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Artificial Intelligence and Multiliteracies: Preparing Learners for a Technologically Evolving World

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STELLA BOLANLE APATA
Adekunle Ajasin University, Nigeria
bolanle.apata@aaua.edu.ng
0000-0001-5955-3695

OLUWATOBI OWOJORI
Tshwane University of Technology

YUSUF OLAYINKA SHOGBESAN
Osun State University Osogbo, Nigeria

MICHAEL KENNETH UGOM
University of Nigeria, Nigeria

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ABSTRACT

As artificial intelligence (AI) continues to evolve rapidly, education is on the cusp of a transition via the goal of multiliteracies development, notably digital, visual/textual, and multimodal literacy abilities. This study examines the integration of AI in literacy education. It explores the role of AI in enhancing multiliteracies development, analyzing its features in educational contexts, its potential as a tool for literacy advancement, and broader pedagogical implications. Drawing on qualitative research utilising extensive review from sources including academic research, policy documents, and instructional materials, the study synthesizes key themes and emerging trends in AI-driven literacy education. By critically assessing these sources, the

RESUMEN

Inteligencia artificial y multialfabetización: preparar a los estudiantes para un mundo en constante evolución tecnológica

A medida que la inteligencia artificial (IA) sigue evolucionando rápidamente, la educación se encuentra en la cúspide de una transición hacia el objetivo del desarrollo de la alfabetización múltiple, en particular la alfabetización digital, visual/textual y multimodal. Este estudio examina la integración de la IA en la alfabetización. Explora el papel de la IA en la mejora del desarrollo de la alfabetización múltiple, analizando sus características en contextos educativos, su potencial como herramienta para el avance de la alfabetización y sus implicaciones pedagógicas

research identifies opportunities and challenges associated with AI integration, offering insights into its evolving role in shaping literacy practices for a rapidly changing technological landscape. Key findings indicate that AI-driven tools can provide personalized learning experiences and foster critical thinking, thereby contributing to the achievement of Sustainable Development Goals—particularly SDG 4 (Quality Education) and SDG 10 (Reduced Inequalities). However, challenges such as the digital divide, ethical concerns, and insufficient educator training remain significant barriers. To address these issues and harness AI's full potential, the study recommends integrating AI literacy into school curricula, establishing minimum access standards through legislative action, and providing targeted professional development for educators. By doing so, AI can play a transformative role in literacy education, equipping students to thrive in an increasingly technology-driven world while ensuring that teaching practices evolve to meet new challenges.

Key words: Artificial Intelligence, Education, Multiliteracies, Personalized Learning, Sustainable Development Goals.

más amplias. A partir de una investigación cualitativa que utiliza una amplia revisión de fuentes como la investigación académica, los documentos políticos y los materiales didácticos, el estudio sintetiza los temas clave y las tendencias emergentes en la alfabetización impulsada por la IA. Mediante una evaluación crítica de estas fuentes, la investigación identifica las oportunidades y los retos asociados a la integración de la IA, ofreciendo una visión de su papel evolutivo en la configuración de las prácticas de alfabetización para un panorama tecnológico en rápida evolución. Las principales conclusiones indican que las herramientas impulsadas por la IA pueden proporcionar experiencias de aprendizaje personalizadas y fomentar el pensamiento crítico, contribuyendo así a la consecución de los Objetivos de Desarrollo Sostenible, en particular el ODS 4 (Educación de calidad) y el ODS 10 (Reducción de las desigualdades). Sin embargo, la brecha digital, los problemas éticos y la insuficiente formación de los educadores siguen siendo obstáculos importantes. Para hacer frente a estos problemas y aprovechar todo el potencial de la IA, el estudio recomienda integrar la alfabetización en IA en los planes de estudio, establecer normas mínimas de acceso a través de la acción legislativa, y proporcionar desarrollo profesional específico para los educadores. De este modo, la IA puede desempeñar un papel transformador en la alfabetización, preparando a los alumnos para prosperar en un mundo cada vez más tecnológico y garantizando al mismo tiempo que las prácticas docentes evolucionen para hacer frente a los nuevos retos.

***Palabras clave**: Inteligencia Artificial, Educación, Plurilingüismo, Aprendizaje Personalizado, Objetivos de Desarrollo Sostenible.*

1. INTRODUCTION

As education evolves in the digital age, the integration of AI in literacy education reshapes how knowledge is created, accessed, and understood. Artificial Intelligence characterised by machine learning adopts human-like attributes as it acquires knowledge and resolves learning issues. Multiliteracies, initially proposed by the New London Group in 1996, assert that we inhabit a world characterised by many modalities of communication and cultural settings, hence expanding the definition of literacy. AI is significantly altering the methods by which individuals acquire new knowledge, ranging from educational applications designed to instruct students, to algorithms that evaluate based on prior interaction (McLaren et al., 2021). Thus, we can generate, analyse, and evaluate texts and other ways of meaning production more than ever before due to the growing ethnic variety and digital technology (Cope & Kalantzis, 2015). As a result, learners and educators now assess and interact with a range of texts in different formats.

Researchers aim to create a framework for multiliteracies, moving beyond the recognition of literacy as merely standardised codes and modes, enabling individuals to read, write, create, dismantle, engage with digital environments, and value multimodality (Kalantzis & Cope, 2025). Consequently, global literacy improves when conventional definitions of literacy do not offer the frameworks for effective communication within pertinent contexts, particularly with the emergence of advanced technology gadgets supported by Artificial intelligence. The integration of AI in educational settings prompts consideration of multiliteracies. Generative AI is a recent development encompassing text production, picture interpretation, video creation and editing, as well as multimodal initiatives that facilitate reciprocal generation and reception. Consequently, its presence in education not only fosters novel communication methods (multimodalities) but also advocates for pedagogical approaches that align classrooms with an increasingly digital landscape (Kalantzis & Cope, 2025; Apata et al., 2025).

Numerous conventional literacies exist and have importance in contemporary classrooms, although there are no initiatives advocating for the recognition of the multimodal dimensions of communication in today's society. Hence, are we ensuring that our students are adequately prepared to engage with the global world? The most significant gap in the studies on digital transformation to digital literate citizenry is an inadequately trained instructor and student (Apata, 2021). For instance, although AI offers creative and unique approaches to literacy education, instructors consider these approaches dispensable in their teaching endeavour owing to insufficient training, inadequate teaching materials and resources, and a lack of administrative motivation (Stolpe & Hallström, 2024).

This study aims to address existing gaps by conducting a review of AI and its intersection of multiliteracies with a view to assessing their instructional significance in an increasingly digital landscape. This research aims to specifically examine: the extent to which AI tools meet the criteria for fostering multiliteracies, the obstacles educators face when required to instruct literacies in an AI-enhanced manner, and the suggestions for the effective integration of AI in the educational process. This study's findings is valuable to educators and policymakers in the field of education. This study contributes to promoting discourse at the convergence of multiliteracies awareness and AI interaction.

2. MATERIALS AND METHODS

This study employs a qualitative approach using content analysis to investigate the integration of AI in multiliteracies, focusing on materials relevant to literacy education. Content analysis is ideal for examining trends, themes, and patterns in documents such as curricular guides, policy mandates, and journal articles, providing a comprehensive overview of AI's evolving role in literacy development. Data was collected through targeted searches of academic databases, including Scopus, Web of Science, and Google Scholar, as well as institutional repositories and educational websites. Thematic content analysis was used to identify and consolidate key concepts into broader themes representing literacy acquisition facilitated by AI systems. The selection of materials was based on relevance rather than a fixed timeframe, ensuring a broad perspective on AI literacy trends. The analysis drew from authoritative secondary sources, including educational policies, curricula, textbooks, literacy resources incorporating AI, and best practice recommendations from recognized educational and technological organizations. The findings of the study based on main themes are presented in the table in the next page.

3. GLOBAL LITERACY RATES

Global literacy rates have been a key focus of international education policies for decades. The United Nations Educational, Scientific and Cultural Organization (UNESCO) defines literacy as the ability to read and write with understanding. It further describes literacy as a continuous process of learning that enables individuals to pursue their goals, enhance their knowledge and skills, and actively contribute to their communities and society at large (UNESCO 2017; 2018). UNESCO's global literacy monitoring efforts have shown a steady improvement in literacy rates over time. As part of the broader agenda for quality education, improving literacy rates is crucial for achieving SDG 4 (Quality Education), which aims to ensure "inclusive,

Main Theme	Description of Findings
Literacy and Multiliteracies Evolution **AI Integration in Education**	Literacy has evolved beyond reading and writing to include multiliteracies, integrating digital, visual, and critical skills. Findings suggest that education systems must adapt by incorporating multimodal learning approaches. Additionally, the shift towards multiliteracies fosters greater critical thinking, preparing learners for the demands of the 21st century. AI is increasingly being integrated into educational frameworks, influencing teaching strategies and learning resources. AI-driven tools such as adaptive learning systems and AI tutors are reshaping the way multiliteracies are taught.
Challenges in AI and Multiliteracies	Despite the advancements, many educational materials still focus on traditional literacy models, with limited inclusion of AI-driven multiliteracies. There is a disconnection between curriculum design and the rapidly evolving AI landscape.
Opportunities for AI in Multiliteracies	AI presents significant opportunities for multimodal literacy development, personalized learning experiences, and digital fluency. AI-driven assessments and interactive AI-based tools offer innovative approaches to enhance multiliteracies.
Institutional and Teacher Preparedness	There is a lack of adequate training and resources for educators to effectively integrate AI into multiliteracies instruction. Institutional barriers, such as funding constraints and policy gaps, further hinder AI adoption in literacy education.

equitable, and quality education for all and promote lifelong learning opportunities". The chart below (Figure 1) presents a comparative analysis of literacy rates from 1960 to 2023, focusing on the share of adults aged 15 and older. It compares data from developed nations such as Australia, Canada, and North America, emerging economies like Argentina, Brazil, and Bolivia, and developing regions such as South Asia, Sub-Saharan Africa, and South Africa.

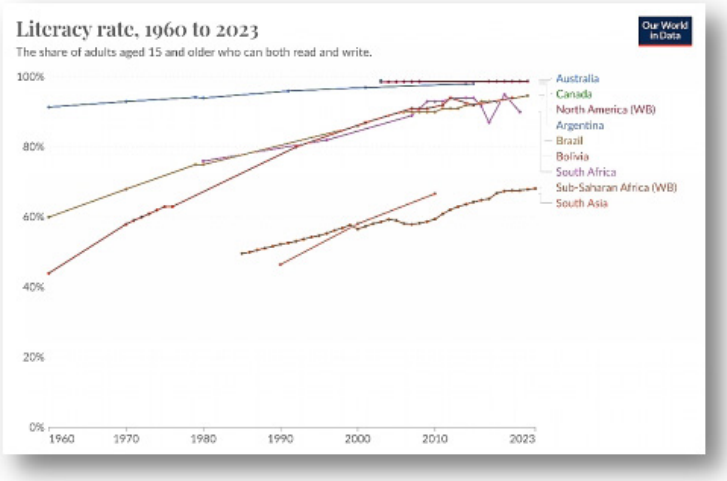

Figure 1. Global literacy rate from 1960 to 2023 (Source: Roser and Ortiz-Ospina, 2018; World Bank, 2024)

As shown in Figure 1, in developed regions, literacy rates have remained remarkably high and stable throughout the period. Australia, Canada, and North America consistently maintained literacy rates approaching or surpassing 99%. This stability can be attributed to well-established education systems, comprehensive public policies supporting universal education, and the economic prosperity of these nations, which has facilitated sustained investment in educational infrastructure (Shen, 2024). In contrast, emerging economies have shown significant improvements over the past several decades. Argentina, Brazil, and Bolivia, for instance, experienced notable increases in literacy rates from the 1960s to the early 21st century. By the 2000s, Argentina and Brazil had both surpassed 90% literacy, reflecting successful educational reforms and economic growth. Bolivia, while starting from a lower base, also demonstrated consistent progress, crossing the 90% threshold around 2015. These developments underscore the impact of both national and international efforts to expand access to education in these countries (Tarlau, 2022).

Developing regions, particularly South Asia and Sub-Saharan Africa, began the period with some of the lowest literacy rates globally, hovering around 40% in 1960 (Roser and Ortiz-Ospina, 2018). Despite substantial efforts to improve literacy, these regions have faced significant challenges. South Asia, however, has experienced remarkable growth, with literacy rates climbing above 70% by 2020. This rapid advancement can be attributed to a combination of government initiatives, international aid, and expanding educational access in countries such as India and Bangladesh (Rao et al., 2021). Sub-Saharan Africa, while making progress, has improved at a slower pace, with literacy rates reaching around 65% in recent years. Factors such as political instability, limited resources, and challenges in infrastructure (Adeniran et al., 2023) have slowed the rate of improvement in this region. South Africa, while part of Sub-Saharan Africa, has performed comparatively better in terms of literacy development. By 2020, the country had achieved a literacy rate close to 90%, a significant improvement over the region's average. However, it remains behind developed countries, highlighting the continued challenges that persist even in nations with relatively stronger educational frameworks.

In parallel to these advancements, the concept of literacy has undergone a profound transformation. Traditionally seen as a singular, cognitive skill, literacy is now recognized as a complex and multi-layered phenomenon Earlier definitions often portrayed literacy as a purely cognitive ability (Cope et al., 2018) or a uniform skill set applicable across all contexts (Li, 2015). However, contemporary research emphasizes the social and cultural dimensions of literacy, presenting it as a layered and context-dependent practice (Purcell-Gates, 2020; Papen, 2023). Brian Street's work, particularly his book Literacy in Theory and Practice (1984),

played a critical role in challenging traditional notions of literacy. Street argued that literacy is far from a neutral or universal skill; instead, it is deeply embedded within the social, cultural, and ideological contexts of different communities (Street, 2013). His approach has inspired a shift in literacy research, from focusing solely on individual cognitive processes to exploring the broader cultural and societal forces shaping literacy practices.

Building on this, scholars Bull and Anstey (2019) propose that literacy encompasses both psychological and social dimensions. They emphasize that literacy involves engaging with a variety of literacies and behaviors, tailored to specific cultural and social settings. This dual perspective highlights the adaptability required to navigate the diverse literacies present in today's interconnected world. As such, literacy is no longer viewed as a fixed skill but as an ever-changing practice that reflects the complexities of human interaction and societal structures. Therefore the concept of literacy has expanded beyond traditional reading and writing skills to encompass new forms of communication and information processing. The rise of digital technologies has introduced new dimensions to the understanding of literacy, emphasizing the need for what is now often referred to as multiliteracies

3.1. Multiliteracies: Concept and Relevance in the Digital Age

As digital technologies continue to shape communication, literacy practices have evolved to reflect the diverse ways people make meaning in a world that is characterized by increasing social diversity and the multimodal nature of communication (Cope & Kalantzis, 2015; Knight et al., 2023). Central to this shift is the concept of multiliteracies, a term coined to describe the various modes of communication, including linguistic, visual, auditory, spatial, and gestural elements, which combine to create meaning in a text (Cope & Kalantzis, 2015). The concept of multiliteracies was introduced by the New London Group (1996) as a response to the evolving communication landscape in the context of globalization and technological advancements (New London Group, 1996). The concept acknowledges that literacy is no longer confined to traditional print-based texts. Instead, learners must be able to navigate and interpret a diverse range of texts, including visual, audio, and digital formats.

Multiliteracies are pivotal in addressing the complexities of digital, multilingual, and culturally diverse societies (Abdullah et al., 2023) and thus, one cannot discuss multiliteracies without acknowledging the profound changes in how we communicate and access information. For instance, the explosion of digital media platforms—social media, blogs, video-sharing sites, and podcasts platforms are not merely new channels; they are entirely new languages of expression. These digital modes demand fluency in combining text, visuals, and audio. The

ability to navigate and create meaning in these multimodal forms is no longer optional; it is a necessity. Learners today must develop "digital fluency," the skillset to decode and produce content across different platforms seamlessly.

This shift redefines literacy itself, signifying that a text is no longer confined to words on a page but is a constellation of modes working together to create meaning. Equally significant is the influence of globalization on education. As borders blur, our classrooms and communities are becoming increasingly diverse, rich with cultural and linguistic variety. According to Hong and Hua (2020), multiliteracies encompass not only the ability to read and write but also the skills required to navigate complex digital ecosystems, evaluate media critically, and produce content that is relevant across platforms. These capabilities are particularly important in the 21st century, where digital transformation reshapes how people consume and create information.

3.2. Evolution of Multiliteracy Theories

Traditional literacy is no longer adequate in a world dominated by digital communication, social media, and globalization. For instance, Minor (2021) and Serafini (2015) highlight the growing significance of visual and multimodal literacy, arguing that students must learn to interpret and produce information across diverse media formats. Educational systems have increasingly incorporated multiliteracies into their pedagogical frameworks. Examples include the integration of digital storytelling, blogging, and interactive media into curricula. According to Ebadi and Ahmadi (2024) video games and other interactive platforms can also serve as powerful tools for developing critical multiliteracy skills. Embracing students' linguistic and cultural diversity through multiliteracies pedagogy fosters inclusivity and enhances learning outcomes, as argued by Hornberger and Link (2012). This approach is especially critical in regions with high levels of linguistic diversity, such as Sub-Saharan Africa and South Asia (Goswami et al., 2009), where traditional monolingual education models often fail to meet learners' needs.

The theories underpinning multiliteracies are deeply rooted in social semiotics and critical literacy studies, drawing attention to the dynamic and multifaceted nature of literacy in contemporary society. (Anstey & Bull, 2018). In this context, multimodality has emerged as a critical framework for understanding how meaning is constructed and interpreted in today's digital world. Multimodality refers to the use of various semiotic resources, such as images, sounds, gestures, body language, and text, to communicate and create meaning (Wanselin et al., 2022). The theory suggests that interpretation occurs not through a singular mode of communication but through configurations of multiple modes working together. For instance, in the digital environment, individuals not only read text but also interpret images, videos,

sounds, and interactive features. These modes operate synergistically to shape how individuals understand and engage with information.

The social semiotic theory, particularly as articulated by Kress and Van Leeuwen (2001), plays a crucial role in the multiliteracies framework. Social semiotics views communication as a social process where meaning is negotiated within specific cultural contexts. This theory emphasizes that individuals use a range of semiotic resources—such as language, visuals, gestures, and sounds—not just to convey information but to shape their social realities and identities. According to Kress and Van Leeuwen (2001), each mode carries its own semiotic potential and is shaped by cultural practices, which in turn influence how meaning is made and interpreted. In the context of literacy, these semiotic resources are seen as essential tools for constructing knowledge and identity, particularly in the digital age, where the lines between text and image, sound and motion are increasingly blurred.

Furthermore, the concept of critical literacy has also informed the multiliteracies approach, emphasizing the role of literacy in understanding power dynamics and social inequality. Critical literacy encourages individuals to question and challenge dominant discourses, making it a transformative tool for both personal and social change. This aligns with the notion of multiliteracies as a practice that is not neutral but shaped by and capable of shaping the social, cultural, and political contexts in which it is situated. In this regard, critical literacy challenges learners to not only engage with multimodal texts but also to critically analyze the power structures embedded in these texts and their creation (Abdullah et al., 2023). The increasing prevalence of digital media has significantly influenced the ways in which literacy is conceptualized and practiced. Digital and online literacies often involve the representation of the self in ways that are socially and culturally constructed, requiring learners to navigate complex identities in virtual spaces. This desire to shape and perform one's identity, particularly in online settings, presents an opportunity for educators to guide students in understanding the interplay between the individual, the social, and the cultural in their engagement with digital platforms (Jones & Hafner, 2012).

3.3. Artificial Intelligence, Multiliteracies, and Contemporary Pedagogy

In this study, we adopt a working definition of AI as articulated by UNICEF

> *AI refers to machine-based systems that can, given a set of human-defined objectives, make predictions, recommendations, or decisions that influence real or virtual environments. AI systems interact with us and act on our environment, either directly or indirectly. Often, they appear to operate autonomously and can adapt their behaviour by learning about the context. (UNICEF, 2021, p. 16)*

Multiliteracies denote established literacy forms that facilitate meaning-making across diverse cultural and social contexts; hence, multiliteracies are applicable to an AI-generated textual landscape as well. The literacies encompass written, visual, and technical forms—comprehension and production of text are essential for meaning-making, pictures produced by machines necessitate interpretation, and proficiency in technology is vital (Anstey and Bull, 2018; Abdullah et al., 2023). Furthermore, the insights from Kellner and Kellner (2021) enhance the findings by positing that technology serves as the cohesive element of multiliteracies, necessitating individuals to acquire proficiency in AI systems and technology-driven literacies/languages to derive meaning. Linked to the multiliteracies concept and the ever-evolving multimodal landscape of communication, A.I. serves as a replacement for traditional literacies and a generator of new literacies pertinent to the digital realm (Kellner&Kellner, 2021).

The relationship among literacy, artificial intelligence, and modern educational paradigms pertains to how it enhances individuals' knowledge acquisition and ongoing learning, while this emerging technology facilitates novel pathways for increasingly tailored educational experiences. This relationship is significant since literacy is now dynamic, contextual, and interactive with many modalities; hence, heightened awareness from these individualised learning experiences across different capacities can foster an understanding of the growth of multiliteracies (Kabudi et al., 2021). As A.I. technology advances, those proficient in its application will be capable of developing adaptive learning paths that cater to each person's needs in real time, providing relevant knowledge irrespective of their current capabilities. This is significant for personalised learning experiences, which should encompass varied learning methods pertinent to the anticipated graduation date and other factors such as language or cultural connections, particularly for those with impairments (Cope et al., 2018).

AI also broadens the concept of multimodality (Kress & van Leeuwen, 2001). As global digital communication expands, the integration of AI technologies provides a practical learning opportunity for students to navigate complex sociocultural contexts and diverse communicative modalities essential for effective living in the 21st century. AI technologies necessitate multimodal interaction—ranging from voice-activated learning to augmented reality applications and responsive engagement platforms—requiring the integration of diverse semiotic resources to produce meaning. Moreover, AI technologies promote multimodal engagement by exposing students to many semiotic modalities for comprehending their meaning-making processes (Zdravkova, 2022).

The convergence of AI with multiliteracies and multimodality suggests two significant transformations: firstly, an increased probability of meaning, being constructed through di-

verse methods across cultures, professions, and social experiences; secondly, the recognition that communication and meaning-making are inherently multimodal, and are enhanced through the utilisation of digitally acquired AI resources. Cope and Kalantzis (2015) contend that these features are essential for the advancement of 21st-century literacy and the transfer of learning in educational settings since AI facilitates flexible, perceptive, and multimodal learning possibilities that allows for personalized learning experiences. Moreover, with these predictive personalisation options, pupils will also get advantages from AI's predictive skills. Predicting an individual's potential for advancement can guide educators on where to focus their attention (Almalawi et al., 2024).

4. AI IN EDUCATION: TRANSFORMATIVE ROLE IN MODERN EDUCATION

In recent years, AI has significantly transformed education through methods like human-AI partnerships, evaluation AI, tutoring systems, and personalized learning (Allam et al., 2023; Chu & Yang, 2022; Wollny et al., 2021). AI enables customized learning for all students, addressing individual learning differences. This allows for the creation of adaptive tutoring systems that offer personalized feedback. The most compelling aspect is AI's potential in evaluation, reshaping the dynamic between teachers and students, and facilitating personalized learning, assessment, and feedback within the classroom (Rudolph & Tan, 2023a). However, as technology becomes increasingly integrated into the classroom, there is a notion that heightened technology usage by students correlates with less human interaction. This attitude poses obstacles to socio-emotional development and the classroom atmosphere. The widespread growth of AI seems to be the predominant concern prevalent in academic settings.

Numerous AI chat systems and assistants, including ChatGPT, Bard, YouChat, Hubspot, ChatSpot, Bing Chat, and Vicuna, have raised concerns among instructors over students' dependence on these tools for composing papers, generating computer code, and completing homework projects (Sullivan et al., 2023). ChatGPT is the artificial intelligence chatbot developed by OpenAI. It was launched on November 30, 2022, as GPT-3.5 and subsequently modified to GPT-4 on March 14, 2023 (OpenAI GPT-4, 2023). It is widely regarded as the most potent AI application available (Rudolph and Tan, 2023b). Given the remarkable learning potential offered by these chat systems (Chen et al., 2023), the question that arises will be; why would students not utilise such convenient assistance? Since the public release of ChatGPT, perceptions of artificial intelligence and its advantages and disadvantages have shifted. Public sentiment on AI has evolved. What was previously a hypothetical notion akin to science

fiction in an uncertain timeline has abruptly transformed into a stark realisation of what is accessible and within reach in the current reality.

Moreover, given the very favourable reaction and performance since its introduction, there are financial incentives to develop analogous AI products for public use, such as Meta's LLaMA and Google's Bard. ChatGPT is fundamentally a generative pre-trained transformer (GPT), a substantial language processing model that undergoes additional training via supervised and reinforcement learning. Consequently, it can comprehend instructions and answer in a very sophisticated manner across many themes, engaging in substantial turn-taking during conversations with users. For instance, it can compose poetry emulating a certain author on a designated subject or generate computer programming code to meet precise criteria. Global universal access to educational opportunities offers cost-effective benefits for governments and individuals, as education significantly enhances gross economic development. The expected growth has not yet materialised. With the advancement of artificial intelligence, access to high-quality education is becoming increasingly standardised worldwide. The capacity to create a more equitable global knowledge acquisition process is present. However, socioeconomic disparities impede the spread of information.

Globally, translation equalises access; yet, those in remote regions lacking internet connectivity may not benefit from the many advantages that technology provides to enhance an AI-driven curriculum. Consequently, this is facilitated by forthcoming communication technologies as 6G (Khanh et al., 2023). Intelligent Tutoring Systems (ITS) replicate the personalised instruction a student receives from a teacher in a one-on-one setting, utilising Artificial Intelligence. Intelligent Tutoring Systems (ITS) might enhance existing methods by utilising sophisticated algorithms and machine learning to analyse individual learning patterns and adjust instructional strategies accordingly. Moreover, utilising natural language processing (NLP), the AIs can interpret student answers and comprehend their requirements, facilitating effective dialogues, enquiries, and instruction across several topics. AI resources—including the metaverse and AR/VR classrooms customises environments according to individual learning preferences and objective. AI may be instructed to assess across curriculum areas with varied formats (Gonzalez et al., 2021). Besides assessment, it assists with several pedagogical tasks, including instruction, material development, evaluation, and the generation of AI-produced prompts for inquiry (Elkins et al., 2023). This alleviates the burden on educators and allows them to concentrate on more essential responsibilities related to critical thinking and problem-solving.

5. CHALLENGES IN INTEGRATING AI INTO MULTILITERACIES

The primary problem is the technology divide, which intensifies disparities in access to AI-driven technologies. Access to technology is a persistent obstacle, particularly for low-income or rural regions. Graves et al. (2021) assert that the disparity in access to the internet and digital infrastructure exacerbates educational disparities, preventing marginalised areas from benefiting from AI educational tools. This imbalance undermines the potential of AI to promote educational fairness for all, hence reinforcing the existing social and socioeconomic disparities. Another significant concern is the scarcity of educators capable of effectively engaging with AI in multiliteracy frameworks. In multiliteracy methods, pedagogy is not influenced by external resources; educators lack professional development necessary to effectively use AI tools for multiliteracy instruction (Li., 2020). Consequently, it generates a divergence between the potential of the technology and its practicality inside the confines of the classroom.

The absence of effective professional development highlights the difficulty that AI may only serve as a gimmick; without well-trained educators, genuine engagement with AI will provide no outcomes and squander potential learning possibilities. Consequently, implementation becomes increasingly challenging due to the ethical implications of AI. From a systems approach, utilising AI for learning in the classroom raises ethical concerns. The complexities of data privacy, surveillance, nonconsensual monitoring, equality, and ethical considerations render the acquisition of new knowledge unworthy. Chen (2023) asserts that search engine algorithms exhibit biases against race and gender, so instructing learners to depend on and interact with a particular bias framework does not cultivate appropriate global citizenship for the educator. However, since bias AI systems are also present while multiliteracies teaching aims for equity; it undermines the objective of promoting global citizenship.

Furthermore, AI systems need substantial supporting hardware and software, along with ongoing maintenance (Li, 2020). Consequently, these centres may seek AI solutions for their cost-effective features rather than aiming to provide a comprehensive, multimodal literacy experience that ultimately compromises the inclusive goals of multiliteracies. Ultimately, multiliteracies are dynamic, rendering collaboration with AI to be also challenging. Therefore, while AI can be designed to enhance many of these attributes, its ephemeral position within society and culture may hinder the advancement of AI as a tool for fostering such dynamic literacies.

5.1. Opportunities in Integrating AI into Multiliteracies

The integration of AI in multiliteracies enhances understanding of communication channels by offering unprecedented learning opportunities. AI can be used to customise educational experiences in an unprecedented manner and track real-time progress on the task given to students in a blended learning classroom. The feedback provided by the AI program will enable learners to refine their projects with tailored suggestions which eventually improve their performance. This is because personalised feedback enables learners to maintain pace with the classroom, allowing them to evaluate their progress and identify new avenues for enhancement. These AI algorithms have also demonstrated efficacy in several educational settings according to different student requirements (Kabudi et al., 2021). Furthermore, in addition to personalisation, AI has the potential to foster multiliteracies that are more accessible and promote equity and inclusion. For impaired learners, the deployment of AI applications like speech-to-text and text-to-speech facilitates tasks that would otherwise be unfeasible (Zdravkova, 2022). Moreover, Natural Language Processing (NLP) capabilities provide real-time translation services, enabling students to interact with information as it occurs while concurrently obtaining translation support in their preferred languages. These additions promote collaborative learning and achievements by addressing the requirements of all learners (Chen, 2023).

Moreover, cooperation is a component of multiliteracies, and AI can facilitate this process. Numerous platforms already have an AI interface that enables students to engage on multimodal projects, whether developing digital goods or aggregating comments to suggested group discussions while situated in different physical locations. These foster critical thinking and multicultural awareness grounded on global trends of collaborative learning. Furthermore, emerging technologies facilitate exploration via immersive realities; for instance, students may utilise AR/VR to see the context of a narrative or the progression of a historical event, rather of merely studying decontextualised information (Takakura, 2022). This is exacerbated by the capabilities of AI in facilitating production and concurrent engagement; for instance, if a student need guidance on integrating image and text in a multimodal assignment, they will receive links to tutorials or examples tailored to their comprehension level. This concurrent engagement maintains pupils' activity, ensuring they remain dynamic in their learning process. Moreover, AI facilitates the recognition of cultural and linguistic differences integral to multiliteracies; for instance, as AI comprehends the significance of symbols, visual cues, and non-verbal elements, it aids learners in identifying and appreciating these critical aspects of diverse multiliteracies in their endeavours for a better global understanding—thereby promoting global citizenship and the essential multiliteracies framework that encompasses all

voices and perspectives (Cope et al., 2018). Also, AI equips students with significant, practical applications that transcend the classroom and school curriculum. It promotes critical thinking and the enhancement of media literacy. Given the abundance of information online, acquiring the ability to distinguish credible sources is essential (Chen, 2023).

6. AI INTEGRATION IN EDUCATION

AI integration into education is changing pedagogical approaches, improving learning opportunities, and broadening the literacy range. By means of real-time feedback and interactive learning experiences, AI-driven educational tools—such as adaptive learning systems and AI tutors—are affecting literacy training (Kalantzis& Cope, 2025). This is consistent with data from Kellner & Kellner (2021), who underline that by providing tailored learning chances and multimodal content generation, artificial intelligence plays a major part in multiliteracies. Nonetheless, the study also exposes a discrepancy in the methodical use of artificial intelligence in multiliteracy as many institutions still depend on conventional literacy theories. This is in line with the results of Wollny et al. (2021), who contend that although artificial intelligence has great promise, systematic integration into educational curricula is still lacking.

6.1. Difficulties with AI and Multiliteracy

Notwithstanding its transforming power, AI incorporation into multiliteracies presents several difficulties including ethical questions, teacher readiness, and technical inequities. Particularly in low-resource settings, the paper notes the digital gap that limits access to AI-driven learning tools (Adeniran et al., 2023). Graves et al. (2021) back up this assertion by pointing out how gaps in digital infrastructure aggravate educational inequality. Lack of educator readiness is another important issue as many of the instructors lack the necessary skills to include artificial intelligence into multiliteracies education (Li, 2020). Concerns about AI prejudice and ethical issues exacerbate this problem even more since, as Chen (2023) points out, AI algorithms might support already existing societal and cultural biases. The research emphasises the importance of focused professional development initiatives to close this disparity and guarantee ethical AI incorporation in multiliteracy education.

6.2. AI Opportunities in Multiliteracy

Through personalised learning, enhanced accessibility, and multimodal literacy engagement, artificial intelligence offers great prospects for the advancement of multiliteracies. The paper

addresses how assistive technologies driven by artificial intelligence (Zdravkova, 2022) such as language translation tools and speech-to-text devices help to make literacy instruction more inclusive. This is consistent with studies by Kabudi et al. (2021), who contend that adaptive learning systems driven by artificial intelligence offer individualised support that meets various student demands. Moreover, the paper emphasises how interactive simulations, AR/VR technologies, and AI-generated material (Masantim, 2025) may assist multimodal learning. Takakura (2022), who stresses the part artificial intelligence plays in making abstract literacy ideas more concrete and interesting for students, backs up this. Thus, the synergy between artificial intelligence and multiliteracies gives a chance to improve digital fluency and equip children for a technologically changing future.

6.3. Teacher and Institutional Readiness

The study emphasises the need for institutional support and teacher readiness to properly incorporate artificial intelligence into multiliteracies teaching. It notes that many teachers need constant professional development to close this gap and lack sufficient knowledge of AI-driven literacy tools (Cooper et al., 2013). In line with this, Rasul et al. (2023) contend that programs for teacher education should centre AI literacy if successful execution depends on it. The report also points to financing restrictions and policy flaws as obstacles to institutional artificial intelligence acceptance. Research by Oloyede (2024) supports this conclusion: national policies should give artificial intelligence literacy development top priority and support for AI-driven educational projects top priority. Emphasising both possibilities and limitations, the paper offers a thorough analysis of the junction of artificial intelligence and multiliteracies. Empirical research confirms that artificial intelligence has the ability to improve literacy instruction, organised integration, teacher training, and ethical concerns are needed to guarantee fair access and application. Future studies should look at how artificial intelligence affects multiliteracies long term and look at ways to reduce prejudices and guarantee inclusive growth of digital literacy.

7. FUTURE RESEARCH DIRECTIONS

As AI continues to shape education, there is a growing recognition of its impact on educational leadership. However, literature remains sparse on the role AI will play in transforming the responsibilities and decision-making of educators. Future studies could explore how AI tools can assist in data-driven decision-making, optimize resource allocation, and support strategic

planning. This research could also focus on what skills and competencies educators will need to effectively navigate AI's impact. How will educational administrators develop the ability to manage AI-based tools for assessment, personalized learning, and curriculum design? Research should consider the training requirements for educators and the organizational strategies that could support AI's integration into leadership practices. As the responsibilities of educators evolve, so too must their capacity to lead in a digital, AI-enhanced educational landscape.

Another promising direction involves the development of social intelligence in the context of AI integration. Social intelligence—the ability to navigate and understand social dynamics and emotional cues—is an essential aspect of multiliteracies. Research could investigate how AI technologies can complement the development of social intelligence in learners, especially in environments that require emotional and interpersonal communication skills. For instance, how might AI-powered tools help students develop empathy, cultural awareness, and emotional regulation? Lastly, comparative studies across diverse sociocultural contexts could yield valuable insights into how AI is being integrated into multiliteracies on a global scale. These studies would examine the barriers, best practices, and cultural nuances influencing AI adoption in education across different regions. Research could focus on understanding how various educational systems harness AI to support multiliteracies, identifying regional strengths and challenges.

8. CONCLUSION

The intersection of AI and multiliteracies broadens the meaning of literacy in the classroom and facilitates the investigation of learning pathways in an increasingly digitized environment. This literature review examines the potential of AI as the further advancement of literacy, extending beyond traditional reading and writing—AI imparts fundamental literacy skills necessary for thriving in the 21st century. AI in educational applications facilitates differentiated learning, enhances multimodal literacy, and promotes equal access and benefits. However, as an increasing number of AI apps for educators are developed, the research highlights an escalating necessity for vigilance over deficiencies that might intensify the digital gap, prejudice, and exclusion, as well as promote unsustainable pathways for multiliteracies that may ultimately undermine equality. For the establishment of multiliteracies with AI, educators must get training for implementation, regulations for suitable usage and integration must be developed, and standardised testing must be revised to align with 21st-century demands. AI does not only promote creativity; it cultivates creativity that stimulates critical thinking,

cooperation, and innovation—essential talents for future global citizens. Consequently, to embark on the trajectory towards the future, access to AI in education must be deemed essential, rather than optional, as stipulated by the United Nations' Sustainable Development Goals for equity among all learners across all socioeconomic backgrounds—both presently and in a future shaped by AI. We must begin immediately.

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