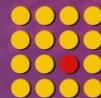




HORIZONTE ACADÉMICO

Transformando la educación: aplicaciones prácticas de las tecnologías en el aula

Coords.
Luisa Vega Caro
Alba Vico Bosch



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TRANSFORMANDO LA EDUCACIÓN:
APLICACIONES PRÁCTICAS DE LAS TECNOLOGÍAS EN EL AULA



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LUISA VEGA CARO
ALBA VICO BOSCH





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TRANSFORMANDO LA EDUCACIÓN: APLICACIONES PRÁCTICAS DE LAS TECNOLOGÍAS EN EL AULA

Diseño de cubierta y maquetación: Francisco Anaya Benítez

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Sevilla – 2024

N.º 35 de la colección Horizonte Académico

Primera edición, 2024

ISBN: 978-84-1177-069-9

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USING AI IN LANGUAGE TEACHING: OPPORTUNITIES AND CONCERNS

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1. INTRODUCTION

The concept of Artificial Intelligence (AI) is considerably broad given that it encompasses a wide spectrum of technologies and applications, although in general lines, and to provide a simple definition, AI refers to machine-produced human-like behaviour. In order to be able to mimic human linguistic or artistic production, among other things, AI models need to be trained with extensive input. Even though AI might sound or seem cutting-edge technology, it is not a novel concept and its roots stretch back decades; yet it seems that it has taken us off guard and caught us flat-footed. In any case, it is undeniable that AI is a revolutionary tool that has irrupted onto the world stage, leaving us to deal with its possible dilemmas and explore potential benefits from an ethical perspective.

It goes without saying that innovation has always had its critics, and AI is no exception. The emergence of this technology has urged humans to adapt, which is not always welcome, to a changing landscape where some tasks have been (or will be) delegated to AI. Automated tasks have been taken over by AI, and there has been a shift in human roles towards tasks less easily automated, such as those involving emotional intelligence, ethical issues, decision-making, and social interaction. Just as AI is transforming other domains, knowledge-building and learning are not immune to it and they are also poised for a significant shift. In the

education landscape, AI is playing an increasingly influential role, offering numerous opportunities alongside a host of challenges, which have been found in the literature analysed in this chapter. Nevertheless, despite its current burgeoning nature, integrating AI into daily pedagogical practices remains a challenge for education stakeholders (Zawaki-Richter et al., 2019). Moreover, the potential stigmas associated with the use of AI, added to the reluctance of ICT use (Prensky, 2008) might discourage educators with an experimental mindset from exploring its applications and discovering new teaching methodologies. The notion of having machines generating text akin to human expression and communication has become a source for concern that carries the aforementioned stigma. However, some authors have identified the bright side to the bleak outlook that others have portrayed, highlighting the potential benefits and opportunities that arise from the integration of such technology in academic settings. Some envision AI as a time-saving tool for teachers (Bryant et al., 2020; Miao et al., 2021), others worry about a potential shift in focus towards technology-driven instruction, neglecting the irreplaceable role of the human element in the classroom (e.g. Seldon & Abidoye, 2018). However, the reality is that AI-powered learning systems have been primarily focused on supporting learners directly, rather than replacing teachers (du Boulay, 2016). For instance, AI tools have been developed to automatically assess learner assignments, although their ability to provide comprehensive and insightful feedback lags behind human teachers. While AI may assist in saving teacher time, it cannot fully replace the human element in providing nuanced evaluation and guidance (Byrne et al., 2010; Holmes et al., 2019; Kim & Kim, 2022). In other words, the human element should not be treated as a mere accessory but rather as an essential and integral part of the learning process.

This transformation invites a critical evaluation aligned with the Council of Europe's (2019) core values, underscoring human rights, democracy, and the rule of law. It is in this context that human intervention is needed to ensure an ethical use of this technological asset. Evidently, it is essential to channel AI towards providing education stakeholders with cutting-edge tools and resources relevant to the 21st century, but

without forgetting that some ground rules should be established. Against this backdrop, the concepts of “digital citizenship” and “AI literacy” emerge as crucial considerations in navigating this evolving terrain (Holmes et al., 2022a). In the digital realm, the term “digital citizenship” denotes the conscientious and ethical utilisation of technology and the internet. It encapsulates a range of behaviours, rights, and responsibilities that individuals are encouraged to uphold while navigating the digital world — focusing on aspects such as netiquette, privacy, security, and respect. Additionally, digital citizenship underscores the cultivation of critical thinking skills, vital for evaluating information in our progressively interconnected and technology-oriented society (Council of Europe, 2019). The cultivation of digital citizenship skills plays a pivotal role in tempering the enthusiasm around AI, especially when it comes to critical thinking, preventing the formation of unrealistic expectations around AI. Both unbridled hype and dismissive negativity might create barriers to the implementation of AI, leading to perpetuate the misconception of AI as a silver bullet, both for teachers and learners. Acknowledging its role as a tool with limitations that can contribute to positive impacts is the first step to exploring the potential it holds. In other words, maintaining a balanced perspective is crucial when approaching the integration of AI to ensure a more informed and realistic assessment of its capabilities and limitations (Holmes et al., 2022b).

1.1. THEORETICAL BACKGROUND

Within the field of education, Computer-Assisted Language Learning (CALL) and e-learning approaches as well as the integration of AI-powered tools have gained attention among linguists and language instructors (Schmidt & Strasser, 2022). For these professionals, AI is perceived as a multifaceted tool that has the potential to offer innovative solutions that enhance language learning outcomes. With recent advancements in natural language processing, deep learning, and networked learning, along with the enhanced capacity to handle vast datasets, contemporary AI holds significant promise for language studies overall, particularly in the domain of foreign language education (Liang et al., 2021).

So far, the exploration of AI subfields such as Natural Language Processing (NLP) has contributed to generating more intricate descriptions of natural languages, refining corpora processing, and developing comprehension of the cognitive processes involved in human verbal communication (Pokrivcakova, 2019; Posekany & Dolezal, 2024). In this sense, NLP can enhance educational technology in several ways. When applying AI into foreign language education, NLP techniques can be used for tasks such as language modelling, sentiment analysis, automation and summarization, among others (Raina & Krishnamurthy, 2022). A clear example would involve the implementation of NLP in order to automate the scoring of students' writings concerning linguistic aspects like grammatical accuracy and organisational structure (Litman, 2016; Shermis & Burstein, 2013). Other studies have investigated the implementation of algorithms for the development of a novel deep collaborative learning resource recommendation model in order to make data analysis more effective (Wang, 2023). In line with this, the design of customised instructional content has also been considered (Vu et al., 2022), benefiting both learners and educators. Thus, while personalised guidance for learners can enhance their learning experience, AI can also help alleviate teacher workload and burnout (Hashem et al., 2024). In this regard, it is not surprising that, depending on the needs of the learning community (i.e. students, educators, institutions), AI aids can be categorised as learner-facing, teacher-facing or system-facing systems (Baker & Smith, 2019).

AI-powered tools, especially those leveraging Machine Learning (ML), are integral to computer linguistics, facilitating the development of programming languages, machine translations, and enhancing human-machine communication through speech recognition and synthesis technologies (Pokrivcakova, 2019). In language education, ML algorithms serve to analyse large datasets of linguistic information, identify patterns, and generate insights that lead to instructional design and personalised learning experiences. Some techniques such as classification, clustering, and regression may be applied to tasks that may require language proficiency assessment, error detection and correction, and adaptive learning, thereby having a positive impact in students'

communicative competence. In fact, there has been a growing interest in exploring whether error detection methods developed for machine translation systems could be adapted for language learners (Xue & Hwa, 2010), taking into account that, when integrated with virtual reality, students are able to improve their grammatical proficiency in the target language, as reported by Ma (2021).

In line with this, it is without doubt that AI writing assistants, based on both Natural Language Processing (NLP) and Machine Learning (ML) systems, have become invaluable aids in the field of foreign language education (Pokrivcakova, 2019). Evidence may be found in the use of Grammarly (Alam et al., 2023; Fitria, 2021), which assists users across multiple stages of the writing process, a concept referred to as augmented writing. These AI systems extend beyond simple grammatical error correction, offering suggestions for future improvements and additional resources for continued learning. By empowering learners to self-correct and reflect on their writing process, these tools also promote autonomy and independence.

As regards AI chatbots, the proliferation of chatbots such as ChatGPT or Gemini (previously known as Google Bard) has increased attention among scholars (Bašić et al., 2023; Jeon et al., 2023; Gill et al., 2024; Yan, 2023). The usability of ChatGPT for formal English language learning has been assessed, examining its impact from learning, social and ethical perspectives (Kostka & Toncelli, 2023; Pack & Maloney, 2023). Other researchers have endeavoured to integrate Intelligent Personal Assistants (IPAs) into their language classrooms, as pointed out by Dizon (2020), due to their capacity to incorporate specific, goal-oriented tasks alongside general task assistance. The implementation of these tools presents a new opportunity for future exploration, employing effective prompts and nurturing metacognitive strategies for language acquisition, as highlighted in the research by Kohnke et al. (2023).

Given the novel and varied features of AI tools, this paper seeks to examine the opportunities and obstacles associated with their integration in language education settings. To this end, the objectives and the methodological approach of this study will be outlined below.

2. OBJECTIVES

The purpose of this paper is to investigate the advantages, limitations, and potential obstacles associated with the incorporation of AI in the domain of foreign language instruction. To accomplish this, a thorough examination of the existing literature has been undertaken. On the one hand, the purpose is to provide a brief summary of contemporary studies relating to AI use in the classroom that might be relevant to educators. On the other hand, we aim to determine the frequency of use of positive or negative words in the existing body of research. Therefore, this study will focus on two research questions:

- How frequent are positive and negative words in research regarding the use of AI in education?
- What are the advantages and disadvantages of AI use in education reported in the literature?

3. METHODOLOGY

In this section, the sample examined for the purpose of this study will be provided. Furthermore, a comprehensive overview of the data analysis and the tool employed in this study will be given.

3.1. SAMPLE

In crafting our methodology, we conducted a thorough analysis of 40 peer-reviewed academic articles published between 2021 and 2024 in journals such as *Internet of Things and Cyber-Physical Systems*, *Management Learning*, *International Journal of Artificial Intelligence in Education*, *Frontiers in Education*, and *Procedia Computer Science*, among others.

The carefully selected literature was sourced from reputable databases such as Scopus, Research Gate, the Council of Europe, and university repositories like UCL Discovery or ACM Digital Library. This comprehensive approach ensures a diverse and authoritative representation of scholarly perspectives. The search terms and strings used to find the

papers for study were: “artificial intelligence in education”, “artificial intelligence in teaching”, “artificial intelligence in learning”, “artificial intelligence in teaching and learning”, “artificial intelligence in language education”, “artificial intelligence in language teaching”, “artificial intelligence in language learning”, “artificial intelligence in language teaching and learning”, “artificial intelligence in foreign language teaching”, “artificial intelligence in foreign language learning”, “artificial intelligence in foreign language teaching and learning”, “artificial intelligence in second language teaching”, “artificial intelligence in second language learning”, “artificial intelligence in second language teaching and learning”.

Table 1 illustrates the databases employed for the selection of papers as well as the total number of documents examined in each category.

TABLE 1. *Corpus information.*

Databases	No. of documents	No. Of tokens	No. of words	No. of sentences
Scopus	40	560,595	398,894	19,407
Research Gate				
University repositories				

3.2. DATA ANALYSIS

This research employs a mixed-method approach, combining qualitative and quantitative analyses to explore not only the advantages and disadvantages of AI tools in education based on the polarity of the words included in the corpus under study. After a deep reading of the selected articles, the advantages and disadvantages found in the literature were extracted and summarised. Later on, a well-known corpus software known as Sketch Engine was employed to determine the occurrence of linguistic items, whose functionalities allowed for the generation of frequency lists and statistical data from corpora. Subsequently, a manual screening process was carried out to include or exclude lexical items

relevant to the concept of this study. These items were those carrying positive and negative connotations of the use of AI in education considering the linguistic context in which they occurred. The resulting corpus is portrayed in Table 2. As seen in Table 2, three grammatical categories were considered, namely nouns, adjectives and adverbs. The affective meanings of these terms were pivotal for the development of our framework.

TABLE 2. *Classification of items under analysis.*

Nouns	Adjectives	Adverbs
student, education, teacher, language, research, assessment, feedback, teaching, writing, performance, problem, interaction, classroom, quality, opportunity, educational, assistant, engagement, instruction, reliability, educator, management, motivation, concern, instructor, accuracy, innovation, improvement, competency, implementation, English, effectiveness, achievement, assistance, consequence, burnout, grade, advantage, academic, coregulation, attitude, attention, acquisition, success, grammar, e-learning, awareness, scaffolding, workload, automation, regulation, proficiency, interactive, confidence, security, anxiety, retention, usefulness, decision-making, self-assessment, responsibility, homework, creativity, availability, distance, administration, ethics, personalization, problems, attribution, lecturer, autonomy, barrier, gain, validity, revision, bottleneck, accessibility, weakness, personalisation fraud, interactivity, inaccuracy, e-feedback, innovator, language-learning, self-awareness, self-motivation	pedagogical, ethical, formative, automated, personalised, automatic, interactional. Instructional. self-regulated, significant, personal, interactive, negative, practical, useful, emotional, administrative, foreign, written, responsible, dynamic, enhanced, real-time, authentic, correct, powerful, autonomous, corrective, reliable, informed, timely, knowledge-based, assistant, scholarly, computer-assisted, continuous, transformative, summative, productive, accessible, synchronous, motivational, customised, unethical, cost-effective	automatically, significantly, potentially, efficiently, easily, explicitly, positively, gradually, properly, slightly, accurately, critically, successfully, independently, negatively, systematically, adequately, individually, immediately, ethically, appropriately, dramatically, consistently, considerably, autonomously, pedagogically, responsibly, rigorously, scientifically, wrongly, proactively, instantly, repeatedly, drastically, academically, meticulously, exponentially

The next section will delve into the main opportunities and challenges identified when applying AI in education.

4. ANALYSIS AND DISCUSSION

In this section, the corpus compiled from the selected literature will be analysed, including word frequency of the deemed relevant lexical items as well as the opportunities and concerns reported in the said literature drawing from the corpus.

4.1. RESEARCH QUESTION 1: POSITIVE AND NEGATIVE ASPECTS

The results derived from the analysis based on the use of AI in education reveals interesting insights. When dealing with nouns, relatable trends can be noticed. Words such as “student”, “education”, “teacher”, “language” and “research” are among the most frequently used terms (see Table 3 below). These words reflect a focus on several aspects of the educational process, including student learning, teaching practices, language acquisition, and educational research, suggesting a positive outlook on the integration of AI in educational settings. The selection of these terms as keywords for the literature search suggests their potential relevance to the research question, and consequently, their high frequency within the retrieved literature is expected. Automation is another critical aspect worth considering, as it facilitates feedback mechanisms and the implementation of effective teaching strategies in AI-enabled education. This is evident from the frequency of terms like “assessment” (776), “feedback” (706), “teaching” (664), and “performance” (461), indicating the potential for reducing teachers' workload and enhancing students' personalised learning experiences.

Conversely, the word “problem” emerges as the most prevalent word with a negative connotation, occurring 409 times. Following this, terms such as “concern” (140), “burnout” (82), and “anxiety” (46) also appear in the dataset, albeit less frequently. These items acknowledge a variety of challenges and concerns associated with the use of AI in education, including issues related to workload, teacher burnout, and student anxiety.

Other terms such as “automation”, “regulation”, “security”, and “ethics” may not be as recurrent as the ones mentioned before with 53, 52, 46 and 29 occurrences respectively. The identification of these nouns emphasises the need for responsible AI implementation and the protection of student data and privacy, taking into account ethical considerations, regulatory frameworks, and security measures in AI-driven educational environments.

TABLE 3. *Noun frequency.*

Item	Frequency	Relative Frequency
student	3595	6412,82923
education	2711	4835,93325
teacher	1346	2401,02034
language	1219	2174,47533
research	1195	2131,66368
assessment	776	1384,24353
feedback	706	1259,3762
teaching	664	1184,4558
writing	486	866,93602
performance	461	822,34055
problem	409	729,58196
interaction	309	551,20006
classroom	299	533,36187
quality	295	526,2266
opportunity	225	401,35927
educational	220	392,44018
assistant	209	372,81817
engagement	200	356,7638
instruction	184	328,22269
reliability	168	299,68159
educator	150	267,57285
management	145	258,65375
motivation	144	256,86993
concern	140	249,73466
instructor	139	247,95084
accuracy	138	246,16702
innovation	124	221,19355
improvement	122	217,62592
competency	122	217,62592
implementation	121	215,8421
English	120	214,05828
effectiveness	120	214,05828

achievement	97	173,03044
assistance	89	158,75989
consequence	83	148,05698
burnout	82	146,27316
grade	82	146,27316
advantage	81	144,48934
academic	80	142,70552
coregulation	80	142,70552
attitude	79	140,9217
attention	79	140,9217
acquisition	78	139,13788
success	77	137,35406
grammar	73	130,21879
e-learning	72	128,43497
awareness	72	128,43497
scaffolding	71	126,65115
workload	54	96,32622
automation	53	94,54241
regulation	52	92,75859
proficiency	51	90,97477
interactive	50	89,19095
confidence	47	83,83949
security	46	82,05567
anxiety	46	82,05567
retention	45	80,27185
usefulness	45	80,27185
decision-making	43	76,70422
self-assessment	43	76,70422
responsibility	43	76,70422
homework	42	74,9204
creativity	42	74,9204
availability	42	74,9204
distance	40	71,35276
administration	39	69,56894
ethics	29	51,73075
personalization	26	46,37929
problems	25	44,59547
attribution	25	44,59547
lecturer	24	42,81166
autonomy	24	42,81166
barrier	23	41,02784
gain	23	41,02784
validity	22	39,24402
revision	22	39,24402
bottleneck	19	33,89256

accessibility	19	33,89256
weakness	19	33,89256
personalisation	16	28,5411
fraud	14	24,97347
interactivity	8	14,27055
inaccuracy	5	8,91909
e-feedback	4	7,13528
innovator	4	7,13528
language-learning	3	5,35146
self-awareness	3	5,35146
self-motivation	3	5,35146

Regarding adjective use, what stands out in Table 4 below is the close frequency rate between the two top adjectives: “pedagogical” and “ethical”, which might suggest a confluence of interest and concern. While the potential applications of AI in learning environments undoubtedly raise interest, the common appearance of the adjective “ethical” hints at the imperative to acknowledge ethical considerations and prioritise responsible practices. The chosen relevant words that follow these are mostly related to assessment and feedback or learning. Related to assessment, adjectives such as “formative”, “automated” or “summative” with 193, 183 and 27 occurrences respectively might reveal a genuine interest in exploiting AI-powered tools to perform less cognitively demanding tasks that do not require critical thinking skills or creativity and where automation and efficiency are prioritised. The high frequency of adjectives such as “automated” (183), “personalised” (163), “real-time” (47), “corrective” (34), “timely” (32), “continuous” (29) and “synchronous” used with “feedback” in the retrieved literature suggests a strong interest in leveraging AI-powered tools to provide learners with instant and tailored input on their learning or work. Furthermore, the literature suggests a potential emphasis within the field of AI in education on promoting autonomous learning facilitated by AI-powered software considering the high-frequency of words such as “self-regulated” (115), “autonomous” (35), “assistant” (30), “computer-assisted” (29) or “accessible” (25). While the high frequency of the adjective “negative” (103) often used with nouns like “consequences” or “impact” suggests potential concerns among education stakeholders about the use of AI in learning,

the presence of adjectives like “responsible” (55) with “implementation” or “integration”, and the adjective “reliable” (34) highlights a focus on ethical and trustworthy applications. Additionally, the appearance of “unethical” (7) might emphasise the need to address potential misuse of AI data sources and practices. Nevertheless, it is worth noting that these last negatively nuanced adjectives are not as frequent compared to the aforementioned positive ones. This might be due to the current enthusiasm surrounding AI software and the existing eagerness to implement it in education in order to maximise its potential.

TABLE 4. *Adjective frequency.*

Item	Frequency	Relative Frequency
pedagogical	222	396,00781
ethical	203	362,11525
formative	193	344,27706
automated	183	326,43887
personalised	163	290,76249
automatic	131	233,68029
interactional	117	208,70682
instructional	117	208,70682
self-regulated	115	205,13918
significant	113	201,57154
personal	112	199,78773
interactive	104	185,51717
negative	103	183,73335
practical	97	173,03044
useful	93	165,89516
emotional	91	162,32753
administrative	74	132,0026
foreign	70	124,86733
written	60	107,02914
responsible	55	98,11004
dynamic	49	87,40713
enhanced	48	85,62331
real-time	47	83,83949
authentic	42	74,9204
correct	42	74,9204
powerful	42	74,9204
autonomous	35	62,43366
corrective	34	60,64985
reliable	34	60,64985

informed	33	58,86603
timely	32	57,08221
knowledge-based	31	55,29839
assistant	30	53,51457
scholarly	29	51,73075
computer-assisted	29	51,73075
continuous	29	51,73075
transformative	27	48,16311
summative	27	48,16311
productive	26	46,37929
accessible	25	44,59547
synchronous	25	44,59547
motivational	21	37,4602
customised	11	19,62201
unethical	7	12,48673
cost-effective	4	7,13528
inaccuracy	5	8,91909
e-feedback	4	7,13528
innovator	4	7,13528
language-learning	3	5,35146
self-awareness	3	5,35146
self-motivation	3	5,35146

As with nouns, the incidence of adverbs is closely linked to the word “automatically” (see Table 5). Other terms such as “significantly” and “potentially” are frequently mentioned, indicating a prevalent focus on the benefits and opportunities associated with AI integration in educational settings. Hence, these linguistic devices suggest a recognition of the potential for AI to enhance efficiency, effectiveness, and overall quality in various aspects of education.

Likewise, words like “efficiently”, “easily” and “explicitly” give prominence to enhancements in procedures, user-friendliness, and clear implementation strategies within AI-enabled educational practices. The recurring mention of “positively” and “gradually” further accentuates the perceived positive trajectory and gradual adoption of AI technologies in education, indicating a sense of optimism and steady advancement over time.

On the other hand, the presence of negative words, such as “negatively” and “wrongly”, suggests an acknowledgment of potential challenges,

drawbacks, or misapplications associated with AI in education. While less frequent, terms like “drastically” indicate instances where significant and potentially concerning changes or impacts resulting from AI implementation may be observed.

TABLE 5. *Adverb frequency.*

Item	Frequency	Relative Frequency
automatically	80	142,70552
significantly	58	103,4615
potentially	44	78,48804
efficiently	30	53,51457
easily	28	49,94693
explicitly	28	49,94693
positively	26	46,37929
gradually	26	46,37929
properly	22	39,24402
slightly	22	39,24402
accurately	20	35,67638
critically	20	35,67638
successfully	19	33,89256
independently	15	26,75728
negatively	15	26,75728
systematically	14	24,97347
adequately	9	16,05437
individually	9	16,05437
immediately	9	16,05437
ethically	8	14,27055
appropriately	8	14,27055
dramatically	8	14,27055
consistently	8	14,27055
considerably	7	12,48673
autonomously	7	12,48673
pedagogically	6	10,70291
responsibly	5	8,91909
rigorously	5	8,91909
scientifically	5	8,91909
wrongly	5	8,91909
proactively	4	7,13528
instantly	4	7,13528
repeatedly	4	7,13528
drastically	3	5,35146
academically	3	5,35146
meticulously	3	5,35146
exponentially	3	5,35146

Overall, the analysis indicates a balanced perspective on the use of AI in education, with a predominant focus on its potential benefits and opportunities, tempered by an awareness of potential challenges and pitfalls. These findings contribute to a comprehensive understanding of the discourse surrounding AI in education and provide valuable insights for educators, policymakers, and researchers seeking to navigate this rapidly evolving landscape.

4.2. RESEARCH QUESTION 2: ADVANTAGES AND DISADVANTAGES

The advantages and disadvantages of AI in language teaching identified in this study were derived from a discourse analysis of the reviewed works based on the frequency of positively and negatively nuanced words, which is portrayed in the tables above.

Amid some of the potential advantages for learners, the literature identifies automated assessment (Hopfenbeck et al., 2023) as a significant benefit for both learners and teachers. On the one hand, it can benefit learners by providing immediate feedback (Luckin et al., 2016), which allows for on-time corrections and improved overall performance. Furthermore, AI can utilise algorithms to analyse students' responses and offer individualised feedback based on the students' needs (Yan, 2023). Research also highlights AI's potential to boost writing efficiency for students by providing real-time feedback, suggesting alternatives, and streamlining the writing process (Kim & Kim, 2022; Murphy, 2019). Additionally, AI also provides enhanced resource accessibility (Hwang et al., 2020), considering that AI helps in organising and providing access to educational resources. On the other hand, AI can also be beneficial for educators in alleviating workload, as found by Hashem et al. (2024). As regards teacher use, given that AI allows for personalised learning (Yan, 2023), as mentioned before, it may act as an assistant to educators in creating and tailoring learning materials based on individual student needs (Kasepalu et al., 2022; Ali, 2020). At the same time, AI tools might be useful for the automation of less creative tasks, making it possible for educators to focus on teaching-related work (Garret et al., 2020; Holmes et al., 2022) and not so much on administrative paperwork. In that regard, AI can be an ally

in providing support in reducing teacher workload and preventing burnout, as reported by Hashem et al. (2024).

On the other side of the spectrum lie the challenges yet to be addressed — or in the process of being addressed. The concerns that the literature has raised involving students have to do with, firstly, lack of human interaction (Baidoo-Anu & Owusu Ansah, 2023). It is worth noting that overreliance on AI may reduce meaningful human interaction, affecting the learning experience. Nevertheless, other authors (e.g., Barros et al., 2023) advocate for a shift in educators' roles whereby the educators adopt a mentorship-oriented approach and become guides and facilitators. In this new approach, the teachers' role in aiding students develop critical thinking skills is more crucial than ever before (Barros et al., 2023; Freire, 2005). Therefore, the adoption of a balanced approach to AI in education, where teachers retain their essential roles as mentors and guides, can alleviate concerns surrounding a potential loss of the human element in the learning process.

Secondly, some authors emphasise technological barriers (Prensky, 2008) that might come in the form of physical elements and lack of access to them, economical aspects, or psychological barriers. Prensky (2008) pinpoints those psychological barriers in teachers and their apprehension to the implementation of new technologies in education. However, this paints an incomplete picture, as learners too can be susceptible to apprehension and reluctance to less conventional learning methods.

Thirdly, the literature has also identified AI's limited contextual understanding (Vasalou et al., 2019) and struggle with linguistic nuances. This might be relevant for student use of AI since it might impact the quality of text production, for instance, when employed as a writing-assisting tool. Therefore, it must be used with caution and supplemented with human oversight to ensure accurate interpretation and understanding.

From the academic community perspective, educators may encounter a myriad of constraints that must be addressed to effectively harness the potential benefits of new technologies. These constraints span

attitudinal concerns, ethical considerations, technological barriers, teacher training programs, and maintenance costs, each presenting unique challenges that require careful navigation. For instance, attitudinal concerns towards new technologies represent a significant obstacle to their widespread adoption. Research by Kim & Kim (2022) and Holmes et al. (2022) highlights how resistance to change and apprehension towards unfamiliar technologies can impede their implementation in educational settings. Similarly, the fear of being replaced by technology, as identified by Holmes et al. (2022), poses a barrier to technology adoption among educators. Addressing these concerns requires proactive efforts to foster a culture of openness, flexibility, and innovation within academic institutions that prioritise the utilisation of technology to augment, rather than replace, human expertise in education.

The lack of familiarity with digital tools among teachers can result in frustration and an increased workload. Hence, there is an urgent requirement to revamp teacher training initiatives in order to equip educators with the essential competencies to seamlessly integrate technology into their teaching methodologies. These programmes should not only emphasise the acquisition of digital skills but also provide updates on ethical considerations such as data privacy, equity, and fairness in educational technology practices (Bin-Nashwan et al., 2023). Saputra et al. (2023) point out the importance of comprehensive and ongoing professional development initiatives aimed at empowering teachers to use technology to improve student learning outcomes.

By proactively addressing these challenges, educators can harness the transformative potential of technology to enhance teaching and learning outcomes for all students.

5. CONCLUSIONS

All in all, this paper has explored the multifaceted landscape of artificial intelligence (AI) in education, addressing two key research questions: (a) How frequent are positive and negative words in research regarding the use of AI in education?, and (b) What are the advantages and disadvantages of AI use in education reported in the literature?

As far as the first research question is concerned, it has been observed that often positively perceived words seem to be more frequently used in the literature reviewed for this study. While the studies predominantly present a positive view of AI, often bordering on optimism, they do acknowledge potential drawbacks. However, these negative aspects are mentioned with significantly less frequency. The observed disparity between the frequency of positive and negative words might be attributed to a potential bias in the analysed studies. This bias might be influenced by the prevalent enthusiasm to promote the use of AI-powered tools, leading researchers to focus on identifying and highlighting the potential advantages. Consequently, the emphasis placed on the benefits could lead to an under-representation of the limitations and drawbacks associated with AI in education.

When dealing with the second research question, through an exhaustive analysis of existing literature, we have identified both the advantages and challenges associated with the integration of AI tools in educational settings. Our results stress the significant benefits AI offers to both students and educators. Automation and personalization emerge as prominent advantages, enabling tailored learning experiences and alleviating teacher workload, thus fostering a conducive learning environment. However, the successful integration of AI in language education demands a pedagogically informed approach, taking into account various factors such as ethical concerns, pedagogical approaches, and teacher training courses. Prioritising personalised learning, efficient assessment methods, and ethical considerations is crucial. By embracing these strategies, educators can harness AI's transformative potential to enhance pedagogical practices and enrich classroom experiences.

The study described may be limited by researchers' own biases and influences when selecting the lexical items, namely nouns, adjectives and adverbs, from the corpus compiled. Furthermore, bias may also be present in article selection, which might mean that the chosen body of literature may not be representative of the research of AI in language education. Another limitation of this study is the fact that AI is a rapidly evolving field. To the date of writing this paper, we have attempted to include recent studies, but the literature chosen may not reflect the latest

findings of AI applicability in language teaching and learning when the chapter is published. Moreover, a potential limitation arises from the inherent and pre-existing limitations of the chosen studies. Several studies advocating for AI's positive outcomes were conducted in narrow contexts, restricting the generalisability and broader applicability of their findings.

Future research should continue to explore the evolving role of AI in education and its impact on teaching and learning outcomes. In line with this, efforts should be made to address the ethical implications of AI integration and develop guidelines to ensure responsible and equitable use of these technologies in educational contexts. Hence, by embracing AI technologies while remaining mindful of their limitations and ethical considerations, educators can harness their potential to enhance teaching practices, improve learning outcomes, and prepare students for success in the digital age.

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