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TECHNOLOGICAL PEDAGOGICAL TRANSFORMATION AND ENGLISH LANGUAGE EDUCATION IN NIGERIA: ADVANCING TECHNICAL COMMUNICATION IN THE FOURTH INDUSTRIAL REVOLUTION

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Abstract

The advent of the Fourth Industrial Revolution (4IR) has changed educational systems worldwide including Nigeria, which has led to the emergence of modern approaches to language teaching and learning. In Nigeria, English language pedagogy is carried out through traditional methods of teaching that insufficiently prepare learners for digitally mediated workplaces. This study examines the digitalisation of English language pedagogy in Nigeria and investigates how emerging 4IR technologies can enhance technical communication competencies among students. The study employs a qualitative systematic review methodology; the study synthesises evidence from peer-reviewed literature, policy documents, and scholarly publications on digital learning, language education, and educational technology. Using the Technological Pedagogical Content Knowledge (TPACK) framework, the study examines the intersection of

Keywords: Digitalised pedagogy, English language education, Fourth Industrial Revolution, Technical communication, Artificial Intelligence, TPACK, Digital literacy

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technology, pedagogy, and content knowledge in English language instruction. Findings reveal four major themes: accessibility, personalised and adaptive learning; real-time feedback and autonomous learning; interactive and contextualised learning environments; and the need for ethical frameworks and educator preparedness. The study concludes that digital tools such as artificial intelligence-powered chatbots, virtual assistants, language learning platforms, and blended learning systems significantly improve learner engagement, communication competence, digital literacy, and workplace readiness. Hence, digitalising English language pedagogy is essential for equipping Nigerian students with the communication and technological competencies required in the contemporary knowledge economy and recommends a context-sensitive framework that integrates technological, pedagogical, and institutional reforms to advance sustainable educational development.

Introduction

Historical Evolution of English in Nigeria

Language is indispensable and it is the basic medium through which human beings communicate. Language further plays a fundamental role in influencing learning experiences (Ibitoye and Abolarin-Egbebiola 2025, Adedigba et al. 2023). Ozoemena et al. (2021), and Omotunde and Ibitoye (2020) strengthen this by arguing that the effect of language on overall learning and educational performance is an important aspect that cannot be overlooked. The English language occupies a focal position in Nigeria's socio-political, educational, and economic systems. The evolution of English as a language in Nigeria can be traced to the colonial period of British rule in the 19th century, when it functioned primarily as a language of administration, trade, and missionary education. Over time, English language metamorphosed from a colonial imposition to a unifying lingua franca in a linguistically diverse nation with over 500 indigenous languages. Nnamani (2024) posits that the linguistic situation of Nigeria is one of the most varied globally, with over 500 languages spoken by more than 200 million people.

Resulting from the attainment of Nigerian independence in 1960, which culminated into the exit of the colonial masters from Nigerian system, English was retained as Nigeria's official language due to its perceived importance, unification, neutrality and utility in governance and global engagement. It therefore assumed the position of the principal medium of instruction in formal education, particularly from upper primary school onwards. The institutionalisation of English in Nigeria has since shaped literacy practices, academic discourse, and professional communication (Ibitoye and Dada, 2023).

Nevertheless, the historical route of English in Nigeria witnessed some challenges and intricacies as Nigeria is one of the countries where English was introduced first through trans-Atlantic trade relations and was fused through many decades of British rule (Ugwuanyi and Aboh, 2026). Some of the intricacies and complexities of English as a language in Nigeria are the varieties of English that evolved by being in contact with the indigenous language because Nigeria is a multi-ethnic society. Ibitoye et al (2026), posits that the varieties of English language that exist in Nigeria showcases the socio-cultural and socio-political issues facing the society. Voloshina (2024) maintains that these intricacies brought about the construction of Nigerian English which is based on two significant developments namely indigenization and globalization thereby making the Nigerian variety of English language so distinct and exceptional. While this variance of English enhances identity and accessibility, it also raises questions about standards, intelligibility, and global competitiveness. The history surrounding the emergence of English language in Nigeria as the official language has generated series of language-related policies that have often led to considerable disruptions within the education sector.

English Language Pedagogy in Nigeria

Following the attainment of English as the official language and formal language of education in Nigeria, it practically implies that a typical Nigerian must have two major tools (language) of thoughts, that is the L1 (which can either be Hausa, Igbo or Yoruba) and English, hence it becomes imperative that Nigerians must be proficient in English language as well, due to its global status and also for mutual intelligibility. Tunde-Awe (2024) asserts that the traditional English language pedagogy as practiced in Nigeria has not promoted the realization of this objective. The obligation of transforming the state of English language pedagogy in Nigeria, consequently, places a challenge to English Language educators to digitalise English Language Pedagogy in Nigeria by reimagining technical communication for the Fourth Industrial Revolution which will help in enhancing English language teaching/learning in Nigeria.

Expertise in English has been widely identified as a determining factor of academic achievement, employability, and engagement in a globalized world. English plays a pivotal role in shaping students' cognitive, linguistic, and socio-cultural development but in spite of this significance of English langauge, student outcomes in English often remain below expected standards, particularly in higher institutions where foundational language skills are critical for understanding complex subjects and contributing eloquently in classroom discourse (Etop, 2023).

Technology has presented new and engaging ways to teach, learn and practice language skills and imbibing these new teaching and learning strategies implies digitalizing English

language pedagogy in Nigeria. English language teaching in Nigeria has traditionally been characterised by teacher-centred approaches, emphasising grammar, rote memorisation, and examination performance. In higher institutions, the focus is often on functional English, aimed at preparing students with basic communication skills for professional contexts.

Despite its importance, English language pedagogy in Nigeria faces continual challenges, especially in this era of fourth Industrial Revolution including overcrowded classrooms, inadequate teaching materials, and most importantly limited integration of technology. These challenges are particularly pronounced in higher education settings, where students require advanced communication skills for technical documentation, workplace interaction, and global collaboration.

The Fourth Industrial Revolution (4IR) and Educational Transformation

The Fourth Industrial Revolution (4IR) is a major driver for a swift global transformation in technology. Shwab (2016) posits that the 4IR is the present era of industrial revolution, marked by the combination of physical, digital, and biological systems, she says that it is defined by things like Cyber-physical systems, Internet of Things (IoT), Big data, cloud computing, Robotics, 3D printing, Artificial Intelligence, Biotechnology, nanotech etc. In corroborating this, Kang et al, (2021) affirms that 4IR exemplifies transformative technologies that impact underlying elements of society. The transformative impact that new technologies such as artificial intelligence, robotics, big data, and the Internet of Things, have on education, economies and societies at large is enormous. The fourth industrial revolution technologies, similarly, referred to as 4IR, saturate every sphere of livelihood as a result of the technologies' new method of doing things, the consistency and efficiency, effectiveness attached to it as well. These technologies are also essential for resource optimisation in order to achieve economic, environmental, and social sustainability (David et.al, 2022). David and his colleagues go further to say that the great revolution brought by the key components of 4IR to the industrial world cannot be overemphasised. This is why it is essential for everyone to enhance capacities via these technologies. The world is changing at a very fast rate and there are modern methods added to everyday life to make traditional way of life easy, and this applies to digitalising English Language Pedagogy in Nigeria by reimagining technical communication for the Fourth Industrial Revolution.

Historically, 4IR, according to Davied et al, (2022) stemmed from three previous industrial revolutions, namely the first Industrial Revolution (1765). During this period, higher productivity was recorded on water and steam-powered mechanisation (Ketchiwou and Ngulube, 2025). The second industrial revolution existed between the end of the 19th century and 20th century, whereby there was high speed of electrically powered huge

production of goods The third revolution occurred in the middle of 1970s in the 20th century, when the world witnessed advanced electronics and information technology and computers. The fourth industrial revolution is the present era of revolution in the 21st century and an advancement of the third industrial revolution, whereby cyber-physical systems, and the Internet of Things take over the entire world. This present revolution can also be referred to as a digital revolution, which brought a new phase to life at all levels, where activities are done, measured, or structured digitally (David et. al, 2022). In today's rapidly evolving digital world, the ability to effectively access, evaluate, and utilize digital technologies is essential for personal, academic, and professional growth and English language educators are not left out.

Although the 4IR presents privileges for new methods and ways of doing things, access to its advantages remains significantly unequal as so many people are not compliant with the revolution. During this period of Fourth Industrial Revolution, the field of education, like all other sectors, is undergoing great revolution, particularly in language learning (Asak and Asak, 2025). Traditional methods of language teaching are increasingly supported with modern methods, as language proficiency is no longer limited to grammatical accuracy but extends to digital literacy, multimodal communication, and critical thinking. For Nigerian tertiary institution students, the ability to communicate effectively in digital environments is essential for employability. However, the present state of English language teaching rarely adequately prepares students for these demands, necessitating a reimagining of pedagogy through digital transformation.

As technology advances, it creates demand for digitalized English language education to address the challenges caused by the demand of the world technologically, conflicting learning styles, and differing competence levels. Digitalizing English language pedagogy in Nigeria entails changing the process or system, not just the format by redesigning English language teaching using digital tools. Traditional education methods have not been able to offer personalized support, leading to disconnected educational outcomes. In addition, traditional teaching methods deprive students of the capability to discover their distinctive interests, which foster their desire and demands in their academic journeys. Lodge et al (2018) posits that there is a need for change in English language pedagogy which will be very adaptive to different learning needs of students. In contrast, digitalized English language pedagogy potentially creates adaptive teaching and learning conditions that commensurate with a learner's progress, desires, and shortcomings. This is corroborated by Wang et al, (2025) when they argue that digitalized systems support the attainment of vocabulary and grammar and further develop critical communicative competencies

In addressing digitalizing English language pedagogy in Nigeria, this study aims to examine the transformative opportunities built in these modern technologies, explore

the role of digital technologies in improving English language pedagogy and identify challenges associated with digital transformation in Nigerian educational institutions (Chaka, 2023). This is essential to investigate the consequences of incorporating modern English language teaching methods, considering potential prejudices, digital divide and the obligation for rightful access to technology (Selwyn, 2019). This study illustrates methods for more informed practices in the integration of digitalized English language pedagogy as it evaluates current developments and prospects and it further answers the research question that: Does digitalised English language pedagogy using 4IR tools compared to traditional pedagogy improve technical communication competence, engagement, and 4IR readiness?

The Fourth Industrial Revolution (4IR) Applications

The fourth industrial revolution applications which are relevant to digitalizing English Language pedagogy namely chatbots, virtual assistants, language learning platforms, have produced transformative processes in enhancing English language education in Nigeria and these applications serve as innovative resources for language teaching and learning. This sub-section under the Fourth Industrial Revolution (4IR) and Educational Transformation explores these applications by emphasizing their transformative capability for language pedagogy.

Chatbots in Language Learning

Chatbots perform many significant functions in English language pedagogy, and they can be referred to as AI-powered technology which was produced to spark discussion through text or voice interactions, as it is universally known that Artificial Intelligence is a core empowering technology of the Fourth Industrial Revolution. Chatbots are referred to as virtual interactive agents in natural language which have been widely employed in language pedagogy due to their chat characteristics (Jeon, 2022). Amongst the inevitable advantages of Chatbots in English language pedagogy are:

- Chatbot platforms are employed to personalize learners' experience by adjusting to the user's competence level by exhibiting dialogue that aligns with the peculiar learning needs of the learner. By so doing, this chatbot presents an adaptable and interactional approach to language learning and ultimately accelerates effective communication skills. Chatbots can also be utilized for supplementary resources for homework, revision, or conversational skills assessment This apparently presents an optimistic impact on English language teaching and learning.
- Secondly, Gutierrez (2023) posits that students' usage of chatbots permits them to obtain instantaneous feedback on grammar, vocabulary, and pronunciation, which eventually builds their confidence and fluency without the nervousness

that may complement teacher-student interactions because chatbot is an application. This application further affords learners an opportunity for frequent conversational practice in a low-pressure environment.

- Thirdly, one of the advantages of Chatbots is accessibility, felxibility and availability. Using chatbots, students can access and learn at their own stride because of the constant availability of the application. This truly enhances the students' language acquisition experience.

The incorporation of chatbots in digitalizing English language pedagogy offers various advantages such as immediate assistance, quick access to information, and enhanced learning outcomes. On the part of teachers, incorporating chatbots into English language pedagogy creätes challenges for educators because its limitations need to be considered by ensuring that they can provide necessary context and corrections when required (Yakubu, 2024).

Virtual Assistants

Some virtual assistants namely Google Assistant, Amazon Alexa, and Apple Siri have the possibility of reforming language learning and teaching through interactive involvements enabled by voice recognition and natural language processing. These assistants function according to their nomenclature by assisting students in their learning experiences compared to traditional methods of language learning and teaching. Following Klar (2025) and Sajja et al (2024)'s position, they argue that chatbots and virtual assistants help students to perform better in language learning because they support task-based language learning by guiding students through specific activities. Virtual assistants such as taskbased language teaching (TBLT) and virtual learning environments (VLEs) help students to progress at their own pace, rehearse pronunciation, and get detailed analysis of language rules, which adds to a more absorbing learning environment.

Language Learning Platforms

Some identified language learning platforms such as Duolingo, Babbel, and Rosetta Stone, aid language acquisition by merging several educational practices and technological tools such as gamification, spaced repetition, and adaptive learning algorithms through organized approaches. Algorithms are employed to evaluate learners" progress and adapt content accordingly. Points, rewards, and challenges which can be referred to as fundamentals of gamification, serve as motivations for learners, making language education enjoyable.

While advocating for digitalization of English language pedagogy in Nigeria, a complementary stance, which entails the combined usage of fourth industrial revolution

applications in conjunction with traditional teaching methods is highly recommended. By so doing, educators can assign the above itemized application platforms for homework and self-study facilitation. While digital technologies offer significant benefits, their implementation in Nigeria is often hindered by infrastructural and socio-economic challenges. In Nigeria, issues such as unreliable electricity, limited internet access, and high cost of digital devices restrict the adoption of digital pedagogy, hence, digital divide features as a deep concern, as inequality in access to technology exacerbates existing educational disparities. Students with underserved backgrounds are less likely to benefit from digital learning, highlighting the need for inclusive policies.

Aim and Objectives of the Study

The advent of educational technologies and digital innovations in the Fourth Industrial Revolution, necessitates a restructuring of the English language pedagogy in Nigeria to accommodate the digitalized teaching and learning methods in the 21st Century. There is need for the English language-learning environment to be transformed with the new technological intrusions and AI intervention. Therefore, the primary aim of this study is to examine how digital technologies can enhance English language pedagogy in Nigeria, particularly in the context of technical and vocational education.

Specific objectives include:

1. To explore the role of digital technologies in improving English language pedagogy.
2. To identify challenges associated with digital transformation in Nigerian educational institutions.
3. To assess the implications of digitalised pedagogy for technical communication and employability.

Rationale for the Study

This study illuminates the transformative possibilities inherent in the Fourth industrial revolution applications by exploring the role of digital technologies in improving English language pedagogy and identify challenges associated with digital transformation in Nigerian educational institutions. The significance of this study lies in its response to the Fourth industrial revolution demands of a digital economy which extends to English language pedagogy. As Nigeria seeks to position itself within the global knowledge economy, the need for digitally competent graduates becomes increasingly urgent. English language proficiency is a critical component of this competence, particularly in technical fields where communication plays a central role in innovation, collaboration, and problem-solving. However, existing pedagogical approaches, which are traditional, seem insufficient for developing these skills.

This study contributes to the literature by providing a comprehensive analysis of digital transformation in English language teaching, with a specific focus on the Nigerian context. It also offers practical recommendations for policymakers, educators, and institutions seeking to enhance educational outcomes. This gap precipitates educational disparities and further undermines equitable access to quality education as conceived by Sustainable Development Goal

This study is timely because digital environments facilitate interactive learning, allowing students to practice language skills and also receive feedback instantly. This is essentially importatant for developing writing and communication skills. In tertiary education, English for Specific Purpose (ESP) is essential for developing technical communication skills, including report writing, presentations, and workplace correspondence. Digital tools enhance ESP by providing authentic learning experiences, such as simulations and collaborative projects, that mirror real-world scenarios.

Technological Pedagogical Content Knowledge (TPACK) as Theoretical Framework

This study is anchored on the Technological Pedagogical Content Knowledge (TPACK) structure. Technological Pedagogy Content Knowledge (TPACK) is a recent theoretical framework that emphasizes the connection between technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK) in education. The TPACK model has its origin in Shulman's construct of Pedagogical Content Knowledge (PCK) to involve technology knowledge as situated in content and pedagogical knowledge. According to Mishra & Koehler (2006), Technological Pedagogical Content Knowledge (TPCK) was brought into research in education as a theoretical scaffold for comprehending teacher knowledge necessary for effective technology. In corroboration to this, Schmidt et al (2009) describes it as a framework that presents the associations and complications between the three basic compositions of knowledge which are technology, pedagogy, and content. They further say that there lies an insightful knowledge of teaching content with designated pedagogical styles and technologies at the connection of these three-knowledge basis. The integration of technology in English language teaching has vital potential for improving language learning experiences and preparation of students for the digital era and fourth industrial revolution era. However, there are obstacles to efficiently integrate technology into curriculum in the schools in Nigeria. Addressing these obstacles and problems requires a comprehensive approach.

The choice of TPACK paradigm for this study was informed by its intersection of technology, pedagogy, and content knowledge which is appropriate for this study. Furthermore, this framework stands as a guide for teachers to inculcate technology perfectly into their teaching practices, which implies digitizing English Language pedagogy in Nigeria by reimagining technical communication for the Fourth Industrial

Revolution. Pertaining to language learning in Nigeria, this approach emphasizes the essentials of training educators to utilise 4IR tools not only as supplementary resources but as integral components of their teaching strategies. In substantiating this, Archambault and Crippen, (2009) postulate that teachers are better ready to leverage 4IR in ways that promote learner engagement and instructional efficiency when they are knowledgeable with TPACK, while speaking on the primary linguistic and cultural needs of their students. This theoretical framework positions the inclusion of 4IR tools in language learning within wider educational theories that promote active, related, and technologically inclined practices. The study proposes methods that promote student engagement and educational outcomes in an increasingly digital landscape of the fourth industrial revolution and the need for English language lecturers to develop competencies in all three areas of technology, pedagogy, and content knowledge. Together, these frameworks provide a foundation for understanding how digital tools can enhance language learning by promoting active engagement and contextualized learning.

Research Methodology

This study employs a qualitative research methodology, centering on the use of secondary data to investigate the digitalising English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial Revolution**.** The primary objective of this research is to examine how digital technologies enhances English language pedagogy in Nigeria, particularly in the context of technical and vocational education. The methodology adopted in this study encompasses several key components, detailed hereafter. The research design employed for this study is a systematic review, whereby the researcher uses second-hand data as earlier mentioned from peer-reviewed academic journals, government reports, and publications without the involvement of primary date or direct contact with human subjects. The study employs PICO, which is regarded as an ordered structure that makes the study objectives explicit by categorizing it into four broad categories: Population, Intervention, Comparison, and Outcomes. The PICO framework also ensures efficiency and effectiveness.

Table 1 PICO Table

Population (P)	Intervention (I)	Comparison (C)	Outcome (O)
Nigerian tertiary-level students and educators in English/Technical Communication courses. The	Digitalised English Language Pedagogy using 4IR tools. Integration of 4IR tools into English language pedagogy curriculum through blended learning	Traditional/Conventional English Language Pedagogy. Lecture-based, paper-centric, face-to-face teaching without 4IR tools. Uses	Primary outcome: Improvement in technical communication competence

Population (P)	Intervention (I)	Comparison (C)	Outcome (O)
students need technical communication skills for 4IR jobs, but traditional pedagogy is not delivering it.	model of 40% online synchronous/asynchronous, 60% face-to-face with 4IR tools.	textbooks, markerboard, and manual essay grading. The purpose is that it serves as baseline to measure the added value of digitalisation.	Secondary outcome: Student engagement, digital literacy, and readiness for 4IR workplace communication.

Source: Own illustration 2026 (Author's)

Population (P)

The study population includes Nigerian tertiary-level students and educators in English/Technical Communication courses. The students need technical communication, hence, the need for this study and skills for 4IR jobs, but traditional pedagogy is not delivering the purpose and not aligning with the current era of fourth industrial revolution. This population is specific because it targets the gap in Nigerian higher education, not generic. Educators, lecturers and teachers of English language play a fundamental role in promoting this change towards digitalized and self-regulated learning. Gutiérrez (2023) supports this by saying that students can be motivated by educators to be involved in self-directed study and assisted in innovating strategies for effective usage of these tools by inculcating digitalized English language pedagogy.

Intervention (I)

The intervention focuses on digitalised English Language Pedagogy using fourth industrial revolution tools. Integration of 4IR tools into English language pedagogy curriculum through blended learning model of 40% online synchronous/asynchronous, 60% face-to-face with 4IR tools. The Intervention is clear as the researcher is not only proposing the use of technology but also digitalising pedagogy with 4IR tools aligned to the research objective. This is in consonance with Bali et al (2024) position that integrating 4IR tools and applications into pedagogy will meaningfully improve Nigeria's educational landscape by offering the ideal learning environment in consonance with individual student needs.

Comparison (C)

The comparison contrasts contexts of traditional/Conventional English Language Pedagogy that is Lecture-based, paper-centric, face-to-face teaching without 4IR tools with the use of textbooks, markerboard, and manual essay grading and digitalized English language pedagogy method using 4IR tools. The purpose for this is to serve as baseline to measure the added value of digitalization.

Outcome (O)

Expected outcome is categorized into two namely: Primary and secondary expected outcomes. For the primary outcome, it involves improvement in English language and technical communication competence while the secondary outcome involves student engagement, digital literacy, and readiness for Fourth industrial Revolution workplace communication.

Identification of Relevant Studies

Studies were identified systematically to ensure full coverage of digitalising English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial Revolution. Major databases: BMC, PubMed, BMJ, Cochrane Library, and PsycINFO were searched using keywords and Boolean operators ("digitalising English Language Pedagogy in Nigeria" AND "reimagining Technical Communication" AND "the Fourth Industrial Revolution"). Results of retrieved, screened, and included studies appear in Table 1.2 and the

Table 2: Advanced Search Strategy

Search Words	**"digitalizing English Language Pedagogy" "reimagining Technical Communication" "the Fourth Industrial Revolution" "Artificial intelligence tools" "Pedagogical knowledge" "Content knowledge" "technology knowledge".**
Filter	digitalizing English Language Pedagogy, reimagining Technical Communication, the Fourth Industrial Revolution.
Data Base Used	Results Found
Google Scholar	1200 Studies
Scopus	748 Studies
JSTOR	621 Studies
ScienceDirect	441 Studies
Total	3,010 Studies

Source: Own illustration 2026 (Author's)

Study Selection

Study selection followed a systematic process to ensure inclusion of only high-quality and relevant research on digitalizing English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial Revolution.

Table 3

Criteria	**Inclusion**	**Exclusion**
Population	Studies focusing on Nigerian tertiary-level students and educators in English language pedagogy in connection with fourth industrial revolution.	Studies focusing exclusively on traditional or conventional pedagogy in Nigeria

Criteria	Inclusion	Exclusion
Intervention	Research examining Digitalised English Language Pedagogy using 4IR tools	Studies unrelated to Digitalised English Language Pedagogy using 4IR tools.
Study Type	Peer-reviewed journal articles, policy reports, institutional publications	Opinion pieces, blog posts, student essays, and non-peer-reviewed materials.
Language	Studies published in English	Studies not published in English
Publication Date	Studies published within the last 10 years	Studies published more than 10 years ago

Source: Own illustration 2026 (Author's)

Screening Process

A comprehensive search across multiple databases and institutional sources on digitalising English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial Revolution. Remaining studies underwent title and abstract screening, eliminating irrelevant ones and retaining those on digitalizing English Language Pedagogy, reimagining Technical Communication, the Fourth Industrial Revolution, Artificial intelligence tools, Pedagogical knowledge, Content knowledge, technology knowledge. In the full-text review, studies were assessed against inclusion criteria, with only those providing empirical or theoretical insights on digitalising English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial Revolution. The final selection was fully documented for transparency, noting reasons for exclusion at each stage.

Data Extraction

Data were extracted from included studies based on parameters like study population, intervention, outcome measures (primary and seconday), and research methods to ensure consistency and enable comparison.

Data Synthesis and Analysis

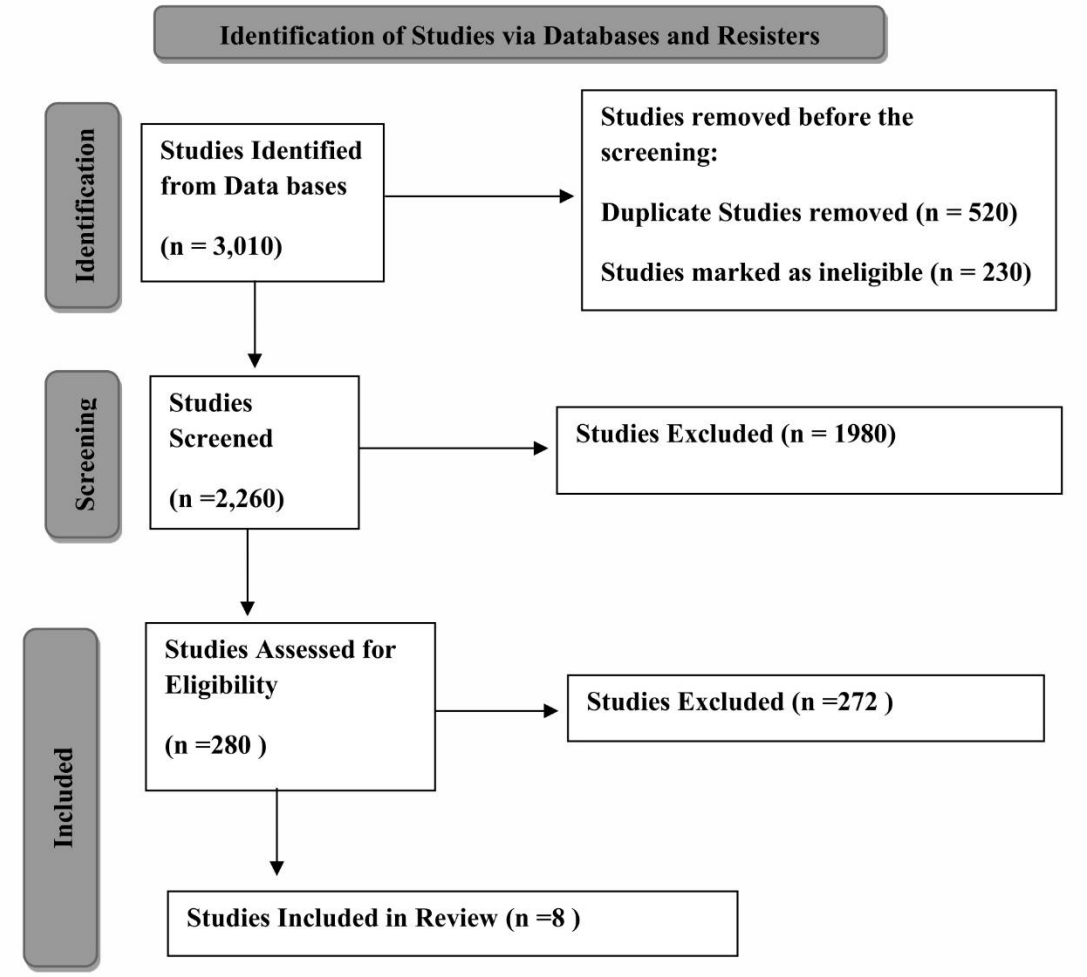
Qualitative thematic synthesis integrated results to show major themes that surfaced from analysis of the literature. These themes align with the theoretical framework established which is the Technological Pedagogical Content Knowledge (TPACK) framework, drawing from insights provided by the cited authors and sources. The emerging themes are Accessibility, personalised and adaptive Learning, Real-Time Feedback and Autonomous Learning, Interactive and Contextualised Learning Environments and Need for Ethical Frameworks and Educator Preparedness. This evidence-based analysis informed policy recommendations for digitalising English

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Identification of Studies Included

Figure 1.4: Flowchart of the screening and selection process



Source: Own illustration 2026 (Author's)

Appraisal of Research Quality

Each of the eight studies was critically appraised focusing on research clarity, methodological soundness, data authenticity, ethics, and conclusion-objective alignment. Studies with clear methods and strong conviction on digitalising English Language Pedagogy in Nigeria were rated high quality, those with minor flaws moderate, and weak ones excluded. This ensured only high-quality, relevant studies shaped the synthesis, enhancing its reliability and policy value.

Table 4: Quality Appraisal of Qualitative Studies

Author and year	Clear aim	Ethical consideration	Appropriate data collection and Sampling	Clear analysis	Research results	Sum total	Measure
Asak, M. O., & Asak, E. E. (2025)	1	1	1	1	1	5	High
Qutub, M. M. T., Bukhari, S.S.F., Fadel, S.A.,& Aljuhani, H.S.A. (2023).	1	1	1	1	1	5	High
Yakubu, Y. (2024)	1	1	0	1	1	5	High
Ji, H., Han, I., & Ko, Y. (2022)	1	1	1	1	1	4	High
Mishra, P., & Koehler, M. J. (2006)	1	1	1	1	1	5	High
Gutiérrez, L. (2023)	1	1	1	1	1	5	High
David. O, Nwulu I., Aigbavboa O., Adepoju O., (2022),	1	1	1	1	1	5	High
Schwab, K. (2016).	1	1	1	1	1	5	High

Own illustration 2026 (Author's)

As evident above, "No" is designated as a score of 0, and "Yes" is allocated a score of 1. A sum standard score of 1 shows low quality, a score of 2 to 3 indicates mediate quality, and scores of 4 to 5 are evaluated as high standards.

Research methodology limitations and Ethical considerations

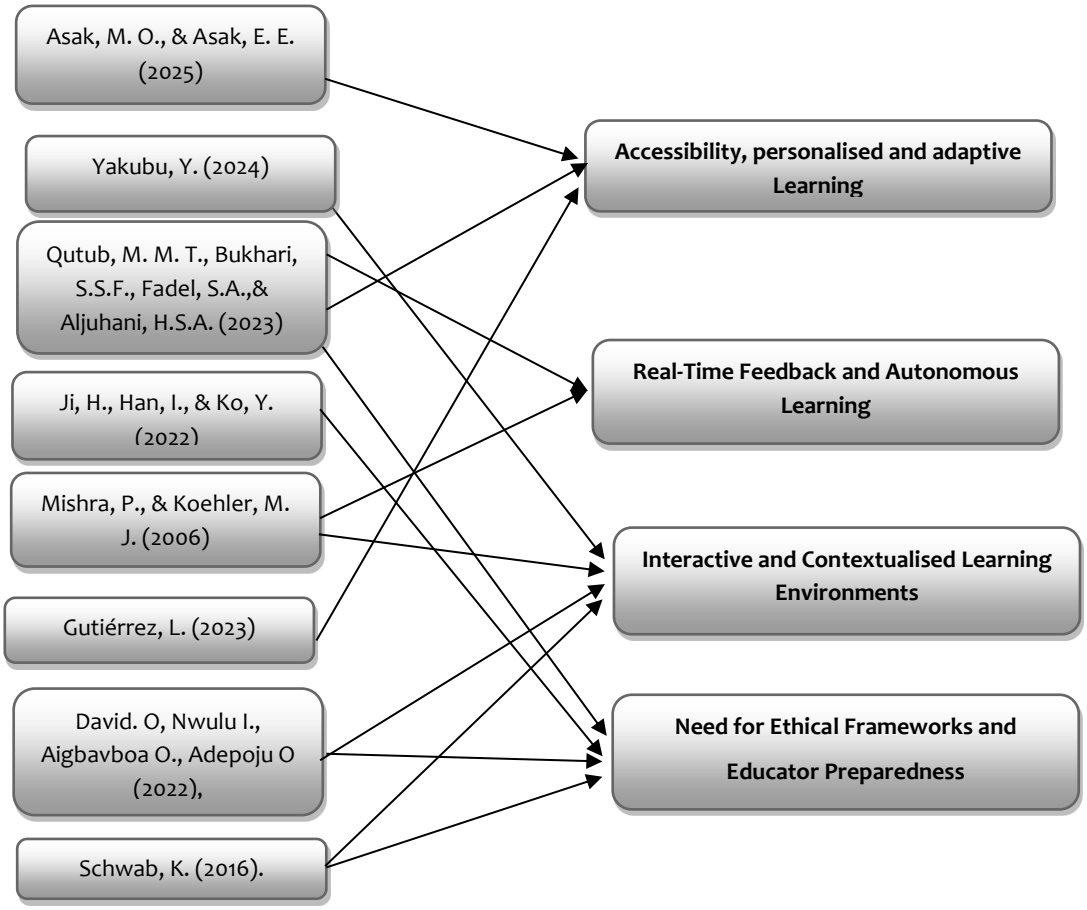
This study acknowledges few research methodology limitations because of its dependence on existing literature which limits the study to the availability and scope of the data at hand. Usage of secondary data in research methodology possesses several advantages, namely cost-effectiveness and ease of access, but despite these advantages, the findings of the study may likely show biases inherent in the original studies. To counter these shortcomings, attempts and endeavours were carried out to employ expansive, far-reaching and comprehensive sources to achieve an impartial and objective viewpoint. Ethical principles, values-based concerns, integrity issues were upheld in this research by ensuring correct referencing, appropriate sourcing and accurate attribution with

recognition of sources. Accountability and honesty were guiding words by ensuring that all findings were presented in a way that sufficiently represents the stance of the original authors.

Identification of Themes

Identification of theme was guided by objectives of study and systematic comparison of findings across the eight selected studies. Thematic coding brought out four dominant themes: (1) Accessibility, personalised and adaptive Learning (2) Real-Time Feedback and Autonomous Learning (3) Interactive and Contextualised Learning Environments and (4) Need for Ethical Frameworks and Educator Preparedness

Thematic Analysis



Source: Compiled by the Researcher 2026

Data Synthesis, Findings and discussion of themes

Fusing the eight studies, four overarching themes were discovered: (1) Accessibility, personalised and adaptive Learning (2) Real-Time Feedback and Autonomous Learning (3)

Interactive and Contextualised Learning Environments and (4) Need for Ethical Frameworks and Educator Preparedness

Accessibility, personalised and adaptive Learning

One of the vital challenges facing Nigeria's educational landscape which 4IR application and tools can resolve, is accessibility. Gutiérrez, (2023) and Qutub et al, (2023) emphasize on accessibility, personalized and adaptive learning by saying that 4IR applications permits self-paced learning experiences that address individual learners' requirements and this has significantly contributed to improving literacy rates and communication skills among students by providing deeper understanding and competency.

Real-Time Feedback and Autonomous Learning

Asak, and Asak, (2025), Qutub, et al, (2023) and Mishra, and Koehler, (2006) find that real-Time Feedback and autonomous learning are advantages of digitalising English Language Pedagogy in Nigeria by reimagining Technical Communication for the Fourth Industrial revolution era. Fourth Industrial revolution tools facilitate immediate feedback for learners, which is central to language learning to understand their strengths and weaknesses. These 4IR applications provide instant corrections for pronunciation, grammar, lexical range, and lexicon use. This process encourages self-paced and independent learning, allowing students to practice independently and develop greater competence. This concept is reinforced by the TPACK model used in the theoretical framework of this study, by accentuating the collaboration between technology, pedagogy, and content knowledge (Mishra & Koehler, 2006).

Interactive and Contextualised Learning Environments

Interactive and contextualised learning environments were indicated by Yakubu, (2024), Qutub, et al, (2023), David et al, (2022), and Schwab, K. (2016). This participatory and responsive pedagogy enhances preservation, inspiration, and enthusiasm in students, which makes the acquisition process very seamless and driven purpose. 4IR applications create deep instructional encounters that contextualise language use in practical settings. This is particularly relevant in Nigeria’s diverse sociolinguistic contexts, verbal environment and language terrain, where learners can learn swiftly from training modules. The inclusion of virtual reality (VR) also permits empirical training that fascinates students' cognitive minds.

Need for Ethical Frameworks and Educator Preparedness

Ji et al, (2022) and Schwab, K. (2016) attest to the fact that there is need for ethical bueprints and educator preparedness. It is essential for both teachers and learners to

utilize 4IR applications responsibly in educational contexts and guide the privacy of data, algorithmic bias, and bridge digital divide gap closely. Furthermore, educators should be adequately trained in the usage of technological tools and in the ethical consequences of 4IR applications, thereby developing an environment saddled with confidence and safety in English language learning and teaching. In addition, lecturers should be in the possession of the TPACK, this is essential to appropriately inculcate 4IR technologies into English language teaching.

Discussion of Findings

This study exposes the transformative possibilities inherent in the Fourth industrial revolution applications by exploring the role of digital technologies in improving English language pedagogy and identify challenges associated with digital transformation in Nigerian educational institutions. The incorporation of 4IR applications into English language pedagogy presents a momentous avenue to address the unique linguistic problems in Nigeria, a nation characterized with about 500 different languages. Traditional teaching methods of English language do not accommodate the different linguistic backgrounds of students, which necessitates the demand for new methods of accentuating language acquisition and instruction across various proficiency levels which necessitated this study. However, challenges such as lack of access to internet and ability to afford technology tools mitigate the actualization of digitalizing English language pedagogy in Nigeria. The study finds that digital tools enhance student engagement, facilitate personalised learning, and improve technical communication skills. Students exposed to digital platforms demonstrate better writing proficiency and greater confidence in communication. Ultimately, digital English language pedagogy enables students to develop skills relevant to the 4IR, including digital writing, online collaboration, and multimedia communication. These skills are essential for success in modern workplaces in the fourth industrial revolution era. Hence, incorporating 4IR tools and applications into pedagogy will meaningfully improve Nigeria's educational landscape by offering the ideal learning environment tailored to individual student needs.

Conclusion and recommendation

This study underscores the transformational potential of digital technologies in enhancing English language pedagogy in Nigeria. However, achieving this potential requires a holistic approach that addresses infrastructural, pedagogical, and policy challenges. By integrating digital tools into traditional or conventional language teaching, Nigerian higher institutions can successfully equip students for the requirements of the Fourth Industrial Revolution. Ultimately, digitalising English language pedagogy is not just an educational transformation but a cogent imperative for national development.

In this study, the primary aim which is to examine how digital technologies can enhance English language pedagogy in Nigeria, particularly in the context of technical and vocational education was addressed by proposing a complementary stance, which entails the combined usage of fourth industrial revolution applications in conjunction with traditional teaching methods. The research question: Does digitalised English language pedagogy using 4IR tools compared to traditional pedagogy improve technical communication competence, engagement, and 4IR readiness? Was also answered because integrating 4IR tools and applications into pedagogy will meaningfully improve Nigeria's educational landscape by offering the ideal learning environment tailored to individual student needs.

Conclusively, digitalizing English language pedagogy in Nigeria exhibits a greater opportunity for improving language teaching and learning in Nigeria to commensurate with the current period of Fourth Industrial Revolution and further prepare students for digitally mediated workplaces. The findings outlined in the analysis show that the four identified themes are suitable to cater for the unique problems aroused by Nigeria's diverse linguistic landscape which implies that 4IR applications importantly make better, language acquisition and teaching methodologies across the country, as it improves personalised learning experiences, enabling encourages immediate response, and creating welcoming educational environments. It becomes imperative for educators to be fully knowledgeable of the needed skills and knowledge to effectively intculcate 4IR applications into their teaching methods. The study proposes a context-sensitive framework for digitalising English language pedagogy that integrates technological, pedagogical, and institutional reforms. It concludes that meaningful transformation requires not only technological adoption but also systemic restructuring of curricula, policy, and teaching practices.

Consequently, the following recommendations will help in fully integrating digitalized English Language pedagogy in Nigeria:

- Nigerian government and educational institutions should increase budgets on technological equipments. Improving access to digital facilities and closing digital divide gap will enhance wider adoption of digitalizing English Language pedagogy in Nigeria
- Nigerian government and educational institutions should organize comprehensive training programs for educators to increase their knowledge of 4IR applications with emphasis on technological proficiency and teaching adaptation. Basic training on basic digital tools like Google Docs and Canva is essential, so that they can create and assess digital tasks. Workshops and frequent professional growth initiatives can help teachers learn to utilise these tools accurately while considering ethical concerns.

- Lastly, Nigerian government should ensure inclusive policies to accommodate students from underserved backgrounds who are less likely to enjoy from digital learning. Issues such as unreliable electricity, limited internet access, and high cost of digital devices should also be addressed so as not to restrict the adoption of digital pedagogy.

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