Integrating Big Data and Artificial Intelligence in Communication and Language Arts: Trends, Applications and Implications

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Abstract
This study was an examination of integrating big data artificial intelligence in communication and language arts: trends, applications and implications. The technological determinism theory was anchored in this study. This study adopts the case study methodology to enable an in-depth exploration of how Big Data and Artificial Intelligence are integrated into communication and language arts within selected academic institutions in Nigeria. The population for the study comprises academic staff and final-year students in the Departments of Mass Communication, English and Literary Studies, and Linguistics across three Nigerian universities; University of Lagos, University of Nigeria Nsukka, and Rivers State University with a combined population of approximately 4,200 individuals (based on institutional records as of 2024). These departments were chosen because they actively engage with communication, media, and language instruction, making them relevant to the study's objectives. A sample size of 30 participants (10 from each university, including lecturers and students) was selected using purposive sampling. In-depth interviews and document analysis (such as syllabuses, project topics, and institutional ICT policies) were employed as the primary methods of data collection. Data were analysed thematically using content analysis, allowing for the identification of patterns, themes, and contextual interpretations of the participants' experiences and institutional practices. Findings revealed that AI and Big Data tools such as Grammarly, Tableau, and Google Trends are actively applied in communication and language arts departments for media research, academic writing, and linguistic analysis. These technologies are gradually being integrated into university curricula through courses like Media Analytics and Digital Communication, although implementation varies by institution. AI applications have expanded beyond instruction to administrative support, including automated email responses and performance tracking tools. There is inconsistency in the level of integration across institutions, with some departments lacking structured policies or updated syllabuses to support AI and Big Data usage. The study recommended that, the National Universities Commission (NUC) and university senates should mandate the integration of AI and

Big Data tools into communication and language arts curricula through structured course design and updated academic policies

Keywords: *Big Data, Artificial Intelligence, Communication, Language Arts, Trends, Applications, Implications*

Introduction

The convergence of Big Data and Artificial Intelligence (AI) has increasingly shaped modern academic and professional landscapes, especially, within the domains of communication and language arts. As digital technologies become more embedded in everyday human interactions, the sheer volume of data generated through various forms of communication ranging from social media, multimedia content and textual exchanges necessitates advanced analytical tools. Big Data, characterised by its volume, velocity, variety, veracity and value, intersects with AI systems that enable machines to mimic cognitive functions such as learning, reasoning and self-correction. Together, these technologies redefine how humans create, interpret, disseminate and consume information (Marr, 2023). In the field of communication and language arts, this integration supports processes such as automated content generation, sentiment analysis, language translation and speech recognition, driving innovations that influence media, education, governance and intercultural interactions. Globally, AI and Big Data are transforming the nature and functions of language, symbols and discourse. Multinational corporations like Google, OpenAI, Meta and Microsoft are at the forefront, deploying models such as ChatGPT, Bard, and Meta LLaMA to enhance natural language processing (NLP) capabilities. These tools analyse immense datasets from diverse cultural contexts, allowing machines to generate human-like content, interpret language nuances and engage in sophisticated dialogue systems (Brown et al., 2020). The significance of these developments lies not only in technological advancement but also in reshaping the communicative dynamics of societies. In journalism, public relations and literature, AI-generated texts challenge the conventional role of human authorship, blurring boundaries between human and machine-created narratives (Vincent, 2023). Consequently, the integration of these technologies in language arts invites both excitement and critical inquiry regarding authenticity, creativity and ethical responsibility. On the continental level, Africa is gradually embracing AI and Big Data in communication and language applications, albeit at a slower pace due to infrastructural, financial and policy limitations. Nevertheless, countries such as Kenya, South Africa, Nigeria and Rwanda are investing in AI-driven educational tools, automated translation systems for indigenous languages and social media analytics to track public discourse (UNECA, 2021). In Nigeria, for instance, start-ups and academic institutions are exploring AI for local language digitisation, enabling the preservation of cultural identity and enhanced access to educational resources (Adepoju, 2022). Despite challenges such as digital divides, limited AI expertise and data privacy concerns, the continent is beginning to realise the potential of these technologies in transforming communication strategies and supporting linguistic inclusivity.

At the national level, Nigeria's integration of AI and Big Data in communication studies has seen a growing emphasis on digital humanities, computational linguistics and media informatics. Nigerian universities are increasingly introducing AI-based research into language and communication departments, reflecting a shift toward interdisciplinary inquiry. For example, the University of Lagos and Covenant University have established AI research hubs focusing on local language processing, sentiment analysis of social media content and AI-assisted journalism (NCC, 2022). These initiatives, often supported by international partnerships and donor agencies,

aim to bridge the gap between technological advancement and academic utility. However, Nigeria still grapples with regulatory uncertainty, lack of technical capacity and ethical concerns surrounding data surveillance and misinformation, indicating the need for more robust frameworks for implementation and oversight. The interplay between Big Data and AI in communication and language arts is driven by the evolution of natural language processing techniques. NLP enables machines to understand, interpret and manipulate human language, making it essential for automating communicative tasks such as summarisation, keyword extraction, machine translation and chatbots. Language models like GPT-4, BERT, and T5 are trained on vast linguistic corpora, learning syntactic structures, idioms, and semantic relationships across multiple languages (Devlin et al., 2019; OpenAI, 2023). This has significant implications for content creators, educators, linguists and policymakers, as machines now participate in the processes of meaning-making and discourse analysis. The ethical dimension becomes, especially, relevant here as biases embedded in datasets can perpetuate stereotypes and misinformation, challenging the integrity of digital communication ecosystems (Bender et al., 2021). Furthermore, Big Data analytics enhances the study of communication patterns, user behaviour and media consumption trends across diverse populations. Social media platforms generate billions of data points daily, which, when analysed, provide insights into public sentiment, political discourse and cultural narratives. Communication scholars use these data streams to identify trends, forecast audience reactions and develop targeted content strategies (Kitchin, 2021). In marketing communications, Big Data allows for hyper-personalised messaging, influencing consumer decisions through tailored narratives based on behaviour prediction. In literary studies, text mining and corpus linguistics enable researchers to analyse themes, genres and stylistic changes across historical periods, offering new dimensions of interpretation and critique. In education and pedagogical practices, AI-powered platforms such as Duolingo, Grammarly and Quill use Big Data to personalise language learning experiences. These systems adapt to learners' proficiency levels, providing feedback and recommendations that evolve with user performance. Such technologies are increasingly incorporated into classrooms and online education platforms globally, promoting inclusivity and accessibility (Luckin et al., 2016). However, the reliance on algorithmic feedback raises concerns about the erosion of human interaction, critical thinking, and the commodification of learning. As communication and language are inherently social and cultural phenomena, scholars caution against reducing them to data-driven processes devoid of context and empathy. In sum, the integration of Big Data and Artificial Intelligence into communication and language arts is a transformative development with far-reaching implications. While the technological advancements open new frontiers for creativity, inclusivity and efficiency, they also introduce ethical, cultural and epistemological dilemmas that demand critical examination. As societies worldwide grapple with issues of data ownership, algorithmic accountability and digital inequality, the role of communication scholars becomes even more crucial. Understanding how these technologies shape narratives, influence public discourse and alter linguistic practices will be essential for navigating the future of human-machine interaction in a digitally interconnected world.

Problem Statement

The growing convergence of Big Data and Artificial Intelligence (AI) with communication and language arts has ushered in a transformative shift in how humans produce, interpret and interact with information. Globally, AI-powered tools such as ChatGPT, BERT and machine translation systems have become integral in language learning, content creation, media production and public

communication. These innovations have redefined traditional linguistic and communicative processes by introducing automation, personalisation and predictive capabilities into human expression and discourse. However, the rapid integration of these technologies raises concerns about the depth of human-machine collaboration in meaning-making, the potential erosion of cultural and linguistic diversity, and the ethical implications of AI-generated communication. In contexts such as Africa and specifically Nigeria, the adoption of these tools has been uneven, characterised by limited access to technological infrastructure, scarce local-language training data and unclear academic, and policy directions. These conditions reveal the need to interrogate how Big Data and AI are being conceptualized and applied in communication and language disciplines, and whether these applications are contextually relevant or merely imported without theoretical and cultural adaptation. In academic research, the intersection of Big Data, AI, and language arts is still emerging, with limited studies critically examining how these technologies influence the interpretation of symbols, language and human interaction across socio-cultural settings. While significant attention has been given to the development of AI systems and their capabilities, less focus has been directed toward understanding their communicative and linguistic implications from an interdisciplinary perspective. Questions remain regarding how AI-driven linguistic tools affect pedagogical practices, literary creativity, language preservation and the dynamics of human communication, particularly, in underrepresented regions. The challenge lies not only in technological deployment but also in establishing frameworks that align AI and Big Data integration with the values, histories and communicative practices of diverse populations. Addressing this gap requires a deeper investigation into the trends, applications and broader implications of these technologies in communication and language arts, to ensure that their use enhances rather than diminishes the richness of human expression. This study aims to examine how Big Data and Artificial Intelligence are being applied in communication and language arts across various cultural and academic contexts. It also seeks to identify the challenges and limitations encountered in integrating these technologies within language-based disciplines, particularly, in underrepresented regions. Additionally, the study will explore the impact of AI-driven communication tools on language learning, creativity, and human expression, while assessing the relevance and adaptability of existing AI and Big Data frameworks to the socio-cultural realities of communication practices in Nigeria.

Communication and Language Arts

Communication and language arts refer to the broad field of human interaction and expression through spoken, written and symbolic language. It encompasses areas such as media communication, linguistics, literature, public relations, and rhetorical studies. The central aim of this domain is to enhance human understanding, build meaning and foster connections across cultures and societies. In academic settings, communication and language arts involve critical thinking, creativity and the mastery of linguistic structures, styles, and strategies for effective information dissemination and engagement (Morreale et al., 2022). With the digital revolution, this field now intersects with emerging technologies, raising questions about how human expression is shaped, preserved, or challenged in data-driven environments.

Today, the evolution of communication and language arts is significantly influenced by technological integration, particularly, the rise of digital platforms and AI-based language systems. Traditional human-centred approaches to narrative construction, argumentation and linguistic aesthetics are increasingly being reshaped by algorithmic and data-centric models. Scholars and

educators now face the task of redefining how communication is taught, evaluated and practiced within a world dominated by automation and virtual interaction (Duranti, 2021). This shift brings both opportunities for innovation and risks of eroding the authenticity and contextual depth that human language inherently carries. As such, communication and language arts serve as the dependent variable in this study, influenced by the extent and manner in which emerging technologies are integrated into their practices.

Big Data and Artificial Intelligence

Big Data refers to the massive volume of structured and unstructured data generated from digital interactions, characterised by high velocity, variety and veracity. Artificial Intelligence (AI), on the other hand, involves the development of machines and software capable of mimicking human cognitive functions, including learning, problem-solving and decision-making (Kitchin, 2021). Together, Big Data and AI enable sophisticated analysis, prediction, and automation of communicative tasks across sectors. In language-related domains, these technologies support applications like Natural Language Processing (NLP), automated translation, sentiment analysis and intelligent tutoring systems, revolutionizing how language is used, studied and taught (Marr, 2023). The influence of Big Data and AI on communication and language arts is increasingly evident in both academic and practical contexts. AI systems now generate written texts, simulate conversations, analyse emotions and offer real-time feedback in educational and creative writing settings. These technologies not only streamline tasks but also introduce new dynamics into human expression, raising concerns about authenticity, authorship and cultural bias (Bender et al., 2021). Moreover, their widespread adoption varies across global contexts, with high implementation rates in technologically advanced countries and minimal access or contextual adaptation in developing regions. Therefore, Big Data and AI serve as the independent variables in this study, shaping the direction and transformation of communication and language arts.

Technological Adaptation

Technological adaptation refers to the process by which individuals, institutions and societies accept, integrate, and utilize new technologies to improve existing practices. In the context of communication and language arts, technological adaptation mediates how effectively AI and Big Data influence human communicative practices. This includes the development of digital literacy, access to relevant infrastructure, policy frameworks and the willingness of stakeholders to embrace and modify their methodologies in response to technological advances (Rogers, 2003; Okonkwo & Otuya, 2023). Without adequate adaptation mechanisms, the potential benefits of AI and Big Data integration may be underutilized or result in negative outcomes such as miscommunication, marginalization of local languages, and ethical violations.

Furthermore, technological adaptation varies widely across different social, cultural, and economic settings. In regions like sub-Saharan Africa, adaptation is often hindered by infrastructural deficits, lack of trained personnel and limited awareness of digital tools in education and communication sectors. However, localised efforts such as language digitization projects, mobile learning platforms, and policy-driven ICT reforms show promise in bridging the gap (UNECA, 2021). The extent to which individuals and institutions adapt to technological advancements plays a critical role in mediating the relationship between AI/Big Data and communication outcomes. Hence, in this study, technological adaptation is positioned as the mediator variable that determines how

effectively Big Data and AI influence the practices and outcomes within communication and language arts.

The Technological Determinism Theory

The Technological Determinism Theory was developed by Marshall McLuhan in 1964. This theory posits that technological innovations, especially, in communication are the primary drivers of societal change, shaping human behaviour, perception, and social structure. One of its core tenets is the idea that "the medium is the message," meaning that the nature of a communication technology influences how messages are perceived and how societies evolve. The theory assumes that new technologies, once introduced, follow a self-fulfilling trajectory that ultimately transforms cultural practices, including language and communication. In the context of Big Data and Artificial Intelligence, this theory suggests that these tools are not neutral; rather, they actively reconstruct how language is used, who controls communication and how meaning is generated. Critics of technological determinism argue that it oversimplifies complex social processes by attributing causality solely to technology, ignoring human agency, cultural diversity, and socio-political factors (Chandler, 2002). Nonetheless, the theory remains highly relevant to the present study, as it provides a foundational lens to explore how AI and Big Data are reshaping communication and language arts. It helps to interrogate not just the tools themselves, but the broader implications they have on human interaction, creativity, and the evolution of linguistic practices in both global and local contexts.

Empirical Review

A study by Zhou and Li (2021) titled "Artificial Intelligence and Communication Studies: Transforming Media Pedagogy and Practice" aimed to examine the application of AI tools in academic communication and language disciplines across global contexts. Using a mixed-methods approach that included surveys and expert interviews across five universities in Asia and North America, the study found that AI integration enhanced media literacy, improved content personalization, and reshaped the pedagogical approaches to communication. This study aligns with the current research objective of exploring how AI and Big Data are applied in communication and language arts by providing empirical evidence on cross-cultural academic use of AI in communication training and theory development.

In a study titled "Barriers to AI Adoption in Sub-Saharan Communication Education", Okeke and Mbakwe (2022) sought to identify the infrastructural, educational, and cultural limitations affecting the integration of artificial intelligence into communication education in Nigeria and Ghana. Employing qualitative case studies and focus group discussions, they discovered that limited technical infrastructure, lack of trained educators, and insufficient curriculum reform were major constraints. Their findings are similar to the current study's objective of identifying the challenges and limitations of AI and Big Data in language-based disciplines, especially in underrepresented regions such as sub-Saharan Africa.

Kim and Park (2023) conducted a study titled "AI Writing Assistants and Language Learning: A Classroom Perspective," which explored the impact of AI-driven tools like Grammarly and QuillBot on students' writing skills and creative expression in Korean high schools. Through an experimental design involving pre- and post-assessment of language tasks, the study found that while students improved in grammar and structure, creativity and critical thinking declined due to overreliance on automated suggestions. This resonates with the current study's objective to explore

the impact of AI-driven communication tools on language learning, creativity, and human expression, particularly by drawing attention to the nuanced outcomes of such technological interventions.

A related study by Ahmed and Musa (2022) titled "Localizing Artificial Intelligence for African Language Preservation and Media Practice" examined the adaptability of AI frameworks in media and communication practices in Nigeria, focusing on indigenous languages. Using ethnographic methods and interviews with language activists and tech developers, the researchers found that while AI systems could aid linguistic preservation, most frameworks lacked adaptability due to Western-centric data models. This study shares a direct link with the current research objective of assessing the relevance and adaptability of current AI and Big Data frameworks to socio-cultural realities, reinforcing the need for culturally sensitive and inclusive technological design.

Gap Identification

The reviewed literature highlights significant progress in the integration of Big Data and Artificial Intelligence into communication and language arts, particularly in areas such as media pedagogy, language learning, and linguistic analysis. Studies have shown that AI tools enhance efficiency, personalization, and access to language resources, while also raising concerns about diminished creativity, cultural bias, and overreliance on automation. In global contexts, especially in technologically advanced regions, these technologies are rapidly transforming communication practices. However, the literature reveals a notable gap in empirical studies that address the contextual and cultural adaptation of these technologies in underrepresented regions like Nigeria. Additionally, while previous research explores technological applications and challenges, there is limited focus on how technological adaptation mediates the relationship between AI/Big Data and language-based practices. Theoretical engagement remains largely Western-centric, with minimal consideration of indigenous communication systems and linguistic diversity. Therefore, the current study fills these gaps by offering a localized, interdisciplinary exploration of the trends, applications, and implications of Big Data and AI in communication and language arts, with a specific emphasis on socio-cultural relevance and adaptive capacity.

Methodology

This study adopts the case study methodology to enable an in-depth exploration of how Big Data and Artificial Intelligence are integrated into communication and language arts within selected academic institutions in Nigeria. The case study approach is appropriate for examining complex, context-specific interactions between technology and language-based disciplines, providing rich, qualitative insights into usage patterns, challenges, and cultural adaptations. The population for the study comprises academic staff and final-year students in the Departments of Mass Communication, English and Literary Studies, and Linguistics across three Nigerian universities; University of Lagos, University of Nigeria Nsukka, and Rivers State University with a combined population of approximately 4,200 individuals (based on institutional records as of 2024). These departments were chosen because they actively engage with communication, media, and language instruction, making them relevant to the study's objectives. A sample size of 30 participants (10 from each university, including lecturers and students) was selected using purposive sampling, focusing on those with practical exposure to or academic engagement with AI and Big Data tools. In-depth interviews and document analysis (such as syllabuses, project topics and institutional ICT policies) were employed as the primary methods of data collection. Data were analysed

thematically using content analysis, allowing for the identification of patterns, themes and contextual interpretations of the participants' experiences and institutional practices. The use of the case study method is justified by its ability to capture real-life complexities and provide nuanced understanding of the technological, pedagogical, and socio-cultural dimensions of AI and Big Data integration in communication and language arts education.

Data Presentation and Analysis

Themes were drawn deductively from research objectives. The themes deduced included: Application of big data and artificial intelligence in communication and language arts; challenges and limitations in the integration of AI and Big Data in language-based disciplines; impact of AI-driven tools on language learning, creativity and human expression; and relevance and socio-cultural adaptability of AI and big data frameworks in Nigerian communication practices. These were articulated and elaborated below:

Application of Big Data and Artificial Intelligence in Communication and Language Arts

Findings from interviews with lecturers across the selected universities show that Big Data and AI tools are increasingly used in academic communication environments, particularly, for data-driven media research, content analysis and computational linguistics. Institutions such as the University of Lagos have integrated AI-assisted software into coursework, allowing students to analyse communication patterns from social media platforms using sentiment analysis and topic modelling tools. Lecturers reported the use of platforms like Tableau, IBM Watson and Google Trends to visualize and interpret large volumes of communication data, especially, for projects related to political discourse, advertising strategies and public opinion tracking. Analysis of departmental documents such as course syllabuses and project topics indicates that AI and Big Data have been formally introduced into the curriculum under courses such as "Media Analytics," "Digital Communication," and "Language and Technology." At Rivers State University, for example, Mass Communication students undertake final-year projects that involve extracting and analysing data from social networks and online news platforms. These projects often combine theoretical frameworks with computational tools, providing students with both conceptual and practical exposure. The introduction of these tools represents a shift from traditional qualitative-only approaches toward more hybridized research paradigms. Further analyses show that AI is being used to support language learning and academic writing in departments of English and Linguistics. Applications such as Grammarly, QuillBot, and Turnitin are used not only for grammar checking and plagiarism detection but also to enhance stylistic and semantic choices in student essays. These tools are also being applied in research supervision, helping instructors provide quicker, data-informed feedback. At the University of Nigeria Nsukka, AI-powered translation tools are occasionally used to compare indigenous language translations and support linguistic preservation efforts. Interviews with IT staff and departmental coordinators illustrated that AI technologies also support administrative and communication functions within faculties. AI-enabled bots respond to student queries, while automated email analysis tools assist academic advisers in tracking students' inquiries. Data collected through university portals are used to predict academic performance, identify at-risk students, and customize learning resources. This use of AI and Big Data, though still developing, shows promise in optimizing both communication strategies and academic outcomes. However, the analyses suggest that the level of integration varies significantly across institutions and departments. While some faculties actively incorporate AI and Big Data into

teaching and research, others lag due to inadequate funding, limited expertise, or lack of access to advanced tools. Document reviews show inconsistent implementation policies, with some syllabuses outdated or lacking in detail about AI-related content. This discrepancy underscores the uneven pace at which these technologies are being adopted in communication and language arts in Nigerian higher education.

Challenges and Limitations in the Integration of AI and Big Data in Language-based Disciplines

Interview data from communication and language arts faculty members highlighted several key challenges in the integration of AI and Big Data tools. One of the most cited issues is the lack of infrastructure, including insufficient high-speed internet, inadequate computing resources and outdated laboratory equipment. In many departments, especially in federal universities, digital tools are available only to postgraduate students or researchers with external funding, making accessibility for undergraduate learning limited. A second major challenge identified is the shortage of skilled personnel. Several departments do not have lecturers trained in computational linguistics, data science, or AI applications. Staff members often lack the technical capacity to teach or supervise AI-related projects effectively. Some institutions rely on occasional training from external agencies, but these are often inconsistent and fail to produce long-term expertise. Document analysis confirmed this gap, as very few faculty development programmes explicitly address AI and Big Data skills in communication education. Another significant barrier is the absence of localized AI tools. Many of the widely used platforms, such as OpenAI and Google NLP, are trained predominantly on Western linguistic and cultural models. As such, they often fail to recognize indigenous expressions, dialectical variations, and cultural idioms in African languages. Interviewees in linguistics departments expressed concern that these tools, while powerful, cannot yet support African language documentation and preservation effectively. This was also evident in policy documents reviewed, which make little mention of efforts to contextualize these technologies for local use. The cost of software licensing and data access was also a recurring theme. Many AI platforms require paid subscriptions, which universities and students cannot afford. As a result, faculty members rely on free or outdated versions, limiting the functionality and scope of integration. In some instances, students use pirated tools or access public APIs without adequate knowledge of legal or ethical implications. Institutional policies on data ethics and copyright are either absent or poorly enforced, as observed in administrative handbooks and ICT policy documents. Lastly, resistance to change among faculty and students was identified as a subtle but influential limitation. Some lecturers, particularly, those trained in traditional communication theory, expressed scepticism about the academic value of automated tools. Concerns were raised about the impact of AI on original thinking and creativity. Similarly, some students remain uncomfortable with algorithmic learning environments, fearing that human interpretation and expression may be side-lined. These findings suggest that successful integration of AI and Big Data into language-based disciplines requires more than tools, it demands cultural, institutional and pedagogical transformation.

Impact of AI-driven Tools on Language Learning, Creativity and Human Expression

Interview data from English and communication lecturers revealed that AI-driven tools have significantly improved students' writing accuracy and productivity, especially in grammar, syntax, and vocabulary usage. Tools like Grammarly and Hemingway Editor are widely used among

undergraduates and postgraduates to correct mechanical errors, enhance sentence structure, and offer real-time stylistic feedback. Faculty members acknowledged that these platforms save time and promote better drafts, particularly among students who struggle with academic writing.

However, several lecturers raised concerns about the decline in originality and critical thinking, especially among students who overly rely on AI-generated suggestions. There were instances where students submitted essays largely constructed with paraphrasing tools such as QuillBot or AI content generators, resulting in polished but shallow arguments. These observations were supported by departmental plagiarism reports, which documented increased use of AI-rephrased content that remained technically undetected by traditional plagiarism software but failed to reflect authentic voice or argumentation. AI tools have also impacted language learning dynamics in classrooms. Students now access real-time translations, speech-to-text features, and interactive vocabulary builders. While this enhances linguistic accessibility and inclusivity, particularly for non-native English speakers, lecturers reported reduced engagement in traditional methods of vocabulary development, oral practice, and creative exercises. Curriculum documents analysed revealed a growing dependency on technology-based assessments and fewer opportunities for expressive, open-ended writing or speaking tasks. In creative writing and literature classes, AI tools such as ChatGPT and Jasper AI are being used to brainstorm story ideas, write poetry, and experiment with dialogue. While these tools can serve as inspiration and scaffolding for creativity, faculty members noted that students often fail to refine, contextualize, or critically reflect on the AI-generated content. This shift raises concerns about the erosion of artistic depth and emotional nuance in human expression, particularly in creative disciplines where originality and voice are central. Overall, the analyses suggest a dual impact: while AI tools enhance efficiency, support learning, and broaden access, they also pose challenges to creativity, authenticity, and deeper cognitive engagement. This duality is not captured in most existing curriculum or policy documents, which often focus on digital competence without integrating ethical, critical, and reflective dimensions. As such, there is a growing need for balanced pedagogical approaches that integrate AI literacy with humanistic values.

Relevance and Socio-cultural Adaptability of AI and Big Data Frameworks in Nigerian Communication Practices

Interviews with faculty members and ICT coordinators across the case study institutions revealed that most AI and Big Data frameworks used in communication departments are imported and Western-centric, lacking sensitivity to local contexts. The majority of AI tools in use are not trained on Nigerian or African data, which results in limited accuracy when processing indigenous names, idiomatic expressions, or culturally embedded communication patterns. For instance, sentiment analysis tools often misinterpret sarcasm or humour in Nigerian Pidgin and other local dialects, leading to skewed data interpretations in media analysis projects.

Document analysis of institutional ICT frameworks, curriculum guides, and communication research topics confirmed a limited focus on contextual adaptation. Most institutional guidelines promote digital literacy in general terms, without specifying strategies for integrating culturally relevant AI applications. There is a noticeable absence of efforts to localize data sets or develop indigenous NLP models that reflect the country's multilingual and multicultural communication environment. This gap was echoed by several interviewees, who emphasized the urgent need for collaborative projects that build localized AI databases for academic and practical use.

Interviews also revealed that students and researchers often face difficulties interpreting AI outputs due to mismatches between software assumptions and socio-cultural communication norms. For example, some speech-to-text tools fail to capture Nigerian accents accurately, leading to distorted transcriptions in audio-visual projects. In public relations and advertising courses, tools that suggest campaign strategies based on foreign consumer behaviour models were found to be incompatible with local values and communication channels. Some efforts are being made to improve adaptability. At the University of Lagos, a pilot initiative is underway to build a machine learning model trained on Nigerian Twitter data, aiming to improve the performance of sentiment analysis tools for local social media campaigns. However, such initiatives are rare and not yet institutionalized. Document review shows that national education policies, including the National ICT Policy and the Nigerian Research and Education Network (NgREN), make limited reference to AI adaptation for humanities and language-based disciplines. In summary, while AI and Big Data frameworks offer enormous potential, their relevance to Nigerian communication contexts remains underdeveloped. The findings underscore the need for localized AI research, open-source data initiatives, and curriculum reforms that embed cultural considerations into technological applications. Without these, the integration of AI and Big Data in communication and language arts may reinforce dependency on foreign models and perpetuate cultural misrepresentation or exclusion.

Discussion of Findings

Findings revealed that AI and Big Data tools such as Grammarly, Tableau, and Google Trends are actively applied in communication and language arts departments for media research, academic writing, and linguistic analysis. These technologies are gradually being integrated into university curricula through courses like Media Analytics and Digital Communication, although implementation varies by institution. AI applications have expanded beyond instruction to administrative support, including automated email responses and performance tracking tools. There is inconsistency in the level of integration across institutions, with some departments lacking structured policies or updated syllabuses to support AI and Big Data usage. The study by Zhou and Li (2021), which explored the integration of AI tools in communication and media pedagogy, directly supports this finding, by demonstrating that platforms like Google Trends, sentiment analysis software, and media analytics tools are increasingly used in academic and professional communication environments. Their research aligns with the finding that Nigerian universities have begun incorporating similar tools into coursework and research, thereby affirming a global trend in AI and Big Data applications within language arts disciplines. This harmony reinforces the strand that technological transformation is actively reshaping communication curricula and research methodologies. The integration of AI and Big Data tools into communication and language arts, as reflected in Finding 1, is backed by Technological Determinism Theory, which posits that technological innovations drive changes in human behaviour, educational practices, and societal structures. The observed shift in curriculum design, media research methods, and academic writing practices demonstrates McLuhan's assertion that the medium (technology) itself reshapes the message and the processes of meaning-making, reinforcing the idea that communication tools fundamentally transform how language and knowledge are produced and disseminated. The study indicated that Infrastructural deficiencies such as poor internet access and outdated computer facilities hinder the effective adoption of AI and Big Data tools in language-based disciplines. A significant shortage of trained personnel limits the depth of AI integration, as

many lecturers lack formal training in data science or computational linguistics. Existing AI tools are poorly suited to local linguistic and cultural contexts, making them less effective in processing indigenous expressions or dialects. Financial constraints and resistance to change among staff and students also pose major limitations to the widespread use of these technologies. Okeke and Mbakwe's (2022) investigation into barriers to AI adoption in sub-Saharan communication education directly echoes this finding, which identified infrastructural limitations, skills shortages, and funding constraints as key obstacles in Nigeria. Their qualitative insights on the unpreparedness of institutions mirror the current study's observations across departments lacking trained staff and adequate facilities. The alignment strengthens the evidence base for the strand of institutional and systemic challenges hindering the full integration of AI and Big Data in language-based education in developing regions. Finding 2, which highlights infrastructural, skill-based, and contextual limitations in adopting AI and Big Data, aligns with Technological Determinism's view that societies unequally experience technological shifts based on their level of access and adaptability. The theory implies that when technological change occurs, it privileges those equipped to engage with it, thus creating a digital divide. In this case, under-resourced departments struggle to adapt, thereby lagging behind in the transformative potential of communication and language education.

The study showed that AI-driven tools enhance grammatical accuracy and writing structure among students but may encourage overreliance that limits critical thinking. Many students use AI tools like QuillBot and ChatGPT to generate or rephrase content, leading to concerns about originality and academic integrity. Language learning has become more accessible through speech-to-text features and translation tools, but traditional vocabulary development and oral skills are being neglected. In creative writing contexts, AI tools aid brainstorming but often result in superficial content that lacks emotional depth and cultural nuance. Kim and Park's (2023) study on the use of AI writing assistants in Korean high schools aligns with this finding, which showed that AI tools improve students' grammatical proficiency but may diminish critical thinking and originality. Both studies highlight the dual impact of AI in learning environments enhancing mechanical skills while potentially undermining creative and analytical depth. This correlation confirms the strand within the current findings that overreliance on AI can lead to reduced human expression and engagement in communicative and language-learning tasks. The dual impact of AI tools on student creativity and language learning in Finding 3 reflects the deterministic perspective that technology shapes not only societal functions but also cognitive and expressive processes. According to McLuhan's theoretical stance, the medium through which people communicate changes the nature of their thought and interaction. The automation of writing, grammar correction, and translation suggests that technology is now a primary agent influencing how individuals develop, express, and refine language, often at the expense of traditional, human-centred linguistic competencies. The study affirmed that Most AI and Big Data frameworks in use are Western-centric and lack relevance to the socio-cultural realities of Nigerian communication environments. Institutional ICT policies and curricula rarely address the need for localized AI tools or context-sensitive data applications. Foreign AI tools struggle with local accents, idioms, and values, often producing inaccurate analyses in sentiment, speech, and cultural meaning. Although a few localized initiatives exist, such as training AI models on Nigerian social media data, these efforts remain fragmented and are not yet institutionalized. Ahmed and Musa (2022) focused on the challenges of localizing AI for African languages and media practices, which resonates strongly with this finding regarding the Western-centric nature of current AI frameworks. The

observation that existing technologies are not optimized for indigenous linguistic contexts supports the finding that AI tools misinterpret local expressions and lack adaptability to Nigeria's cultural realities. This alignment affirms the strand that emphasizes the need for context-sensitive, locally trained AI systems to ensure effective and inclusive communication practices. Finding 4, which reveals that imported AI frameworks lack relevance to Nigerian socio-cultural contexts, is supported by Technological Determinism's assumption that technologies impose structural changes regardless of cultural alignment. McLuhan's theory suggests that new technologies, especially when externally developed, introduce paradigms that reshape local communication patterns, often displacing indigenous systems. This theoretical lens explains the disconnection between existing AI tools and local communicative realities, emphasizing the dominance of the technology over cultural specificity unless intentionally adapted.

Conclusion

The study concludes that, the application of Big Data and Artificial Intelligence in communication and language arts signifies a transformative shift in academic practice, as institutions gradually adopt these technologies to enhance research, learning and administrative efficiency; however, the uneven pace of integration highlights the need for structured policies and consistent curriculum reform to ensure wider and more effective utilization.

The study validates that the integration of AI and Big Data tools in language-based disciplines is significantly constrained by infrastructural limitations, lack of skilled personnel, and poor localization, indicating that technological potential alone is insufficient without strategic investment in capacity building, digital infrastructure and context-aware educational reforms.

The study explores that While AI-driven tools have proven beneficial in improving linguistic accuracy and accessibility, their growing influence on learning environments raises concerns about declining originality and critical engagement, underscoring the necessity of balancing technological support with pedagogical approaches that preserve human creativity and cognitive depth. This study establishes that The current reliance on Western-centric AI frameworks that lack cultural and linguistic adaptability diminishes the relevance of these tools in Nigerian communication contexts, pointing to an urgent need for the development of localized AI systems and inclusive data models that reflect the country's diverse socio-cultural realities.

This study contributes to knowledge by offering an original and context-specific exploration of how Big Data and Artificial Intelligence are shaping communication and language arts within Nigerian academic institutions, an area that has received limited empirical attention. It creatively bridges technology and humanities by analysing the pedagogical, cultural, and institutional dynamics of AI integration, thereby introducing innovative insights into the practical and theoretical intersections of digital tools and human expression. The research advances Technological Determinism Theory by extending its relevance to underrepresented educational and cultural contexts, highlighting how imported technologies impact local communicative practices. It also provides a framework for product development by emphasizing the need for culturally adaptive AI tools and localized data models that support indigenous language processing, thereby laying the foundation for future innovations in educational and linguistic technologies in Africa.

Recommendations

Based on the results of the work, the following has been proffered.

1) The National Universities Commission (NUC) and university senates should mandate the integration of AI and Big Data tools into communication and language arts curricula through structured course design and updated academic policies.
2) The Federal Ministry of Education and TETFund should provide targeted funding and training programs to improve digital infrastructure and build staff capacity in AI and data science within language-based departments.
3) The Nigerian Educational Research and Development Council (NERDC) and university faculties should promote balanced pedagogical models that combine AI-assisted learning with creativity-enhancing and critical thinking strategies.
4) The National Information Technology Development Agency (NITDA) and local universities should collaborate with AI developers to create culturally and linguistically adaptive AI frameworks that reflect Nigeria's communication realities.

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