the ethical implications of AI applications. *Revista Review Index Journal of Multidisciplinary, 3*(2), 24-35. https://doi.org/10.31305/rrijm2023.v03.n02.004

Mohammadkarimi, E. (2023). Teachers' reflections on academic dishonesty in EFL students' writings in the era of artificial intelligence. *Journal of Applied Learning and Teaching, 6*(2), 105-113. https://doi.org/10.37074/jalt.2023.6.2.10

Mohammadkarimi, E. (2024). Exploring the use of artificial intelligence in promoting English language pronunciation skills. *LLT Journal: A Journal on Language and Language Teaching, 27*(1), 98-115.https://doi.org/10.24071/llt.v27i1.8151

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of artificial intelligence powered digital writing assistant in higher education: Randomized controlled trial. *Heliyon, 7*(5), e07014. https://doi.org/10.1016/j.heliyon.2021.e07014

Ogunleye, B., Zakariyyah, K. I., Ajao, O., Olayinka, O., & Sharma, H. (2024). Higher education assessment practice in the era of generative AI tools. *Journal of Applied Learning and Teaching, 7*(2), 46-56. https://doi.org/10.37074/jalt.2024.7.1.28

Osasona, F., Amoo, O. O., Atadoga, A., Abrahams, T. O., Farayola, O. A., & Ayinla, B. S. (2024). Reviewing the ethical implications of AI in decision making processes. *International Journal of Management & Entrepreneurship Research, 6*(2), 322-335. https://doi.org/10.51594/ijmer.v6i2.773

Owan, V. J., Abang, K. B., Idika, D. O., Etta, E. O., & Bassey, B. A. (2023). Exploring the potential of artificial intelligence tools in educational measurement and assessment. *Eurasia Journal of Mathematics, Science and Technology Education, 19*(8), em2307. https://doi.org/10.29333/ejmste/13428

Parsakia, K. (2023). The effect of chatbots and AI on the self-efficacy, self-esteem, problem-solving and critical thinking of students. *Health Nexus, 1*(1), 71–76. https://doi.org/10.61838/hn.1.1.14

Roshanaei, M. (2024). Towards best practices for mitigating artificial intelligence implicit bias in shaping diversity, inclusion and equity in higher education. *Education and Information Technologies, 29*(14), 18959-18984. https://doi.org/10.1007/s10639-024-12605-2

Rudolph, J., Tan, S., & Tan, S. (2023). War of the chatbots: Bard, Bing Chat, ChatGPT, Ernie and beyond. The new AI gold rush and its impact on higher education. *Journal of Applied Learning and Teaching, 6*(1), 364-389. https://doi.org/10.37074/jalt.2023.6.1.23

Silitonga, L. M., Hawanti, S., Aziez, F., Furqon, M., Zain, D. S. M., Anjarani, S., & Wu, T. T. (2023, August). The impact of AI chatbot-based learning on students' motivation in English writing classroom. In *International Conference on Innovative Technologies and Learning* (pp. 542-549). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-40113-8_53

Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: Assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. *Frontiers in Psychology, 14,* 1260843. https://doi.org/10.3389/fpsyg.2023.1260843

Stahl, B. C., Antoniou, J., Bhalla, N., Brooks, L., Jansen, P., Lindqvist, B., ... & Wright, D. (2023). A systematic review of artificial intelligence impact assessments. *Artificial Intelligence Review, 56*(11), 12799-12831. https://doi.org/10.1007/s10462-023-10420-8

Sullivan, M., Kelly, A., & McLaughlan, P. (2023). ChatGPT in higher education: Considerations for academic integrity and student learning. *Journal of Applied Learning and Teaching, 6*(1), 31-40. https://doi.org/10.37074/jalt.2023.6.1.17

Toufaha, S. A. H. K. I. (2024). *The effect of automated error corrective feedback on the improvement of EFL learners' writing and autonomy* (Doctoral dissertation, University Kasdimerbahouargla). DSpace. https://dspace.univ-ouargla.dz/jspui/handle/123456789/35662

Van Wyk, M. M. (2024). Is ChatGPT an opportunity or a threat? Preventive strategies employed by academics related to a GenAI-based LLM at a faculty of education. *Journal of Applied Learning and Teaching, 7*(1), 35-45.https://doi.org/10.37074/jalt.2024.7.1.15

Wach, K., Duong, C. D., Ejdys, J., Kazlauskaitė, R., Korzynski, P., Mazurek, G., ... & Ziemba, E. (2023). The dark side of generative artificial intelligence: A critical analysis of

controversies and risks of ChatGPT. *Entrepreneurial Business and Economics Review, 11*(2), 7-30. https://doi.org/10.15678/eber.2023.110201

Washington, J. (2023). *The impact of generative artificial intelligence on writer's self-efficacy: A critical literature review.* SSRN Electronic Journal, 4538043. https://dx.doi.org/10.2139/ssrn.4538043

Wei, P., Wang, X., & Dong, H. (2023). The impact of automated writing evaluation on second language writing skills of Chinese EFL learners: A randomized controlled trial. *Frontiers in Psychology, 14*, 1249991. https://doi.org/10.3389/fpsyg.2023.1249991