Jurnal Review Pendidikan dan Pengajaran
http://journal.universitaspahlawan.ac.id/index.php/jrpp
Volume 7 Nomor1, 2024
P-2655-710X e-ISSN 2655-6022

Submitted : 06/01/2024
Reviewed : 09/01/2024
Accepted : 13/01/2024
Published : 16/01/2024

Jusak Patty[1]

THE USE OF AI IN LANGUAGE LEARNING: WHAT YOU NEED TO KNOW

Abstrak

Kecerdasan Buatan adalah kekuatan transformasional dalam pendidikan, terutama dalam pembelajaran bahasa. Studi ini membahas berbagai alat AI yang digunakan untuk pembelajaran bahasa, seperti terjemahan mesin, teknologi ucapan, *chatbot*, dan konten yang dihasilkan oleh kecerdasan buatan. Studi ini secara komprehensif menjelajahi potensi dan tantangan yang terkait dengan peran kecerdasan buatan dalam pendidikan bahasa. Di satu sisi, kecerdasan buatan menawarkan manfaat seperti panduan personal, keterlibatan interaktif, dan pelacakan kemajuan. Namun, juga menimbulkan kekhawatiran tentang interaksi manusia yang berkurang, dampak potensial pada otonomi pembelajar, dan peran yang berkembang dari guru bahasa. Oleh karena itu, studi ini menekankan pentingnya menggabungkan prinsip-prinsip etika, transparansi, dan inklusivitas untuk memandu integrasi kecerdasan buatan dalam pendidikan secara bertanggung jawab. Penelitian ini menggunakan metodologi penelitian perpustakaan untuk membangun landasan teoritis yang kuat, menekankan peran penting integrasi kecerdasan buatan yang bertanggung jawab dalam meningkatkan pendidikan bahasa sambil menjaga standar etika yang tinggi.

Kata Kunci: Kecerdasan buatan, Pembelajaran bahasa, Prinsip Etika, Integrasi Kecerdasan Buatan.

Abstract

Artificial Intelligence (AI) is a transformative force in education, particularly language learning. This study discusses the various AI tools employed for language learning, such as machine translation, speech technology, chatbots, and AI-generated content. It comprehensively explores the promises and challenges associated with AI's role in language education. On the one hand, AI offers benefits like personalized guidance, interactive engagement, and progress tracking. However, it also raises concerns about diminished human interaction, potential impacts on learners' autonomy, and the evolving role of language teachers. Therefore, it underscores the significance of incorporating ethical principles, transparency, and inclusiveness to responsibly guide AI integration in education. This research utilizes library research methodology to establish a solid theoretical foundation, emphasizing the pivotal role of responsible AI integration in enhancing language education while upholding high ethical standards.

Keywords: Artificial intelligence, Language Learning, Ethical Principles, Responsible AI Integration

INTRODUCTION

Artificial Intelligence (AI) stands as a remarkable achievement in technological progress, striving to emulate and replicate the intricate cognitive processes of the human mind. Virtual assistants like Siri, Alexa, and Google Assistant use AI to help humans with various tasks, such as setting alarms, playing music, and making phone calls. This groundbreaking field encompasses diverse techniques and methodologies, all aimed at imparting intelligent thinking capabilities to machines. Fundamentally, AI represents a pivotal knowledge mechanism that plays a central role in the development and assessment of intelligence, underpinned by the tools employed to facilitate this process. The study and application of AI technology traverse a broad spectrum of domains, including education, finance, entertainment, e-commerce, healthcare, agriculture, gaming, robotics, transportation, remote sensing, and industry (Kumain et al.,

[1]Progam Studi Pendidikan Bahasa Inggris, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Pattimura
email: jusak.patty@gmail.com

2020). These interdisciplinary endeavors deepen our understanding of AI's capacity to endow computers with intelligent cognition. For example, AI-powered tutoring platforms are being used to personalize learning programs for students, AI-powered fraud detection systems are being used to identify and prevent fraudulent transactions, and AI-powered cancer detection systems are being used to identify cancer cells in medical images.

In a particular context, the burgeoning integration of AI in language learning has emerged as a topic of significant interest, sparking vigorous debates and discussions. AI is not merely a system designed to comprehend human speech but also a catalyst for integrating a flipped learning approach into language teaching, enhancing learners' competence and productivity while enabling the evaluation of human speech (Ali, 2020). This transformative technology holds immense promise as a potent tool for enriching language learning environments by facilitating automatic feedback, intelligent tutoring, and personalized learning experiences (Weng & Chiu, 2023). Such advancements empower language learners by providing access to a wealth of language resources and creating authentic platforms for communication in their target language (Ji et al., 2023). Furthermore, AI systems support online learning and teaching by enabling personalized student learning, automating routine tasks for instructors, and facilitating adaptive assessments (Seo et al., 2021).

However, the enormous potential of AI in language learning also brings forth challenges, including concerns related to privacy, information security, and teachers' preparation (Woo & Choi, 2021). Inadequate privacy measures may expose students to data breaches and misuse of their personal information. For instance, if a school uses an AI-powered tutoring platform without solid privacy safeguards, a hacker could breach the system, steal student data, and sell it to third parties for marketing without consent. On the other hand, a lack of information and teacher preparation can hinder the effective integration of AI tools into language learning environments. Additionally, teachers may express reservations about the authenticity of student work when assignments are completed through copy-and-paste practices, potentially compromising the quality of learning (Godwin-Jones, 2022). With better understanding and preparation, teachers can use AI tools effectively. Thus, it is crucial to comprehensively examine these multifaceted challenges and opportunities AI presents in language learning.

To gain a deeper insight into the incorporation of AI in language learning, it is essential to explore the foundational concepts that underpin this field. One such theory is Computer-Assisted Language Learning (CALL), which involves leveraging computers to aid in the presentation, reinforcement, and assessment of learning materials, typically incorporating a significant interactive component (Rahmadini & Zpalanzani, 2018). CALL applications are vital in personalizing learning in two key ways (Vu et al., 2022). Firstly, they provide individual learners access to a wealth of learning materials, offering a vast repository of resources for self-guided exploration. Secondly, CALL offers individualized support through various helpful features and options. The evolution of CALL extends beyond its initial purpose of tutoring and language learning, with modern CALL programs engaging learners in problem-solving, critical analysis, and automated learning activities. These programs immerse learners in challenging and complex scenarios, enhancing their understanding of the subject matter (Ali, 2018).

The emergence of programs integrating advanced technologies falls under the purview of intelligent computer-assisted language learning, abbreviated ICALL (Heift & Schulze, 2007). ICALL encompasses many extended CALL elements, including AI, computational linguistics, Natural Language Processing (NLP), and speech processing techniques integrated into language learning resources. These resources can range from basic grammar checkers to sophisticated learning environments (Ward, 2017). ICALL delves into applying Artificial Intelligence methods and techniques in language learning, unlocking new horizons for innovation and personalized education (Gamper & Knapp, 2002).

The impact of ICALL systems on language learning can be profound when tailored to meet the specific needs of contemporary foreign language education. This adaptation spans a broad spectrum, encompassing various activity types, input constraints, interface design, instructional methodologies, integration of the learner's native language, feedback mechanisms, and language analysis (Amaral & Meurers, 2011). Exploring these foundational theories sheds light on the potential of AI in language learning. It establishes a robust groundwork for

integrating technology into education, ultimately fostering enhanced and personalized learning experiences.

The utilization of AI in language learning is grounded in fundamental concepts, including machine learning (ML), Natural Language Processing (NLP), and deep learning. Machine Learning (ML) empowers machines to learn autonomously without needing constant user direction. It relies on statistical analysis, mathematics, and data mining to analyze data and execute specific tasks. The term "Machine Learning" originated in the 1920s and has since evolved rapidly, with notable applications such as IBM's Deep Blue, which defeated professional chess champions in 1996. ML is vital in various domains, from smartphone facial recognition to personalized online advertising based on user preferences. ML learns by analyzing both development data and real-world usage data, with continuous advancements driven by new learning algorithms, theoretical developments, and the proliferation of online data and affordable computing (Jordan & Mitchell, 2015).

Natural Language Processing (NLP) is a specialized branch of AI dedicated to processing human language. NLP equips computers with the ability to understand and process natural language humans use in everyday communication. It involves enabling computer systems to perform meaningful tasks using human-understandable language (Jain et al., 2018). NLP applications include chatbots, language chunking, text summarization, translation tools, and other tools that facilitate computers' understanding and response to user-inputted language instructions. NLP focuses on various aspects of language, including syntax, semantics, and pragmatics, to enable adequate language comprehension. Additionally, Information Retrieval (IR) entails retrieving documents relevant to users' information needs, commonly implemented in web search engines with features like corpus documents, language-specific queries, search results, and result presentation.

Deep learning represents a revolutionary approach that enables computers to learn analogously to human learning by understanding complex patterns in data such as images, text, and sound. It leverages intricate neural networks with advanced operations, surpassing human performance and autonomously extracting meaningful insights from raw input data (Janiesch et al., 2021). Deep learning's potential extends to improving data performance on websites and applications, benefiting various domains.

In light of these foundational concepts, this study endeavors to address specific research questions:

1. What are the diverse types of AI that can be utilized in language learning?
2. How does AI contribute to language learning, and in what ways does it enhance the learning experience?
3. What potential risks need consideration in the context of language learning with AI?
4. What are the ethical principles governing AI in education?

By delving into these questions, this study aims to provide a comprehensive exploration of the role of AI in language learning, shedding light on its promises and challenges in education.

METHOD

In this research, the researcher employed library research as the research method, which involves examining reference materials and prior research to establish a theoretical foundation for the research problem. This approach utilizes data collection techniques like reviewing books, notes, and relevant reports to delve into theoretical exploration, references, and scientific literature associated with the cultural, value, and normative aspects within the social context being studied. As George (2008) emphasized, library research is vital across disciplines, enabling researchers to identify previous work, assess expert opinions, and engage in a systematic process that expands knowledge.

As Snyder (2019) outlined, the research process consists of several key steps: designing the review, conducting it, analyzing the gathered information, and writing it. Initially, the researcher defines the review's purpose and research questions while considering the audience and publication goals. A focused search strategy is developed, incorporating relevant terms and criteria. Standardized methods are employed to extract essential details from the collected data.

The choice of analysis method aligns with the review's objectives. In this research, content analysis was used for data analysis. When writing, it is essential to effectively communicate the motivation and structure while adhering to established guidelines. This study explores the role of AI in language learning, drawing on foundational concepts like CALL and ICALL and integrating ML, NLP, and deep learning to address critical questions regarding AI's impact on education and language learning.

RESULT AND DISCUSSION

Types of AI Utilized in Language Learning

Language learning involves a deliberate effort to comprehend and master a new language, often through formal education or structured teaching, such as second language acquisition methods. This approach employs educators who provide direct guidance and rule-based instruction. Learning a language offers numerous benefits, including enhanced brain and cognitive development, improved memory, creativity, and academic progress (Zhang, 2021). Nevertheless, language acquisition is demanding and time-consuming, requiring dedication, persistence, and hard work. It presents various cognitive, social, and emotional challenges, from grasping fundamental grammar concepts to achieving fluency and addressing pronunciation difficulties. Recognizing and addressing these challenges is vital in language education to facilitate effective language acquisition. Fortunately, artificial intelligence has revolutionized language learning, making it more accessible and efficient for learners. In this section, the researcher explores deeply the types of AI tools used in language learning.

a. Machine Translation

Machine translation (MT) is an automated system that facilitates seamless translation between languages, addressing the need for cross-lingual communication in our increasingly globalized world. Traditional manual translation methods are resource-intensive and costly, making MT a practical solution to enhance efficiency. In language education, machine translation technology integrates static learning approaches into interactive systems that foster productive human-machine collaboration Urlaub & Dessein, (2022). These dynamic systems offer learners valuable opportunities and prompt language educators to recognize the positive impact of MT tools in their classrooms. Machine translation's capacity to generate tens of millions of translations daily and swiftly adapt to new terminology is a capability that surpasses the reach of individual learners (Raheem, 2020). Studies on MT, such as Google Translate, reveal its effectiveness in facilitating the acquisition of word meanings, comprehension of complex sentence structures, sentence construction, spelling accuracy, and pronunciation, making it a valuable resource for students in various language-learning activities (Shahriar, 2023; Wirantaka & Fijanah, 2021).

b. Speech Technology

Speech technology is a collection of computing capabilities that enable electronic devices to recognize, analyze, and comprehend spoken words or audio inputs. Typically, this entails processing and comparing digital sound data to a reference pattern library. Speech recognition, including Automatic Speech Recognition (ASR) and speech synthesis, known as Text-to-Speech (TTS), are two uses of this technology.

ASR, a crucial component of speech technology, specializes in converting spoken words into text by dissecting audio into discrete sounds, transforming them into a digital format, and employing algorithms to determine the most probable corresponding textual representation, enabling computers to understand spoken language. Conversely, Speech Synthesis, specifically TTS, functions in the opposite direction, translating text into audible spoken words. Virtual assistants like Alexa utilize TTS with trigger word detection and Natural Language Processing (NLP) to comprehend user intent and respond with synthesized speech. This integrated process forms the basis for interactive conversational interactions. Furthermore, Makashova (2021) highlights that TTS and ASR tasks serve essential purposes beyond communication, including assisting individuals with disabilities, such as visually impaired individuals, through accessibility technology. Speech technology finds practical applications in various educational contexts, such as pronunciation training, communication skills development, vocabulary assessment, and listening comprehension skill enhancement (Krasnova & Bulgakova, 2014).

c. Chatbots and Virtual Assistants

Huang et al. (2021) described a chatbot as a software program that facilitates natural language conversations with users. Leveraging AI capabilities, chatbots strive to emulate human dialogues and act as automated conversational agents, available to assist users through natural language interactions in various contexts. As Essel et al. (2022) denoted, these virtual assistants are engineered to comprehend user needs through AI methods and respond using natural language. As AI advances, chatbots have found applications across diverse domains, including educational support. Their versatility enables them to undertake various tasks, from answering questions to offering directions. Haristia's (2019) research indicates that language learners favor chatbots for language learning due to their accessibility and the confidence they inspire, compared to direct interactions with human tutors. Furthermore, findings from Belda-Medina and Calvo-Ferrer (2022) shed light on the positive perceptions of chatbot integration, highlighting their perceived utility and ease of use, albeit with a moderate interest in future adoption.

d. AI- Generated Content (AIGC)

AI-generated content (AIGC) replicates human writing and thinking, offering a versatile solution for content generation. AIGC products, bolstered by the advancements in large model algorithms, are becoming increasingly promising tools that enhance our daily lives. These content generators come in various forms, capable of creating entire pieces such as articles and quizzes or facilitating creative brainstorming through human-like interactions in chat (Wu et al., 2023). The growing relevance of AI-generated content makes it essential to understand its optimal utilization. AI can produce language-based materials like exercises, quizzes, and short stories tailored to specific proficiency levels in language learning.

A prime example is Quizizz AI, a platform designed to expedite quiz creation, effortlessly adapting to individual needs. With Quizizz AI as a personalized teaching assistant, quizzes can be crafted in under a minute, effectively enhancing language learning (Degirmenci, 2021). Students benefit from the engaging and meaningful activities provided by Quizizz, leading to improved reading skills (Pradnyadewi & Kristiani, 2021). Furthermore, Quizziz demonstrates its positive impact on grammar comprehension, as a significant increase in test scores among students is evident (Rahayu & Purnawarman, 2018).

The Advantages of AI in Language Learning

AI exerts a significant influence across multiple domains, including education. This influence extends to foreign language learning and teaching, where the integration of AI is long overdue. While attempts to modernize language education with AI have been ongoing for years, their impact has remained constrained. However, converging neural network capabilities with AI-driven language learning holds promise for students, educators, and the corporate sector. AI's potential lies in its ability to personalize digital language instruction, reducing students' time, expenses, and challenges. AI algorithms can enhance learning across diverse sectors, allowing individuals to study conveniently. Moreover, incorporating AI language learning into traditional educational institutions can yield many benefits.

In general, AI can significantly enhance language learning as follows:

a. Enhancing Personalized Learning

Personalized learning tailors instruction to individual students' needs to accelerate their progress while adhering to curriculum requirements. It allows students to explore their interests and strengths, fostering a sense of ownership over their learning journey (Bray & McClaskey, 2013). This approach empowers students to set higher goals, tackle complex problems, and generate meaningful outcomes. Central to student-centered learning is the high degree of involvement it requires, focusing on addressing each student's unique strengths and weaknesses (Makhambetova et al., 2021). It involves connecting prior knowledge with new information, and in the digital realm, personalized content is vital (Fitria, 2021). Integrating AI is crucial, allowing for tailored curriculum interactions that make educational content more accessible, engaging, and relevant (Følstad & Brandtzaeg, 2020). In language learning, AI tools offer personalized experiences based on individual needs and progress, saving students time and providing targeted support (De La Vall & Araya, 2023). For instance, Rosetta Stone utilizes AI

algorithms to offer tailored instruction and feedback in over 30 languages, accessible on mobile and desktop platforms.

b. Providing Interactive Learning

Interactive learning emphasizes collaboration and teamwork, offering a hands-on, real-world approach to education. This approach not only injects fun and enjoyment into children's learning experiences but also increases opportunities for sharing, collaboration, and sustained motivation, addressing some of their fundamental human needs. Moreover, interactive language learning activities have significantly enhanced learners' speaking proficiency by fostering self-confidence, cultivating a conducive learning environment, bolstering motivation, and facilitating authentic conversations (Omar et al., 2020). In language learning, AI manifests in various forms, such as chatbots, virtual language tutors, language learning apps, and online courses, providing learners with real-time feedback and guidance that closely simulates interactions with human language instructors. Through these AI-driven applications, learners can develop a range of speaking skills, including fluency, grammatical accuracy, pronunciation, rhythm, organization of ideas, reading aloud, and presentation skills. This interactive approach with AI throughout the learning process affords learners more opportunities to engage with instructors and peers. It is a potent motivator for speaking practice, ultimately leading to more effective learning outcomes (Zou et al., 2023).

c. Monitoring Constant Progress

AI can be used as a learning analytics tool that provides valuable support to instructors by enabling them to monitor learners' progress, pinpoint areas for improvement, and dynamically adapt course content. These analytics tools decode students' clickstream data, allowing instructors to gain insights into their performance, advancement, and untapped potential (Seo et al., 2021). Furthermore, AI fosters student autonomy by facilitating automated feedback cycles within the learning systems, enabling students to progress independently of the course instructor. These AI-enhanced learning systems result from extensive research on AI, including intelligent tutors, learning analytics, and educational data mining techniques (Kabudi et al., 2021). For instance, ChatGPT offers an adaptive assessment tool that informs teachers about class performance and areas of difficulty and customizes teaching methods while delivering personalized feedback to students, ultimately enhancing the assessment process and promoting student development (Liu et al., 2023).

d. Availability & Flexibility

According to Almusaed et al. (2023), AI is critical in bridging educational access barriers by providing students with greater freedom and accessibility. It considerably improves educational access by allowing students to learn independently using multiple forms such as video lectures, online courses, and personalized learning plans. Additionally, AI assists educators by automating administrative duties, offering real-time feedback, and recognizing individual students' strengths and weaknesses to tailor training to their needs—for example, Duolingo, an AI used in language learning apps. Duolingo's AI-powered features include personalized lessons, speaking and listening exercises, and adaptive difficulty adjustments based on the user's progress and performance. The accessibility of AI-powered language learning tools at any time and from any location further empowers students to study on their own terms, removing the limits associated with traditional classroom learning.

e. Providing Immersive Learning

Several AI-powered systems use Augmented Reality (AR) and Virtual Reality (VR) technology to develop immersive learning environments. These immersive activities successfully simulate real-life scenarios, assisting learners in gaining a deeper comprehension of the language. VR and AR provide interactive and engaging learning environments that engage students and improve knowledge retention. Radia et al.'s (2020) research has shown that students who participate in VR experiences retain more information and can successfully apply their learning. Furthermore, as Huang et al. (2021) demonstrated, AR tools like HP Reveal and VR tools like Google Expedition, Google Earth, and Tour Creator increase language acquisition by providing immersive learning experiences, increasing motivation, fostering interaction, and decreasing learning anxiety.

Potential Risk and Ethical Concerns of Using AI in Language Learning

Implementing AI in language learning raises significant concerns and risks that merit serious consideration. While AI has a growing role in education, particularly in language learning, it may progressively reduce human interaction—a factor closely tied to effective language learning, especially in international communication and discourse-based learning (Tanabe, 2021). Interactions and interpersonal relationships foster creative language use, facilitating discussions and mutual understanding among learners (Muho & Kurani, 2014). However, AI systems increasing repetitive task automation, as Ahmad et al. (2023) highlighted, hinder human cognitive development and erode decision-making capabilities. In contrast, traditional in-person classrooms provide a vital platform for meaningful teacher-student interactions that shape character and civic values. In such environments, students learn from their peers, question their instructors, and actively engage in their education. Nevertheless, the pervasive influence of AI technology threatens to curtail these interactions, potentially impacting students' overall development, including their character, civic responsibility, and decision-making skills. Hence, while AI-driven language learning tools can complement conventional teaching methods, it is crucial to acknowledge and preserve the irreplaceable value of human interaction in the language learning process (De La Vall & Araya, 2023).

Moreover, the integration of AI in language learning poses a potential threat to learners' autonomy, a fundamental aspect of language education, empowering students to take charge of their learning process (Çakici, 2015; Najeeb, 2013). While AI's capabilities have expanded with the utilization of big data and enhanced processing power (IRENA, 2019), it introduces the challenge of diminishing individual autonomy, potentially guiding individuals' choices (Danaher, 2018; Regan & Jesse, 2019). Excessive reliance on AI may result in detrimental student dependency, where tasks such as translation and question-answering are handed over to AI without active language skill development efforts. As (Ahmad et al., 2023) highlighted, this over-reliance can lead to a decline in human skills, fostering stress in scenarios requiring physical or cognitive abilities. Ultimately, students risk losing their capacity for independent language speaking, writing, and comprehension as AI becomes their primary source for these activities.

Furthermore, AI struggles with context and cultural nuances, often resulting in inappropriate responses. Language is context-rich, and AI models, despite their language-processing prowess, may misinterpret meanings without proper context. This challenge extends to humor and sarcasm, a complex task in Natural Language Processing (Khurana et al., 2022). For example, ChatGPT might misinterpret sarcasm or humor, providing irrelevant responses. Language understanding is intricate due to word meanings, extensive context, and evolving comprehension (Favre, 2019). Cultural differences further complicate language, affecting notions of politeness and offensiveness. Neglecting cultural diversity in AI design can hinder equitable access to technology (Messner, 2022). AI needs a better understanding of diverse cultures since it cannot do so itself (Hardman, 2022).

Lastly, the widespread use of AI language learning tools could jeopardize the role of language teachers, potentially reducing their demand. If people can learn all language skills through AI conveniently at home, the need for language teachers might decline. Bill Gates predicts advanced AI models like ChatGPT could soon serve as teachers (Abdullah, 2023). However, Chan and Tsi (2023) report that while some teachers and students believe AI might replace teachers, most argue that teachers' human qualities, including critical thinking and creativity, are irreplaceable.

Ethical Principles Governing AI in Education

AI technology has become integral to education, revolutionizing the learning process. It empowers students to engage in independent learning, allowing teachers to concentrate on imparting essential knowledge and guiding students' moral and behavioral development. However, the rapid development of AI technology brings both opportunities and challenges. To ensure its responsible use, it must adhere to ethical principles that prevent it from exceeding reasonable limits.

In Nguyen et al. (2023) definition, ethical principles for AI in education (AIED) is defined as a set of guiding principles and guidelines focused on the design, implementation, and

evolution of AI technologies in educational settings, with the overarching goal of aligning these technologies with societal values and prioritizing the well-being of all stakeholders, including educators, students, parents, AI developers, and policymakers. These principles have been derived through a thematic analysis of pertinent ethical guidelines and reports from international organizations, such as UNESCO, OECD, the European Commission, and the European Parliament. They propose that ethical AI in education should address seven critical aspects: governance and stewardship, transparency and accountability, sustainability and proportionality, privacy, security and safety, inclusiveness, and human-centered AIED. These principles play a vital role in providing essential guidelines for the responsible development and application of AI in education, ensuring that it remains aligned with societal values.

Given AI's reliance on big data and the potential for misuse, maintaining oversight is paramount to control its autonomous development. In this context, these principles serve as a crucial framework for the oversight and responsible management of AIED, establishing rules and ensuring its ethical design and usage. AI stewardship and governance involve risk management and consider AI, including models, algorithms, data, and human interactions (Isom, 2022). Governance creates rules and standards for AI, while stewardship ensures responsible management. Unfortunately, these aspects have often been overlooked in recent discussions. Therefore, it is essential to consider various ethical perspectives, including data ethics, learning analytics ethics, and human rights, to ensure the ethical and responsible implementation of AIED, benefiting all stakeholders while upholding critical ethical principles. In applying analytics, educators and institutions should ensure that data and analysis techniques are used appropriately (Corrin et al., 2019).

Data ethics in AIED emphasizes the importance of transparency in data usage. Transparency is crucial for educators, ed-tech experts, and AI practitioners to understand AI tools' purpose, requirements, and data quality, ultimately enhancing their effectiveness (Chaudhry et al., 2022). Despite the growing prominence of AI tools in education, challenges related to data transparency, ownership, accessibility, and explainability persist. Data ownership issues raise questions about student rights, while explainability is crucial for understanding AI's decision-making processes. Ethical principles emphasize transparency in data and algorithms, along with clear regulations and accountability. Accountability involves recognizing and limiting authority while interrogating power, encompassing seven key features: context, range, agent, forum, standard, process, and implications (Novelli et al., 2023). Responsible AI implementation requires attributing responsibility and addressing potential negative consequences, with educational stakeholders leading the way. This approach balances human oversight and AI use while considering sustainability and proportionality.

In education, AI, including AIED, must prioritize environmental responsibility by using energy efficiently and minimizing ecological impact. This approach can harness AI's potential to integrate with renewable energy and IoT, benefiting supply, decision-making, and autonomous control (Chen et al., 2023). Regulations should ensure these considerations are integrated into AIED's design, promoting innovation, accountability, and accessibility. In contrast, the proportionality principle ensures that AI methods are used only when justified and aligned with their intended goals (Karliuk, 2022).

Privacy emerges as a crucial concern in AIED due to the extensive collection and analysis of personal data. AI will bring privacy and other risks that are hard to address only via individual decision-making; additional protections will be needed (Cardona et al., 2023). Protecting learners' privacy and well-being necessitates developers to consider the perspectives of both students and teachers when deploying AI in the classroom. Privacy violations mainly occur when people expose excessive personal information online (Akgun & Greenhow, 2021). Ethical concerns, such as using facial recognition or attendance tracking without consent, may arise. Building trust requires well-informed consent and confidentiality maintenance. Additionally, questions about data management, storage, and accessibility rights must be addressed after data collection.

Educational learning systems aim to predict user behavior and performance but face risks like data manipulation and cyber threats. By learning from its interactions and adapting, AI holds great potential to significantly improve human health and well-being by addressing

various challenges more effectively than humans (Conn, 2017). The security principle underscores the importance of robustness against these risks to ensure data privacy. Incorruptibility in AIED aligns with data security and personal data protection, especially in virtual learning. IoT devices are ubiquitous and interconnected and often lack essential security features, leaving them vulnerable to cyber threats (Tariq et al., 2023). Furthermore, AIED raises safety concerns, emphasizing the need for protective measures to prevent user harm. Developers must prioritize safety through careful design and testing of AI systems, while oversight mechanisms and user training should be in place to maintain security.

Accessibility and inclusiveness are paramount in AIED to uphold human rights and promote global justice. This involves ensuring affordability, user-friendly designs, and accommodation for diverse demographics, including individuals with disabilities. The inclusiveness principle highlights AIED's need to cater to a wide range of individuals, considering factors like infrastructure, equipment, skills, and societal acceptance to ensure equitable access (Nguyen et al., 2023). The digital divide, exacerbated by COVID-19, underscores the urgency of addressing inclusion to reduce educational disparities and discrimination. AIED development must prioritize unbiased data and algorithms to prevent perpetuating inequalities and avoid biased training data that could lead to unfair outcomes. AIED should prioritize fairness, equality, and quality education for all.

In conclusion, AIED development and regulation must adopt a human-centric approach that values autonomy. Using AI without human mediation raises concerns about vulnerabilities in cybersecurity (Naik et al., 2022). The Human-Centered AIED principle emphasizes enhancing human capabilities while preserving freedom of choice and control over AI processes. AIED should avoid manipulating users' motivation and emotions, particularly in an educational context. Ensuring learner agency is vital to prevent AIED from undermining autonomy. AIED should promote the interdisciplinary development of negotiation-based adaptive learning systems to achieve this, allowing learners to shape their educational experience. This approach fosters collaboration between humans and machines, ultimately improving educational outcomes while ensuring humans retain control.

CONCLUSION

Within language learning, AI offers a wealth of tools and technologies to enrich the educational experience. Machine translation, speech technology, chatbots, virtual assistants, and AI-generated content enhance language learning through personalized, interactive, and flexible solutions. These tools empower language learners with personalized guidance, interactive engagement, progress tracking, and accessible learning experiences. However, it is crucial to address the challenges and potential drawbacks, including reduced human interaction, risks to student autonomy, contextual understanding issues, and potential impacts on the role of language teachers. Balancing AI's advantages with the irreplaceable value of human interaction is critical to optimizing language education.

Ethical principles are the cornerstone in guiding the responsible use of Artificial Intelligence in Education (AIED). These principles, including governance, transparency, sustainability, privacy, security, inclusiveness, and a human-centered approach, provide a sturdy framework to ensure that AIED enhances education while maintaining high ethical standards. They ensure responsible oversight, transparency, and the ethical use of AI tools while balancing autonomy and collaboration. These principles are essential for harnessing AIED's potential for the benefit of both learners and educators.

REFERENCES

Abdullah, A. (2023). *Bill Gates: ChatGPT Will Soon be Able to Replace Teachers*. Chinese Gadget Reviews. https://www.gizchina.com/2023/04/26/bill-gates-chatgpt-will-soon-be-able-to-replace-teachers/

Ahmad, S. F., Han, H., Alam, M. M., Rehmat, M. K., Irshad, M., Arraño-Muñoz, M., & Ariza-Montes, A. (2023). Impact of Artificial Intelligence on Human Loss in Decision Making, Laziness and Safety in Education. *Humanities and Social Sciences Communications 2023 10:1*, *10*(1), 1–14. https://doi.org/10.1057/s41599-023-01787-8

Akgun, S., & Greenhow, C. (2021). Artificial Intelligence in Education: Addressing Ethical Challenges in K-12 Settings. *AI and Ethics 2021 2:3*, *2*(3), 431–440. https://doi.org/10.1007/S43681-021-00096-7

Ali, M. A. (2018). The Human Intelligence vs. Artificial Intelligence: Issues and Challenges in Computer Assisted Language Learning. *International Journal of English Linguistics*, *8*(5), p259. https://doi.org/10.5539/IJEL.V8N5P259

Ali, Z. (2020). Artificial Intelligence (AI): A Review of its Uses in Language Teaching and Learning. *IOP Conference Series: Materials Science and Engineering*, *769*(1). https://doi.org/10.1088/1757-899X/769/1/012043

Almusaed, A., Almssad, A., Yitmen, I., & Homod, R. Z. (2023). Enhancing Student Engagement: Harnessing "AIED" 's Power in Hybrid Education—A Review Analysis. *Education Sciences 2023, Vol. 13, Page 632*, *13*(7), 632. https://doi.org/10.3390/EDUCSCI13070632

Amaral, L. A., & Meurers, D. (2011). On Using Intelligent Computer-Assisted Language Learning in Real-Life Foreign Language Teaching and Learning. *ReCALL*, *23*(1), 4–24. https://doi.org/10.1017/S0958344010000261

Belda-Medina, J., & Calvo-Ferrer, J. R. (2022). Using Chatbots as AI Conversational Partners in Language Learning. *Applied Sciences (Switzerland)*, *12*(17), 8427. https://doi.org/10.3390/APP12178427/S1

Bray, B., & McClaskey, K. (2013). A Step-by-Step Guide to Personalize Learning. *Learning & Leading with Technology*, *40*(7), 12–19. www.iste.org.

Çakici, D. (2015). Autonomy in Language Teaching and Learning Process. *İnönü Üniversitesi Eğitim Fakültesi Dergisi*, *16*(1), 31–42. https://doi.org/10.17679/IUEFD.16168538

Cardona, M. A., Rodríguez, R. J., & Ishmael, K. (2023). *Artificial Intelligence and the Future of Teaching and Learning*. Office of Educational Technology. https://tech.ed.gov/ai-future-of-teaching-and-learning/

Chan, C. K. Y., & Tsi, L. H. Y. (2023). The AI Revolution in Education: Will AI Replace or Assist Teachers in Higher Education? *ArXiv Preprint ArXiv:2305.01185*. https://arxiv.org/abs/2305.01185v1

Chaudhry, M. A., Cukurova, M., & Luckin, R. (2022). A Transparency Index Framework for AI in Education. *ArXiv:2206.03220*. https://doi.org/https://doi.org/10.35542/osf.io/bstcf

Chen, L., Chen, Z., Zhang, Y., Liu, Y., Osman, A. I., Farghali, M., Hua, J., Al-Fatesh, A., Ihara, I., Rooney, D. W., & Yap, P. S. (2023). Artificial Intelligence-Based Solutions for Climate Change: A Review. *Environmental Chemistry Letters 2023 21:5*, *21*(5), 2525–2557. https://doi.org/10.1007/S10311-023-01617-Y

Conn, A. (2017). *Artificial Intelligence: The Challenge to Keep It Safe - Future of Life Institute*. Future of Life. https://futureoflife.org/ai/safety-principle/

Corrin, L., Kennedy, G., French, S., Shum, S. B., Kitto, K., Pardo, A., West, D., Mirriahi, N., & Colvin, C. (2019). *The Ethics of Learning Analytics in Australian Higher Education: Discussion Paper*. https://researchnow.flinders.edu.au/en/publications/the-ethics-of-learning-analytics-in-australian-higher-education-d

Danaher, J. (2018). Toward an Ethics of AI Assistants: An Initial Framework. *Philosophy and Technology*, *31*(4), 629–653. https://doi.org/10.1007/S13347-018-0317-3/METRICS

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*(01), 7569–7576. https://doi.org/10.18535/IJSSHI/V10I01.02

Degirmenci, R. (2021). The Use of Quizizz in Language Learning and Teaching from the Teachers' and Students' Perspectives: A Literature Review. *Language Education and Technology*, *1*(1), 1–11. https://langedutech.com/letjournal/index.php/let/article/view/12

Essel, H. B., Vlachopoulos, D., Tachie-Menson, A., Johnson, E. E., & Baah, P. K. (2022). The Impact of a Virtual Teaching Assistant (chatbot) on Students' Learning in Ghanaian Higher Education. *International Journal of Educational Technology in Higher Education*, *19*(1), 1–19. https://doi.org/10.1186/S41239-022-00362-6/TABLES/7

Favre, B. (2019). *Contextual Language Understanding Thoughts on Machine Learning in Natural Language Processing* [Aix-Marseille Universite]. https://amu.hal.science/tel-02470185

Fitria, T. N. (2021). The Use Technology Based on Artificial Intelligence in English Teaching and Learning. *ELT Echo : The Journal of English Language Teaching in Foreign Language Context*, *6*(2), 213–223. https://doi.org/10.24235/ELTECHO.V6I2.9299

Følstad, A., & Brandtzaeg, P. B. ·. (2020). Users' Experiences with Chatbots: Findings from a Questionnaire Study. *Quality and User Experience 2020 5:1*, *5*(1), 1–14. https://doi.org/10.1007/S41233-020-00033-2

Gamper, J., & Knapp, J. (2002). A Review of Intelligent CALL Systems. *Computer Assisted Language Learning*, *15*(4), 329–342. https://doi.org/10.1076/CALL.15.4.329.8270

George, M. W. (2008). The Elements of Library Research: What Every Student Needs to Know. *The Elements of Library Research: What Every Student Needs to Know*, 1–201. https://doi.org/10.5860/choice.46-4758

Godwin-Jones, R. (2022). Partnering with AI: Intelligent Writing Assistance and Instructed Language Learning. *Language Learning and Technology*, *26*(2), 5–24. https://www.lltjournal.org/item/10125-73474/

Hardman, L. (2022). Cultural Influences on Artificial Intelligence: Along the New Silk Road. *Perspectives on Digital Humanism*, 233–239. https://doi.org/10.1007/978-3-030-86144-5_31/COVER

Haristiani, N. (2019). Artificial Intelligence (AI) Chatbot as Language Learning Medium: An inquiry. *JPhCS*, *1387*(1), 012020. https://doi.org/10.1088/1742-6596/1387/1/012020

Heift, Trude., & Schulze, M. (2007). *Errors and Intelligence in Computer-Assisted Language Learning : Parsers and Pedagogues*. Routledge. https://www.routledge.com/Errors-and-Intelligence-in-Computer-Assisted-Language-Learning-Parsers/Heift-Schulze/p/book/9780415541282

Huang, W., Hew, K. F., & Fryer, L. K. (2021). 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, X., Zou, D., Cheng, G., & Xie, H. (2021). A Systematic Review of AR and VR Enhanced Language Learning. *Sustainability 2021, Vol. 13, Page 4639*, *13*(9), 4639. https://doi.org/10.3390/SU13094639

IRENA. (2019). *Artificial Intelligence and Big Data*. International Renewable Energy Agency. https://www.irena.org/publications/2019/Sep/Artificial-Intelligence-and-Big-Data

Isom, P. (2022). Earning Citizen Confidence through a Comprehensive Approach to Responsible and Trustworthy AI Stewardship and Governance. *Journal of AI, Robotics & Workplace Automation*, *1*(3), 278–284. https://ideas.repec.org/a/aza/airwa0/y2022v1i3p278-284.html

Jain, A., Kulkarni, G., & Shah, V. (2018). Natural Language Processing. *International Journal of Computer Sciences and Engineering*, *6*(1), 161–167. https://doi.org/10.26438/ijcse/v6i1.161167

Janiesch, C., Zschech, P., & Heinrich, K. (2021). Machine Learning and Deep Learning. *Electronic Markets*, *31*(3), 685–695. https://doi.org/10.1007/S12525-021-00475-2/TABLES/2

Ji, H., Han, I., & Ko, Y. (2023). A Systematic Review of Conversational AI in Language Education: Focusing on the Collaboration with Human Teachers. *Journal of Research on Technology in Education*, *55*(1), 48–63. https://doi.org/10.1080/15391523.2022.2142873

Jordan, M. I., & Mitchell, T. M. (2015). Machine Learning: Trends, Perspectives, and Prospects. *Science*, *349*(6245), 255–260. https://doi.org/10.1126/SCIENCE.AAA8415

Kabudi, T., Pappas, I., & Olsen, D. H. (2021). AI-Enabled Adaptive Learning Systems: A Systematic Mapping of the Literature. *Computers and Education: Artificial Intelligence*, *2*, 100017. https://doi.org/10.1016/J.CAEAI.2021.100017

Karliuk, M. (2022). Proportionality Principle for the Ethics of Artificial Intelligence. *SSRN Electronic Journal*. https://doi.org/10.2139/SSRN.4251497

Khurana, D., Koli, A., Khatter, K., & Singh, S. (2022). Natural Language Processing: State of The Art, Current Trends and Challenges. *Multimedia Tools and Applications*, *82*(3), 3713–3744. https://doi.org/10.1007/s11042-022-13428-4

Krasnova, E., & Bulgakova, E. (2014). The Use of Speech Technology in Computer Assisted Language Learning Systems. *Speech and Computer*, 459–466. https://doi.org/10.1007/978-3-319-11581-8_57

Kumain, S. C., Kumain, K., & Chaudhary, P. (2020). AI Impact on Various Domain: An Overview. *International Journal of Management*, *11*(10), 1433–1439. https://papers.ssrn.com/abstract=3741307

Liu, M., Ren, Y., Nyagoga, L. M., Stonier, F., Wu, Z., & Yu, L. (2023). Future of Education in The Era of Generative Artificial Intelligence: Consensus Among Chinese Scholars on applications of ChatGPT in schools. *Future in Educational Research*, *1*(1), 72–101. https://doi.org/10.1002/FER3.10

Makashova, L. (2021). *Speech Synthesis and Recognition for A Low-Resource Language Connecting TTS and ASR for Mutual Benefit* [University of Gothenberg]. https://gupea.ub.gu.se/handle/2077/69692

Makhambetova, A., Zhiyenbayeva, N., & Ergesheva, E. (2021). Personalized Learning Strategy as a Tool to Improve Academic Performance and Motivation of Students. *International Journal of Web-Based Learning and Teaching Technologies (IJWLTT)*, *16*(6), 1–17. https://doi.org/10.4018/IJWLTT.286743

Messner, W. (2022). Improving The Cross-Cultural Functioning of Deep Artificial Neural Networks Through Machine Enculturation. *International Journal of Information Management Data Insights*, *2*(2), 100118. https://doi.org/10.1016/J.JJIMEI.2022.100118

Muho, A., & Kurani, A. (2014). The Role of Interaction in Second Language Acquisition. *European Scientific Journal, ESJ*. https://doi.org/10.19044/ESJ.2011.V16N0P

Naik, N., Hameed, B. M. Z., Shetty, D. K., Swain, D., Shah, M., Paul, R., Aggarwal, K., Brahim, S., Patil, V., Smriti, K., Shetty, S., Rai, B. P., Chlosta, P., & Somani, B. K. (2022). Legal and Ethical Consideration in Artificial Intelligence in Healthcare: Who Takes Responsibility? *Frontiers in Surgery*, *9*, 862322. https://doi.org/10.3389/FSURG.2022.862322/BIBTEX

Najeeb, Sabitha. S. R. (2013). Learner Autonomy in Language Learning. *Procedia - Social and Behavioral Sciences*, *70*, 1238–1242. https://doi.org/10.1016/J.SBSPRO.2013.01.183

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

Novelli, C., Taddeo, M., & Floridi, L. (2023). Accountability in Artificial Intelligence: What It Is and How It Works. *AI and Society*, *1*, 1–12. https://doi.org/10.1007/S00146-023-01635-Y/FIGURES/1

Omar, S. F., Nawi, H. S. A., Shahdan, T. S. T., Mee, R. W. M., Pek, L. S., & Yob, F. S. C. (2020). Interactive Language Learning Activities for Learners' Communicative Ability. *International Journal of Evaluation and Research in Education*, *9*(4), 1010–1016. https://doi.org/10.11591/ijere.v9i4.20605

Pradnyadewi, D. A. M., & Kristiani, P. E. (2021). The Use of Quizizz in Improving Students' Reading Skill. *The Art of Teaching English as a Foreign Language*, *1*(2), 1–7. https://doi.org/10.36663/TATEFL.V1I2.93

Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A Systematic Review of Immersive Virtual Reality Applications for Higher Education: Design Elements, Lessons Learned, And Research Agenda. *Computers & Education*, *147*, 103778. https://doi.org/10.1016/J.COMPEDU.2019.103778

Rahayu, I. S. D., & Purnawarman, P. (2018). The Use of Quizizz in Improving Students' Grammar Understanding through Self-Assessment. *Eleventh Conference on Applied Linguistics (CONAPLIN 2018)*, 102–106. https://doi.org/10.2991/CONAPLIN-18.2019.235

Raheem, B. R. (2020). The Role of Machine Translation in Language Learning. *Academic Research International*, *7*(4), 60–67.

https://www.researchgate.net/publication/342027951_The_Role_of_Machine_Translation_in_Language_Learning

Rahmadini, S., & Zpalanzani, A. (2018). A Study on Interactivity in Computer Assisted Language Learning (CALL) Based for Language Learning. *VISUALITA*, *7*(1), 55. https://doi.org/10.33375/vslt.v7i1.1079

Regan, P. M., & Jesse, J. (2019). Ethical Challenges of Edtech, Big Data, and Personalized Learning: Twenty-First Century Student Sorting and Tracking. *Ethics and Information Technology*, *21*(3), 167–179. https://doi.org/10.1007/s10676-018-9492-2

Seo, K., Tang, J., Roll, I., Fels, S., & Yoon, D. (2021). The Impact of Artificial Intelligence on Learner–Instructor Interaction in Online Learning. *International Journal of Educational Technology in Higher Education*, *18*(1), 54. https://doi.org/10.1186/s41239-021-00292-9

Shahriar, A. (2023). The Effectiveness of Machine Translation Using "Google Translate" in English Language Learning in Bangladesh. *Pedagogy : Journal of English Language Teaching*, *11*(1), 75. https://doi.org/10.32332/joelt.v11i1.6355

Snyder, H. (2019). Literature Review as A Research Methodology: An Overview and Guidelines. *Journal of Business Research*, *104*, 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

Tanabe, J. (2021). Sustaining Language Learning through Social Interaction at a Japanese National University. *IAFOR Journal of Education*, *9*(6), 112–125. https://doi.org/10.22492/ije.9.6.06

Tariq, U., Ahmed, I., Bashir, A. K., & Shaukat, K. (2023). A Critical Cybersecurity Analysis and Future Research Directions for the Internet of Things: A Comprehensive Review. *Sensors*, *23*(8), 4117. https://doi.org/10.3390/s23084117

Urlaub, P., & Dessein, E. (2022). Machine Translation and Foreign Language Education. *Frontiers in Artificial Intelligence*, *5*. https://doi.org/10.3389/frai.2022.936111

Vu, D. C., Lian, A.-P., & Siriyothin, P. (2022). Integrating Natural Language Processing and Multimedia Databases in CALL Software: Development and Evaluation of an ICALL Application for EFL Listening Comprehension. *Comprehension. Computer Assisted Language Learning- Electronic Journal*, *23*(3), 41–69.

Ward, M. (2017). ICALL's relevance to CALL. In *CALL in a climate of change: adapting to turbulent global conditions – short papers from EUROCALL 2017* (pp. 328–332). Research-publishing.net. https://doi.org/10.14705/rpnet.2017.eurocall2017.735

Weng, X., & Chiu, T. K. F. (2023). Instructional Design and Learning Outcomes of Intelligent Computer Assisted Language Learning: Systematic Review in The Field. *Computers and Education: Artificial Intelligence*, *4*, 100117. https://doi.org/10.1016/j.caeai.2022.100117

Wirantaka, A., & Fijanah, M. S. (2021). Effective Use of Google Translate in Writing. *Proceedings of the International Conference on Sustainable Innovation Track Humanities Education and Social Sciences (ICSIHESS 2021)*. https://doi.org/10.2991/assehr.k.211227.003

Woo, J. H., & Choi, H. (2021). Systematic Review for AI-based Language Learning Tools. *ArXiv Preprint ArXiv:2111.04455*. https://arxiv.org/abs/2111.04455v1

Wu, J., Gan, W., Chen, Z., Wan, S., & Lin, H. (2023). AI-Generated Content (AIGC): A Survey. *ArXiv Preprint ArXiv:2304.06632*. https://arxiv.org/abs/2304.06632v1

Zhang, C. (2021). The Advantages and Disadvantages of Learning a Second Language Early. *Proceedings of the 2021 International Conference on Social Development and Media Communication (SDMC 2021)*. https://doi.org/10.2991/assehr.k.220105.008

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), 1–19. https://ideas.repec.org/a/gam/jsusta/v15y2023i4p2872-d1058418.html