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Ethical Frontiers of AI in Language Pedagogy: Navigating Transparency, Accountability, and Equity

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Abstract

The rapid integration of artificial intelligence (AI) into language education presents complex ethical challenges that demand critical examination. One way to explore the multifaceted ethical implications of AI tools in language teaching and learning through the lens of transparency, accountability, and equity is by drawing upon the OECD principles for responsible AI implementation. The study investigates three primary ethical dimensions: transparency in AI tool usage, accountability for AI-mediated learning outcomes, and equity in access and implementation. Through a comprehensive review of current literature and practical implementations, the paper explores guidelines for ethical AI integration into language education that prioritize student learning while mitigating potential technological risks. Recommendations emerging from the analysis include emphasizing the need for

transparent disclosure protocols, honing students' awareness of AI capabilities and limitations, and establishing responsible accountability mechanisms. The research ultimately argues for a balanced approach that leverages AI's transformative potential while maintaining human-centered pedagogical principles, highlighting the critical role of ongoing evaluation and adaptive strategies in navigating the ethical frontiers of AI in language education.

Keywords: AI in education, Language pedagogy, Ethical AI, Educational technology, Digital learning

1. Introduction

In the field of Second Language Acquisition (SLA), it is well known that language learning processes are as unique as the individuals who participate in them and the educational conditions, opportunities, and limitations they encounter. In the AI turn, the recent shift towards including AI-related technologies in language classrooms has implied the need to explore the ethical implications of the guidelines and practices adopted by policymakers and teachers to determine what benefits all learners and avoid reinforcing biases or inequalities through AI.

Regarding the individual, ethical concerns arise when student autonomy is taken for granted to the extent that students are attributed the sole responsibility for their learning, regardless of their background. Their personal and academic realities and experiences might not be determining factors in their journey in second language acquisition spaces. Other ethical challenges emerge when language development is conceptualized as a uniform and standardized process, ignoring learner diversity and agency and the learner's language learning goals.

With the rise of new technologies, especially generative artificial intelligence (GenAI), these challenges have become more relevant as focusing on students' notions of language learning is central to an equitable and inclusive use of technology. Power dynamics exist in designing and creating AI programs and determining who has privileged access to input information. This process significantly shapes AI's conceptual framework in the language education landscape. Those who can contribute information can shape the perspectives and ideas promoted by AI systems. Hence, with the integration of AI into second language education, policymakers and teachers must critically assess the cultural notions and worldviews embedded in these technologies. Teachers, positioned on the front lines, often experiment with AI tools in real time, facing limitations in vision, knowledge, and resources to evaluate the tools critically. This situation can lead to a process of trial and error that does not benefit learners. Therefore, educators need to develop critical analysis skills to use AI technologies intentionally and with a clear rationale and contribute to their responsible adoption in language teaching, ensuring they cater to every student. These considerations raise important ethical questions about creating inclusive and equitable language education environments where pedagogical practices align with standards promoting transparency, accountability, and fairness.

Beyond enhancing language learning, ethical assessment of AI implementation ensures

students, educators, and policymakers engage responsibly with language teaching and learning. The Organisation for Economic Co-operation and Development principles, also known as OECD (2025), provide a valuable framework for this effort, emphasizing the creation of a trustworthy digital ecosystem supporting inclusive growth and thoughtful AI integration into language learning. As the first intergovernmental standard on AI, these guidelines set a global benchmark for innovation while ensuring AI remains trustworthy, respects human rights, and upholds democratic values. The Organization devised five value-based principles with practical recommendations for ethical AI integration in education. They address inclusive growth, sustainable development, well-being, transparency, explainability, robustness, security, safety, and accountability. They also offer flexible, actionable direction for policymakers and stakeholders, promoting responsible AI development across sectors while facilitating discussions on ethical AI application in education. By grounding its analysis in these principles, this paper explores factors related to AI use in language education, including the crucial role of governmental bodies in developing and providing access to an inclusive, dynamic, sustainable, and interoperable digital ecosystem for trustworthy AI. By presenting applications of those OECD principles to language learning, this paper hopes to establish a sustainable language education ecosystem that shares responsible AI knowledge and its ethical application in language education. This approach leverages AI to augment human capabilities, foster creativity, and ensure inclusivity for underrepresented learners, serving as a foundation for transformative language learning. The following section examines the ethical dimensions of transparency, equity, and accountability comprehensively for language learning.

2. Literature Review

2.1 Transparency

2.1.1 What Is Transparency in AI?

Transparency is a multifaceted concept viewed through multiple lenses and disciplines (Margetts, 2011). Turilli and Floridi (2009) associated transparency with the ethical nature of information. They described transparency as the degree to which information is easily accessible and can be practically applied to support decision-making. With the advancement of AI over the past few years, the concept of transparency has regained public attention (Felzmann et al., 2020). As an essential enabler, AI is inherently connected to algorithmic transparency, which involves how algorithms operate, make decisions, and present information (Larsson, 2020). Some initial research showed that eople preferred algorithmically made decisions compared to humans under many circumstances, which indicated the importance of transparency in AI systems and understanding how they could influence human behaviors and decisions (Logg et al., 2019; Schecter et al., 2023). Walmsley (2021) summarized two types of transparency. One type is outward transparency, emphasising what is shared or made visible to the external world. The other is functional transparency, which focuses on the internal mechanisms of AI, such as the processes involved in making specific decisions. Given the complexity of AI, a more systematic perspective and nuanced understanding of AI transparency are required to ensure the ethical and responsible

use of AI (Larsson, 2020).

Transparency is not a standalone concept but is always related to other ethical considerations in AI, such as data privacy, data security, and information bias (Walmsley, 2021; Yan et al., 2024). For instance, Walmsley (2021) argued that the demand for transparency arose from developing machine learning (ML), big data, and the growing reliance on algorithmic systems for predictions, recommendations, and decisions. Ethically, transparency is crucial because an opaque AI system might pose the risk of "machine bias" (Floridi et al., 2018) and the potential to reinforce "epistemic injustice" (Fricker, 2007). Similarly, Amin (2023) was concerned that a lack of transparency can undermine public confidence and impede the ability to ensure proper accountability. Some international organizations have advocated transparency as one of the key ethical guidelines, recognizing its importance in fostering trust and equity, developing accountability measures, and establishing open communication channels (Miao et al., 2021; OECD, 2025; UNESCO, 2025).

2.1.2 AI Transparency and Language Education

While AI technologies are widely employed in various fields and industries (e.g., STEM, business), they have a strong connection to language education since many AI technologies, such as ChatGPT, are built on natural language processing, making them inherently suited for language-related tasks (Jeon et al., 2024; Yu et al., 2025). One application of AI in language education is that these technologies have been built into language learning applications to support second language acquisition (Zou et al., 2023). For example, a prevailing language app, Duolingo, which is a cloud-based online platform, employs Automatic Speech Recognition (ASR) and Natural Language Processing (NLP) techniques to provide adaptive learning within a networked community (Kannan & Munday, 2018). With the rapid development of AI, there is no doubt that such advanced technologies will continue to be widely integrated into various language learning apps to enhance teaching and learning. In this context, both app developers and instructors who utilize AI-integrated apps must address ethical considerations, particularly regarding transparency. For example, concerns about transparency in Duolingo English Test (DET) include questions about "fairness, security breaches, limited accessibility, the authenticity of test items, and possible adverse effects on educational outcomes" (Yao, 2024). After these concerns were made public, more technical information about the test (Cardwell, LaFlair, & Settles, 2022) was provided; however, other issues, such as the relationship between automatic machine and human scoring, must be explored further (Isbell & Kremmel, 2020). Tech companies that develop language learning apps need to be transparent with their algorithmic processes, helping end users understand how decisions are made, for example, by understanding how AI determines learners' language level in educational settings (Amin, 2023; Owan et al., 2023). Moreover, tech companies should disclose to learners what data AI language tools collect, and how the data are analyzed and used (Hockly, 2023; Nguyen et al., 2023).

Another example involves incorporating AI tools like ChatGPT directly into the language learning process, such as generating ideas, offering feedback, and creating writing content (Yu et al., 2025). Although it is challenging for language instructors to fully understand how

AI processes information in the background, they can still ensure transparent practices in their use of AI. Hence, the need to further examine equity and how it applies to language education.

2.2 Equity

2.2.1 Towards a Definition of Equity in AI

According to Dignum (2021) artificial intelligence is oftentimes perceived as "an (autonomous) entity … with all-knowing, all-powerful qualities" and also that "AI happens to us without us having any power to control it". Also, AI systems are socio-technical, meaning they depend on the context in which they are created and used (Dignum, 2021, p. 2). Therefore, there is great power, agency, responsibility, and ethical obligations in application use. With the increasing application of Artificial Intelligence across various areas of society, concerns about equity have emerged in different fields. In health, concerns about improving access to diagnosis and treatment are addressed (Abràmoff et al., 2023; Berdahl, et al., 2023). In finance, issues related to fairness, opportunity, and bank credit analysis are areas of concern (Sadok & El Maknouzi, 2022). In marketing, considerations related to how minority groups and underserved communities are represented and included in marketing strategies and materials emerge (van Esch et al., 2024). The field of education faces similar concerns. The application of artificial intelligence in education (AIEd) is expected to leverage opportunities, create democratizing spaces and provide high-quality instruction that solves current educational issues faced by minority groups and underserved populations. However, various challenges need to be addressed to ensure equity and make learning solutions feasible for all (Pedro et al., 2019; Garcia Ramos & Wilson-Kennedy, 2024; Holstein & Doroudi, 2021; Ravanera & Kaplan, 2021). To widen the scope of the analysis to global perspectives, a comprehensive operational framework is essential for maximizing AI benefits ethically, particularly in regions experiencing significant educational disparities. This is especially critical as AI systems trained predominantly on Western datasets risk reinforcing existing inequities when deployed in diverse global contexts. Research from sub-Saharan Africa and South America demonstrates that when properly implemented with locally representative data, AI has significant potential to foster educational equity and inclusion while empowering underserved communities through more accessible innovations (Corrêa et al., 2023; Dlamini & Ndzinisa, 2025). These findings underscore why AI designers, educators, and policy-makers from diverse global backgrounds must collaborate, as they should equity and fairness by critically examining AI technologies as they evolve. Their collective responsibility lies in guaranteeing these tools genuinely serve learners' interests across varied cultural and socioeconomic contexts, rather than merely advancing the complex interests of external stakeholders, typically from dominant Western economies, outside the educational field.

2.2.2 AI Equity and Language Learning: Opportunities and Challenges

Equity for language learning refers to addressing disparities caused by social, cultural and economic factors that prevent people and groups from achieving specific outcomes because of their circumstances (Benadusi, 2001). In terms of language learning, it refers to reducing

barriers and obstacles and supporting every learner to acquire the necessary competences that will help them participate actively in society. Language learning is required to advance different populations at a local and international level in people's personal and professional lives (Murray, 2020). Therefore, language learning is intrinsically related to equity, as educational contexts should provide "educational programs, assessments, curriculum, pedagogy, [and] resources" that close achievement gaps and leverage opportunities for underserved communities (Tung, 2013). These resources enable students to thrive not only in a more globalized world, but also in an increasingly technological one. However, this equity goal is challenged by perceptual gaps regarding AI technologies. A case study on language teachers' perceptions revealed that students often overlook the importance of privacy in AI tools, viewing the risks of data vulnerability and information bias as inevitable trade-offs (Kilhoffer et al., 2023). Hence why current directions of implementing new technologies in language education may create equity challenges in reducing bias, ensuring fair representation of individuals and groups, creating inclusive learning environments, tools and resources, and promoting culturally responsible pedagogy and practices that serve all. Research and teaching should be centred in promoting fair machine learning, reducing algorithmic bias and representation harms, and implementing social justice pedagogies (Mayfield et al., 2019).

2.2.3 Equitable Pedagogical Practices

AI is used in education mainly in two ways: a) Transfer of teacher responsibility or b) as a tool to enhance human intelligence (Pratama, Sampelolo & Lura, 2023). This assumes that artificial intelligence is capable of adapting to the learners' specific needs and preferences, fostering engagement in the learning process, and improving the learning outcomes as learners interact with the system at their own pace, and receive adaptive real-time feedback and resources in their unique learning experiences (Ayeni et al., 2024). Three meta-analyses of the use of AI technologies for language learning addressed how these technologies are being used and what the impact is for students (Lee & Lee, 2024; Lin et al., 2022; Lo et al., 2024).

Because of the nature of AIEd systems, equitable educational opportunities are expected from AI systems as they provide student-centered interactions and opportunities for personalized learning (Holstein & Doroudi, 2021) in the form of intelligent tutoring, data analytics and predictive modeling, natural language processing and chatbots and automated grading and assessment (Kumar, et al., 2023). For language learning specifically, Woo & Choi (2021) describe the analysis of 53 articles between 2017-2020 on the use of AI-based language tools such as intelligent personal assistants like Alexa, machine translation tools, courses with automated feedback, and speaking training software, games, mobile applications that cater to different language skills. They mentioned that not only did students' language abilities improve, but AI use also had impacted other psychological factors such as confidence development, anxiety reduction and motivation. This has been further evidenced by a case study on students' positive perspectives regarding AI in language education. Participants asserted that AI not only improved their production skills in a foreign language but also enhanced their self-efficacy through improved information accessibility, cultural awareness,

and self-perception as successful language practitioners (Karataş et al., 2024). For underserved and underrepresented communities, these benefits directly relate to a sense of belonging and the ability to navigate educational contexts successfully.

2.2.4 Obstacles to Accessibility From Equity Perspectives

The digital divide plays a role in accessing information and resources for specific individuals and communities that are traditionally underserved. This extends to access to artificial intelligence, exacerbating existing inequalities (Eden, Chisom, & Adeniyi, 2024). Differences in socio-economic status create a gap for populations that do not have access to adequate digital infrastructure, the Internet and cutting-edge digital technologies (Carter et al., 2020). In addition, differences in skills and digital literacies also create disparities among possible users of AI (Eden et al., 2024). While AI has the potential to enhance learning experiences and support personalized instruction, disparities in access to technology and internet connectivity can exacerbate existing inequalities in education because of the lack of access to the necessary hardware, software, or internet infrastructure which are supposed to benefit from AI-enabled learning platforms and resources (Eden et al., 2024).

2.2.5 Equity and Historical Inequalities

Systems are trained using initial data, which is later nurtured with user data. If the data used to train the system over-represents certain groups while neglecting others, inequalities will arise in different contexts. (Holstein & Doroudi, 2021). For example, Wang, Morgenstern and Dickerson (2025) explain that Large Language Models (LLMs) do not include many identities and essentialize them. This information is later used in other fields, creating misrepresentations and biases. Caliskan (2023) explains how ChatGPT translates Turkish to English gender-neutral sentences into gender-biased ones. It assigns a male pronoun to a doctor, demonstrating an implicit bias. Caliskan (2023) asserts that these assumptions and associations extend to “gender, race or ethnicity, skin color, ability, age, sexuality, religion, social class, and intersectional associations” (p. 7007). Tests like the Word Embedding Association Test (WEAT) have been used to study bias in AI and the perpetuated links, such as women's association with gender-loaded stereotypes that reflect human-generated associations (Caliskan, 2021). Identifying biases, as well as understanding how they manifest and perpetuate through AI production, is fundamental for using Artificial Intelligence in educational contexts. Clark et al. (2024) highlight that these barriers limit the empowerment of underserved communities and make the digital divide greater.

2.2.6 Cultural and Contextual Barriers to Equitable AI Use

AI systems can generate text based on data learned in a given language and permeated by cultural elements; however, AI has difficulties expressing the nuances of culture and language (De la Vall & Araya, 2023). First, underrepresented languages and dialects may not be present since large amounts of input data are required to train these systems. Language directly related to place and specific groups, such as idioms and colloquialisms, may not be grasped by learners who identify themselves with cultural elements and expressions. These factors help learners develop respect and appreciation for their own cultures and others.

Second, cultural biases may emerge, as AI is like a black box that decides what and how information is shared (Varona & Suárez, 2022). By acknowledging these constraints while working to mitigate them, educators can harness AI's capabilities while preserving the richness of human language and cultural exchange. Therefore, the future of AI in language education depends not only on technological advancement but on our commitment to ensuring that these tools enhance rather than diminish the complex, nuanced nature of human communication across cultures. This brings the discussion to implementing accountability measures at every language learning stage, from AI development to classroom deployment, to ethically position AI as a tool that augments, rather than supplants, the vital human exchanges that define meaningful language learning.

2.3 Accountability

2.3.1 Accountability and Language Education: A Student and Teacher Perspective

Accountability in language education is multifaceted due to the dichotomy between human accountability and the AI being held accountable for specific learning and teaching processes. Porter et al. (2022) argue that human accountability can be conceptualized by explaining and facing the consequences of actions perpetrated to attain specific goals. More specifically, accountability measures the responsibility of users for the results generated by their use of AI (Memarian & Doleck, 2023; Shin et al., 2022). Types of human accountability include the capacity to explain choices, behaviors, results, and normative justifications regarding ethical or unethical activities carried out with AI. Conversely, AI can remove the burden of autonomous decision-making from humans, thus absolving them of responsibility for specific uses of AI in language learning. However, this also makes it difficult to hold the AI accountable for its feedback generation. This difficulty stems from the lack of transparency in the provenance of its datasets and reasoning systems (Boch et al., 2022). Such considerations highlight the need to investigate further the consequences of AI use in language learning and teaching from accountability perspectives. In particular, considerations emerge on whether and why using AI may justify specific educational conduct from both teachers' and students' perspectives and the interplay between educational practices and institutional frameworks.

2.3.2 Trusting AI in Generating Linguistic Output

A key element of accountability is trust, since users can only deploy AI assistance if they have confidence in the tool's usability. This trust can be fostered by improving the understandability of AI systems in supporting user decisions and action scopes (Kim et al., 2020; Gunning et al., 2019). For instance, language learners can use AI platforms to generate ideas and outlines, fix grammatical and syntactic mistakes, and enhance vocabulary acquisition (Nugroho et al., 2023). This presupposes trusting the output to correspond to a "right" answer deemed useful to perform the specific language task. It also envisions a high level of comfort in entrusting the quality of information output and confidently delegating performative decisions on linguistic output to generative AI. All the while, users maintain control over the machine and thus safeguard their sense of autonomy in light of perceiving themselves as superior to machines (Kim et al., 2016). In other words, AI systems' perceived "benevolent" intentions underscore the need for human accountability in linguistic generation.

In the educational context, language learners may delegate linguistic tasks to AI systems because they operate only under human agency and control, allowing individuals' autonomy and control to remain intact (Candrian and Sherer, 2022).

These considerations highlight other key aspects of AI accountability, such as fostering creativity and maintaining voice integrity when personalizing language production. Research has shown that AI can assist language learners in generating creative content and streamlining the writing process (Doshi & Hauser, 2023). For instance, AI platforms may assist learners by preparing essays in a foreign language, brainstorming ideas, revising grammar content, and proofreading morphosyntactic accuracy. Therefore, AI assistance benefits language learners who craft argumentative compositions, present ideas and structure them as syntactically cohesive texts (Booth Olson et al., 2023).

2.3.3 Balancing AI Assistance With Autonomy and Accountability in Language Writing

With the emergence of AI-assisted language learning, users share their decision-making and implementational agency with machines, raising questions about their accountability in the language learning process (Godwin-Jones, 2022). Therefore, as autonomy is a skill developed and refined through linguistic production, exploring it through the lens of autonomy is useful. When making and implementing language learning decisions, autonomous students critically reflect upon their learning process by applying self-regulatory and metacognitive strategies (Dickinson, 1987; Little, 1991). With AI-assisted learning, individual accountability is bestowed upon the learners' critical assessment of the tools they use for assistance in the learning process and understanding of the way languages work (Kern, 2021).

When it comes to writing in a foreign language, it is evident that AI can profoundly affect this activity. Researchers have argued that it represents an opportunity to develop a person's autonomy as it is linked to cultivating what being human is about (Aylsworth & Castro, 2024). Writing, whether conducted in one's native or second language, provides the opportunity to conceptualize high-degree order skills, reflect on the experiences that shape our values, analyze socio-cultural matters and develop the ability to structure arguments in logical and cohesive ways (Lowe & Zemliansky, 2010). In other words, second-language writing can boost students' metacognitive practices and self-assessment. Students become more aware of their responsibilities towards their learning and exercise their ability to make informed choices with technology. Such dual awareness integrates cognitive skills related to writing and personal accountability involving technology use and decision-making. However, the situation becomes more complex when AI tools are recognized as co-authors or collaborators in shaping the final written product. In a case study, one student, reflecting on their use of ChatGPT as a writing assistant, stated:

"I would definitely say I have to assign partial authorship to GPT, even though I didn't use the exact output it gave me. It did define a lot of the general structure of my whole paper, and that's obviously a huge part of any writing task, you know" (Vetter et al., 2024, p. 7).

This perspective highlights AI's evolving role not merely as a tool for surface-level editing but as an active contributor to deeper structural and conceptual aspects of writing, raising

ethical questions about agency, authorship, and accountability within human-AI text production.

Many researchers agree that computer-assisted tools enhance writing processes in language learners (Yusuf et al., 2019; Zaini & Mazdayasna, 2014). Some even argued that AI assistance in foreign language writing can foster students' autonomy by promoting social presence through emotional, authentic, and coherent discourse (Huang et al., 2021). Moreover, boosting autonomy strengthens students' accountability, as it maintains their locus of control and promotes the acquisition of writing skills. However, AI assistants can generate logically coherent and contextually relevant texts that emulate diverse human writing styles, leading to a divide among educational practitioners regarding the integration of AI into the curriculum (Punar Özçelik & Yangın Ekşi, 2024). Furthermore, the situation becomes increasingly complex as researchers warn about the perils of AI integration in writing. Some went as far as to argue that students have a moral duty to foster their human values (Ferdman, 2023). In other words, as students rely on AI to generate language without the critical oversight developed through metacognitive awareness, they forfeit the opportunity to cultivate self-awareness, human agency, and personal growth. This is why educators play a vital role in guiding students to develop the skills needed to make informed decisions about integrating AI into language learning. However, as language teachers incorporate AI into their professional practices, questions about accountability also arise.

2.3.4 Navigating Teachers' Accountability in AI-enhanced Language Education and Assessment

Accountability is bestowed upon teachers to foster the critical and self-aware use of AI by language students, assess their linguistic production, and leverage AI resources to enhance their educational practices. Teachers have recognized the benefits of using AI to provide personalized feedback and increase the accessibility of learning resources (Lin & Chen, 2024). However, they are also increasingly challenged by the need to draw a line between the students' and technological creativity when tasked with fostering students' critical skills in AI-assisted language learning. To cultivate autonomy and reinforce perceptions of human accountability in their students and themselves, teachers must embrace their role as facilitators of active learning experiences (George, 2023; Olivant, 2015). This implies integrating discussions on the best AI practices into the curriculum and assessing problem-solving techniques that complement AI and human input (Kim et al., 2022).

Since AI allows the possibility of grading linguistic production, researchers have been investigating the potential of using AI to assess linguistic production and its accountability in quantitative grading. This has also raised questions about the added value of human intervention in quantitative language assessment and the reliability of automated systems for the quantitative scoring of human writing (Pack et al., 2024; Mizumoto & Eguchi., 2023; Wang et al., 2022). From a quantitative standpoint, AI's lack of training in grading human writing makes its assessments unpredictable (Ouyang et al., 2024). Specifically, due to their reliance on probabilistic algorithms, AI systems prioritize statistically likely words, often at the expense of their creative and contextual relevance (Carlson et al., 2023). From a

qualitative perspective, some researchers have argued that AI assessment can improve students' performance by fostering divergent thinking and offering personalized feedback and suggestions to strengthen language production (de Chantal & Organisciak, 2023). This reduces the risk of human bias when grading and nurtures students' linguistic creativity and adaptability to social and interdisciplinary situations (Zhao, 2024; Acar, 2023). Specifically, benefits have been identified in sustaining and enhancing students' voices in a second language (L2) by critically evaluating and leveraging AI tools to improve learning techniques, hence safeguarding learner agency (Alm, 2024). However, accountability in the ethical integration of generative AI in developing students' writing skills remains a key debate among educational institutions, whose responsibility is to determine how these tools can best support students' linguistic development (Escalante et al., 2023). Pressured to provide guidelines for the ethical use of AI technologies, institutions have either adopted a permissive approach to using AI in some situations or prevented their use (Coghlan et al., 2021). This underscores the ongoing evolution of educational practices that place equal importance on both process-oriented and outcome-based language learning (Chiang et al., 2024). Hence, a key goal of education, and by extension language learning, is to foster agency-based understanding, defined as contextual adaptability and an agentive awareness of tool availability and reliability (Heersmink & Knight, 2018; Cassinadri, 2024). In sum, language teaching accountability is driven by AI models' inherent characteristics and human involvement in the educational process.

3. Scholarly Gaps and Future Directions

This paper has identified several areas in the literature of AI ethics in language education that deserve further attention. In particular, scholarly papers on AI transparency and its role in education are still emerging, underscoring the importance of ethical consideration of AI use. Regarding accountability, AI assistance may be interpreted as academic misconduct if not explicitly integrated into the educational curriculum and conforming to institutional guidelines (Dabis & Csáki, 2024). This highlights the need to mitigate the potential disadvantages of AI-assisted language learning through continuous, self-aware decisions regarding AI use, peer collaboration to uphold scholarly integrity and the development of transparent ecosystems (Jacob et al., 2024). However, acknowledging AI use could bring challenges for both instructors and learners. Tan et al. (2025) investigated how disclosing GenAI use in writing affects teachers' evaluations of L2 compositions. The findings revealed that teachers tend to assign lower scores when informed of GenAI involvement, often influenced by assumptions about students' abilities and biases against GenAI. This highlights the urgent need for developing objective assessment criteria that evaluate the quality of language production based on merit rather than its technological origins.

3.1 Transparency and AI-assisted Language Learning

The widespread use of AI in education brings many challenges and ethical concerns (Pedro et al., 2019). To address the challenges related to transparency in AI education, it is essential to establish comprehensive educational frameworks that serve as practical guides for educators and practitioners when working with students and integrating AI technologies into

educational practices (Chan, 2023; Memarian & Doleck, 2023). For example, Robinson (2020) suggested encouraging transparency by making educational models accessible to the public. Pereira et al. (2021) argued the need to develop methods for interpreting predictive model decisions and extracting explainable, transparent models for AI in Education. Chaudhry et al. (2022) proposed an AI Transparency Index framework for real-world educational scenarios. The researchers summarized some requirements for transparency in each stage of the AI development process, such as data transparency, algorithmic transparency, and implementation transparency.

3.2 Equity and AI-assisted Language Learning

Using AI in language education can create opportunities for learners but also present equity challenges. From a pedagogical standpoint, research has centered on applying AI tools to help students develop their linguistic competences (Warschauer & Xu, 2024). For example, implementing chatbot-supported language learning has been used to increase EFL Listening competencies and improve motivation. The exploration of such uses offers general insights into practices that can enhance the experiences of student groups. However, as learners come from different backgrounds, their expertise cannot be described from the group perspective, as one size fits all. Huang et al. (2024) explain that it is vital to include students from diverse groups for future research. The perceptions and nuanced experiences of underserved communities and individuals provide the perspective needed to determine how the democratization of education can be attained. The development of principles that close, for example, access and literacy gaps, reduces disparities and shows the path towards a responsible use of AI by education stakeholders. Principles for an equitable use of AI in teaching must be developed from empirical research to ensure that the voices of underrepresented groups and individuals are honored and represented.

3.3 Accountability and AI-assisted Language Learning

Despite the growing adoption of AI in language education, there is limited empirical research addressing the challenges posed by this technology to human accountability and its impact on language education. Further areas of study should include leveraging human accountability with AI to encourage the application of critical judgment on text generation, as well as social and argumentative skills in foreign languages. Further research is needed to understand how language teachers can use AI to promote accountability and intellectual virtues in themselves and their students, considering both the benefits and challenges of AI integration in linguistic education. These virtues are essential for encouraging language learning and teaching shaped by human accountability, where AI functions as a tool for refining linguistic output instead of imposing automated feedback.

These considerations suggest that much greater attention to AI is now required in all aspects of the language education profession, from teacher training to curricular development, the production of educational media and technology, classroom teaching, and educational or linguistic research. Keeping the latter in mind, we suggest three types of productive research approaches, focusing on texts, practices, and outcomes.

4. Recommendations

This conceptual piece has explored AI transparency, equity and accountability in the context of language learning and proposes actionable principles for both language instructors and learners. Building on these principles, it is crucial to recognize that the implications of accountability, equity, and transparency in AI-driven language learning are deeply intertwined. Hence, this paper proposes several recommendations to foster these principles in designing, implementing, and evaluating AI tools in education to bridge existing gaps in the literature and research practices.

4.1 Optimising Support Strategies for AI Integration in Language Learning and Teaching

As a primary recommendation, it is essential that training and support are provided to both learners and educators to develop the necessary digital literacy skills to use and critically evaluate AI tools effectively. Teachers could be involved in communities of practice where they can monitor their pedagogical practices and impact on their professional development to foster the use and implementation of AI (Mocanu, 2024). Educators possessing the necessary knowledge can train learners on how AI systems work, their limitations, and potential biases. By critically evaluating AI-generated content and feedback, learners develop critical media literacy and critical thinking skills directly applicable to analyzing and interpreting language materials. Educators should also prioritize the development of "agency-based understanding" among students, which includes contextual adaptability of AI tools usage according to situational needs, as this empowers learners to make informed choices about how to use AI effectively.

Addressing equity in language learning and teaching means investing in infrastructure and programs to ensure equitable access to technology, internet connectivity, and digital literacy training for all learners, particularly those from underserved communities and learners with disabilities. In this way, AI systems can become sensitive to cultural nuances and avoid perpetuating stereotypes or misrepresenting cultural elements. Employing methods like the Word Embedding Association Test (WEAT) and other detection techniques might foster the mitigation of biases in training data and AI algorithms, with regular checks and audits performed by researchers and data scientists to make the necessary adjustments as the database expands.

Ensuring that all users can benefit from AI and are not disadvantaged by a lack of technical skills also requires investments in developing AI systems trained on diverse datasets, including underrepresented languages and dialects. This would enhance the transparency of reasoning processes and the equitable access to AI systems, which will become more unambiguous. Consequently, students and educators will be able to understand how feedback and other outputs are generated and increase their accountability for AI-assisted learning and teaching. Teachers, designers, and policymakers must monitor, update, and maintain control of AI applications to be used as a tool for refining, not imposing feedback, which is a principle that education should nurture through sound deontological practices for teachers and students. This ties into the idea of sharing moral duty to foster human values by finding a balance between using AI tools and maintaining accountability over the performed language

tasks.

4.2 Explicit AI Knowledge Instruction in Language Learning

As pedagogical specialists, language teachers may not necessarily be experts on AI. However, it is beneficial for language instructors to gain a working understanding of AI technologies, including the basic concepts and features of AI, and how it is applied in the context of language learning, so that language instructors can impart that knowledge directly to learners. For example, language instructors can actively engage learners in learning, experiment with prompting strategies, and communicate ChatGPT's capabilities and limitations to the learners in language learning (Mhlanga, 2023). Learners may interact with AI technologies effectively and critically if equipped with the necessary knowledge to apply them to their learning practices. If language instructors utilize AI tools, like ChatGPT, to provide writing feedback, they should clearly explain the tools' purpose and how they can be used. Hence, fostering user trust with AI tools is crucial for their effective deployment in language practices. In particular, AI use in language learning, even for brainstorming, grammar correction, and text generation, must be explicitly integrated into the curriculum and aligned with institutional guidelines. Educators and policymakers should actively invest in providing such indications to language students and the wider community to avoid academic misconduct. For example, to facilitate such integration, a case study conducted on academic teachers suggested the need for institutionally-provided, contextualized support organised through interactive workshops where educators could experiment with AI tools in a guided, collaborative environment and receive feedback on their technological progression with AI tools tailored to their learning contexts (Kohnke et al., 2023). Such proactive, context-aware initiatives are essential not only for fostering responsible AI use in academic settings, but also for cultivating a culture of integrity, adaptability, and informed digital literacy across educational communities.

4.3 Incorporate AI Policies Into the Curriculum

Language instructors are encouraged to develop AI use policies for language learning and integrate them into the curriculum. These policies should specify the guidelines for AI adoption by prospecting implementation scenarios on how AI can be used and what learners should do and consider when they use it when, for example, they credit AI for contribution. Companies like OpenAI, which are at the forefront of AI tool development, may offer insights into addressing these challenges, as seen by this ChatGPT-generated example of an AI use policy (OpenAI, 2025):

Students are encouraged to use AI tools as supplementary resources for practice, idea generation, and language improvement. However, all AI usage must be transparently disclosed, and students are expected to critically evaluate AI-generated outputs to demonstrate their understanding. AI use is not a substitute for personal effort or originality.

This example also highlighted that language learners must disclose AI use in their academic work by citing it accordingly. As a result, language learning assessments should evaluate both the process and the final product. Building mutual trust between instructors and learners is crucial to minimizing potential biases when assessing AI-assisted linguistic output. Moreover,

language instructors could ask learners to document their AI interactions and reflect on their experiences to encourage critical thinking and self-awareness of AI use.

4.4 Promoting Dialogue on the Ethical and Responsible Use of AI

Besides explicitly teaching AI knowledge, instructors should encourage learners to share their experiences and reflections on AI use for language learning and co-construct an understanding of how to use AI ethically during the process. Task-integrated questions could prompt learners' discussions and be incorporated into task activities by including items such as:

- What are AI tools' limitations and potential biases in language learning?
- How do learners keep integrity and avoid plagiarism when using AI in supporting writing?
- How do learners balance originality and AI use in language learning?

Through conversations, learners can clarify instructors' expectations when incorporating AI, develop a deeper understanding of ethical guidelines, and enhance their metacognition by reflecting on how and why AI tools are utilized to support learning.

4.5 Ensure Transparency in Learners' Data and Secure the Necessary Consent

The age of AI represents a transformative, data-driven era in language education, where advanced technologies now offer unprecedented capabilities to capture and document the learning journey. Through sophisticated algorithms and sensing mechanisms, AI systems seamlessly collect learners' responses, track performance patterns, generate nuanced automated assessments, and produce comprehensive analytical reports that were previously impossible to obtain. Language instructors increasingly find themselves navigating this rich data landscape, regularly analyzing information generated by AI tools and learners' interactions with these systems. This wealth of data provides educators with deep insights into learners' true language proficiency, subtle development patterns, and long-term progression trajectories that inform more targeted and effective instruction. However, this data revolution brings important ethical responsibilities, such as the obligation for language instructors to maintain transparent communication with learners about data collection practices. Educators must clearly articulate what information is being gathered, how it will be interpreted, and its purposes in the educational process. By embracing both the analytical power of AI and the ethical principles that should guide its use, language education enters a new era where data-informed practices and human-centered teaching create more personalized, effective, and empowering learning experiences for all language learners.

5. Conclusions

A new technological turn has emerged with the implementation of AI in different fields of knowledge, bringing many unique challenges. In the case of using artificial intelligence in education (AIEd) and second language acquisition and teaching, those challenges can be directly linked to the concepts of transparency, equity and accountability and their

relationship with underserved communities. The OECD principles provide a framework to navigate, ethically explore and critically analyze the practices and guidelines to ensure that AI becomes a digital ecosystem that caters for diverse populations.

AI technologies will continuously evolve and shape the landscape of language education. Undoubtedly, AI has brought significant benefits to language teaching and learning; however, it also raises ethical questions related to accessibility, effective use, and reasonable decision-making, which are difficult to address. When integrating AI into language instruction and assessment, ethical considerations must remain at the forefront. Key issues such as transparency, equity, and accountability, which were discussed in this conceptual paper, require careful attention to ensure AI's responsible and ethical use.

The ethical use of AI requires the collaborative efforts of various stakeholders, including AI language learning platform developers, policymakers, researchers, practitioners, and language learners. All stakeholders should be critically engaged in conversations about ethical implications, constructing knowledge, and complying with the frameworks/principles of ethical use of AI. Advancements in AI should be leveraged to support learners better and enhance their language learning experience. Embracing technological innovation while upholding ethical standards should always be a guiding principle in integrating AI into language education.

References

Abràmoff, M. D., Tarver, M. E., Loyo-Berrios, N., Trujillo, S., Char, D., Obermeyer, Z., … Maisel, W. H. (2023). Considerations for addressing bias in artificial intelligence for health equity. *NPJ Digital Medicine*, *6*(1), 170. https://doi.org/10.1038/s41746-023-00913-9

Acar, S. (2023). Creativity assessment, research, and practice in the age of artificial intelligence. *Creativity Research Journal*, 1-7. https://doi.org/10.1080/10400419.2023.2271749

Alm, A. (2024). Exploring autonomy in the AI wilderness: Learner challenges and choices. *Education Sciences*, *14*(12). https://doi.org/10.3390/educsci14121369

Amin, M. Y. M. (2023). AI and ChatGPT in language teaching: Enhancing EFL classroom support and transforming assessment techniques. *International Journal of Higher Education Pedagogies*, *4*(4), 1–15. https://doi.org/10.33422/ijhep.v4i4.554

Ayeni, O. O., Al Hamad, N. M., Chisom, O. N., Osawaru, B., & Adewusi, O. E. (2024). AI in education: A review of personalized learning and educational technology. *GSC Advanced Research and Reviews*, *18*(2), 261-271.

Aylsworth, T., & Castro, C. (2024). Should I use ChatGPT to write my papers?. *Philosophy & Technology*, *37*(4), 117. https://doi.org/10.1007/s13347-024-00809-w

Benadusi, L. (2001). Equity and education: A critical review of sociological research and thought. In W. Hutmacher, D. Cochrane, & N. Bottani (Eds.), *Pursuit of equity in education: Using international indicators to compare equity policies* (pp. 25-64). Springer Nature.

Berdahl, C. T., Baker, L., Mann, S., Osoba, O., & Girosi, F. (2023). Strategies to improve the impact of artificial intelligence on health equity: Scoping review. *JMIR AI, 2*, e42936.

Boch, A., Hohma, E., & Trauth, R. (2022). *Towards an Accountability Framework for AI Systems* [White paper]. Institute for Ethics in Artificial Intelligence, Technical University of Munich. Retrieved January 10, 2025, from https://www.ieai.sot.tum.de/research/towards-an-accountability-framework-for-ai-systems/

Booth Olson, C., Maamuujav, U., Steiss, J., & Chung, H. (2023). Examining the impact of a cognitive strategies approach on the argument writing of mainstreamed English learners in secondary school. *Written Communication, 40*(2), 373-416. https://doi.org/10.1177/07410883221148724

Caliskan, A. (2021). *Detecting and mitigating bias in natural language processing*, Brookings Institution. United States of America. Retrieved from https://coilink.org/20.500.12592/823z48

Caliskan, A. (2023). Artificial Intelligence, bias, and ethics. *International Joint Conference on Artificial Intelligence* (pp.7007-7013).

Candrian, C., & Scherer, A. (2022). Rise of the machines: Delegating decisions to autonomous AI. *Computers in Human Behavior, 134*, 107308. https://doi.org/10.1016/j.chb.2022.107308

Cardwell, R., Naismith, B., LaFlair, G. T., & Nydick, S. (2023, December 15th). Duolingo English Test: Technical manual (Duolingo Research Report). Duolingo. Retrieved from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://duolingo-testcenter.s3.amazonaws.com/media/resources/technical_manual.pdf

Carlson, M., Pack, A., & Escalante, J. (2024). Utilizing OpenAI's GPT-4 for written feedback. *TESOL Journal*, *15*(2), e759. https://doi.org/10.1002/tesj.759

Cassinadri, G. (2024). ChatGPT and the technology-education tension: Applying contextual virtue epistemology to a cognitive artifact. *Philosophy & Technology, 37*(14). https://doi.org/10.1007/s13347-024-00701-7

Chan, C. K. Y. (2023). A comprehensive AI policy education framework for university teaching and learning. *International journal of educational technology in higher education, 20*(1), 38.

Chaudhry, M. A., Cukurova, M., & Luckin, R. (2022). A transparency index framework for AI in education. In M. M. Rodrigo, N. Matsuda, A. I. Cristea, & V. Dimitrova (Eds.), *Proceedings of the 23rd International Conference on Artificial Intelligence in Education, Part II* (AIED 2022), 27-31 July 2022, Durham, UK (pp. 195-198). Springer. https://doi.org/10.1007/978-3-031-11647-6 33

Chiang, Y. V., Chang, M., & Chen, N.-S. (2024). Can generative AI help realize the shift from an outcome-oriented to a process-outcome-balanced educational practice?. *Educational Technology & Society*, *27*(2), 347-385. Retrieved from https://www.jstor.org/stable/48766179

Coghlan, S., Miller, T., & Paterson, J. (2021). Good proctor or "big brother"? Ethics of online exam supervision technologies. *Philosophy & Technology*, *34*(4), 1581-1606.

Corrêa, N. K., Galvão, C., Santos, J. W., Pino, C. D., Pinto, E. P., Barbosa, C., ... Oliveira, N. de. (2023). Worldwide AI ethics: A review of 200 guidelines and recommendations for AI governance. *Patterns*, *4*(10). https://doi.org/10.1016/j.patter.2023.100857

Dabis, A., & Csáki, C. (2024). AI and ethics: Investigating the first policy responses of higher education institutions to the challenge of generative AI. *Humanities and Social Sciences Communications*, *11*(1), 1-13. https://doi.org/10.1057/s41599-024-03526-z

de Chantal, P.-L., & Organisciak, P. (2023). Automated feedback and creativity: On the role of metacognitive monitoring in divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts*. https://doi.org/10.1037/aca0000592

De la Vall, R. R. F., & Araya, F. G. (2023). Exploring the benefits and challenges of AI-language learning tools. *International Journal of Social Sciences and Humanities Invention*, *10*(1), 7569-7576.

Dickinson, L. (1987). *Self-instruction in language learning*. Cambridge University Press, Cambridge: UK.

Dignum, V. (2021). The role and challenges of education for responsible AI. *London Review of Education*, *19*(1), 1-11.

Dlamini, R., & Ndzinisa, N. (2025). Towards a critical discourse on artificial intelligence and its misalignment in sub-Saharan Africa: Through an equality, equity, and decoloniality lens. *Journal of Education (University of KwaZulu-Natal)*, *98*, 42-61. https://doi.org/10.17159/2520-9868/i98a03

Doshi, A. R., & Hauser, O. (2023). Generative artificial intelligence enhances creativity but reduces the diversity of novel content. *Science Advances*, *10*(28). https://doi.org/10.2139/ssrn.4535536

Eden, C. A., Chisom, O. N., & Adeniyi, I. S. (2024). Integrating AI in education: Opportunities, challenges, and ethical considerations. *Magna Scientia Advanced Research and Reviews*, *10*(2), 006-013. https://doi.org/10.30574/msarr.2024.10.2.0039

Escalante, J., Pack, A., & Barrett, A. (2023). AI-generated feedback on writing: Insights into efficacy and ENL student preference. *International Journal of Educational Technology in Higher Education*, *20*(1), 57. https://doi.org/10.1186/s41239-023-00425-2

Felzmann, H., Fosch-Villaronga, E., & Lutz, C. (2020). Towards Transparency by Design for Artificial Intelligence. *Sci Eng Ethics*, *26*, 3333-3361. https://doi.org/10.1007/s11948-020-00276-4

Ferdman, A. (2023). Human flourishing and technology affordances. *Philosophy & Technology*, *37*(1), 1-28. https://doi.org/10.1007/s13347-023-00686-9

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., … Vayena, E.

(2018). AI4People—an ethical framework for a good AI society: opportunities, risks, principles, and recommendations. *Minds and Machines*, *28*, 689-707. https://doi.org/10.1007/s11023-018-9482-5

Fricker, M. (2007). *Epistemic injustice: Power and the ethics of knowing*. Oxford University Press.

Garcia Ramos, J. (2024). Promoting equity and addressing concerns in teaching and learning with artificial intelligence. *Frontiers in Education*, *9*, 1487882. https://doi.org/10.3389/feduc.2024.1487882

George, D. A. S. (2023). Preparing students for an AI-driven world: Rethinking curriculum and pedagogy in the age of artificial intelligence. *Partners Universal Innovative Research Publication*, *1*(2). https://doi.org/10.5281/zenodo.10245675

Godwin-Jones, R. (2024). Distributed agency in language learning and teaching through generative AI. *Language Learning & Technology*, *28*(2), 5-30. https://doi.org/10125/73570

Gunning, D., Stefik, M., Choi, J., Miller, T., Stumpf, S., & Yang, G.-Z. (2019). XAI—Explainable artificial intelligence. *Science Robotics*, *4*(37), eaay7120. https://doi.org/10.1126/scirobotics.aay7120

Heersmink, R., & Knight, S. (2018). Distributed learning: Educating and assessing extended cognitive systems. *Philosophical Psychology*, *31*(6), 969-990. https://doi.org/10.1080/09515089.2018.1469122

Hockly, N. (2023). Artificial intelligence in English language teaching: The good, the bad and the ugly. *Relc Journal*, *54*(2), 445-451. https://doi.org/10.1177/00336882231168504

Holstein, K., & Doroudi, S. (2021). *Equity and artificial intelligence in education: Will "AIEd" amplify or alleviate inequities in education?*. arXiv: Human-Computer Interaction. https://doi.org/10.48550/arxiv.2104.12920

Huang, W., Hew, K. F., & Fryer, L. K. (2022). Chatbots for language learning-Are they really useful? A systematic review of Chatbot-supported language learning. *Journal of Computer Assisted Learning*, *38*(1), 237-257. https://doi.org/10.1111/jcal.12610

Huang, W., Jia, C., Hew, K. F., & Guo, J. (2024). Using chatbots to support EFL listening decoding skills in a fully online environment. *Language Learning & Technology*, *28*(2). 62-90. Retrieved from https://hdl.handle.net/10125/73572

Isbell, D. R., & Kremmel, B. (2020). Test review: Current options in at-home language proficiency tests for making high-stakes decisions. *Language Testing*, *37*(4), 600-619. https://doi.org/10.1177/0265532220943483

Isbell, D. R., Crowther, D., & Nishizawa, H. (2023). Speaking performances, stakeholder perceptions, and test scores: Extrapolating from the Duolingo English test to the university. *Language Testing*, *41*(2), 233-262. https://doi.org/10.1177/02655322231165984

Jacob, S. R., Tate, T., & Warschauer, M. (2024). Emergent AI-assisted discourse: A case study

of a second language writer authoring with ChatGPT. *Journal of China Computer-Assisted Language Learning*. https://doi.org/10.1515/jccall-2024-0011

Jeon, J., Lee, S., & Choi, S. (2024). A systematic review of research on speech-recognition chatbots for language learning: Implications for future directions in the era of large language models. *Interactive Learning Environments*, *32*(8), 4613-4631. https://doi.org/10.1080/10494820.2023.2204343

Kannan, J., & Munday, P. (2018). New trends in second language learning and teaching through the lens of ICT, networked learning, and artificial intelligence. In C. Fernández Juncal, & N. Hernández Muñoz (Eds.), V ías de transformación en la enseñanza de lenguas con mediación tecnológica. *Círculo de Lingüística Aplicada a la Comunicación* (76, (pp.13-30). https://doi.org/10.5209/CLAC.62495

Karataş, F., Abedi, F. Y., Ozek Gunyel, F., Karadeniz, D., & Kuzgun, Y. (2024). Incorporating AI in foreign language education: An investigation into ChatGPT's effect on foreign language learners. *Education and Information Technologies*, *29*(15), 19343-19366. https://doi.org/10.1007/s10639-024-12574-6

Kaya, F., Aydin, F., Schepman, A., Rodway, P., Yetişensoy, O., & Demir Kaya, M. (2022). The Roles of Personality Traits, AI Anxiety, and Demographic Factors in Attitudes toward Artificial Intelligence. *International Journal of Human–Computer Interaction*, *40*(2), 497-514. https://doi.org/10.1080/10447318.2022.2151730

Kern, R. (2021). Twenty-five years of digital literacies in CALL. *Language Learning & Technology*, *25*(3), 132-150. http://hdl.handle.net/10125/73453

Kilhoffer, Z., Zhou, Z., Wang, F., Tamton, F., Huang, Y., Kim, P., Yeh, T., & Wang, Y. (2023). "How technical do you get? I'm an English teacher": Teaching and Learning Cybersecurity and AI Ethics in High School. *2023 IEEE Symposium on Security and Privacy (SP)*, 2032-2049. https://doi.org/10.1109/SP46215.2023.10179333

Kim, B., Park, J., & Suh, J. (2020). Transparency and accountability in AI decision support: Explaining and visualizing convolutional neural networks for text information. *Decision Support Systems*, *134*, 113302. https://doi.org/10.1016/j.dss.2020.113302

Kim, J., Lee, H., & Cho, Y. H. (2022). Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. *Education and Information Technologies*, *27*(5), 6069-6104. https://doi.org/10.1007/s10639-021-10831-6

Kim, S., Chen, R. P., & Zhang, K. (2016). Anthropomorphized helpers undermine autonomy and enjoyment in computer games. *Journal of Consumer Research*, *43*(2), 282-302. https://doi.org/10.1093/jcr/ucw016

Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). Exploring generative artificial intelligence preparedness among university language instructors: A case study. C*omputers and Education: Artificial Intelligence*, *5*, 1-8. https://doi.org/10.1016/j.caeai.2023.100156

Kumar, D., Haque, A., Mishra, K., Islam, F., Mishra, B. K., & Ahmad, S. (2023). Exploring

the transformative role of artificial intelligence and metaverse in education: A comprehensive review. *Metaverse Basic and Applied Research*, *2*, 55-55. https://doi.org/10.56294/mr202355

Larsson, S., & Heintz, F. (2020). Transparency in artificial intelligence. *Internet Policy Review*, *9*(2). https://doi.org/10.14763/2020.2.1469

Lee, H., & Lee, J. H. (2024). The effects of AI-Guided individualized language learning: A meta-analysis. *Language Learning & Technology, 28*(2). 134-162. Retrieved from https://hdl.handle.net/10125/73575

Lin, H., & Chen, Q. (2024). Artificial intelligence (AI)-integrated educational applications and college students' creativity and academic emotions: Students and teachers' perceptions and attitudes. *BMC Psychology*, *12*(1), 487. https://doi.org/10.1186/s40359-024-01979-0

Lin, R., Zhang, Q., Xi, L., & Chu, J. (2022, August). Exploring the effectiveness and moderators of artificial intelligence in the classroom: A meta-analysis. In J. Yang, D. Liu, Kinshuk, A. Tlili, M. Chang, E. Popescu, D. Burgos, & Z. Altinay (Eds.), *Resilience and Future of Smart Learning* (pp. 6166). Springer. https://doi.org/10.1007/978-981-19-5967-7_7

Little, D. (1991). *Learner Autonomy 1: Definitions, Issues and Problems.* Autentik: San Francisco, CA.

Lo, C. K., Yu, P. L. H., Xu, S., Ng, D. T. K., & Jong, M. S. (2024). Exploring the application of ChatGPT in ESL/EFL education and related research issues: a systematic review of empirical studies. *Smart Learning Environments*, *11*(1), 50-24. https://doi.org/10.1186/s40561-024-00342-5

Logg, J. M., Minson, J. A., & Moore, D. A. (2019). Algorithm appreciation: People prefer algorithmic to human judgment. *Organizational Behavior and Human Decision Processes*, *151*, 90-103. https://doi.org/10.1016/j.obhdp.2018.12.005

Lowe, C., & Zemliansky, P. (2010). *Writing Spaces 1: Readings on Writing*. Parlor Press LLC.

Margetts, H. (2011). The internet and transparency. *The Political Quarterly*, *82*(4), 518-521. https://doi.org/10.1111/j.1467-923X.2011.02253.x

Mayfield, E., Madaio, M., Prabhumoye, S., Gerritsen, D., McLaughlin, B., Dixon-Román, E., & Black, A. W. (2019, August). Equity beyond bias in language technologies for education. In *Proceedings of the fourteenth workshop on innovative use of NLP for building educational applications* (pp. 444-460). https://doi.org/10.18653/v1/W19-4446

Memarian, B., & Doleck, T. (2023). Fairness, accountability, transparency, and ethics (FATE) in artificial intelligence (AI) and higher education: A systematic review. *Computers and Education: Artificial Intelligence*, *5*, 100152. https://doi.org/10.1016/j.caeai.2023.100152

Mhlanga, D. (2023). Open AI in education, the responsible and ethical use of ChatGPT towards lifelong learning. In D. Mhlanga (Ed.), *FinTech and artificial intelligence for sustainable development: The role of smart technologies in achieving development goals*

(pp.387-409). Cham: Springer Nature Switzerland. https://doi.org/10.2139/ssrn.4354422

Miao, F., Holmes, W., Huang, R., & Zhang, H. (2021). *AI and education: Guidance for policy-makers.* United Nations Educational, Scientific and Cultural Organization. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000376709

Mizumoto, A., & Eguchi, M. (2023). Exploring the potential of using an AI language model for automated essay scoring. *Research Methods in Applied Linguistics*, *2*(2), 100050. https://doi.org/10.1016/j.rmal.2023.100050

Mocanu, G. (2024). Communities of practice and preservice teachers in the rise of Artificial Intelligence era: ChatGPT as a method of inquiry and reflection. In L. Xi, R. Y. Chan, S. Sharma, & K. Bista (Eds.), *ChatGPT and Global Higher Education: Using Artificial Intelligence in Teaching and Learning* (pp. 241-253). Star Scholars Press.

Murray, D. E. (2020). The world of English language teaching: Creating equity or inequity?. *Language Teaching Research*, *24*(1), 60-70. https://doi.org/10.1177/1362168818777529

Nguyen, A., Ngo, H. N., Hong, Y., Dang, B., & Nguyen, B. P. T. (2023). Ethical principles for artificial intelligence in education. *Education and Information Technologies*, *28*(4), 4221-4241. https://doi.org/10.1007/s10639-022-11316-w

Nugroho, A., Putro, N., & Syamsi, K. (2023). The Potentials of ChatGPT for Language Learning: Unpacking its Benefits and Limitations. *Register Journal*, *16*, 224-247. https://doi.org/10.18326/register.v16i2.224-247

OECD. (2025). *OECD AI principles overview*. Retrieved from https://oecd.ai/en/ai-principles

Olivant, K. F. (2015). "I Am Not a Format": Teachers' experiences with fostering creativity in the era of accountability. *Journal of Research in Childhood Education*, *29*(1), 115-129. https://doi.org/10.1080/02568543.2014.978920

OpenAI. (2025). *ChatGPT 4o.* [Large language model]. Retrieved from https://chat.openai.com/

Ouyang, S., Zhang, J. M., Harman, M., & Wang, M. (2024). An empirical study of the non-determinism of ChatGPT in code generation. *ACM Transactions on Software Engineering and Methodology*, 3697010. https://doi.org/10.1145/3697010

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

Pack, A., Barrett, A., & Escalante, J. (2024). Large language models and automated essay scoring of English language learner writing: Insights into validity and reliability. *Computers and Education: Artificial Intelligence*, *6*, 100234. https://doi.org/10.1016/j.caeai.2024.100234

Pedro, F., Subosa, M., Rivas, A., & Valverde, P. (2019). *Artificial intelligence in education: Challenges and opportunities for sustainable development*. Paris, UNESCO. Retrieved from

https://unesdoc.unesco.org/ark:/48223/pf0000366994

Pereira, F. D., Fonseca, S. C., Oliveira, E. H. T., Cristea, A. I., Bellhauser, H., Rodrigues, L., … Carvalho, L. S. G. (2021). Explaining individual and collective programming students' behavior by interpreting a black-box predictive model. *IEEE Access, 9*, 117097-117119. https://doi.org/10.1109/ACCESS.2021.3105956

Porter, Z., Zimmermann, A., Morgan, P., McDermid, J., Lawton, T., & Habli, I. (2022). Distinguishing two features of accountability for AI technologies. *Nature Machine Intelligence, 4*(9), 734-736. https://doi.org/10.1038/s42256-022-00533-0

Punar Özçelik, N., & Yangın Ekşi, G. (2024). Cultivating writing skills: The role of ChatGPT as a learning assistant-a case study. *Smart Learning Environments, 11*(10). https://doi.org/10.1186/s40561-024-00296-8

Ravanera, C., & Kaplan, S. (2021). An equity lens on artificial intelligence. *Institute for Gender and the Economy, Toronto, ON*. Retrieved from https://www.gendereconomy.org/wp-content/uploads/2021/09/An-Equity-Lens-on-Artificial-Intelligence-Public-Version-English-1.pdf

Robinson, S. C. (2020). Trust, transparency, and openness: How inclusion of cultural values shapes Nordic national public policy strategies for artificial intelligence (AI). *Technology in Society, 63*, 101421. https://doi.org/10.1016/j.techsoc.2020.101421

Roscoe, R. D., Salehi, S., Nixon, N., Worsley, M., Piech, C., & Luckin, R. (2022). Inclusion and equity as a paradigm shift for artificial intelligence in education. In *Artificial Intelligence in STEM Education* (pp. 359-374). CRC Press. https://doi.org/10.1201/9781003181187-28

Sadok, H., Sakka, F., & El Maknouzi, M. E. H. (2022). Artificial intelligence and bank credit analysis: A review. *Cogent Economics & Finance, 10*(1), 2023262. https://doi.org/10.1080/23322039.2021.2023262

Sampelolo, R., & Lura, H. (2023). Revolutionizing education: harnessing the power of artificial intelligence for personalized learning. *Klasikal: Journal of education, language teaching and science, 5*(2), 350-357. https://doi.org/10.52208/klasikal.v5i2.877

Schecter, A., Bogert, E., & Lauharatanahirun, N. (2023, April). Algorithmic appreciation or aversion? The moderating effects of uncertainty on algorithmic decision making. In *Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-8). https://doi.org/10.1145/3544549.3585908

Shin, D., Rasul, A., & Fotiadis, A. (2021). Why am I seeing this? Deconstructing algorithm literacy through the lens of users. *Internet Research, 32*(4), 1214-1234. https://doi.org/10.1108/INTR-02-2021-0087

Tan, X., Wang, C., & Xu, W. (2025). To disclose or not to disclose: Exploring the risk of being transparent about GenAI use in second language writing. *Applied Linguistics*, amae092.

Tung, R. (2013). Innovations in educational equity for English language learners. *Voices in*

Urban Education, *37*, 2-5.

Turilli, M., & Floridi, L. (2009). The ethics of information transparency. *Ethics and Information Technology*, *11*(2), 105-112.https://doi.org/10.1007/s10676-009-9187-9

UNESCO (2025). Ethics of artificial intelligence. Retrieved from https://www.unesco.org/en/artificial-intelligence/recommendation-ethics

van Esch, P., Cui, Y. (Gina), & Heilgenberg, K. (2024). Using Artificial Intelligence (AI) to Implement Diversity, Equity and Inclusion (DEI) into Marketing Materials: The 'CONSIDER' Framework. *Australasian Marketing Journal*, *32*(3), 250-262. https://doi.org/10.1177/14413582241244504

Varona, D., & Su árez, J. L. (2022). Discrimination, bias, fairness, and trustworthy AI. *Applied Sciences*, *12*(12), 5826. https://doi.org/10.3390/app12125826

Vetter, M. A., Lucia, B., Jiang, J., & Othman, M. (2024). Towards a framework for local interrogation of AI ethics: A case study on text generators, academic integrity, and composing with ChatGPT. *Computers and Composition*, *71*, 1-12. https://doi.org/10.1016/j.compcom.2024.102831

Walmsley, J. (2021). Artificial intelligence and the value of transparency. *AI & society*, *36*(2), 585-595. https://doi.org/10.1007/s00146-020-01066-z

Wang, A., Morgenstern, J., & Dickerson, J. P. (2025). Large language models that replace human participants can harmfully misportray and flatten identity groups. *Nature Machine Intelligence*, 1-12. http://dx.doi.org/10.1038/s42256-025-00986-z

Wang, X., Pang, H., Wallace, M. P., Wang, Q., & Chen, W. (2024). Learners' perceived AI presences in AI-supported language learning: A study of AI as a humanized agent from community of inquiry. *Computer Assisted Language Learning*, *37*(4), 814-840. https://doi.org/10.1080/09588221.2022.2056203

Warschauer, M, & Xu, Y. (2024). Generative AI for Language learning: Entering a new era. Language Learning & Technology, 28(2), 1-4. https://hdl.handle.net/10125/73569

Yan, L., Sha, L., Zhao, L., Li, Y., Martinez‐Maldonado, R., Chen, G., Li, X., Jin, Y., & Gašević, D. (2024). Practical and ethical challenges of large language models in education: A systematic scoping review. *British Journal of Educational Technology*, *55*(1), 90-112. https://doi.org/10.1111/bjet.13370

Yao, D. (2024). Does perceived test fairness affect test preparation? -- A case study of *Duolingo EnglishTest*. *Heliyon*, *10*(23), e40579. https://doi.org/10.1016/j.heliyon.2024.e40579

Yu, H., Guo, Y., Yang, H., Zhang, W., & Dong, Y. (2025). Can ChatGPT revolutionize language learning? Unveiling the power of AI in multilingual education through user insights and pedagogical impact. *European Journal of Education*, *60*(1), e12749. https://doi.org/10.1111/ejed.12749

Yusuf, Q., Jusoh, Z., & Yusuf, Y. Q. (2019). Cooperative learning strategies to enhance writing skills among second language learners. *International Journal of Instruction*, *12*(1), 1399-1412. https://doi.org/10.29333/iji.2019.12189a

Zaini, A., & Mazdayasna, G. (2014). The effect of computer assisted language learning on the development of EFL learners' writing skills. *Procedia - Social and Behavioral Sciences*, *98*, 1975-1982. https://doi.org/10.1016/j.sbspro.2014.03.631

Zhao, S. (2024). Research on the design of a system based on machine learning algorithms for automatic scoring of English writing ability. *Scalable Computing: Practice and Experience*, *25*(5). https://doi.org/10.12694/scpe.v25i5.3153

Zou, B., Guan, X., Shao, Y., & Chen, P. (2023). Supporting speaking practice by social network-based interaction in artificial intelligence (AI)-assisted language learning. *Sustainability*, *15*(4), 2872. https://doi.org/10.3390/su15042872

Authors' contributions

In this work, Dr. Compagnoni, Dr. Wen and Dr. Oguilve jointly collaborated to conceptualize the paper's overall structure and introduction. Dr. Wen developed the section on AI transparency (2.1), while Dr. Oguilve's contribution focused on articulating principles of AI equity (2.2). Dr. Compagnoni wrote the paragraphs on AI accountability (2.3). The three authors collaboratively analyzed scholarly gaps in current AI ethics discourse and jointly formulated recommendations and conclusions.

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