

Harnessing Artificial Intelligence (AI) in Educational Broadcasting for Gender Equality and Inclusion: Opportunities and Challenges

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Abstract: This study aims at identifying and analyzing innovative applications of Artificial Intelligence (AI) in creating, disseminating, and personalizing educational broadcast content that promote gender equity, inclusive narratives and diverse representation, with a view to assessing the ethical implications, biases and practical hurdles in implementing AI-driven educational broadcasting initiatives in Nigeria. Anchored on Innovation Diffusion Theory, Feminist Media Theory (FMT) and Digital Generative Multimedia Tools Theory (DGMTT), the study posits that AI can dismantle traditional stereotypes and amplify marginalized voices through personalized and adaptive content delivery and accessible multimedia formats. Using the qualitative research approach comprising systematic literature review, findings reveal that AI offers opportunities in tailoring content to individual learning styles, providing real-time feedback, and creating inclusive language models. The study further identifies challenges to include the potential for algorithmic bias to reinforce stereotypes, digital divide limiting access for marginalized groups or communities, lack of ethical guidelines and regulatory frameworks to enhance AI adoption in educational broadcasting in Nigeria, among others. The authors recommend an investment in digital literacy to pave way for technology adoption among Nigerian educators and broadcasters, and the promotion of interdisciplinary collaboration between AI developers, educators, and broadcasters.

Keywords: Artificial intelligence, educational broadcasting, gender inequality, inclusion, opportunities and challenges, DGMTT.

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INTRODUCTION

Advancements in information and communication technologies, ICTs and the rapid evolution of Artificial Intelligence (AI) presents a paradigm shift across various sectors, including education, and broadcasting. Artificial intelligence, according to European Parliament [1] is the ability of machine to take up human-like capabilities such as reasoning, learning, planning, and creativity. It is the use of machines to perceive the environment, tackle the problems they perceive, and perform roles normally carried out by

humans, autonomously. The field of education is being tremendously transformed with the emergence of technology and artificial intelligence.

“Education is both the act of teaching knowledge to others and the act of receiving knowledge from someone else” [2]. It is a learning interaction between a teacher and a learner, with the aim of sharing knowledge that can help the learner live a better life. Broadcasting on the other hand, is the electronic transmission of audio-visual signals (programmes or



content) through the air waves, to a wide, scattered, and heterogeneous audience simultaneously, from a single source. Asemah & Asogwa [3] ever that “broadcasting is the distribution of audio and video contents to a dispersed audience via radio, television or other media”.

Over the years, educational contents have been delivered to the various media audiences, known as educational broadcasting, using radio, television, or film which has helped in widening the access to quality education, across the globe. The initiative has not only complemented the learning outcomes of the mainstream classroom teaching and learning but has helped to close the gaps created by geographic, and socio-economic diversities among learners. With the advent of the Internet which gave rise to social media platforms, educational broadcasting content are now also delivered or shared on various online platforms for the digital citizens, which makes access wider, fostering a non-disruptive education as witnessed during the COVID-19 era, globally.

Today, artificial intelligence has emerged as a transformative force to democratize education through the broadcast media. The potentials of integrating AI into educational broadcasting holds a significant promise for fostering a more equitable and inclusive learning environment for all classes of learners, irrespective of their physical, sexual, social and economic background [4-6]. This is because, the broadcast media have the potential to overcome geographic, language, and temporal barriers to reach diverse and massive audiences with diverse educational content beyond what the traditional classrooms can reach.

Educational broadcasting is the use of various electronic media platforms including radio, television, film and online resources to disseminate a diverse educational content to diverse categories of learners. Educational broadcast content can be on core basic school subjects, such as English language, science, technology, engineering and mathematics (STEM). It can also feature cultural programmes comprising folklore, history, cookery, and other artistic expressions geared towards promotion of values, cultural norms, mores and societal lifestyle. Quality education is meant for all, regardless of who you or where you live [7].

The global initiative of quality education for all, EFA, according to Goal 4 of the Sustainable Development Goals, SDGs, which targets inclusive and equitable quality education and promotion of lifelong learning opportunities for all, aligns with Nigeria’s National Policy on Education [8] which states as that:

- Education is an instrument for national development and social change;
- Education is vital for the promotion of a progressive and united Nigeria;

- Education maximizes the creative potentials and skills of the individual for self-fulfillment and general development of the society;
- Education is compulsory and a right of every Nigerian irrespective of gender, social status, religion, colour, ethnic background and any peculiar individual challenges; and
- Education is to be qualitative, comprehensive, functional, and relevant to the needs of the society.

However, certain barriers, such as access, inequitable distribution of educational resources and lack of qualified teachers, among others have continued to hinder the promise of education for all over the years. Statistics show that, globally, 272 million children and youths were out of school in 2023, and 754 million adults were still illiterates in 2024, while women account for 63% of the total [9]. The mainstream classrooms, often, inadvertently perpetuate gender stereotypes and overlooks the diverse needs of marginalized groups, and learners with special needs, thereby widening educational disparities between learners either on the bases of their gender or those with one form of disability or the other and their able-bodied counterparts.

Educational broadcasting have tried to bridge the gap of gender inequality in access to quality education by broadcasting educational programmes in areas where socio-cultural challenges deprive either girls or boys from learning, both formal and informally, because both gender can freely access the educational contents from the comfort of their homes either through the radio or television set.

The current state of knowledge regarding AI in education points to a nascent but rapidly expanding field. Research has explored AI's role in intelligent tutoring systems, adaptive assessments, and automated content generation [10,11]. However, the specific intersection of AI, educational broadcasting, gender equality and inclusion remains an area ripe for deeper investigation, hence the motivation for this study.

Statement of the problem

The pursuit of equal access to quality and inclusive educational opportunities remains a core priority for the Nigerian government. This is evidenced by various policy interventions, including the Universal Basic Education (UBE) Act of 2004, the introduction of multigrade teaching techniques, and the recent Model Smart School initiative [8,12]. These efforts align with the global "Education For All" (EFA) goals and Sustainable Development Goal 4, which mandates inclusive and equitable quality education for all learners regardless of gender or physical ability.



However, despite these institutional efforts, a significant gap persists between policy intent and educational reality. Nigeria continues to struggle with a staggering number of out-of-school children and high adult illiteracy rates, with women accounting for the majority of these figures [9,13]. Traditional educational broadcasting, while intended to bridge geographical and socio-economic divides, is currently hampered by severe infrastructural deficits. These include inconsistent electricity supply, a slow transition from analog to digital broadcasting, and a lack of funding for state-owned stations [14-16]. Consequently, many learners in hard-to-reach rural areas remain excluded from the benefits of educational content [17,18].

Furthermore, the emergence of AI presents a "double-edged sword" in the quest for inclusion. While AI has the potential to democratize education through personalized and adaptive content [11,19], there is a grave risk of "algorithmic bias." If AI systems are trained on datasets that reflect existing societal prejudices, they may inadvertently reinforce harmful gender stereotypes or marginalize minority voices [6,20]. Additionally, the "digital divide" characterized by a lack of internet connectivity and digital literacy in low-income households threatens to create a new form of "AI divide," where the benefits of smart educational broadcasting are reserved only for the elite [21,22].

Therefore, there is an urgent need to systematically investigate how AI can be integrated into educational broadcasting in a way that proactively addresses these biases and infrastructural hurdles. Without a clear framework for ethical AI adoption, the potential for technology to foster gender equality and inclusion may remain unrealized, further widening the educational disparity between different social groups in Nigeria. This study seeks to fill this gap by assessing the opportunities and formidable challenges of harnessing AI for inclusive educational broadcasting.

Objectives of the study

This study generally seeks to assess the potentials of harnessing AI in educational broadcasting for gender equality and inclusion. It specifically aims at the following:

1. To explore the impacts of AI in educational broadcasting in Nigeria;
2. Identify the prospects of integrating AI in educational broadcasting in Nigeria;
3. Ascertain the inherent challenges in harnessing AI in educational broadcasting in Nigeria.

CONCEPTUAL DISCUSSION

Artificial intelligence (AI) in education

Artificial Intelligence refers to the simulation of human intelligence processes by machines, especially computer systems. Russell & Norvig [23] describe AI as the capability of computerized systems to perform tasks that essentially require human intelligence. These

tasks include the acquisition of learning, critical thinking and reasoning, and self-correction. In the educational context, AI encompasses a range of learning technologies such as machine learning, natural language processing (NLP), and expert systems designed to personalize learning, automate administrative tasks, and provide intelligent tutoring [19]. The contemporary global educational landscape is increasingly characterized by a demand for personalized learning experiences and a recognition of the diverse needs of learners. AI-driven tools for educational purposes such as Algorithmic teaching assistant or intelligent tutoring systems is noted to be able to bridge such gaps as language barriers, and augment resources especially in under-served areas [6].

The limitations of one-size-fits-all educational approaches have become acutely inadequate, leading to calls for more adaptable and responsive pedagogical strategies [24]. AI's capacity to analyze vast datasets, understand individual learning patterns, and adapt content in real-time is perceived as a powerful strategy to meet these demands. It offers a potential bridge over the existing educational divides and fosters equitable environments where every learner can thrive regardless of their background or gender [6,11,25].

Integration of AI in educational broadcasting

AI in educational broadcasting specifically refers to the application of artificial intelligence-driven technologies to content creation, delivery, and interaction within broadcast media to achieve targeted learning outcomes. Educational broadcasting involves the use of radio, television, or digital platforms to disseminate educational content to a wide audience. It serves as a powerful medium for delivering formal and informal instructional materials, fostering socio-cultural development, promotion of lifelong learning, bridging geographical divides and reaching learners who may lack access to traditional schooling [26-28].

The integration of AI into educational broadcasting extends beyond passive transmission of educational programmes to include interactive, personalized, and adaptive content delivery mechanisms that leverage digital infrastructure, and distribution of content that is both engaging and inherently inclusive [29]. By this means, AI in educational broadcasting seems to be the pathway to achieving equitable distribution of quality education for all, with its inherent potentials to enhance educational opportunities for diverse classes of learners.

Gender equality and inclusion

Gender equality refers to the state where individuals of all genders have equal rights, responsibilities, and opportunities, and where their different needs, behaviors, and aspirations are valued and favored equally [30]. It entails the provision of equal playing ground for both males and females to actualize their potentials [31]. In the context of educational



opportunities, global best practices provide that boys and girls should learn in the same educational environment devoid of any form of discrimination, because all humans are equal with equal rights and privileges. Also, Nigeria's National Policy on Education [8] holds that education is a right of every Nigerian irrespective of gender,...". Thus, no boy or girl should be discriminated against access to quality education in Nigeria.

Inclusion, in a broader sense, encompasses ensuring that all individuals, regardless of their background, abilities, gender, or socio-economic status have equal access to educational opportunities and resources, and are fully respected and valued. Achieving gender equality and inclusion through educational broadcasting, implies creating and distributing content that represents diverse genders equitably; challenges stereotypes, and is accessible and relevant to all learners. This concept clearly aligns with goal number 1 of the national goals of education in Nigeria which aims at a free and democratic society [8]. It is a form of education that is gender equitable and inclusive that can produce learners who can thrive in a free, democratic, just and egalitarian society where bright opportunities are available for all citizens.

A comprehensive understanding of how AI can be strategically leveraged within broadcasting to actively dismantle stereotypes and build inclusive narratives within the Nigerian context holds a lot of opportunities in the Nigerian educational broadcasting landscape.

Challenges of AI in educational broadcasting for inclusive education

Despite the various promising opportunities available in the integration of AI into educational broadcasting for many social objectives as already stated, the initiative is fraught with significant challenges. A primary concern is the potential for algorithmic bias. In the contemporary Nigerian society, certain groups and persons with disabilities are still left behind due to the digital divide that still exists between the urban and rural areas of Nigeria. Even with AI-enhanced broadcasting, access to reliable internet, affordable devices, and digital literacy skills are still limited for a significant portion of the population, especially those in rural areas or low-income households [14, 16, 18]. As such, the benefits of AI-driven educational initiatives will remain unequally distributed. This could inadvertently exacerbate the existing inequalities, and subsequently create a new form of "AI divide" that leaves already marginalized communities further behind.

Again, despite various development efforts, persistent digital divide is still critical, particularly in Nigeria and other developing regions of the world [6]. This singular challenge makes it difficult for the educational content to reach all the targeted audiences. Thus, the benefits of

AI-driven educational initiatives will remain unequally distributed.

Limited resources and infrastructural deficit also militate against the realization of education for all initiative, where electricity supply and information and communication technologies are limited [14,32], certain groups of learners in under-served areas would lag behind in accessing quality education supported by AI.

Under representation of certain groups, such as girls can be perpetuated inadvertently through the pattern of representation or framing of certain themes in education. AI itself can inadvertently perpetuate or even amplify these inequalities in its content generation or recommendation systems [6]. For instance, if training data disproportionately features male scientists, an AI might implicitly suggest more science-related content to boys, inadvertently discouraging girls from pursuing STEM fields.

High cost of broadcast infrastructure and poor funding of broadcast industry is another significant hurdle that can diminish the potential benefits of integrating AI in educational broadcasting. Today's broadcasting ecosystem is digital oriented, globally and the audience would need to access their content via active cable network services.

Sadly, many radio and television stations in Nigeria are still operating with analogue facilities and are yet to fully migrate into the Digital Switchover, DSO which began in 2007 in Nigeria. Hence, most stations disseminate poor quality content with limited access. The implication is that many households both poor and rich cannot actually access whatever educational content that the stations are delivering because they are no longer on free to air services following the digitization of the broadcast industry in the global scene.

Invariably, inadequate funds to procure and maintain state-of-the-art broadcast equipment, and digital resources needed to implement AI integration in educational broadcasting is unreachable in many public or State owned broadcasting stations in Nigeria. As such, only rich households can afford to subscribe to Cable Networks where quality educational content can be accessed. The implication is that children of the poor are left behind [14,15].

Lack of stable and sustainable power supply in many parts of Nigeria, especially the rural areas where development is still lagging behind is another critical challenge that makes it impossible for many target audiences of educational programmes to access such content, especially on television, which can only be accessed with electricity supply. The result of this eminent challenge is low audience engagement [17].



Hesitancy of technology development and adoption by educators and broadcasters can also hamper effective integration of AI into educational broadcasting especially in developing countries such as Nigeria, where poverty, ineffective policies and absorptive challenges remain significant barriers to technology development [22]. Sequel to hesitancy of technology adoption is lack of technologically savvy teachers and broadcasters who can be effectively deployed to harness the AI-driven tools in teaching and learning on air. This challenge can diminish the opportunity of leveraging AI in educational broadcasting [32].

Harnessing AI in educational broadcasting for gender equality and inclusion

The intersection of AI, educational broadcasting, gender equality and inclusion remains a focal point in the quest for achieving the 2030 global agenda in harnessing AI technologies in education [33]. Stakeholders in education and broadcasting are expected to ensure that the numerous gains inherent in adopting and integrating AI in educational broadcasting benefits the learners without jeopardizing the Goal 4 of the SDGs in the digital era. The advent of AI technologies provides an unprecedented opportunity to transcend the numerous limitations to achieving quality education for all. It has the potential to democratize access to education by overcoming all known barriers to accessing quality and inclusive education, especially for under-served groups, and communities who may not be easily reached by educators in the traditional classrooms as a result of their environments [5].

Also, in rural areas where teachers and learning resources are limited, educational broadcasting have helped in closing the gap and in complementing face-to-face schooling to offer education to the masses regardless of their geographic setting. With the inclusion of AI in educational broadcasting, this feat will be sustained, with AI's capacity to offer personalized learning and deliver educational content to specific individuals according to their needs, as well as provide equal learning opportunities for all learners, irrespective of their intellectual and, linguistic differences, or other conditions [11,34]. Through personalized learning pathways, AI can tailor educational materials to resonate with diverse cultural backgrounds and learning preferences to ensure that content is not only relevant but accessible to both boys and girls, while minimizing their risks [19].

AI can facilitate the development and production of educational content that actively counters harmful stereotypes against women and girls, by analyzing scripts for biased language and suggesting inclusive alternatives. Furthermore, AI-driven tools, such as adaptive learning platforms; intelligent tutoring systems; speech-to-text and text-to-speech platforms; predictive analytic; Natural Language Processing (NLP); text; automated essay grading; and AI-driven

analytic; among others can be harnessed to promote accessibility for learners with disabilities, providing alternative formats and real-time translation. This, no doubt, would significantly broaden the reach and quality of inclusive education [11,35].

In addition, AI in educational broadcasting has the potential to enhance real-time feedback systems, which completes the cycle of communication in the teaching and learning process. Whether in the traditional classroom or on air, AI-driven tools can offer an instant and personalized feedback to teachers, by highlighting areas of weaknesses and strengths. Also through oral or visual formats, hearing aids, and captioning system, learners with speech, visual and hearing impairments can adapt the assessment and instruction format through an interactive tool for accessibility and participate actively in class discussions.

Similarly, Holmes *et al.* [10] observe that AI-driven platforms can provide visual, auditory, or kinesthetic learning materials tailored to each learner's preferred learning style, and ensure that learners with one form of disability or the other are actively engaged in the learning process. Also, digital tools like grammar checkers and AI-based word completion are capable of assisting learners with poor writing skills, in expressing their ideas better. These opportunities would not only enhance quality education, but can democratize access for all.

For the educators themselves, AI can assist the teachers in classroom management, students' engagements, class participation, and performance. Teachers can gain more insights into the learners' areas of strengths and weaknesses as well as the learning pattern of the pupil. By this, learners with special needs can easily be identified and assisted to have a better understanding of difficult concepts.

Approaches for adoption and integration of AI in educational broadcasting

The need for increased awareness and knowledge of AI among broadcasters, educators and learners is expedient for a more ethical adoption of the technology [7]. It behooves the media educators and media practitioners to device practical strategies of creating awareness and knowledge of the importance of speedy adoption and utilization of AI in educational broadcasting which has become the global trend.

A strong policy framework and institutional support on the part of the critical stakeholders for a sustainable inclusion of AI in educational broadcasting in Nigeria is currently lacking. The National Broadcasting Commission, NBC, which is responsible for regulating broadcasting in Nigeria, should strictly map out specific hours for educational broadcasting, while concerted efforts should be made to provide a stable and functional electricity supply for broadcast stations for



uninterpreted broadcasting to sustain their audience. Educational content development should be funded by corporate bodies for such AI-driven educational content to be aired free of charge, while the educators invited to present such content can be offered some form of incentives by UBEC; TRCN, NUT, or the NBC to motivate them. These agencies can also collaborate to create policy guidelines to entrench AI into educational broadcasting in Nigeria. These approaches are considered very critical if Nigeria would avail her learners of the enormous potential benefits in integrating AI in her educational broadcasting policies.

Theoretical frameworks

Three theories were found relevant for this study. These are: the Diffusion of Innovation Theory, Feminist Media Theory, and Digital Generative Media Tool Theory, DGMTT.

The Diffusion of Innovation Theory was developed by Everett Rogers in 1962. Diffusion of innovation is concerned with the process by which an innovation is disseminated through certain channels. The theory explains the factors that influence people's thoughts and the process of adopting a new message, idea or technology. It posits that the adoption of an innovation depends on a number of factors, such as compatibility, trialability, complexity, observability, and relative advantage. This means that the innovation should be tested on the prism of perceived benefits, and compatibility with existing technology and values, needs and traditional practices. The perceived challenge or difficulty in understanding and using the new technology; while trialability is concerned with the ability to experiment with the innovation; and observability explains the visibility of the new technology. The theory, according to Asemah, Nwammuo & Nkwam-Uwaoma [36], traces the process of communicating a new idea or process through certain processes among a social system over time.

This theory clearly aligns with the focus of this study by exploring the factors that influence the adoption and integration of AI technology in the educational broadcasting system, while guiding broadcasters and educators in formulating effective strategies for promoting gender equity and inclusive education. By highlighting the inherent benefits of adopting AI in educational broadcasting content in promoting gender equality and inclusive education, adopting the innovation will be faster among broadcasters and educators,

Feminist Media Theory explains how media constructs and perpetuates gender roles, stereotypes, and power dynamics in societies to unravel how people interact. The theory posits that media, including the broadcast media, are not neutral conveyors of information but an active participant in shaping societal perceptions of gender. Its core concepts include sex,

gender, race, discrimination, equality, difference and choice; and it believes that there are systems and structures that work against individuals on the bases of these qualities against inequality and equity [37].

Feminist Media Theory examines media representation of gender roles, audience reception, and the production processes to uncover biases and advocate for more equitable portrayals of both genders. In the context of AI, Feminist Media Theory helps to interrogate whether AI-driven content generation might inadvertently encode and amplify existing gender biases present in training data. On the other hand, it examines how media content can be intentionally designed to deconstruct these biases and promote progressive gender balanced narratives. This theory becomes quite relevant in the context of the targeted desire for gender equity in educational opportunities for both boys and girls, where no one is left behind.

Digital Generative Media Tool Theory developed by Onyejelem & Aondover [38] explains the growing importance of multimedia generative and artificial intelligence in education. The theory holds that the use of digital generative tools such as text-to-image engines, AI writing assistants, audio-visual synthesizers, and simulation-based learning platforms can re-imagine learning experiences, knowledge co-creation, experiential learning in a post-digital era [39]. The theory believes that generative multimedia tools can allow students and teachers to jointly create knowledge using dynamic and user-generated formats.

The relevance of DGMTT lies on the premise that the theory supports multimedia interactive learning and diversified opportunities for learners with diverse backgrounds and learning needs.

Empirical reviews

Vorobyeva *et al.* [40] studied "Personalized learning through AI: Pedagogical approaches and critical insights", by searching the web of Science and Scopus databases. The result of their review shows that ChatGPT and machine learning technologies are among the most used tools, while general education and language learning account for the majority of the AI applications in the field of education. Their findings also reveal that automated feedback system, and adaptive content distribution mostly defines AI's educational responsibilities. The study equally found constraints in the areas of technical expertise and data privacy concerns and recommend a comprehensive strategy that addresses technological, pedagogical, and ethical issues that may emerge from adopting AI in education.

In a study on "Democratizing education in rural Nigeria through AI and mobile technologies as transformative pathway to inclusive learning" by Olugbade [13], the author argues that Nigeria is still struggling to provide



access to quality education for her learners as a result of many hindrances. The author asserts that a paradigm shift is needed to leverage the confluence of artificial intelligence and mobile phone technologies to democratize education and promote inclusive learning environment for all. The study shows that the digital gap between technology ‘haves’ and ‘have nots’ can be closed with AI powered mobile applications that are capable of overcoming geographic and economic barriers. It concludes that the existing telecommunication infrastructure can be harnessed to deliver educational content and facilitate virtual classrooms in the contemporary society where mobile devices have penetrated everywhere, including the rural areas of Nigeria.

Tripathi *et al.*, [7] did a study on “Empowering education: The role of artificial intelligence in supporting students with disabilities”. The study deployed the review of existing literature and survey data, while highlighting such AI-driven tools as speech-to-text applications, intelligent tutoring systems, language translation services, and personalized learning platforms that can enhance learning experiences for students with disabilities. It recommends the development and adoption of AI-driven educational tools to ensure that the disabled have equal academic and learning opportunities as their non-disabled peers. Findings from the study show that there is need for more awareness and education on current AI trends for disabled children to maximize the benefits of these modern technologies; advocating for a future where AI-powered adaptive learning technologies can empower all students to reach their full potentials.

METHODOLOGY

This study adopts a qualitative research approach to comprehensively investigate the opportunities and challenges of harnessing AI in educational broadcasting for gender equality and inclusion. This approach is particularly suitable given the exploratory nature of the research objectives, which seek to understand the complex socio-technological phenomena and generate rich, insights rather than quantifiable data. The methodology is structured across several phases, incorporating diverse data collection techniques to ensure clarity and understanding of the subject matter.

Research Design

The research design is primarily qualitative and descriptive, aiming to provide an in-depth understanding of the current landscape, potential applications, and existing barriers. It draws upon elements of content analysis for examining existing literature on thematic bases. This allows for a holistic exploration of theoretical perspectives, and expert opinions on the topic.

Data Collection Instruments and Procedures

Data was collected by reviewing publicly available reports, white papers, website content related to the selected platforms. The study also systematically examined the AI functionalities implemented by these platforms, noting how they address personalization, content generation, accessibility, and efforts towards gender-equitable representation and inclusion in educational opportunities for all.

Method of data Analysis

The collected data were analyzed using thematic analysis, which the authors believe to be a flexible method for identifying, analyzing, and reporting patterns (themes) within the available data. The process involves: synthesized literature to gain a deep understanding of the content. This systematic process allows for the identification of key opportunities (e.g., enhanced personalization, improved accessibility, stereotype challenge, among others). the major challenges such as algorithmic bias, digital divide, and hesitancy in technology adoption, related to AI in educational broadcasting for gender equality and inclusion were analyzed.

Data Presentation and Discussion of Findings

This section presents the synthesized findings derived from the comprehensive literature review. The discussion is structured around key themes that emerged regarding the opportunities and challenges of harnessing AI in educational broadcasting for gender equality and inclusion, aligning with the study's objectives and theoretical frameworks.

1. Enhanced content personalization and adaptive learning

Integration of AI into educational broadcasting holds great potentials for gender equality and inclusion. Through enhanced content personalization and adaptive learning. Findings reveal that AI can revolutionize content delivery through content and curriculum personalization [11,19]. AI-driven systems can analyze individual learner profiles, including their learning styles, prior knowledge, and progress, to adapt educational content in real-time. Experts noted that this personalization extends beyond academic performance to address diverse cultural backgrounds and social identities. For instance, an AI system could recommend stories featuring strong female role models or culturally relevant historical figures to learners in specific regions, thereby promoting diverse representation.

Challenging stereotypes through proactive content generation and dissemination

AI-driven educational tools can challenge stereotypes through proactive content generation and dissemination as reported by many studies that found that AI algorithms could be designed to flag and suggest alternatives for biased language, imagery, or narratives in educational broadcast scripts and visuals. By training



AI on diverse and non-stereotypical datasets, it can become a tool for creating content that consistently portrays equitable gender roles, diverse family structures, and inclusive representations of various ethnic and social groups [41]. For example, an AI could ensure that science programmes feature female scientists prominently or that historical narratives include contributions from marginalized communities, those in hard-to-reach areas or rural settings where infrastructures are lacking. It can also create contents beyond traditional values, devoid of male-dominated or racially biased narratives. This proactive approach supports Feminist Media Theory's call for media to challenge, rather than perpetuate, harmful stereotypes.

Improved accessibility for diverse learners

AI's capacity to improve accessibility for diverse learners has the potential to transform the educational landscape. It offers tangible benefits in enhancing the accessibility of educational broadcasting. Available literature underscored features like automated captioning, real-time translation, and text-to-speech functionalities as crucial for learners with disabilities or those from linguistic minorities [7]. For instance, AI can facilitate the immediate translation of broadcast content into multiple indigenous languages in Nigeria, making education accessible to communities previously excluded due to language barriers. This improved accessibility directly contributes to inclusion by removing significant barriers to participation in educational opportunities. Hence expanding the reach of quality education to previously under-served populations.

Algorithm bias and perpetuation of stereotypes

On the challenges to gender equality and inclusion, algorithmic bias and perpetuation of stereotypes are tangible concerns in adopting AI in educational broadcasting in Nigeria. Despite its huge potential, the most frequently cited challenge is algorithmic bias. Drawing heavily from O'Neil's [20] work, experts warned that AI systems are only as unbiased as the data they are trained on. If AI models for content generation or personalization are fed historical data reflecting existing societal gender and racial biases, they will inevitably learn and perpetuate these stereotypes. For example, if images used to train an AI predominantly show men in STEM fields, the AI might inadvertently create or suggest content that reinforces this imbalance, undermining efforts towards gender equality in STEM education. This challenge directly aligns with both Feminist Media Theory, highlighting how existing power structures and biases can be inadvertently encoded into technological systems, thus maintaining inequalities.

Digital divide and access

On the digital divide and access inequality that are likely to emerge from integrating AI in educational broadcasting due largely to limited infrastructure in

parts of rural communities in Nigeria, Vitalis, Aondover, Ogunbola, Onyejelem & Ridwan [21]. Note that while AI promises advanced educational tools, its effectiveness is contingent upon access to reliable internet connectivity, affordable devices, and digital literacy. This resonates with the factors influencing the diffusion of innovation as outlined in the Diffusion of Innovation theory's availability, testability and trialability conditions. Several studies attest to the fact that even the most sophisticated AI-driven educational broadcasts would be inaccessible to large segments of the population, especially those in rural areas or low-income households, if basic infrastructure is lacking [5,15]. This creates a risk of exacerbating existing educational inequalities, where those with access benefit from advanced AI-powered learning, while those without are further marginalized. The promise of inclusion through AI in broadcasting remains theoretical for those unable to connect.

Poor regulatory frameworks

Governance gaps in AI deployment in educational broadcasting represent another significant challenge. Concerns were raised about the lack of robust regulatory frameworks governing AI use in education. Who owns the data generated by AI learners? How is sensitive personal information protected? Furthermore, the transparency and accountability of AI decision-making processes may not necessarily be authentic, hence questionable. If an AI system makes biased recommendations, who is responsible? Without clear ethical guidelines and governance structures, the deployment of AI could lead to unintended negative consequences, thus undermining trust and potentially harming vulnerable learners. This highlights the need for a human-centered approach to AI deployment in educational broadcasting by ensuring that ethical considerations are embedded from design to implementation.

Cost and sustainability of AI in educational broadcasting

The cost associated with developing, deploying, and maintaining AI systems in educational broadcasting remains a practical challenge, particularly for a developing country like Nigeria. The initial investment required for AI infrastructure, specialized personnel, and high-quality, diverse training data can be prohibitive. Considering the fact that many State-owned broadcast stations in Nigeria are poorly funded, hence, their contents hardly measure up with what is obtainable in international television services such as CNN, BBC, Aljazeera, Channels Television, Arise and TVC. A greater majority of public Television stations are no longer viewed by their habitual audience following the digitization of the broadcast industry in Nigeria since 2020. Consequently, funding remains a big hindrance to a sustainable deployment of AI in educational broadcasting in Nigeria.



Again, sustainable models for funding and technical support are crucial to drive this initiative. The continuous need for updates and refinement of AI algorithms to remain effective and inclusive. Without adequate resources, many educational broadcasting initiatives might be unable to leverage AI to its full potential, thus limiting its widespread impact on gender equality and inclusion.

SUMMARY AND CONCLUSION

This study from the fore-going has established that integrating AI in educational broadcasting holds great opportunities for both learners and educators, considering its capacity to democratize education for learners with different educational needs and from diverse background. Nigeria has developed various initiatives to promote free, compulsory, equitable and inclusive education for every child in the country, including Education for All, EFA; Universal Primary Education, UPE, Universal Basic Education, UBE, Multigrade Teaching, MT; and more recently, Smart Model Schools, SMS, following the evolution of the Internet that has revolutionized all sectors including education and broadcasting. Despite these initiatives, the number of out-of-school children across the country has not recorded appreciable progress, while some groups and communities are still lagging behind.

The emergence of AI as an advancement in computerized systems which is capable of performing tasks that require human intelligence with precision, such as learning, and problem solving becomes a good option. Expectations are high that AI can be leveraged to foster equitable and inclusive learning, thereby, bridging the education gap created by geographic, linguistic and social status.

However, despite the numerous promises that this initiative holds in making quality education available for all, in line with UNESCO [33] vision for inclusive education that is geared towards providing equal opportunities for all learners, while recognizing diversities in abilities, gender, race, and socio-cultural divides; a number of significant factors pose great impediments to harnessing the powers inherent in AI to transform access to education for learners.

In conclusion, the study advocates that the identified challenges if efficiently addressed can enhance the capacity of educators working in synergy with broadcasters to promote an effective and sustainable deployment of AI in educational broadcasting in Nigeria to enhance the learning outcome of learners while making quality, equitable and inclusive education available for all categories of learners.

RECOMMENDATIONS

This study has tried to explore the potentials of harnessing AI in educational broadcasting for gender

equity and inclusion. The study offers the following recommendations:

1. A sincere investment in quality education for all by the Nigerian government is required through a firm policy and institutional framework to drive AI in educational broadcasting initiative;
2. The cost of funding, and delivering AI-driven tools for educational purposes should be a shared responsibility between the government, corporate organizations, and community-driven support to ensure a sustainable planning and implementation of the initiative;
3. Adequate training and retraining of educators and broadcasters is paramount for the adoption of AI and proper knowledge of digital tools in this technology-driven age.
4. An inter-disciplinary collaboration between the regulatory agencies of education and broadcasting, namely, the Federal Ministry of Education, and the National Broadcasting Commission is essential to promote a speedy adoption of AI in educational broadcasting for the critical objectives of equitable and inclusive education.

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