Artificial Intelligence Applications in College Academic Writing and Composition: A Systematic Review

Aplicaciones de inteligencia artificial en la escritura y la corrección académicas en la universidad: una revisión sistemática

Applications de l'intelligence artificielle dans l'écriture et la composition universitaires : une revue systématique

Aplicativos de inteligência artificial na escrita e composição acadêmica na universidade: uma revisão sistemática

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Abstract

Proofreading and editing are essential to enhance the quality of texts. While literature is abundant on technological tools for identifying semantic and lexical-grammatical errors, evidence on the actual effectiveness of artificial intelligence (AI) in this process remains limited, with studies varying in scope and rigor. This study examines whether existing evidence supports or contradicts the hypothesis that a AI-based applications help edit and proofread texts in higher education. A review was conducted in Scopus and Web of Science databases, covering scientific articles in English and Spanish, published between 2019 and 2024, related to university writing and the use of AI in text correction. Most studies were exploratory and descriptive. A notable increase in publications related to AI and academic writing was observed between 2022 and 2024, with the United States, China, Australia, and Canada leading in this area. Findings suggest that AI improves linguistic quality and feedback in the writing process. It also highlights issues related to academic integrity, data privacy, and AI's inability to manage complex writing errors. More explicit connections between AI and university instruction are necessary to complement traditional pedagogical strategies. The need for more research in this area is urgent, as issues related to equitable access and responsible integration are essential to the use AI to support academic writing development.

Keywords: higher education, educational technology, editing, academic writing, artificial intelligence

Resumen

La corrección y la edición son esenciales para mejorar la calidad de los textos. Aunque existe abundante bibliografía sobre herramientas tecnológicas para identificar errores semánticos y léxico-gramaticales, las pruebas sobre la eficacia real de la inteligencia artificial (IA) en este proceso siguen siendo limitadas, y los estudios

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varían en alcance y rigor. Este estudio examina si las pruebas existentes apoyan o contradicen la hipótesis de que las aplicaciones basadas en IA ayudan a editar y corregir textos en la enseñanza superior. Se realizó una revisión en las bases de datos Scopus y Web of Science, que abarcó artículos científicos en inglés y español, publicados entre 2019 y 2024, relacionados con la escritura universitaria y el uso de IA en la corrección de textos. La mayoría de los estudios fueron exploratorios y descriptivos. Se observó un notable aumento de las publicaciones relacionadas con la IA y la escritura académica entre 2022 y 2024, con Estados Unidos, China, Australia y Canadá a la cabeza en este ámbito. Los hallazgos sugieren que la IA mejora la calidad lingüística y la retroalimentación en el proceso de escritura. También se destacan problemas relacionados con la integridad académica, la privacidad de los datos y la incapacidad de la IA para resolver errores de escritura complejos. Son necesarias conexiones más explícitas entre la IA y la enseñanza universitaria para complementar las estrategias pedagógicas tradicionales. La necesidad de más investigación en este ámbito es urgente, ya que las cuestiones relacionadas con el acceso equitativo y la integración responsable son esenciales para el uso de la IA para apoyar al desarrollo de la escritura académica.

Palabras clave: educación superior, tecnología en la educación, edición, escritura académica, inteligencia artificial

Résumé

La relecture et l'édition sont essentielles pour améliorer la qualité des textes. Bien que la littérature soit abondante sur les outils technologiques permettant d'identifier les erreurs sémantiques et lexicales-grammaticales, l'évidence de l'efficacité réelle de l'intelligence artificielle (IA) dans ce processus reste limitée, les études variant en termes de portée et de rigueur. Cette étude examine si les études existantes soutiennent ou contredisent l'hypothèse selon laquelle les applications basées sur l'IA aident à la révision et à la correction des textes dans l'enseignement supérieur. Une analyse a été menée sur les bases des données Scopus et Web of Science, couvrant les articles scientifiques en anglais et en espagnol, publiés entre 2019 et 2024, liés à la rédaction universitaire et à l'utilisation de l'IA dans la correction des textes. La plupart des études ont été exploratoires et descriptives. Une augmentation notable des publications liées à l'IA et à la rédaction universitaire a été observée entre 2022 et 2024, les États-Unis, la Chine, l'Australie et le Canada étant en tête dans ce domaine. Les résultats suggèrent que l'IA améliore la qualité linguistique et le feedback d'information dans le processus de composition. Elles mettent également en évidence des problèmes liés à l'intégrité académique, à la confidentialité des données et à l'incapacité de l'ia pour adresser des erreurs d'écriture complexes. Des liens plus explicites entre l'IA et l'enseignement universitaire sont nécessaires pour compléter les stratégies pédagogiques traditionnelles. Il est urgent de poursuivre les recherches dans ce domaine, car les questions liées à l'accès équitable et à l'intégration responsable sont essentielles à l'utilisation de l'IA pour soutenir le développement de l'écriture académique.

Mots-clés : troisième cycle, technologie dans l'éducation, édition, écriture académique, intelligence artificielle

Resumo

A revisão e a edição são essenciais para melhorar a qualidade dos textos. Embora a literatura sobre ferramentas tecnológicas para identificar erros semânticos e léxico-gramaticais seja abundante, as evidências sobre a eficácia real da inteligência artificial (IA) nesse processo permanecem limitadas, com estudos que variam em escopo e rigor. Este estudo examina se as evidências existentes apoiam ou contradizem a hipótese de que os aplicativos baseados em IA ajudam a editar e revisar textos no ensino superior. Metodologicamente, foi realizada uma revisão sistemática nas bases de dados Scopus e Web of Science, abrangendo artigos científicos em inglês e espanhol, publicados entre 2019 e 2024, relacionados à redação universitária e ao uso da IA na correção de textos. A maioria dos estudos foi exploratória e descritiva. Um aumento notável nas publicações relacionadas à IA e à escrita acadêmica foi observado entre 2022 e 2024, com os Estados Unidos, a China, a Austrália e o Canadá liderando nessa área. As descobertas sugerem que a IA melhora a qualidade linguística e os comentários no processo de redação. Também destacam questões relacionadas à integridade acadêmica, à privacidade dos dados e à incapacidade da IA de lidar com erros complexos de redação. São necessárias conexões mais explícitas entre a IA e o ensino universitário para complementar as estratégias pedagógicas tradicionais. A necessidade de mais pesquisas nessa área é urgente, pois as questões relacionadas ao acesso equitativo e à integração responsável são essenciais para o uso da IA com o fim de apoiar ao desenvolvimento da escrita acadêmica.

Palavras chave: ensino superior, tecnologia educativa, edição, escrita acadêmica, inteligência artificial

Introduction

The evolution of information and communication technologies (ICTs), especially artificial intelligence (AI), in the last five years has profoundly transformed academic environments. These advancements significantly impact students' engagement in reading, writing, and related academic activities. Exceeding the utility of modern word processors, AI is poised to introduce functions that could reshape academic literacy— an evolving set of skills influenced by both individual growth and the societal norms and values that guide academic practices.

This perspective aligns with Brian Street's (1984) ideological literacy model, which offers a foundational understanding of academic literacy. Street (1984) emphasizes that literacy is contextually bound and shaped by social ideologies. Additionally, Street argues that higher education institutions are a mosaic of literacies, each uniquely influenced by their respective disciplinary traditions and methodologies (Barton, 2001; Carlino, 2013).

This comprehensive view of academic literacy acknowledges that it encompasses more than just "texts." Academic literacy is, in fact, a fabric that serves to interweave political, social, and cultural contexts with established literacy practices. This interconnection is not limited to reading and writing processes and includes the understanding of broader social implications (Freire, 1970; Horner, 2013; Lea & Street, 2006; Weng, 2016). To write effectively in an academic context, one must be well-versed in the conventions and genres that shape academic discourse (Carlino, 2013; Porter, 2017).

This view of academic literacy is not only a construct, but a universal phenomenon acknowledged across disciplines. While academic literacy's essence remains consistent, its application and study are intricately tied to each discipline's unique characteristics, with tailored pedagogical approaches. The primary goal remains constant: ensuring students and professionals engage effectively in academic discourse (Trigos-Carrillo, 2019). To achieve this, college students learn that academic writing is rigorous and systematic since it requires the comprehension of textual genres (Benítez et al., 2021; Guerra-Lyons et al., 2023), their purposes, uses of language (Pérez, 2019), and the formal and normative aspects demanded by the discursive academic community in addition to academic integrity. In the context of learning, text editing is essential before submitting a text's final draft (Cassany, 1995).

Colloquial usage of the word "editing" excludes distinctions between "editing," "publishing," "editorial field", or "proofreading" (Philip & Bhaskar, 2019). Strictly speaking, editing is the process of making a manuscript suitable for physical or digital publication. There is a general agreement in editing manuals that "adapting" or "preparing" a text for publication means attending to two specific criteria: transmit information contained in the text efficiently and consider the aesthetic experience of the reader; that is, the reader should enjoy reading the text and not "suffer" it (Beltrán, 2008).

For communication and aesthetic experience to be articulated in a text, an editor must develop macroediting and microediting skills (Pérgola, 2021), while assuming tasks associated with the graphic and material production of the publication, whether physical or digital (Gil & Gómez, 2016). Thus, editing involves several reading layers: reading the material critically and objectively; reading from the point of view of a potential reader; questioning what is read and reacting to it; and reviewing, testing, verifying, and evaluating the content of what is to be published (Pérgola, 2021). It is not only a matter of considering the meaning of the words, but also of thinking about the meaning of the text.

Given the development of technology, it is unsurprising that academic writing's trajectory has been significantly influenced by innovations in ICTs, with AI tools at the forefront. As AI continues to

permeate teaching and writing (Aljuaid, 2024), it is crucial to explore its profound impact across disciplines and how it intertwines with the ever-evolving concept of academic literacy in the digital age.

In recent decades, technology has become indispensable to education, transforming academic experiences from reading and writing to communication (Franklin & Bolick, 2007; Ryzheva et al. 2024). These technological shifts have ushered in broader definitions of literacy, encapsulating not just traditional reading and writing, but also digital literacy and new socio-cultural dynamics (Williams, 2009). The transformative power of ICTs is most palpable in writing activities. Word processors, for example, offer a range of features from editing and formatting texts to spelling and grammar correction, to citation and reference support, among others (Valverde, 2018). Moreover, ICTs can also enhance students' engagement and participation in writing tasks, while fostering social interaction and collaboration among peers (Williams & Beam, 2019).

The pedagogical capabilities of AI are compelling. An attempt to "infuse human intelligence into machines" (Jiang et al., 2022, p. 1), AI or "intelligent systems" (Hopgood, 2022) seek to approximate processes of human cognition, for example, learning and problem solving (Ezzaim et al., 2022). AI is divided into subclasses which include artificial narrow intelligence (ANI) and artificial general intelligence (AGI). ANI, also weak AI, depends on the specificity of human instruction input and is designed to handle predetermined tasks of limited scope (Jiang et al., 2022). Strong AI, or AGI, is, in contrast, a "general problem-solving program" (Jiang et al., 2022, p. 14) characterized by its range and content flexibility, and capacity to imitat human intelligence. Advancements in the design of strong and weak AI have relied on increased computation power, extended data sets, and deep learning techniques (Kaynak, 2021; Li et al., 2021).

While the potential of AI to enhance academic literacy and student writing is undeniable, it is crucial to approach its implementation with caution. The rapid development of AI technology, particularly in educational settings, raises a number of ethical concerns. Concerning human use of AI — including the use of AI in the context of academic literacy— there is cause for caution given the risks posed by processes that relinquish human supervision and command to machines of accelerating complexity (Samek et al., 2019).

The expanding implementation of AI programs in educational contexts (or AIED) raises wide-ranging ethical concerns including the "accuracy of diagnoses of learners interacting with AIED systems; choices of pedagogies employed by AIED systems; predictions of learning outcomes made by those systems; issues of fairness, accountability, and transparency; and questions related to the influence of AI and learning analytics on teachers' decision making" (Holmes et al., 2022a, p. 506). Additional AIED-related research is needed to better understand its implications and to ensure that its potential is harnessed effectively and ethically (Holmes et al., 2022b).

One dimension of AIED that demands closer examination is the role of AI in both academic writing and editing. Given its pivotal role in academic success, as higher education transitions to digital formats globally, the ongoing examination of AI's impact on student writing has become increasingly critical.

This study aims to test the hypothesis that AI facilitates the editing and proofreading of academic texts by college students while exploring its potential benefits and ethical concerns within the context of academic literacy. The systematic review (SR) is guided by three key questions:

- **Q1:** How have publications on AI applied to the correction and editing of academic texts developed over the last 5 years, in which journals are they published, where do the articles

come from in terms of geographical distribution, and what is the relationship between the number of article authors and the number of articles published?

- **Q2:** How is AI conceptualized in relation to academic literacy, and what ethical implications, challenges, and risks are being considered?
- **Q3:** What are the advantages and disadvantages of using AI in academic writing?

This review offers valuable insights to the educational community by illustrating the evolution of AI applications in academic literacy, identifying the journals and regions where these studies are published, and examining AI's role in college education. It also provides an analysis of the ethical considerations surrounding AI in editing and proofreading, promoting reflection on its instructional and methodological impact. Additionally, the review helps assess the risks and challenges AI poses for students, teachers, and institutions in higher education.

Previous systematic reviews related to AI and higher education have identified both challenges and opportunities. Zawacki-Richter et al. (2019) highlighted the critical risks of implementing AI in higher education, pointing out a weak connection between pedagogical and theoretical perspectives and underscoring the need for more exploration of ethical and educational approaches. Fajardo et al. (2023) emphasized the growing trend of AI in education, noting its ability to personalize learning, improve efficiency, and adapt to diverse learning styles, which enhances student understanding and retention. However, Faisal (2024) cautioned that while AI, such as ChatGPT, has proven valuable in areas such as social psychiatry, science education, and healthcare, its integration should be ethical and complementary to human instruction, avoiding full reliance. Similarly, Aljuaid (2024) reviewed the use of AI in academic writing instruction and found it beneficial for improving efficiency and accessibility but warned against risks such as overreliance, diminished creativity, as well as ethical concerns related to issues like plagiarism. Both Faisal (2024) and Aljuaid (2024) stress the importance of human-AI collaboration to ensure that AI enhances rather than replaces traditional teaching practices.

In short, what does literature published in the last five years say, and what do recent studies contribute to new AIED discourse? A synthesis of available research on AI and academic literacy is urgently needed to provide well-supported, coherent answers to questions regarding AIED in a systematic and objective form under the PRISMA Declaration while using a rigorous and transparent method (Page et al., 2021a).

Method

SRs are conducted to synthesize and critically evaluate the available evidence on a particular research topic to provide answers to research questions. Given our methodological approach, the study used the PRISMA 2020 Declaration (Page et al., 2021a, 2021b, 2021c) since it systematically and objectively facilitates a synthesis of published research on AI application in college academic literacy. Although designed to evaluate health interventions, the PRISMA 2020 Declaration also applies to other fields.

In this review, we answer specific questions that require analysis and the application of a systematic and replicable search strategy with inclusion and exclusion criteria to identify the corpus of the study (Gough et al., 2017). This method is a guide that allows the preparation of a report that reflects the methodological advances to identify, select, evaluate and synthesize studies (Ciapponi, 2021), original and updated (Yepes-Nuñez et al., 2021). Additionally, SRs recently conducted in the field of educational research and technologies (Anghelescu et al., 2023, Tiwari et al., 2023; Sallam, 2023, Mahir, 2023; Jeon et al., 2023, Zawacki-Richter et al., 2019) provide a model for the development of this research design.

The procedure resulted in the collection of data extracted and coded from the studies included. The data analyzed, recorded in an Excel document and in Zotero, was then used to synthesize the results of previous studies and to clarify the practical application of AI in the composition and revision of academic texts in college. The data was also employed for an examination of the advantages, disadvantages, and challenges posed by AIED. Using PowerBI, trends and patterns were visualized in the data. Specifically, this article maps 92 articles on AI and academic literacy in higher education.

This study was completed thanks to the collaborative effort of a group of interdisciplinary researchers, who reviewed the articles under consideration individually and as a group. This methodology aimed to minimize possible biases regarding AIED. When discrepancies arose in the analysis, articles were analyzed in greater depth. However, a consensus was not reached for all AIED articles identified in the study. In cases of discrepancy, agreement was defined considering the inclusion or exclusion of specific AIED articles in our study (Gisbert & Bonfill, 2004). The SR process is described below.

Initial Search String and Criteria

For the study, specific inclusion and exclusion criteria were applied (see Table 1). The review focused on scientific articles examining AI applications in higher education, indexed in Web of Science (WOS) or Scopus, and selected based on titles, abstracts, and keywords. Only articles published in scientific journals were included. From an initial dataset of 1,969,888 records, 92 relevant scientific articles were identified for review.

The collections of scientific articles in WOS included Science Citation Index Expanded (SCI-Expanded), Social Sciences Citation Index (SSCI), Arts & Humanities Citation Index (AHCI), and Emerging Sources Citation Index (ESCI) to achieve greater coverage of the platform and its databases.

After applying the inclusion and exclusion criteria, the study was further narrowed to articles published between 2019 and June 2024, including those accepted for publication in 2025. The final corpus focused specifically on articles discussing the application of AI in the composition, editing, and proofreading of texts within higher education.

Next, keywords for the search of records were defined according to the criteria of the PRISMA statement (Urrútia & Bonfill, 2010). This definition allowed the configuration of the search string from the study's main topics: AI and composition or academic writing. The keywords used in our study are: ("artificial intelligence" OR "artificial intelligence-based technology" OR "machine learning") AND ("text editing" OR "editing" OR "proofreading") AND ("academic writing" OR "academic literacy" OR "composition" OR "writing").

Table 1 Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Platforms/databases: Indexed in Web of Science and Scopus	Not a journal article registered with WOS or Scopus
Publication years: Published between 2019 and June 2024	Published before 2019
Document Types: Article	Not an article
Language: English or Spanish	Not in English or Spanish
Open access: All	Non-open access
Context: related to writing, composition, editing and proofreading in higher education	Not related to writing, composing, editing and proofreading in higher education
Uses of AI-based technologies in text editing, proofreading, composition and academic writing or literacy	Not related to AI-based technologies Not related to academic literacy

Content Analysis

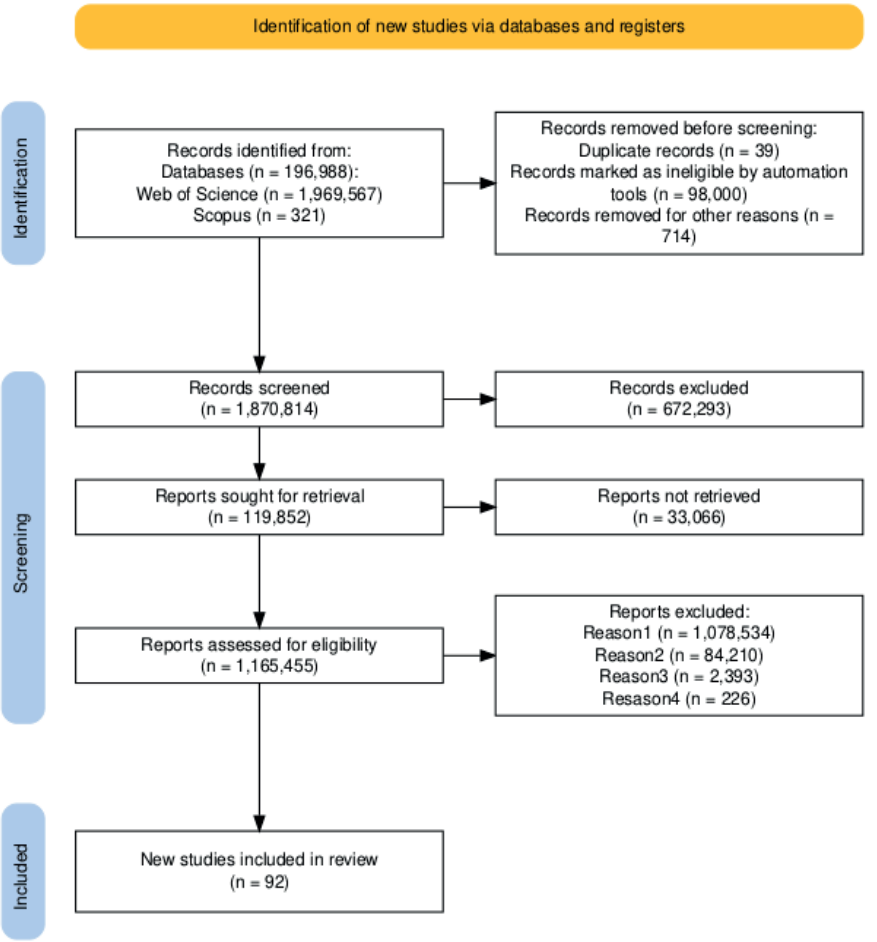
The detailed search process of the study initially identified 1,969,888 articles in WOS and Scopus. After applying the inclusion/exclusion criteria (see Table 1), 39 duplicate articles were removed, 98,000 were excluded for not including all the search terms, and 714 records were removed for other reasons.

Our detailed review identified 1,165,364 articles published between 2019 and 2024 in English and Spanish. After filtering, 672,293 articles remained, which were downloaded to the Zotero document manager and transferred to a shared OneDrive database for an initial review (Screening 1), focusing on titles, abstracts, and keywords. In a second-round review (Screening 2), selected studies were re-read to identify those that addressed the SR research questions.

Figure 1 presents a flowchart outlining the phases of the document selection process. The diagram was created using the Shiny application (Haddaway et al., 2022), which is designed to generate flowcharts compliant with PRISMA 2020 standards.

During the inclusion and selection phase, our team conducted a detailed review of each study using the agreed-upon criteria. Several studies were excluded for various reasons, such as those focusing solely on the design and development of AI-based technologies without directly referencing AI in education (AIED). Additionally, articles addressing AI technologies for language learning were excluded if they lacked a connection to editing, correction, or composition of academic texts in higher education. Other studies were excluded due to their divergence from the specific research purpose of our SR.

Figure 1 Flowchart for the Selection of Studies According to the Prisma Model in the First Review



Following the review, 226 records were deleted for not addressing the research questions, such as those concerning the conceptualization of AI in academic literacy, its ethical implications, challenges, risks, and the advantages and disadvantages of AI in editing, proofreading, composition, and academic writing.

To ensure consistency between reviewers, a two-stage screening process was conducted: title and abstract screening (1) and full-text screening (2). CSV files were converted into Excel tables, and PDF documents were organized in a OneDrive folder for easy access and review. Ultimately, 92 articles were selected for inclusion (see Appendix 1), each directly addressing the SR research questions.

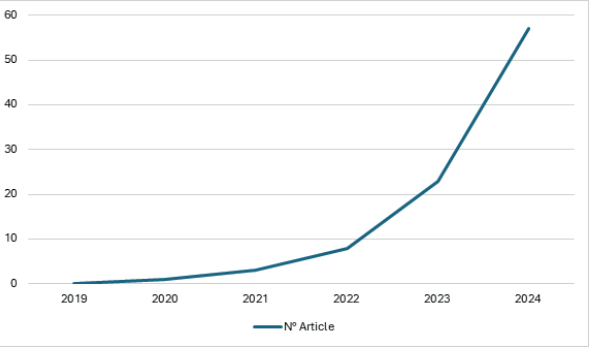
Findings and Discussion

In this section, we present the findings of the systematic review of the literature on the use of AI in the revising and editing of academic texts. To this end, first, we present the development of publications on AI applied to the revising and editing of academic texts. Then, we analyze how AI is conceptualized in academic literacy and what kind of ethical implications, challenges, and risks are considered. Next, we discuss the advantages and disadvantages of using AI in academic editing, proofreading, and writing. Finally, we discuss the biases, limitations and opportunities of extant research in the area. We aim to offer a comprehensive overview of the impact of AI on written production processes in the academic field.

(Q1) Development of Publications on AI Applied to the Revising and Editing of Academic Texts

The results below indicate how publications related to AI application in the processes of composition, revising and editing of university-level academic texts have developed over the last five years. The results include the journals where the articles were published, the journals' geographical distribution, and the relationship between author number and articles.

Figure 2 Number of Articles Included per Year (n = 92)



Articles per Year

There was a significant increase in papers published from 2022 onwards. The number of included articles grew from 8 in 2022 to 57 in 2024 (see Figure 2).

There has been a significant increase in scientific publications on AI applied to composition, revising, and editing of academic texts, rising from 8 to 57 articles, as shown in Figure 2. This growth reflects an incrementation in interest in the utilization of AI to enhance the quality of academic writing at the college level. This rise in scientific publications can be attributed to advances in AI technologies engineered to improve efficiency, as well as increasing regulatory and ethical concerns, which are likely driving further research in this area. These trends indicate that AI 's role in academic writing is becoming increasingly significant, particularly in studies exploring experiences, perceptions, opportunities, and challenges associated with its use.

Journal per Impact Factor and Countries

Of the 92 articles, 14 were published in journals indexed in WOS, 3 in Scopus, and 70 were published in both the WOS and Scopus databases. The most productive year is 2022. However, given that the SR included articles published until the first half of 2024, it is likely that publications from 2024 will surpass this number by the time the dataset is complete.

In terms of impact factor, the 92 journals are classified into quartiles: Q1, Q2, Q3, and Q4, ranging from highest to lowest. Of the journals that appear in both WOS and Scopus, 59 are classified into the same quartile across areas and databases, while 33 have different quartiles (see Appendix 2). Some of the 92 journals have impact factors linked to multiple thematic areas, resulting in different impact factors across subjects.

However, those with the highest prestige in each subject area are categorized as Q1: *International Journal for Educational Integrity*, *Journal of Educational Computing Research*, *International Journal of Educational Technology in Higher Education*, *Studies in Higher Education, ELT Journal, Higher Education Research & Development, Education and Information Technologies, Journal of Educational Evaluation for Health Professions, Assessment & Evaluation in Higher Education, Education and Information Technologies, Comunicar, Technology Knowledge and Learning, Internet and Higher Education, International Journal for Educational Integrity, BMC Medical Education, Studies in Higher Education, Smart Learning Environments, Language Learning & Technology, Languages,* and *RELC Journal*.

A matrix showing valuable data on the impact factor, quartiles, and citations of studies included is illustrated in Appendix 2. It also lists the journals that contain the most cited articles (https://tinyurl.com/2a73ryoc). For example, the work of Perkins (2023) [E9] has received 140 citations in the *Journal of University Teaching and Learning Practice* (as of September 2024), Yan (2023) has 105 citations in *Education and Information Technologies*, Guo and Wang (2024) have 77 citations in *Education and Information Technologies,* and Barrot (2023) 71 citations in *Assessing Writing*. These, among other highly cited papers, are in the top 1% based on the number of citations received compared to other articles published in the same field in the same year, as they received citations quickly after publication. Of the articles analyzed, 12 stand out with several citations, for example, E11 (58), E35 (37), E24 (34), E3 (31), E7 (26), E25 (23), and E8 (21).

Our review also found that some articles, despite having cited a wealth of references, have few citations themselves. For example, 5 articles only had 2 citations; 12, 1 citation; and 35, 0 citations. However, in some cases, time is required for articles to receive citations, particularly if they were published near the end of the analysis period.

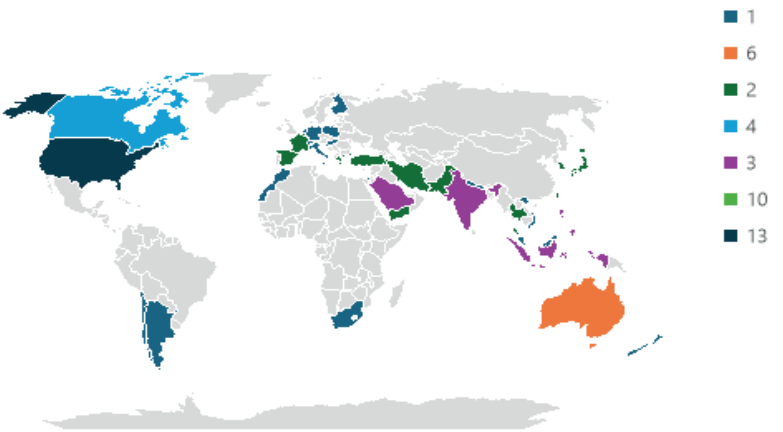
Additionally, if an article is published in a journal with limited accessibility or not indexed in relevant databases, this can hinder its dissemination and citation count. This depends on the type of "Open Access" to which the journal, publisher, or institution subscribes. In our particular case, 714 documents were excluded from the review due to limited access. This issue of accessibility can be considered a methodological limitation, and was therefore used as an exclusion criterion in the study.

Publications from 2023 and 2024 have yet to gain significant visibility in the academic community, which is crucial since citations are key to measuring academic impact (Gregorio-Chaviano et al., 2023; Santos & Fernández-Ríos, 2016). This underscores the need for strategies that researchers, their collectives, journals, publishers, and institutions implement to enhance the visibility of their work. These strategies may include collaboration with other researchers, presenting at conferences, and promoting their research through social and academic networks.

The trends of recent publications suggest that AI is still emerging as a topic of significant interest within the academic-scientific community, reflecting its notable impact in various fields. AI's multifarious applications are increasingly being explored, including in college education (see Appendix 1).

In relation to our analysis of the geographical distribution of articles, the country of origin of

Figure 3 Distribution of Articles by Country (n = 92)



each article's first author was taken into consideration (n = 14 countries). Figure 3 shows the four countries that contributed at least four papers. In addition, the data reveals that most of the articles originated from a broader range of countries, including Australia, Canada, Chile, Egypt, England, China, Peru, Saudi Arabia, South Korea, Spain, Turkey, the United Arab Emirates, the US, and Vietnam.

Figure 3 shows the geographic distribution of AI-related publications to academic text editing and proofreading, with the USA leading the way (13 articles), followed by China (10), Australia (6), and Canada (4). Other countries between 1 and 3 publications. These countries are likely leading AI research due to institutional interest, investments in academic literacy technologies, and greater collaboration among researchers. The data suggest that the growing need for AI tools in academic writing is driving research on how AI addresses these challenges. These nations are also at the forefront of discussions on AI ethics and regulation in education, likely spurring further research in the field.

Authors and Affiliations

Of the 92 articles included in the review, 89 were published in English and 3 in Spanish. Additionally, 24 articles were authored by 1 person, 28 by 2 authors, 20 by 3 authors, and 20 by 4 or more authors. This indicates that 73.8% of the studies were conducted collaboratively, while 26.2% were done individually (see Figure 4).

This trend of collaboration (https://tinyurl.com/2a73ryoc) reflects the configuration of networks among researchers working together on topics related to AI. This implies that more robust and diverse research is being developed, through the exchange of ideas, resources and methodologies; connections that indicate greater influence and academic visibility.

Methods

Of the 92 articles, 2 studies (2.18%) were theoretical-descriptive or reflective, 27 (29.3%) used

Figure 4 Authors per Article

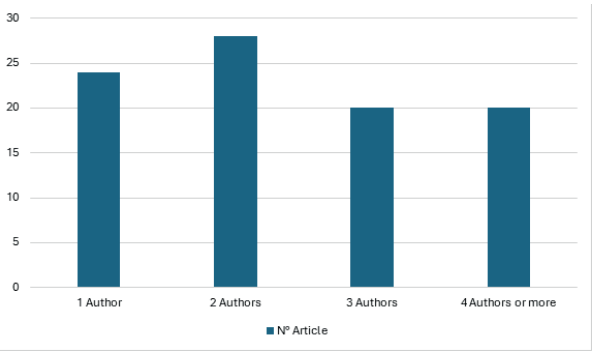
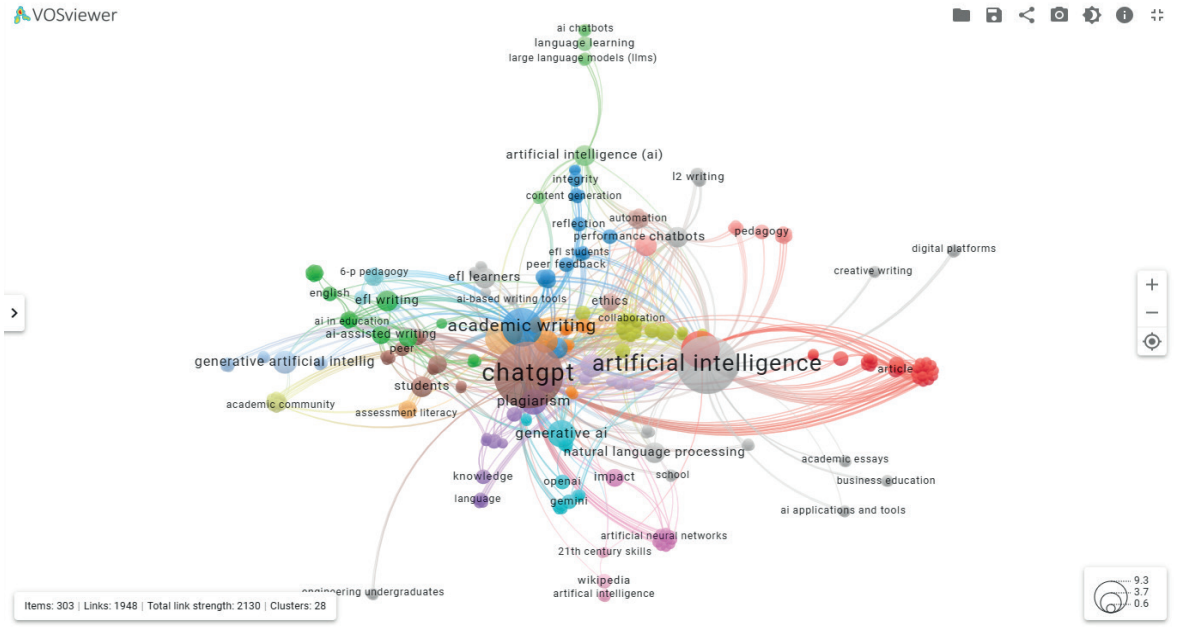


Figure 5 Co-Occurrence of All Keywords



quantitative methods, 42 (45.7%) were qualitative, and 21 (22.8%) employed a mixed-methods approach. Case study procedures dominated both quantitative and qualitative research, with 4 quantitative studies using quasi-experimental methods and 1 qualitative study adopting an ethnographic design. All articles examined AI applications in college academic writing.

The prevalence of qualitative research reflects a focus on exploring complex phenomena and understanding human experiences, emphasizing how users interact with AI, their perceptions, and the quality of AI support in academic composition and editing. Quantitative studies, on the other hand, aim for objective, measurable evidence, indicating that AI's impact in this area is being evaluated more systematically. Mixed-methods studies, although fewer, combine qualitative depth with quantitative validation, adding robustness to research on AI in academic writing.

Keywords

One interesting finding is the frequency of the most common keywords that appear in these articles which reflect prevalent terms used in investigations on the application of AI-based technologies in college academic literacy.

Figure 5 shows that the representative terms, organized from highest to lowest frequency, are distributed in 12 large groups: "ChatGPT", "artificial intelligence", "academic writing", "chatbot", "higher education", "machine learning", "technology", "generative AI", "editing", "feedback", "ethics", and "plagiarism" (https://tinyurl.com/23tjbjx3). However, the most frequent clusters are the first five terms. They correspond to a set of closely related nodes according to the topic and other more specific topics.

In this network developed in VOSviewer (version 1.6.20 released on October 31, 2023), the visualization of the size of each node is determined by the highest occurrence or frequency of the topic. The largest node, "artificial intelligence," represents the degree or number of relationships it has with the rest of the nodes. In addition, it suggests that it is interconnected with various parts of the network, for example, with "ChatGPT", "academic writing", "technology", "chatbots", and "generative AI", among others. It also distances itself from other nodes such as "ChatGPT", "ethics," and

"pedagogy." This implies that it has a greater influence by size. In Figure 5, the higher the frequency of joint occurrence of keywords or the proximity of nodes between other nodes, the greater the conceptual link between the terms.

In terms of color usage, a pattern emerges where elements are colored and layered based on their score or value. Each color corresponds to a specific group, which is also identified by shape (circles), intensity, and the connections or lines between elements. Additionally, these colors represent the proportion of articles grouped within the bibliometric network.

This visualization reveals several clusters, including ones associated with cyan, shades of blue, green, yellow, red, and other colors. The different colors represent groups and illustrate the relationship between them in terms of co-citation links. In other words, the closer topics like "artificial intelligence," "ChatGPT," "generative AI," and "writing" are, the stronger their relationship is. Finally, the size of each topic category, as shown in Figure 5, reflects the strength of that category, while the color indicates its impact. In this case, "ChatGPT" and "artificial intelligence" stand out.

AI Application: Critical Reflections Regarding Challenges and Risks

After analyzing the trends of publications on AI applied to the revising and editing of academic texts across the globe, this section presents a critical reflection on the ethical implications, challenges and risks of AI use in academic literacy.

Q2: How is AI Conceptualized in Academic Literacy and What Kind of Ethical Implications, Challenges, and Risks Are Considered?

In the articles included in this SR, AI is viewed through a prism of complex opportunities and challenges (Kumar, 2023; Perkins, 2023). Its conceptualization varies, although some thematic continuities emerge across the scholarly discourse. Chaudhry et al. (2023) define ChatGPT as "a conversational artificial intelligence (AI) tool that uses a deep learning model to generate human-like text response based on provided input" (pp. 1-2). De Vicente-Yagüe-Jara et al. (2023) highlight AI as beneficial for writing and creativity but stress that it cannot replace human intelligence or creativity. Similarly, Al-Zubaidi et al. (2024) assert that human creativity remains unmatched by AI systems like ChatGPT.

Martín-Marchante (2022) discusses AI as a transformative but underutilized technology in education, while Chaudhry et al. (2023) present the concept of AI as a "disruptive technology" with educational potential. Moreover, researchers have recently conceptualized ChatGPT as a critical tool for reshaping traditional writing instruction and promoting new learning paradigms. (Chambers & Owen, 2024; Levine et al., 2024; Li et al., 2024; McKnight & Shipp, 2024).

In academic literacy, AI research covers a variety of systems related to academic writing (Cortes & da Cunha, 2022; Martín-Marchante, 2022; Vazquez-Cano et al., 2021; Ozcelik et al, 2024; Mudawy, 2024), computer-generated writing (Abd-Elaal et al., 2022), scientific writing (Kim & Kim, 2022), assessment, feedback and grading (Kumar, 2023, Martín-Marchante, 2022; Nazar & Renau, 2023; Perkins, 2023; Sanosi, 2022; Taskiran & Goksel, 2022), EFL learning (Chung, 2020; Taskiran & Goksel, 2022; Woo et al., 2023), academic integrity (Abd-Elaal et al., 2022; Chaudhry et al., 2023; Perkins, 2023), academic dishonesty (Sweeney, 2021), and student learning (Reiss, 2021), among others.

Recent literature on ChatGPT highlights how it could improve student learning by providing feedback on essay structure and content clarity (Chambers & Owen, 2024; Mahapatra, 2024; Tossell et al., 2024; Jiang et al., 2023), supporting students throughout the writing process, enhancing their performance and confidence in producing academic work (Bender, 2024; Kim et al., 2024; Nguyen et al. 2024; Pellas, 2023; Prachnakorn et

al., 2024), and significantly improving non-native English-speaking students' writing (Li et al., 2024). However, ChatGPT remains unable to substitute aspects of human writing quality, such as emotional depth, writing voice and identity, and rhetorical flexibility (Barrot, 2023). Research has also indicated that the use of ChatGPT can result in reduced student engagement with traditional learning methods, such as class participation and exam preparation (Hamamra et al., 2024), and disengagement from foundational academic skills (Li et al., 2024) such as planning, revision, and self-editing skills (Guo et al., 2024; Levine et al., 2024). Research has warned of the risks of over-reliance on AI in writing, noting that it can potentially hinder students' development of critical thinking, original thought, and creativity (Ironsi & Ironsi, 2024).

Particularly, ethical implications and challenges include a change in the traditional teacher role, which could affect the dynamics of teacher-student relationships. Kim and Kim (2022) explore the attitudes and perceptions of teachers towards AI in STEM education. Reiss (2021) alludes to the challenge of ensuring that the application of AI does not diminish the social aspects of learning or reduce the need for human interaction, although it has the potential to be particularly beneficial for students with special educational needs. Hutchinson (2024) and Maphoto et al. (2024) propose managing the balance between teachers and AI, ensuring that educational technologies are equitable. This concern for the depersonalization of education is shared by Vázquez-Cano et al. (2021), who indicate that a reliance on AI tools lacks the human touch that often motivates students.

The technology's potential for misuse is also highlighted. Sweeney (2023) conceptualizes AI as a facilitator of academic dishonesty, pointing to its role in aiding unauthorized essay-writing services. Alsagri et al. (2024) and Nugroho (2024) emphasize the potential for AI inaccuracies and misuse to bypass critical thinking and original work. Similarly, Waltzer et al. (2024) highlight the difficulty of ensuring academic integrity in an era where AI tools are easily accessible and hard to detect. Bozkurt (2024) suggests a specific framework for acknowledging and disclosing the use of generative AI in scholarly writing, and Barrent and Pack (2023) emphasize transparency in the use of AI tools as a shared responsibility of students and faculty. De Wilde (2024) focuses on the need for educators to develop strategies for detecting AI-generated writing to preserve academic honesty and originality in student submissions.

These ideas contrast with the research by Reiss (2021) and Abd-Elaal et al. (2022), which view AI as an enriching adjunct to traditional pedagogical approaches. Other studies divert the attention from AI to other digital utilities, like Microsoft Word's collaborative features, suggesting that we are still grappling with defining the boundaries of what constitutes AI in academic literacy (Hafner and Yu, 2020).

While studies diverge in their emphasis, they collectively underscore AI's multifaceted role in academic literacy. Chung (2020), Geng (2024) and Fonseca et al. (2024) discuss the complex interaction between machine translation tools and language proficiency. Vazquez-Cano et al. (2021) and Sanosi (2022) highlight AI's potential in language learning, especially in Spanish literacy and automated written evaluation. Heintz et al. (2022) and Taskiran and Goksel (2022) subtly bring to the fore questions about the adequacy and limitations of automated feedback, a notion that correlates with Chaudhry et al. (2023) close examination of natural language generation tools.

The integration of AI and digital tools in education raises complex ethical concerns that are primarily related to equity and inclusivity. While Vazquez-Cano et al. (2021) and Sanosi (2022) question educational equity within the context of AI-based tools, Hafner and Yu (2020) and Kong et al. (2024) extend this concern to digital inclusion, emphasizing that not all students may have the skills or resources to access basic software such

as Microsoft Word. Intellectual property also comes into focus. Hafner and Yu (2020) highlight the complications surrounding academic misconduct and plagiarism in collaborative settings. This view adds a fresh dimension to existing discourse on data privacy and authenticity outlined by authors such as Chaudhry et al. (2023), Cortes and da Cunha (2021), and Sanosi (2022).

Among the challenges of AI incorporation, issues of adaptability and integrating effective feedback emerge in the work of Hafner and Yu (2020), resonating with Vazquez-Cano et al. (2021), and Cortes and da Cunha (2021). Taskiran and Goksel (2022) hint at the inadequacy of automated feedback systems, while Heintz et al. (2022) raise concerns about AI's ability to understand specialized terminologies and its adaptability to various academic fields. These points echo earlier observations made by Abd-Elaal et al. (2022), Perkins (2023), and Chaudhry et al. (2023) about the practical difficulties of integrating these technologies into educational settings (De Wilde, 2024; Waltzer et al., 2024).

Regarding risks, over-reliance on technology is a recurring theme. Barrot (2023) raises concerns about students becoming overly reliant on AI, diminishing their ability to develop critical and creative writing skills. Data security, especially in collaborative settings, is another critical risk, aligning with the data privacy concerns raised by Heintz et al. (2022) and Vazquez-Cano et al. (2021). Additionally, concerns about academic integrity and originality have been emphasized by Fathi & Rahimi (2024) and Ironsi & Ironsi (2024). Hafner and Yu (2020) highlight the neglect of interpersonal skills such as face-to-face communication as another risk. Similarly, Heintz et al. (2022) discuss the potential diminishment of human interaction and mentorship in academic editing, echoing concerns of depersonalization and decreased pedagogical quality and student engagement identified by Kim and Kim (2022), Kumar (2023), Vazquez-Cano et al. (2021) and Hamamra et al. (2024). Heintz et al. (2022) further introduce the risk of AI replacing human jobs, particularly in the editorial field. Consuegra-Fernandez et al. (2024) point out the risks related to the misuse of ChatGPT, suggesting that it may interfere in the students' learning process. In sum, AI and digital tools command a multidimensional approach to address an intricate tapestry of ethical implications, logistical challenges, and risks. These studies collectively emphasize the need for rigorous evaluation, stakeholder dialogue, and ethical considerations in navigating AI-based technologies in education.

In the academic literacy context, AI is conceptualized as a multifaceted tool that reshapes writing instruction, feedback, and creativity. However, research highlights that AI cannot replace the emotional depth and originality of human cognition. Scholarship also underscores that the ethical implications, challenges, and risks of AI in this context are significant, including academic integrity issues, depersonalization of learning, potential data privacy breaches, and reduced student engagement with foundational skills. These factors underline the pressing need for equitable and responsible integration of AI in academic literacy.

Q3: What are the advantages and disadvantages of using AI in academic editing, proofreading, and writing?

To provide a coherent answer to this third question, we reviewed research that highlights the pros and cons of using AI for academic writing, editing and composition. Kumar (2023) identifies time-saving, convenience, consistency of feedback, and career advancement as possible advantages. Other benefits include improvements in the quality and effectiveness of writing, particularly in creativity and fluency, while potential disadvantages include legal conflicts, high costs, inadequate feedback quality, and concerns about student privacy. Other disadvantages involve concerns about plagiarism, difficulties in controlling AI-generated texts (de Vicente-Yagüe-Jara et al.,

2023), limitations in the correcting of conceptual content, and limited precision in the detection of complex errors in grammar usage and bibliographic references (Nazar & Renau, 2023).

Martin-Marchante (2022) points out that students' underutilization of available AI tools in their writing process can hinder their potential to fully benefit from the advantages these technologies offer. He suggests that this challenge can be overcome by developing new pedagogical strategies that better integrate AI into the composition process, thus allowing students to take full advantage of AI's capabilities, such as enhancing writing efficiency, consistency, and overall quality. Analyzing the efficacy of AI scaffolding systems utilized in scientific writing in STEM classrooms, Kim and Kim (2022) assert that "most STEM teachers positively experienced AI as a source for superior scaffolding" (p. 1) while acknowledging that AI decision-making lacked transparency and problematized the role of instructors. While free machine rranslation (MT) services provide L2 learners with accessible language support, Chung (2020) notes that low-proficiency learners often adopt MT output without critical analysis, which can lead to errors and overreliance.

Some advantages of using ChatGPT during academic composition identified by Chaudhry et al. (2023) include facilitating student learning through dialogue. Sweeney (2023) and Berek (2024) analyze limitations in traditional plagiarism detection systems while arguing that a proactive response to AI can assist in the promotion of transparency and student reflection. Moreover, according to Sanosi (2022), the advantages of Automatic Writing Evaluation (AWE) include the detection and correction of diction, punctuation, and spelling errors. AWE is, however, less useful than human instructors when addressing overarching syntactical difficulties and language acquisition. Al-Garaady et al. (2023) also indicate that ChatGPT can only identify surface-level errors and cannot replace the deeper understanding of human instructors regarding deep structure and pragmatics in writing. Chambers and Owen (2024) report the advantages of using chatbots to improve writing outcomes. Similarly, Levine et al. (2024) and Yuan and Sawaengdist (2024) suggest that integrating AI into various stages of the writing process enhances students' ability to generate ideas, plan arguments, and refine their writing style. Li et al. (2024) and Woo et al. (2023) found that non-native English-speaking students benefited from AI-assisted academic writing, particularly in organizing content and enhancing language structure. Tsai et al. (2024) identified that ChatGPT provides timely feedback to English language learners. Additionally, Pitychoutis (2024) showed the benefits of using AI chatbots, especially in fostering learner's autonomy.

Finally, Santillan and Monica (2021) argue that collaborative virtual tools improve text planning, production, revision, and rewriting. In relation to academic text production, Hafner and Yu (2020) argue that MS Word is, among other AI tools, useful in language socialization in English for Specific Purposes (ESP) classrooms.

While most studies confirm that employing AI in academic text composition and revision can improve student learning outcomes; it is crucial to emphasize that further research is needed to identify effective pedagogical strategies for classroom implementation. AI tools can enhance efficiency, consistency, and linguistic quality—particularly for non-native English speakers—but they also raise concerns about privacy, academic integrity, and handling complex errors. Addressing these challenges will require careful oversight, transparency, and complementary pedagogical approaches to ensure their responsible and beneficial application.

Biases, Limitations, and Opportunities

The analyzed literature primarily comprises exploratory and initial studies, often limited to

small, case studies or specific text corpora. This represents a limitation in the understanding of the implementation of AI-based technologies in the correction, editing, and composition of academic texts written by college students. However, there are significant opportunities to expand research in this area given the incremental access and advance of these technologies during the last three years, as confirmed by the increased number of publications since 2022.

Future research should analyze the extensive use of AI technologies in academic literacy instruction, editing, revising, and composition in college and other educational settings.

In addition, this SR limited its search to Scopus and WOS databases that, although large and international in scope, could exclude other published research. Furthermore, this study only included scientific articles published in English or Spanish. Future research should consider the use of other databases and different types of publications written in different languages to broaden the review's scope.

Conclusion

This systematic review addressed three guiding questions: How have publications on AI applied to academic text correction and editing evolved over the last five years, including their journals of publication, geographical origins, and authorial patterns; how is AI conceptualized in relation to academic literacy, and what specific ethical implications, challenges, and risks arise, such as data privacy, academic integrity, and over-reliance on AI-generated content; and what are the advantages and disadvantages of using AI in academic writing. In response to the first question, over the last five years, research on AI-based technologies for academic text revising and editing has expanded notably, with a dominant presence of scholars from the United States, China, and England, and key publications featured in reputable journals such as the *International Journal for Educational Integrity, Journal of Educational Computing Research, International Journal of Educational Technology in Higher Education,* and *RELC Journal*.

Addressing the second question, the literature conceptualizes AI as a tool that streamlines academic literacy processes, improves linguistic quality, and delivers efficient feedback, especially beneficial for non-native English speakers. However, this enthusiasm is tempered by concerns about data privacy, academic integrity, possible over-reliance on AI-generated content, and the technology's limited capacity to address complex rhetorical or conceptual challenges. Such issues underscore the importance of transparent, responsible usage and the development of pedagogical strategies that complement AI tools rather than replace human judgment, providing reassurance about the ethical considerations in AI implementation.

In response to the third question on advantages and disadvantages, while AI can expedite the writing process, foster learner autonomy, and enhance idea generation and refinement, it also suffers from shortcomings related to privacy risks, subtle error detection, and handling nuanced conceptual material. Consequently, its effective integration in educational settings calls for careful oversight, thoughtful pedagogical scaffolding, and ongoing stakeholder dialogue, ensuring that all voices are heard and considered in the implementation process.

Although current literature suggests that incorporating AI-based tools into academic writing and editing may yield meaningful improvements in student learning outcomes, the body of research still needs to be expanded. Future studies should include a broader spectrum of discourse communities, academic genres (extending beyond scientific articles to books, book chapters, and novels), and diverse educational contexts and languages. Such investigations will help guide the equitable, responsible, and context-sensitive implementation of AI technologies, ensuring that these tools

serve as valuable complements to, rather than substitutes for, human expertise and traditional pedagogical practices.

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Appendix 1. Works Selected for the Systematic Review

Code	Publication Title	Publication Year	Author	Title
E1	*International Journal for Educational Integrity*	2023	Kumar, R	Faculty members' use of artificial intelligence to grade student papers: a case of implications
E2	*Research in Education and Learning Innovation Archives-Realia*	2022	Martin-Marchante, B	The use of ICTs and artificial intelligence in the revision of the writing process in Valencian public universities
E3	*Frontiers in Education*	2022	Kim, NJ; Kim, MK	Teacher's Perceptions of Using an Artificial Intelligence-Based Educational Tool for Scientific Writing
E4	*Journal of Asia TEFL*	2020	Chung, ES	The Effect of L2 Proficiency on Post-editing Machine Translated Texts
E5	*Cogent Education*	2023	Chaudhry, IS; Sarwary, SAM; El Refae, GA; Chabchoub, H	Time to Revisit Existing Student's Performance Evaluation Approach in Higher Education Sector in a New Era of ChatGPT - A Case Study
E6	*International Journal of Management Education*	2023	Sweeney, S	Who wrote this? Essay mills and assessment-Considerations regarding contract cheating and AI in higher education
E7	*London Review of Education*	2021	Reiss, MJ	The use of AI in education: Practicalities and ethical considerations
E8	*European Journal of Engineering Education*	2022	Abd-Elaal, ES; Gamage, SHPW; Mills, JE	Assisting academics to identify computer generated writing
E9	*Journal of University Teaching and Learning Practice*	2023	Perkins, M	Academic Integrity considerations of AI Large Language Models in the post-pandemic era: ChatGPT and beyond
E10	*Journal of Educational Computing Research*	2023	Woo, DJ; Wang, YZ; Susanto, H; Guo, K	Understanding English as a Foreign Language Students' Idea Generation Strategies for Creative Writing with Natural Language Generation Tools
E11	*International Journal of Educational Technology in Higher Education*	2021	Vázquez-Cano, E; Mengual-Andres, S; López-Meneses, E	Chatbot to Improve Learning Punctuation in Spanish and to Enhance Open and Flexible Learning Environments
E12	*Círculo de Lingüística Aplicada a la Comunicación*	2022	Cortes, JAN; da Cunha, I	The Impact of using Computer Assisted Writing Systems in the Writing Process of University Students
E13	*Information Technologies and Learning Tools*	2022	Sanosi, A	To Err Is Human: Comparing Human and Automated Corrective Feedback
E14	*Aula de Encuentro*	2021	Santillan, S; Monica, E	Virtual Collaborative Tools to Improve Text Production
E15	*RELC Journal*	2020	Hafner, CA; Yu, C	Language Socialization in Digitally Mediated Collaborative Writing: Evidence from Disciplinary Peer and Teacher Feedback
E16	*Turkish Online Journal of Distance Education*	2022	Taskiran, A.; Goksel, N.	Automated Feedback and Teacher Feedback: Writing Achievement in Learning English as a Foreign Language at a Distance

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E17	*Science Editing*	2022	Heintz, K; Roh, Y; Lee, J	Comparing the Accuracy and Effectiveness of Wordvice AI Proofreader to two Automated Editing Tools and Human Editors
E18	*PLOS One*	2024	Chemaya, N., Martin, D	Perceptions and Detection of AI use in Manuscript Preparation for Academic Journals
E19	*Otolaryngology—Head and Neck Surgery (OTO Journal)*	2023	Jerome R. Lechien, Amy Gorton, Jean Robertson, Luigi A. Vaira	Is ChatGPT-4 Accurate in Proofread a Manuscript in Otolaryngology—Head and Neck Surgery?
E20	*Computers and Composition*	2024	Robert E. Cummings, Stephen M. Monroe, Marc Watkins	Generative AI in First-Year Writing: An Early Analysis of Affordances, Limitations, and a Framework for the Future
E21	*Social Sciences & Humanities Open*	2024	Mohammed Abdulkareem A. Alkamel, Nasim Amin Saleh Alwagieh	Utilizing an adaptable artificial intelligence writing tool (ChatGPT) to enhance academic writing skills among Yemeni university EFL students
E22	*RELC Journal*	2024	Todd J Allen, Atsushi Mizumoto	ChatGPT Over My Friends: Japanese English-as-a-Foreign-Language Learners' Preferences for Editing and Proofreading Strategies
E23	*Contemporary Educational Technology*	2023	Santi Pratiwi Tri Utami, Andayani, Retno Winarni, Sumarwati	Utilization of artificial intelligence technology in an academic writing class: How do Indonesian students perceive?
E24	*Research Ethics*	2023	Mohammad Hosseini, David B Resnik, and Kristi Holmes	The ethics of disclosing the use of artificial intelligence tools in writing scholarly manuscripts
E25	*Data and Metadata*	2022	William Castillo-González, Carlos Oscar Lepez, and Mabel Cecilia Bonardi	ChatGPT: a promising tool for academic editing
E26	*Comunicar*	2023	de Vicente-Yagüe-Jara, Maria-Isabel; Lopez-Martinez, Olivia; Navarro-Navarro, Veronica; Cuellar-Santiago, Francisco	Writing, creativity, and artificial intelligence. ChatGPT in the university context
E27	*Arab World English Journal*	2023	Algaraady, Jeehaan; Mahyoob, Mohammad	ChatGPT 's Capabilities in Spotting and Analyzing Writing Errors Experienced by EFL Learners
E28	*Education And Information Technologies*	2024	Yang, Hongzhi; Gao, Chuan; Shen, Hui-zhong	Learner interaction with, and response to, AI -programmed automated writing evaluation feedback in EFL writing: An exploratory study

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E29	*Assessing Writing*	2023	Barrot, Jessie S.	Using ChatGPT for second language writing: Pitfalls and potentials
E30	*Interactive Learning Environments*	2023	Rad, Hanieh Shafiee; Alipour, Rasoul; Jafarpour, Aliakbar	Using artificial intelligence to foster students' writing feedback literacy, engagement, and outcome: a case of Wordtune application
E31	*Education and Information Technologies*	2023	Yan, Da	Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation
E32	*Perspectiva Educacional*	2023	Nazar, Rogelio; Renau, Irene	Estilector: an automatic evaluation system for academic writing in Spanish
E33	*Journal of Language and Education*	2023	Crcek, Nikola; Patekar, Jakob	Writing with AI: University Students' Use of ChatGPT
E34	*Australasian Journal of Educational Technology*	2023	Ducasse, Ana Maria; Ferrero, Carmen Lopez; Mateo Girona, Maria Teresa	Technology-enabled higher education academic writing feedback: Practices, needs and preferences
E35	*Register Journal*	2023	Martono; Drajati, Nur Arifah; Rochsantiningsih, Dewi; Wijaya, Surya Agung	Intertextuality in Pre-service Teachers' Argumentative Essay in Raising AI: Practices and Beliefs
E36	*South African Journal of Higher Education*	2023	Singh, M.	Maintaining the integrity of the south african university: the impact of ChatGPT on plagiarism and scholarly writing
E37	*International Journal of Adult Education and Technology-ijaet*	2023	Storey, Valerie A.	AI Technology and Academic Writing: Knowing and Mastering the Craft Skills
E38	*Journal of Academic Language and Learning*	2023	Tail, Andy Man Yeung; Meyer, Maximilian; Varidel, Mathew; Prodan, Ante; Vogel, Marc; Lorfino, Frank; Krausz, Reinhard Michael	Exploring the potential and limitations of ChatGPT for academic peer-reviewed writing: Addressing linguistic injustice and ethical concerns
E39	*Assessment & Evaluation in Higher Education*	2024	Tam, Angela Choi Fung	Interacting with ChatGPT for internal feedback and factors affecting feedback quality
E40	*Innovations In Education and Teaching International*	2024	Bucol, Junifer Leal; Sangkawong, Napattanissa	Exploring ChatGPT as a writing assessment tool
E41	*Education And Information Technologies*	2024	Strzelecki, Artur; Cicha, Karina; Rizun, Mariia; Rutecka, Paulina	Acceptance and use of ChatGPT in the academic community

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E42	*Electronic Journal of E-learning*	2024	Tseng, Yu -Ching; Lin, Yi-Hsuan	Enhancing English as a Foreign Language (EFL) Learners' Writing with ChatGPT: A University-Level Course Design
E43	*IEEE Transactions on Learning Technologies*	2023	Abbas, Mohsin; van Rosmalen, Peter; Kalz, Marco	A Data-Driven Approach for the Identification of Features for Automated Feedback on Academic Essays
E44	*Journal of Educational Evaluation for Health Professions*	2023	Park, Janghee	Medical students' patterns of using ChatGPT as a feedback tool and perceptions of ChatGPT in a Leadership and Communication course in Korea: a cross-sectional study
E45	*Education And Information Technologies*	2024	Guo, Kai; Wang, Deliang	To resist it or to embrace it? Examining ChatGPT 's potential to support teacher feedback in EFL writing
E46	*Perspectives On Medical Education*	2023	Lingard, Lorelei	Writing with ChatGPT: An Illustration of its Capacity, Limitations & Implications for Academic Writers
E47	*Innovations In Education and Teaching International*	2024	Daly, Peter; Deglaire, Emmanuelle	AI-enabled correction: A professor's journey
E48	*Journal Of Teaching in Travel & Tourism*	2024	Nimri, Rawan; Yang, Elaine	Addressing the elephant in the room: engaging students in ChatGPT conversations on assessments
E49	*Education And Information Technologies*	2024	Fokides, Emmanuel; Peristeraki, Eirini	Comparing ChatGPT 's correction and feedback comments with that of educators in the context of primary students' short essays written in English and Greek
E50	*Education And Information Technologies*	2024	Shin, Dongkwang; Lee, Jang Ho	Exploratory study on the potential of ChatGPT as a rater of second language writing
E51	*International Journal of Applied Linguistics*	2024	Liu, Yanhua; Park, Jaeuk; Mcminn, Sean	Using generative artificial intelligence/ ChatGPT for academic communication: Students' perspectives
E52	*Higher Education Research & Development*	2024	Ghimire, Som Nath; Bhattarai, Upaj; Baral, Raj K.	Implications of ChatGPT for higher education institutions: exploring Nepali university students' perspectives
E53	*Journal Of Chemical Education*	2024	Reddy, Manik R.; Walter, Nils G.; Sevryugina, Yulia V.	Implementation and Evaluation of a ChatGPT -Assisted Special Topics Writing Assignment in Biochemistry
E54	*Techtrends*	2024	Meishar-Tal, Hagit	ChatGPT: The Challenges It Presents for Writing Assignments
E55	*Language Learning in Higher Education*	2024	Yuan, Ye; Li, Huan; Sawaengdist, Anan	The impact of ChatGPT on learners in English academic writing: opportunities and challenges in education
E56	*Education And Information Technologies*	2024	Tsai, Chung-You; Lin, Yi-Ti; Brown, Iain Kelsall	Impacts of ChatGPT -assisted writing for EFL English majors: Feasibility and challenges
E57	*Arab World English Journal*	2024	Al-Zubaidi, Khairi; Jaafari, Mohamed; Touzani, Fatima Zahra	Impact of ChatGPT on Academic Writing at Moroccan Universities

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E58	*Arab World English Journal*	2024	Mudawy, Ammar Mohammed Ahmed	Investigating EFL Faculty Members' Perceptions of Integrating Artificial Intelligence Applications to Improve the Research Writing Process: A Case Study at Majmaah University
E59	*Arab World English Journal*	2024	Pitychoutis, Konstantinos M.	Harnessing AI Chatbots for EFL Essay Writing: A Paradigm Shift in Language Pedagogy
E60	*Smart Learning Environments*	2024	Ozcelik, Nermin Punar; Eksi, Gonca Yangin	Cultivating writing skills: the role of ChatGPT as a learning assistant-a case study
E61	*Rie-revista De Investigacion EducativA*	2024	Consuegra-Fernandez, Marta; Sanz-Aznar, Javier; Burguera-Serra, Joan Gabriel; Molina, Juan Jose Caballero	ChatGPT: The Dilemma of the Authorship of Graded Assignments in Higher-Education
E62	*Brock Education-a Journal of Educational Research and Practice*	2024	Chambers, Leah; Owen, William J.	The Efficacy of GenAI Tools in Postsecondary Education
E63	*Cogent Education*	2024	Hamamra, Bilal; Mayaleh, Asala; Khlaif, Zuheir N.	Between tech and text: the use of generative AI in Palestinian universities - a ChatGPT case study
E64	*Quality Assurance in Education*	2024	Ironsi, Chinaza Solomon; Ironsi, Sarah Solomon	Experimental evidence for the efficacy of generative AI in improving students' writing skills
E65	*Technology Knowledge and Learning*	2024	Barrot, Jessie S.	Leveraging Google Gemini as a Research Writing Tool in Higher Education
E66	*Journal Of Academic Ethics*	2024	Alsagri, Hatoon S.; Farhat, Faiza; Sohail, Shahab Saquib; Saudagar, Abdul Khader Jilani	ChatGPT or Gemini: Who Makes the Better Scientific Writing Assistant?
E67	*Education And Information Technologies*	2024	Kim, Jinhee; Yu, Seongryeong; Detrick, Rita; Li, Na	Exploring students' perspectives on Generative AI -assisted academic writing
E68	*International Journal of Educational Technology in Higher Education*	2024	Shahzad, Muhammad Farrukh; Xu, Shuo; Javed, Iqra	ChatGPT awareness, acceptance, and adoption in higher education: the role of trust as a cornerstone
E69	*Journal Of Adolescent & Adult Literacy*	2024	Levine, Sarah; Beck, Sarah W.; Mah, Chris; Phalen, Lena; Pittman, Jaylen	How do students use ChatGPT as a writing support?
E70	*ELT Journal*	2024	De Wilde, Vanessa	Can novice teachers detect AI -generated texts in EFL writing?

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E71	*Internet And Higher Education*	2024	Guo, Kai; Pan, Mengru; Li, Yuanke; Lai, Chun	Effects of an AI-supported approach to peer feedback on university EFL students' feedback quality and writing ability
E72	*Education And Information Technologies*	2024	Bui, Ngoc My; Barrot, Jessie S.	ChatGPT as an automated essay scoring tool in the writing classrooms: how it compares with human scoring
E73	*BMC Medical Education*	2024	Li, Jiakun; Zong, Hui; Wu, Erman; Wu, Rongrong; Peng, Zhufeng; Zhao, Jing; Yang, Lu; Xie, Hong; Shen, Bairong	Exploring the potential of artificial intelligence to enhance the writing of english academic papers by non-native english-speaking medical students - the educational application of ChatGPT
E74	*International Journal for Educational Integrity*	2024	Waltzer, Tal; Pilegard, Celeste; Heyman, Gail D.	Can you spot the bot? Identifying AI-generated writing in college essays
E75	*Computer Assisted Language Learning*	2024	Fathi, Jalil; Rahimi, Masoud	Utilizing artificial intelligence-enhanced writing mediation to develop academic writing skills in EFL learners: a qualitative study
E76	*Studies In Higher Education*	2024	Nguyen, Andy; Hong, Yvonne; Dang, Belle; Huang, Xiaoshan	Human-AI collaboration patterns in AI-assisted academic writing
E77	*Changing English-studies In Culture and Education*	2024	Bender, Stuart Marshall-	Awareness of Artificial Intelligence as an Essential Digital Literacy: ChatGPT and Gen-AI in the Classroom
E78	*Innovations In Education and Teaching International*	2024	Nugroho, Arif; Andriyanti, Erna; Widodo, Pratomo; Mutiaraningrum, Ira	Students' appraisals post- ChatGPT use: Students' narrative after using ChatGPT for writing
E79	*Reading Teacher*	2024	Hutchison, Amy	Making Artificial Intelligence Your Friend, Not Your Foe, in the Literacy Classroom
E80	*Smart Learning Environments*	2024	Mahapatra, Santosh	Impact of ChatGPT on ESL students' academic writing skills: a mixed methods intervention study
E81	*Medical Teacher*	2024	Prachnakorn, Natdanai; Preecha, Kongsit; Sri-u-thai, Thanapon; Jaroenyod, Thanat; Sawang, Kanokpitch; Patwong, Natthakamol; Wattanapisit, Apichai	Incorporating artificial intelligence into a workshop on scientific and scholarly report writing for preclinical medical students
E82	*English Teaching-practice And Critique*	2024	McKnight, Lucinda; Shipp, Cara	Just a tool? Troubling language and power in generative AI writing
E83	*Interdisciplinary Description of Complex Systems*	2024	Berek, Laszlo	Artificial intelligence-generated text in higher education - usage and detection in the literature

Appendix 1. Works Selected for the Systematic Review (continued).

Code	Publication Title	Publication Year	Author	Title
E84	*Open Praxis*	2024	Bozkurt, Aras	GenAI et al.: Cocreation, Authorship, Ownership, Academic Ethics and Integrity in a Time of Generative AI
E85	*International Journal of Technology in Education*	2024	Kim, Dave; Majdara, Aref; Olson, Wendy	A Pilot Study Inquiring into the Impact of ChatGPT on Lab Report Writing in Introductory Engineering Labs
E86	*Research And Practice in Technology Enhanced Learning*	2024	Kong, Siu-Cheung; Lee, John Chi -Kin; Tsang, Olson	A pedagogical design for self-regulated learning in academic writing using text-based generative artificial intelligence tools: 6-P pedagogy of plan, prompt, preview, produce, peer-review, portfolio-tracking
E87	*Open Praxis*	2024	Maphoto, Kgabo bridget; Sevnarayan, Kershnee; Mohale, Ntshimane elphas; Suliman, Zuleika; Ntsopi, Tumelo jacquiline; Mokoena, Douglas	Advancing Students' Academic Excellence in Distance Education: Exploring the Potential of Generative AI Integration to Improve Academic Writing Skills
E88	*IEEE Transactions on Learning Technologies*	2024	Tossell, Chad C.; Tenhundfeld, Nathan L.; Momen, Ali; Cooley, Katrina; de Visser, Ewart J.	Student Perceptions of ChatGPT Use in a College Essay Assignment: Implications for Learning, Grading, and Trust in Artificial Intelligence
E89	*Language Learning & Technology*	2024	Woo, David James; Susanto, Hengky; Yeung, Chi Ho; Guo, Kai; Fung, April Ka Yeng	Exploring AI-Generated text in student writing: How does AI help?
E90	*Languages*	2024	Jiang, Zilu; Xu, Zexin; Pan, Zilong; He, Jingwen; Xie, Kui	Exploring the Role of Artificial Intelligence in Facilitating Assessment of Writing Performance in Second Language Learning
E91	*International Journal of Educational Technology in Higher Education*	2024	Barrett, Alex; Pack, Austin	Not quite eye to AI: student and teacher perspectives on the use of generative artificial intelligence in the writing process
E92	*Education Sciences*	2024	Pellas, Nikolaos	The Effects of Generative AI Platforms on Undergraduates' Narrative Intelligence and Writing Self-Efficacy

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E1	*International Journal for Educational Integrity*	Education & Educational Research (Q1) / Education (Q1) - Social Sciences (Q1)	3.8/1.95	12	WOS / Scopus	21
E2	*Research in Education and Learning Innovation Archives-Realia*	Education & Educational Research (Q3)	1/0.34	3	WOS	38
E3	*Frontiers in Education*	Education & Educational Research (Q2) / Education (Q2)	1.9/1.04	31	WOS / Scopus	91
E4	*Journal of Asia TEFL*	Education & Educational Research (Q4) / Education (Q3) - Linguistic and Language (Q2)	0.4/0.31	10	WOS / Scopus	43
E5	*Cogent Education*	Education & Educational Research (Q2) / Education (Q2)	1.5/0.86	37	WOS / Scopus	78
E6	*International Journal of Management Education*	Business(Q1) - Education & Educational Research (Q1) - Management (Q1)/ Education (Q1) - Strategy and Management (Q1)	6/2.1	17	WOS / Scopus	80
E7	*London Review of Education*	Education & Educational Research (Q2)	1.9/0.78	26	WOS	54
E8	*European Journal of Engineering Education*	Education & Educational Research (Q2) / Education (Q1) - Engineering (Q1)	2.0/1.07	21	WOS / Scopus	62
E9	*Journal of University Teaching and Learning Practice*	Education & Educational Research (Q2) / Education (Q2)	2/0.96	140	WOS / Scopus	96
E10	*Journal of Educational Computing Research*	Education & Educational Research (Q1) / Education (Q1) - Computer Sciences Applications (Q1)	4/2.35	6	WOS / Scopus	51
E11	*International Journal of Educational Technology in Higher Education*	Education & Educational Research (Q1) / Education (Q1) - E-Learning (Q1) - Computer Science Applications (Q1)	8.6/3.95	58	WOS / Scopus	96
E12	*Círculo de lingüística Aplicada a la comunicación*	Language & Linguistic (Q3) - Linguistic (Q4) / Linguistic and Language (Q1)	0.7/0.33	0	WOS / Scopus	30
E13	*Information Technologies and Learning Tools*	Education & Educational Research (Q4/Q3)	0.5/0.41	1	WOS	40

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E14	*Aula de Encuentro*	Education & Educational Research (Q4)	0.3/0.11	0	WOS	17
E15	*RELC Journal*	Linguistic (Q1) / Education (Q1) - Linguistics and Language (Q1)	3.6/1.77	5	WOS / Scopus	29
E16	*Turkish Online Journal of Distance Education*	Education & Educational Research (Q2) / Education (Q2)	1.9/0.9	8	WOS / Scopus	76
E17	*Science Editing*	Communication(Q2/Q3) / Communication(Q2) - Health Informatics(Q3)	1.6/0.61	1	WOS / Scopus	15
E18	*PLOS ONE*	Multidisciplinary Sciences (Q1)/ Agricultural and Biological Sciences (Q1)- Biochemistry, Genetics and Molecular Biology (Q1)- Medicine (Q1)- Multidisciplinary (Q1)	2.9/0.88	0	WOS/ Scopus	48
E19	*Otolaryngology—Head and Neck Surgery (OTO Journal)*	Otorhinolaryngology (Q1)-Surgery (Q1)/Medicine (Q1)-Otorhinolaryngology (Q1)-Surgery (Q1)	2.6/1.39	14	WOS/ Scopus	14
E20	*Computers and Composition*	Computer Science (Q2)- Education (Q1)- Linguistics and Language (Q1)	(impact score: 1.55/SJR:0.70)	3	Scopus	30
E21	*Social Sciences & Humanities Open*	Decision Sciences (Q2)- Psychology (Q2)-Social Sciences (Q1)	(cite score: 4.2/ SJR: 0.69)	0	Scopus	23
E22	*RELC Journal*	Linguistics (Q1)/ Education (Q1)- Linguistics and Language (Q1)	3.6/1.77	0	WOS/ Scopus	40
E23	*Contemporary Educational Technology*	Education & Educational Research (Q1)/ Education (Q2) Management of Technology and Innovation (Q2)	2.4/1.43	15	WOS/ Scopus	60
E24	*Research Ethics*	Ethics (Q2) Medical Ethics (Q2) Social Issues (Q2)/ Education (Q2) Philosophy (Q1)	2.1/0.89	34	WOS/ Scopus	49

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E25	*Data and Metadata*	Computer Science (Q3)-Health Information Management (Q4)-Information Systems (Q3)-Information Systems and Management (Q3)	(cite score: 4.1/ SJR: 0.25)	23	Scopus	28
E26	*Comunicar*	Communication (Q1) Education & Educational Research (Q1)/ Communication (Q1)-Cultural Studies (Q1)-Education (Q1)	5.1/2.99	10	WOS/ Scopus	49
E27	*Arab World English Journal*	Language & Linguistics (Q2)	0.6/0.83	7	WOS	32
E28	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	7	WOS/ Scopus	41
E29	*Assessing Writing*	Education & Educational Research (Q1)-Linguistics (Q1)/ Education (Q1)-Linguistics and Language (Q1)	4.2/2.32	71	WOS/ Scopus	12
E30	*Interactive Learning Environments*	Education & Educational Research (Q1)/ Education (Q1)- Computer Science (Q1)- E-Learning (Q1)	3.7/1.94	12	WOS/ Scopus	60
E31	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	105	WOS/ Scopus	80
E32	*Perspectiva Educacional*	Education & Educational Research (Q3)	0.7/0.19	1	WOS	40
E33	*Journal of Language and Education*	Education & Educational Research (Q3)- Linguistics (Q2)/ Education (Q3) Linguistics And Language (Q2)	1/0.44	4	WOS/ Scopus	28
E34	*Australasian Journal of Educational Technology*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)	3.3/1.83	0	WOS/ Scopus	67

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E35	*Register Journal*	Education & Educational Research (Q4)- Linguistics (Q4)	0.4/0.56	0	WOS	40
E36	*South African Journal of Higher Education*	Education & Educational Research (Q3)	0.6/0.35	0	WOS	29
E37	*International Journal of Adult Education and Technology-IJAET*	Education & Educational Research (Q4)	0.2/0.11	3	WOS	35
E38	*Journal of Academic Language and Learning*	Education & Educational Research (Q3)	0.7/0.39	4	WOS	37
E39	*Assessment & Evaluation in Higher Education*	Education & Educational Research (Q1)/ Education (Q1)	4.1/1.97	0	WOS/ Scopus	32
E40	*Innovations in Education and Teaching International*	Education & Educational Research (Q2)/ Education (Q1)	1.9/0.89	0	WOS/ Scopus	48
E41	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)- Library and Information Sciences (Q1)	4.8/2.51	1	WOS/ Scopus	
E42	*Electronic Journal of E-learning*	Education & Educational Research (Q1)/ Computer Science Applications (Q2) Education (Q2) E-Learning (Q2)123	2.4/1.2	1	WOS/ Scopus	45
E43	*IEEE Transactions on Learning Technologies*	Computer Science, Interdisciplinary Applications (Q2) Education & Educational Research (Q1)/ Education (Q1) Computer Science Applications (Q1) E-Learning (Q1) Engineering (Q1)	2.9/1.09	2	WOS/ Scopus	118
E44	*Journal of Educational Evaluation for Health Professions*	Education, Scientific Disciplines (Q1)/ Education (Q1) Health Professions (Q1) Medicine (Q3)	9.3/1.16	6	WOS/ Scopus	14

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E45	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	77	WOS/ Scopus	56
E46	*Perspectives on Medical Education*	Education, Scientific Disciplines (Q1) Health Care Sciences & Services (Q1)/ Education (Q1) Medicine (Q1)	4.8/1.28	19	WOS/ Scopus	16
E47	*Innovations in Education and Teaching International*	Education & Educational Research (Q2)/ Education (Q1)	1.9/0.89	0	WOS/ Scopus	22
E48	*Journal of Teaching in Travel & Tourism*	Education & Educational Research (Q1)/ Education (Q2) Tourism, Leisure and Hospitality Management (Q3)	1.3/1.96	0	WOS/ Scopus	27
E49	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	0	WOS/ Scopus	96
E50	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	0	WOS/ Scopus	44
E51	*International Journal of Applied Linguistics*	Education & Educational Research (Q2) Linguistics (Q2)/ Linguistics and Language (Q1)	1.5/1.12	0	WOS/ Scopus	54
E52	*Higher Education Research & Development*	Education & Educational Research (Q1)/ Education (Q1)	2.6/1.51	1	WOS/ Scopus	42
E53	*Journal of Chemical Education*	Chemistry, Multidisciplinary (Q2) Education, Scientific Disciplines (Q2)/ Chemistry (Q2) Education (Q2)	2.5/0.92	1	WOS/ Scopus	54

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E54	*Techtrends*	Education & Educational Research (Q1)/ Computer Science Applications (Q2) Education (Q1)	2.2/1.14	0	WOS/ Scopus	43
E55	*Language Learning in Higher Education*	Education & Educational Research (Q1)/ Education (Q3) Linguistics and Language (Q3)	0.7/0.3	1	WOS/ Scopus	35
E56	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	0	WOS/ Scopus	21
E57	*Arab World English Journal*	Language & Linguistics (Q2)	0.6/0.83	0	WOS	53
E58	*Arab World English Journal*	Language & Linguistics (Q2)	0.6/0.83	0	WOS	24
E59	*Arab World English Journal*	Language & Linguistics (Q2)	0.6/0.83	0	WOS	57
E60	*Smart Learning Environments*	Education & Educational Research (Q1)/Computer Science Applications (Q1)	6.7/3.04	3	WOS/ Scopus	48
E61	*RIE-Revista de Investigación Educativa*	Education & Educational Research (Q1) / Education (Q2)	1.2/1.14	0	WOS/ Scopus	39
E62	*Brock Education-a Journal of Educational Research and Practice*	Education & Educational Research (Q2)	1.6/1.79	0	WOS	40
E63	*Cogent Education*	Education & Educational Research (Q2) / Education (Q2)	1.5/0.86	0	WOS / Scopus	50
E64	*Quality Assurance in Education*	Education & Educational Research (Q2) / Education (Q2)	1.5/0.81	0	WOS/ Scopus	41

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E65	*Technology Knowledge and Learning*	Education & Educational Research (Q1) / Computational Theory and Mathematics (Q1) Computer Science Applications (Q1) Education (Q1) Engineering (Q1) Human-Computer Interaction (Q1) Mathematics (Q1) Theoretical Computer Science (Q1)	3/1.65	0	WOS/ Scopus	22
E66	*Journal of Academic Ethics*	ETHICS (Q1)/ Arts and Humanities (Q1) Education (Q2) Philosophy (Q1) Sociology and Political Science (Q2)	2.2/0.71	2	WOS/ Scopus	46
E67	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)-Library and Information Sciences (Q1)	4.8/2.51	0	WOS/ Scopus	91
E68	*International Journal of Educational Technology in Higher Education*	Education & Educational Research (Q1) / Education (Q1) - E-Learning (Q1) - Computer Science Applications (Q1)	8.6/3.95	3	WOS/ Scopus	53
E69	*Journal of Adolescent & Adult Literacy*	Education & Educational Research (Q3)/ Education (Q2)	0.9/0.45	1	WOS/ Scopus	37
E70	*ELT Journal*	Education & Educational Research (Q1) Linguistics (Q1)	3.1/2.08	0	WOS	12
E71	*Internet and Higher Education*	Education & Educational Research (Q1)/ Computer Networks and Communications (Q1) Computer Science Applications (Q1) Education (Q1) E-Learning (Q1)	6.4/4.13	0	WOS/ Scopus	71

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E72	*Education and Information Technologies*	Education & Educational Research (Q1)/ Education (Q1)-E-Learning (Q1)- Library and Information Sciences (Q1)	4.8/2.51	0	WOS/ Scopus	41
E73	*BMC Medical Education*	Education & Educational Research (Q1) Education- Scientific Disciplines (Q1)/ Education(Q1) Medicine (Q1)	2.7/1.52	2	WOS/ Scopus	37
E74	*International Journal for Educational Integrity*	Education & Educational Research (Q1) / Education (Q1) - Social Sciences (Q1)	3.8/1.95	0	WOS/ Scopus	59
E75	*Computer Assisted Language Learning*	Education & Educational Research (Q1)- Linguistics (Q1)/ Computer Science Applications (Q1)- Linguistics and Language (Q2)	6/3.56	0	WOS/ Scopus	48
E76	*Studies in Higher Education*	Education & Educational Research (Q1)/Education (Q1)	3.7/2.13	11	WOS/ Scopus	38
E77	*Changing English-studies In Culture and Education*	Education & Educational Research (Q3)/Cultural Studies (Q1) Education (Q2)	0.7/0.38	2	WOS/ Scopus	61
E78	*Innovations in Education and Teaching International*	Education & Educational Research (Q2)/ Education (Q1)	1.9/0.89	4	WOS/ Scopus	40
E79	*Reading Teacher*	Education & Educational Research (Q2)/ Linguistics and Language (Q1) Pharmacology (Q3) Pharmacology (Medical) (Q3)	1.4/0.62	0	WOS/ Scopus	37
E80	*Smart Learning Environments*	Education & Educational Research (Q1)/Computer Science Applications (Q1) Education (Q1)	6.7/3.04	9	WOS/ Scopus	53

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E81	*Medical Teacher*	Education, Scientific Discipline (Q1) Health Care Sciences & Services (Q1)/Education (Q1) Medicine (Q2)	3.3/1.53	0	WOS/ Scopus	5
E82	*English Teaching-practice And Critique*	Education & Educational Research (Q3)- Linguistics (Q3)/ Education (Q3) Linguistics and Language (Q1)	0.8/0.66	1	WOS/ Scopus	30
E83	*Interdisciplinary Description of Complex Systems*	Social Sciences, Interdisciplinary (Q3)	0.6/0.24	0	WOS	11
E84	*Open Praxis*	Education & Educational Research (Q3)/ Education Category (Q2) Library and Information Sciences (Q2).	0.9/057	6	WOS/ Scopus	59
E85	*International Journal of Technology in Education*	Education & Educational Research (Q2)	1.9/1.04	1	WOS	91
E86	*Research And Practice in Technology Enhanced Learning*	Education & Educational Research (Q2)/ Education (Q1) Media Technology (Q1) Management of Technology and Innovation (Q2) Social Psychology (Q2)	3.1/1.74	3	WOS/ Scopus	76
E87	*Open Praxis*	Education & Educational Research (Q3)/ Education Category (Q2) Library and Information Sciences (Q2).	0.9/057	0	WOS/ Scopus	87
E88	*IEEE Transactions on Learning Technologies*	Computer Science, Interdisciplinary Applications (Q2) Education & Educational Research (Q1)/ Education (Q1) Computer Science Applications (Q1) E-Learning (Q1) Engineering (Q1)	2.9/1.09	17	WOS/ Scopus	87
E89	*Language Learning & Technology*	Education & Educational Research (Q1)- Linguistics (Q1)	3.5/1.57	2	WOS	34

Appendix 2. Impact Factor, Quartile, and Citations of Studies Reviewed (continued).

Article	Publication Title	JCR Category (Category Quartile)	Journal Impact Factor / Journal Citation Indicator	Citations	Databases	References
E90	*Languages*	Linguistics (Q1)/ Linguistics and Language (Q1)	0.9/0.9	1	WOS/ Scopus	18
E91	*International Journal of Educational Technology in Higher Education*	Education & Educational Research (Q1) / Education (Q1) - E-Learning (Q1) - Computer Science Applications (Q1)	8.6/3.95	20	WOS/ Scopus	52
E92	*Education Sciences*	Education & Educational Research (Q1)/ Computer Science Applications (Q2) Computer Science (Q2) Developmental and Educational Psychology (Q2) Education (Q2) Physical Therapy, Sports Therapy and Rehabilitation (Q2) Public Administration (Q2)	2.5/1.46	3	WOS/ Scopus	34

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