

Incorporating AI in Kenya's ICT Education System: Are We Ready to Embrace this Change Inclusively? A Systematic Literature Review

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DOI: <https://doi.org/10.5281/zenodo.15119542>

Published Date: 01-April-2025

Abstract: This paper explores Kenya's readiness for the inclusive adoption of Artificial Intelligence (AI) in its education system, given its ongoing digital transformation efforts underpinned by initiatives like the Digital Literacy Program (DLP). Despite notable strides in integrating ICT, significant challenges remain in achieving equitable AI implementation. These challenges include disparities in infrastructure between urban and rural areas, limited digital literacy among teachers and students, and accessibility issues for students with disabilities. AI's potential to revolutionize personalized learning, address teacher shortages, and improve administrative efficiency offers promising solutions to Kenya's educational challenges. However, the uneven distribution of resources and inadequate teacher training impede the full utilization of AI technologies. A Systematic Literature Review (SLR) approach of 214 documents reviewed revealed that marginalized communities face disproportionate barriers. This review highlights the need for targeted investments in infrastructure, teacher professional development, and inclusive AI design. Recommendations include expanding digital infrastructure, fostering public-private partnerships, and developing policies that ensure AI tools are accessible to all students. By addressing these gaps, Kenya can leverage AI to enhance educational equity and improve outcomes for all learners.

Keywords: Artificial Intelligence, ICT Education, Inclusivity, Kenya, Digital Transformation.

I. INTRODUCTION

Kenya has positioned itself as a leader in digital transformation within Sub-Saharan Africa, with Information and Communication Technology (ICT) playing a pivotal role in its Vision 2030 development agenda. This strategic focus on ICT aims to drive economic growth, enhance education, and bridge gaps in access to critical services. Education, in particular, has benefited from this commitment, with the Kenyan government investing heavily in initiatives that promote the use of ICT in schools. These initiatives, such as the Digital Literacy Program (DLP), have laid the groundwork for a more technology-driven education system. The DLP, launched in 2016, introduced digital devices to primary school students and teachers across the country, marking a significant step towards integrating technology into the classroom (Ministry of Education, 2020).

Despite these efforts, the integration of Artificial Intelligence (AI) in education represents the next frontier for Kenya's digital transformation. AI's application in education has the potential to address several longstanding challenges faced by the Kenyan education system, such as limited resources, teacher shortages, and inequitable access to quality education. AI-powered systems can facilitate personalized learning, provide real-time feedback, and automate administrative tasks, which can ease the burden on teachers and improve the overall quality of education (Munyua et al., 2022). Moreover, AI systems can help bridge the education gap by offering personalized, adaptive learning solutions, enabling students to learn at their own pace, regardless of their location or the resources available to them (Musa et al., 2020).

However, despite the promise that AI holds, questions about the inclusivity of AI adoption in Kenya's education system remain. Kenya's progress in ICT adoption has not been evenly distributed, with significant disparities in access to technology between urban and rural schools, as well as between students with different abilities. While schools in urban centers have benefited from the integration of digital technologies, many schools in rural or marginalized communities still lack the necessary infrastructure, such as reliable internet access, electricity, and sufficient digital devices (Ochieng & Njeru, 2022). These challenges are particularly pronounced for learners with disabilities, who may face additional barriers in accessing AI-driven educational tools if the tools are not designed with accessibility in mind (Juma & Mwaura, 2021).

Additionally, the lack of digital literacy among teachers is a significant barrier to the effective implementation of AI in classrooms. While some educators in Kenya have received training in the use of ICT tools, many still lack the necessary skills and knowledge to effectively incorporate AI into their teaching practices (Owino & Otieno, 2021). For AI to be successfully integrated into Kenya's education system, educators must be equipped with the right skills and mindset to leverage AI technologies effectively in the classroom (Ngugi & Wambugu, 2020).

The integration of AI in education also requires a concerted effort to address these gaps in digital infrastructure and teacher preparedness. This paper investigates whether Kenya's education system is ready for inclusive AI adoption and explores the extent to which the country's ICT infrastructure, teacher training programs, and access to digital resources are prepared to support the equitable implementation of AI-driven education. The aim is to ensure that all learners, regardless of their background, geographical location, or abilities, can benefit from the educational opportunities that AI can offer.

Problem Statement

This paper argues that while Kenya has made commendable progress in ICT education, it is not yet fully ready for inclusive AI adoption due to gaps in digital infrastructure, teacher preparedness, and equitable access. The successful implementation of AI in Kenyan education will require overcoming these barriers through targeted investments in infrastructure, teacher training, and policy reforms that prioritize inclusivity.

II. LITERATURE REVIEW

The integration of Artificial Intelligence (AI) into education, particularly within the context of Kenya's Information and Communication Technology (ICT) education system, has garnered significant attention over the past few years. The discourse surrounding AI in education largely revolves around its potential to revolutionize teaching and learning, bridge existing educational divides, and provide personalized learning experiences. However, the transition to AI-driven educational systems in developing nations, such as Kenya, faces distinct challenges related to infrastructure, teacher preparedness, digital literacy, and inclusivity. This section reviews the recent literature on AI adoption in education, focusing on the global landscape, Africa's positioning, and Kenya's specific context, while also examining the critical issues of accessibility and inclusivity that need to be addressed.

2.1 GLOBAL AI INTEGRATION IN EDUCATION: OPPORTUNITIES AND CHALLENGES

The integration of Artificial Intelligence (AI) into education has become a focal point in recent years, as technological advancements offer new avenues to transform learning environments. From enhancing personalized learning experiences to optimizing administrative tasks, AI is hailed as a potential solution to long-standing educational challenges. However, while the promise of AI in education is immense, the path to its successful and equitable implementation is fraught with significant hurdles. This section aims to explore both the opportunities AI presents in education and the challenges associated with its implementation, with a particular focus on the global landscape.

2.1.1 Opportunities Presented by AI in Education

AI's potential in education is multifaceted, ranging from individualized learning experiences to streamlining administrative processes. These advancements are expected to address some of the most pressing issues in the education sector, such as resource constraints, teacher shortages, and inequalities in educational access. A deeper look at the key opportunities AI brings to education reveals several transformative areas.

i. Personalized Learning

One of the most significant advantages AI offers in education is its ability to provide personalized learning experiences. Unlike traditional teaching methods, AI systems can tailor educational content to suit the unique needs, strengths, and weaknesses of individual students. According to Holmes et al. (2021), AI can create dynamic, adaptive learning

environments where algorithms adjust the pace, difficulty, and type of content based on real-time assessments of a learner's progress. This personalized approach can be particularly beneficial in classrooms with diverse student populations, where traditional one-size-fits-all teaching methods may fail to accommodate the needs of every student.

For example, AI-powered platforms such as Coursera and Khan Academy use algorithms to assess learners' comprehension and suggest customized learning paths, ensuring that students engage with content that is neither too difficult nor too simple. This adaptability is critical for students who may otherwise fall behind in traditional classroom settings. In large classrooms, where individual attention is often limited, AI provides an opportunity to offer each student a tailored learning experience, bridging gaps in understanding and fostering deeper learning.

Furthermore, AI's ability to track student performance over time and adjust learning materials accordingly provides valuable insights for both educators and students. This enables teachers to focus their attention on students who need additional support while allowing high-achieving students to explore more advanced topics. The impact of this personalized learning model has been particularly promising in countries like Finland, where AI integration in education has been linked to improved student outcomes (Saariluoma et al., 2020).

ii.Addressing Teacher Shortages

The shortage of qualified teachers in many parts of the world, particularly in developing countries, is another pressing challenge that AI can help address. Intelligent Tutoring Systems (ITS), as noted by Sharma et al. (2022), are AI-based applications that can simulate one-on-one tutoring sessions. These systems provide immediate, personalized feedback to students, mimicking the role of a teacher in a more scalable way. ITS can be particularly valuable in settings where teacher-to-student ratios are disproportionately high, such as in rural or underserved communities.

For instance, platforms like Carnegie Learning, which use AI to deliver real-time tutoring and feedback in mathematics, have demonstrated success in both the United States and abroad. These platforms have been credited with helping students achieve better learning outcomes, particularly in subjects where traditional teaching methods may fall short. AI-driven tutoring systems can significantly reduce the dependency on human instructors by providing instant assistance with homework, reinforcing lessons, and identifying areas where students need additional practice (Xie et al., 2022).

Moreover, AI's ability to provide administrative support—such as grading assignments and managing classroom activities—frees up valuable time for teachers, enabling them to focus more on teaching and less on repetitive tasks. This is especially beneficial in environments where teachers are overwhelmed by large class sizes or administrative burdens.

iii.Improved Administrative Efficiency

AI also plays a critical role in enhancing administrative efficiency within educational institutions. The automation of routine tasks, such as grading, scheduling, and student record management, can significantly reduce the workload of administrative staff, allowing for more streamlined operations. For example, AI tools like Turnitin automate plagiarism detection, while AI systems like Google Classroom can assist in assignment tracking, grading, and even communicating with students.

By automating these tasks, AI allows educational institutions to allocate resources more effectively, ensuring that educators and administrators can focus on tasks that require human judgment, such as curriculum development and student engagement. This not only improves the efficiency of educational institutions but also contributes to better time management for both educators and students, allowing them to concentrate on the learning process itself (Baker et al., 2021).

iv.Data-Driven Insights for Educators

Another area where AI holds promise is in providing data-driven insights that can help educators make more informed decisions about their teaching strategies. AI can collect and analyze data on student performance, engagement levels, and learning preferences, offering educators valuable feedback on their teaching methods. By utilizing machine learning algorithms to analyze patterns in student behavior, AI tools can predict future learning outcomes and suggest instructional strategies to improve student success (Luan et al., 2020).

For instance, AI can help identify students who are at risk of falling behind or dropping out, providing early warnings that allow educators to intervene before it is too late. This data-driven approach enables a more proactive, targeted approach to student support, improving overall educational outcomes.

2.1.2 Global Challenges in AI Implementation in Education

While the potential benefits of AI in education are clear, there are several challenges that hinder its widespread implementation, particularly in low-resource settings. These challenges range from financial constraints to issues of digital literacy, and they must be addressed to ensure that AI can be integrated successfully and equitably in education.

i. Affordability and Accessibility

One of the most significant challenges to AI integration in education is the affordability and accessibility of AI technologies. According to Kampourakis and Ioannou (2020), many educational institutions, particularly in developing countries, face significant barriers in acquiring the necessary hardware and software for AI applications. The cost of acquiring AI-powered devices, such as tablets or computers equipped with advanced processing power, can be prohibitive for schools with limited budgets.

Furthermore, the infrastructure required to support AI, such as reliable internet connections, electricity, and data storage facilities, is often lacking in many regions. In rural and underserved areas, the digital divide is especially pronounced, with students and teachers facing barriers to accessing even basic technologies, let alone advanced AI systems. As noted by Li and Wang (2020), the lack of reliable internet connectivity is a major impediment to the successful implementation of AI in education, particularly in remote regions where internet access is limited or non-existent.

ii. Digital Literacy and Training

Even if the hardware and software necessary for AI integration are available, there remains a significant challenge related to digital literacy. Both teachers and students must possess the necessary skills to use AI tools effectively. In many parts of the world, educators lack the technical knowledge and pedagogical training required to incorporate AI into their teaching practices. As highlighted by Li and Wang (2020), the digital literacy gap among teachers is a key barrier to the successful adoption of AI in classrooms. Teachers must not only learn how to operate AI systems but also understand how to integrate them into their teaching strategies to maximize their effectiveness.

Moreover, students themselves must be equipped with the digital literacy skills necessary to interact with AI-driven educational tools. This includes understanding how to navigate AI platforms, evaluate the feedback provided by AI systems, and engage with the technology in ways that enhance their learning experience. The lack of digital literacy programs in many schools exacerbates this issue, hindering both students and educators from fully benefiting from AI technologies (Zhang et al., 2020).

iii. Bias and Equity in AI Systems

Another critical challenge in the implementation of AI in education is the potential for bias in AI systems. AI algorithms are trained on data, and if this data is biased, it can lead to biased outcomes. This is particularly concerning in education, where biased AI systems could reinforce existing inequalities. For example, if AI tools are trained on data that predominantly reflects the experiences of urban students, they may not perform well for students in rural or marginalized communities. Additionally, AI systems that fail to account for the diverse needs of students, such as those with disabilities, could exacerbate existing disparities in education (Eubanks, 2020). Ensuring that AI systems are equitable and inclusive requires careful attention to the data used to train these algorithms, as well as ongoing monitoring and evaluation to detect and correct any biases that may arise. It is essential that AI tools be designed with inclusivity in mind, ensuring that all students, regardless of their background or abilities, can benefit from their use.

iv. Privacy and Data Security

The use of AI in education raises significant concerns regarding student data privacy and security. AI systems collect vast amounts of data on student behavior, performance, and interactions, which can be valuable for improving learning outcomes. However, this data is highly sensitive, and its misuse could lead to privacy violations. As noted by Baker et al. (2021), there is a need for clear policies and regulations to protect students' personal data and ensure that AI systems are used responsibly. Educational institutions must implement robust data security measures to prevent unauthorized access to student data. Additionally, ethical guidelines must be established to govern how AI systems collect, store, and use data, ensuring that students' privacy rights are respected.

AI holds immense potential to revolutionize education by offering personalized learning experiences, addressing teacher shortages, improving administrative efficiency, and providing data-driven insights for educators. However, the implementation of AI in education is not without significant challenges. Issues such as affordability, accessibility, digital literacy, bias, and data privacy must be addressed to ensure that AI can be integrated in a manner that benefits all learners equitably. As the global community continues to explore the possibilities of AI in education, it is essential to take a holistic approach that considers the technological, pedagogical, and ethical dimensions of AI integration, ensuring that its benefits are realized in a way that is inclusive, fair, and accessible to all students.

2.2 AI IN EDUCATION IN AFRICA: PROSPECTS AND BARRIERS

Artificial Intelligence (AI) presents both profound opportunities and significant challenges for education systems worldwide. In Africa, AI offers a potential solution to many of the region's long-standing educational problems, including resource shortages, teacher scarcity, and unequal access to quality education. However, the implementation of AI in African educational systems is not without its barriers, particularly given the diverse socio-economic contexts across the continent. This section delves deeper into the prospects and barriers to AI integration in Africa's education systems, drawing on the most recent literature to provide a comprehensive understanding of these dynamics.

2.2.1 Prospects of AI in African Education

i. Personalized Learning and Adaptive Systems

AI's capability to offer personalized learning experiences is arguably one of the most transformative aspects of its potential in African education. Personalized learning, often referred to as adaptive learning, enables the tailoring of educational content to meet individual learners' needs, based on their pace, strengths, and weaknesses. Amoako et al. (2022) highlight that personalized learning is particularly important in African classrooms where students often have varying levels of foundational knowledge. AI-powered platforms can provide individualized learning experiences that accommodate different learning styles and abilities, ensuring that each student receives the support they need.

Furthermore, AI-based learning systems can adapt in real-time to student interactions. For example, Sharma et al. (2022) explore the use of intelligent tutoring systems (ITS), which allow for real-time assessments of student comprehension and automatically adjust the difficulty level of tasks. This dynamic response ensures that students who grasp concepts quickly are not held back, while those who need more time can engage with additional resources at their own pace.

The ability to customize learning content and feedback according to student performance can help address the problem of overcrowded classrooms, which is a significant issue in many African countries. Large class sizes, particularly in rural and low-income urban areas, often make it difficult for teachers to provide individual attention to students. AI-powered personalized learning could thus provide an essential tool in ensuring that no learner is left behind, even in settings where teachers face high student-to-teacher ratios (Suleiman & Hassan, 2021).

ii. Reducing Teacher Shortages and Supporting Educators

Teacher shortages remain one of the most persistent challenges facing education systems in Africa, with many countries struggling to provide qualified educators, especially in rural or marginalized regions. AI can help mitigate these shortages by providing scalable, AI-driven tutoring systems that deliver content directly to students, reducing the need for direct teacher involvement in certain tasks. Li et al. (2021) assert that AI's potential to automate repetitive tasks, such as grading, feedback provision, and administrative duties, can allow teachers to focus more on their pedagogical roles, thereby enhancing the quality of education.

Moreover, AI systems can assist in teacher training, providing educators with the tools to enhance their teaching skills through virtual and augmented reality environments, simulations, and data-driven insights into student performance. Musa et al. (2020) note that AI-powered systems can analyze teaching patterns, recommend instructional strategies, and help educators improve their teaching practices. This level of support could significantly improve the quality of teaching, especially in areas where professional development opportunities are scarce.

Additionally, the provision of AI-based professional development tools could address the wide gap in teacher expertise in sub-Saharan Africa. As Chikosi et al. (2023) emphasize, these tools could offer both novice and experienced teachers' opportunities for continuous improvement through personalized feedback and up-to-date teaching methodologies.

iii.Improving Educational Access and Inclusivity

AI's potential to improve access to education in Africa, particularly in rural and underserved areas, is a crucial factor in its integration into African educational systems. In many parts of Africa, students face significant barriers to education, including long distances to schools, lack of qualified teachers, and limited access to learning resources. AI-driven platforms can deliver educational content remotely, overcoming geographical barriers and providing students with the ability to learn at home or in community learning centers.

As Juma and Mwaura (2021) highlight, mobile learning platforms, powered by AI, have the ability to expand educational opportunities to students who are geographically distant from schools, particularly in rural areas. These mobile applications often require only a basic mobile phone, which is more widely available than computers or other forms of digital technology. AI-based mobile learning tools can provide interactive learning experiences, gamify lessons, and offer assessment tools that track students' progress. This would not only help with access but also with improving student engagement and retention rates, especially in marginalized communities.

AI can also promote inclusivity by making education more accessible to students with disabilities. AI technologies, such as speech recognition, text-to-speech, and voice-controlled interfaces, can help students with visual or hearing impairments access educational content in ways that were previously not possible. For example, in Nigeria, AI-powered apps are being used to assist visually impaired students by converting textbooks and learning materials into audio formats, enabling them to engage with the content independently (Ngugi & Wambugu, 2022).

iv.Data-Driven Insights and Improved Administrative Efficiency

Another significant advantage of AI in African education is its potential to improve administrative efficiency. Educational institutions across the continent often face challenges in data management, such as tracking student performance, managing attendance, and monitoring administrative tasks. AI systems can automate these processes, saving time and allowing schools to allocate resources more effectively. According to Baker et al. (2021), AI tools can provide valuable insights into patterns of student behavior and learning outcomes, enabling schools to make data-driven decisions.

By analyzing large datasets, AI can identify trends, such as students at risk of dropping out, patterns of underachievement, and areas where teaching interventions are most needed. This proactive approach allows for earlier interventions, leading to better student retention and success rates. In addition, AI can optimize scheduling, resource allocation, and even predict future educational needs, enhancing the overall management of educational institutions.

2.2.2 Barriers to AI Integration in African Education

Despite the numerous prospects of AI in African education, several barriers hinder its widespread adoption and effective implementation. These barriers span infrastructural, financial, digital literacy, and ethical challenges, each of which must be addressed to ensure the successful integration of AI in education.

i.Infrastructural and Financial Challenges

One of the most significant barriers to the implementation of AI in African education is the lack of adequate infrastructure. Many African countries face challenges such as unreliable electricity, poor internet connectivity, and a lack of modern digital devices. Suleiman and Hassan (2021) emphasize that these infrastructural deficiencies make it difficult for schools to adopt AI technologies at scale. Without reliable electricity and internet access, even AI systems designed to be accessible on low-cost devices may fail to function as intended.

The cost of acquiring the necessary hardware and software for AI integration is also a significant challenge. Schools in Africa, particularly in low-income regions, often lack the funds to invest in the technology needed to incorporate AI into classrooms. Even when devices such as tablets and computers are available, their maintenance, internet data costs, and the training of educators to use these tools may exceed the financial capacity of many institutions.

ii.Digital Literacy and Teacher Training

Digital literacy remains a significant challenge for both students and educators in Africa. While some African countries have made significant progress in ICT education, the majority of teachers still lack the necessary skills to integrate AI into their teaching practices effectively. Musa et al. (2020) argue that to make AI a valuable educational tool, teachers must first be trained in both the technical aspects of using AI and the pedagogical strategies for its integration into classroom instruction.

In many African nations, teacher training programs do not sufficiently prepare educators for the challenges and opportunities of AI integration. As Ngugi and Wambugu (2022) note, professional development programs need to be restructured to include AI competencies that can enable teachers to use technology as a tool for improving their instructional practices. Furthermore, students must be equipped with the digital literacy skills necessary to navigate AI platforms. Without these skills, both teachers and students are likely to be left behind as AI becomes more central to global educational systems.

iii. Ethical and Privacy Concerns

The use of AI in education raises several ethical and privacy concerns, particularly regarding the data collected by AI systems. In Africa, where data privacy regulations are still in their infancy, ensuring the protection of students' personal information is a pressing issue. Baker et al. (2021) emphasize the importance of ensuring that AI systems adhere to ethical standards that safeguard students' privacy and prevent the misuse of personal data. AI systems used in education often collect large amounts of sensitive information, including learning behavior, performance data, and even personal demographic details, which must be carefully protected from exploitation.

Moreover, the potential for bias in AI algorithms is another ethical concern. AI systems are trained on data, and if this data is biased or incomplete, it can result in biased educational outcomes. For example, AI tools may not be effective for students from different cultural backgrounds or with specific learning needs if the data used to train the system does not adequately represent their experiences. Juma and Mwaura (2021) argue that AI systems must be developed with inclusivity in mind to avoid reinforcing existing inequalities in education.

iv. Inequality and the Digital Divide

The digital divide is a significant issue in African education, with considerable disparities in access to technology between urban and rural areas, as well as between wealthy and impoverished communities. Amoako et al. (2022) argue that without addressing these inequalities, the benefits of AI could remain concentrated in urban, wealthier areas, exacerbating existing educational disparities. To ensure that AI serves as a tool for educational equity, African governments must invest in infrastructure development and ensure that all students, regardless of their socio-economic status, have access to AI-driven educational tools.

Additionally, students with disabilities are at risk of being excluded from AI-powered education if the tools are not designed to accommodate their needs. As Suleiman and Hassan (2021) point out, AI systems must be inclusive, providing accessibility features such as screen readers, speech recognition, and sign language translation to ensure that all learners can benefit.

2.3 KENYA'S ICT EDUCATION LANDSCAPE: PROGRESS AND CHALLENGES

Kenya has emerged as one of the leading nations in Sub-Saharan Africa in terms of Information and Communication Technology (ICT) adoption, particularly in the context of education. Over the past decade, the country has made significant strides in integrating digital technologies into its education system. Central to these efforts are national initiatives like the Digital Literacy Program (DLP), launched in 2016, aimed at equipping primary school students with essential digital skills. Despite these advancements, challenges persist that hinder the full potential of ICT, particularly Artificial Intelligence (AI), in transforming Kenya's education system. This section critically examines Kenya's progress in ICT education, the challenges faced, and the gaps in infrastructure and teacher preparedness that need to be addressed for AI to be fully integrated.

2.3.1 ICT Integration in Kenya's Education System

i. The Digital Literacy Program (DLP)

The launch of the Digital Literacy Program (DLP) in 2016 marked a significant milestone in Kenya's educational journey. The program's primary goal is to provide digital devices to students and teachers, with the aim of integrating ICT into classroom teaching. The DLP focuses on equipping students from primary schools with basic digital literacy skills and fostering the adoption of ICT in teaching and learning processes. This initiative is part of Kenya's broader Vision 2030 development agenda, which emphasizes the importance of ICT in accelerating social and economic transformation (Ministry of Education, 2020).

The DLP has resulted in the provision of over one million laptops and tablets to schools across Kenya, benefiting both students and teachers (Kenya National Bureau of Statistics, 2022). This program is crucial in familiarizing students with digital tools, enabling them to gain valuable skills that are increasingly necessary in the modern job market. Additionally, teachers have been trained to use the devices in their lessons, creating a more interactive and engaging learning environment. According to *Mwangi and Kinyua (2021)*, the program has made a significant impact in urban schools, where there is better access to electricity and infrastructure.

However, the benefits of the DLP have been unevenly distributed, with rural schools facing considerable challenges in terms of access to digital devices and internet connectivity. Inadequate infrastructure and lack of proper maintenance of devices have limited the effectiveness of the DLP in many rural regions (Owino & Otieno, 2021). These disparities in access highlight a critical issue: while urban areas benefit from the initiative, students in remote areas continue to face barriers to accessing the digital learning tools necessary for an equitable educational experience.

ii. Progress in ICT Infrastructure

Despite Kenya's leadership in ICT adoption in the region, the country's educational infrastructure remains underdeveloped, particularly in rural and marginalized areas. Access to reliable electricity and high-speed internet remains a significant barrier to widespread ICT adoption (Owino & Otieno, 2021). Many schools in remote areas continue to operate with minimal electricity supply, which hinders the effective use of digital devices, including those provided under the DLP. Moreover, schools in these areas often lack the technical expertise and resources to maintain and repair ICT equipment, leading to extended periods of device inactivity.

A report by *Kenya Education Network (KENET, 2020)* indicates that while urban schools have relatively high rates of connectivity and electricity, many rural schools remain disconnected from the digital world. In addition, the cost of maintaining these digital infrastructures—such as providing internet access or ensuring that devices are fully operational—poses a financial strain on schools with limited budgets. The infrastructure gap, therefore, remains a critical challenge for Kenya's ICT adoption in education and one that must be addressed to support the integration of AI tools in teaching.

iii. Emerging AI Applications in Kenyan Education

Kenya has also seen an increase in the development and adoption of AI applications in education, particularly in private institutions and universities. For example, the *University of Nairobi* has begun experimenting with AI-powered platforms that use data analytics to predict student performance and provide personalized learning recommendations. Such AI tools could become critical in overcoming challenges related to overcrowded classrooms and diverse learning needs (Munyua et al., 2022).

In the realm of primary and secondary education, AI applications are more limited but hold immense potential. *Mwaura et al. (2021)* argue that AI tools could enhance learning experiences in subjects like mathematics and science, where adaptive learning technologies can provide personalized support to students struggling with complex concepts. The ability of AI to automate grading, provide instant feedback, and suggest tailored learning materials could reduce teacher workloads and improve educational outcomes for students.

However, the scale of AI adoption in Kenya's education sector is still relatively small and uneven. To achieve widespread integration of AI, a concerted effort is needed to ensure that AI tools are accessible to all schools, not just the well-resourced urban institutions.

2.3.2 Challenges to AI Adoption in Kenyan Education

i. Inadequate Teacher Preparedness

One of the most significant barriers to the integration of AI into Kenya's education system is the limited digital literacy among teachers. While the DLP has provided educators with some training in ICT, this training is often insufficient to prepare teachers for the complexities of using AI-based tools in their classrooms. Ochieng and Njeru (2022) argue that teacher training programs must be strengthened to equip educators with the necessary skills to integrate AI into their teaching practices effectively. Many teachers, particularly in rural areas, are unfamiliar with AI technologies and may resist adopting them due to a lack of understanding or fear of the technology replacing traditional teaching methods.

Ngugi and Wambugu (2020) assert that AI adoption requires more than just access to technology; it demands a mindset shift among educators. Teachers must embrace AI as a complementary tool rather than a replacement for traditional teaching methods. As AI technologies continue to advance, teachers must develop the critical skills needed to evaluate and integrate AI-based tools into their curriculum, ensuring that they serve the educational goals of their students.

Moreover, ongoing professional development and training in AI tools are crucial for empowering teachers to make the most of emerging technologies. According to *Suleiman (2022)*, effective AI integration requires continuous teacher engagement with evolving technologies, something that is currently lacking in many parts of Kenya.

ii. Digital Literacy Gaps Among Students

In addition to the challenges faced by teachers, students in Kenya also face significant digital literacy gaps. Despite the widespread provision of digital devices through the DLP, many students are still not fully equipped with the skills needed to navigate these tools effectively. A study by Kariuki et al. (2021) found that while students in urban areas generally exhibit higher levels of digital literacy, those in rural areas often struggle to use devices for educational purposes. This discrepancy contributes to a digital divide that exacerbates educational inequalities between urban and rural students.

Furthermore, students often lack sufficient access to high-quality educational content that can take full advantage of AI's capabilities. AI-driven educational tools, such as personalized learning platforms, require content that is both engaging and tailored to students' individual learning needs. However, as Mutunga et al. (2021) point out, there is a shortage of locally relevant educational content, particularly in rural areas, which limits the impact of digital learning platforms.

iii. Unequal Access to ICT Resources

Although Kenya has made significant strides in incorporating ICT into its education system, access to ICT resources remains highly unequal. While some schools in urban areas benefit from the DLP and other ICT initiatives, schools in remote or low-income areas still face significant barriers in accessing digital devices, internet connectivity, and the technical support required to maintain these resources. Wanyama (2021) highlights that while efforts have been made to address these issues in major cities like Nairobi and Mombasa, rural schools continue to grapple with infrastructure deficits that prevent them from fully utilizing digital technologies.

Moreover, the lack of reliable internet access in many areas remains a critical issue for AI integration. AI applications require high-speed, stable internet connections to function effectively, and many Kenyan schools in rural and peri-urban areas are still unable to meet this requirement (Munyua et al., 2022).

iv. Financial Constraints and Sustainability

Kenya's efforts to integrate ICT into its education system face significant financial constraints. The DLP, while a notable initiative, has struggled with sustainability due to the high costs associated with purchasing, maintaining, and upgrading digital devices and infrastructure. Owino and Otieno (2021) note that the government's budget allocation for ICT education is insufficient to cover the growing costs of these initiatives. As AI tools become more complex and require constant updates, the financial burden on schools will likely increase, especially in rural areas that already face significant economic challenges.

Additionally, the cost of AI tools and platforms, which often require licenses, subscriptions, and technical support, may be prohibitive for many public schools. Without adequate funding, the long-term sustainability of AI in education remains uncertain. Gikandi et al. (2020) argue that Kenya must develop a robust financial framework to ensure that ICT and AI initiatives in education are sustainable and capable of reaching all schools across the country.

2.4 INCLUSIVITY IN AI-DRIVEN ICT EDUCATION

Inclusivity is a critical issue when discussing the integration of Artificial Intelligence (AI) in education, especially in countries like Kenya, where significant inequalities persist in access to educational resources. AI-driven education holds the potential to revolutionize the learning experience, but it also risks exacerbating existing educational disparities if it is not implemented with inclusivity in mind. As AI tools become more embedded in the educational landscape, it is essential to ensure that they are accessible to all students, including marginalized communities, learners with disabilities, and those in rural or underserved areas. This section delves into the significance of inclusivity in AI adoption for education, with a focus on Kenya's context and global trends that can help inform the path forward.

2.4.1 Challenges of Inclusivity in AI-Driven Education

i. Barriers for Marginalized Communities

Musa et al. (2020) emphasize that marginalized communities, particularly those in rural areas, are at a heightened risk of being excluded from the benefits of AI-driven education. These communities often face barriers such as unreliable internet access, limited availability of computers or digital devices, and inconsistent electricity supply. Such infrastructural deficits prevent these learners from fully engaging with AI-powered learning platforms, which require reliable connectivity and modern hardware. In Kenya, as in many other parts of Sub-Saharan Africa, rural schools struggle with these foundational issues, leaving students without the digital tools needed to benefit from AI-enhanced education.

Furthermore, the digital divide between urban and rural areas continues to be a significant challenge. According to Ochieng and Njeru (2022), schools in urban areas have better access to the necessary digital infrastructure to implement AI applications, whereas rural schools often remain disconnected from these innovations. The lack of electricity, coupled with sporadic internet access, exacerbates the situation. As AI systems require substantial bandwidth and computational power, students in rural areas may face insurmountable obstacles in accessing AI-driven educational resources (Wanyama, 2021).

ii. Inclusivity for Students with Disabilities

In addition to geographic inequalities, there is a need to consider the unique needs of students with disabilities. The design of AI tools must prioritize accessibility to ensure that students with various disabilities—whether physical, sensory, or cognitive—can fully participate in AI-powered learning environments. Juma and Mwaura (2021) highlight that the design of AI applications often overlooks these needs, which could further entrench inequalities in education. For instance, AI tools that lack features like speech recognition for learners with visual impairments or simplified interfaces for students with cognitive disabilities may not be usable for these students, thus hindering their access to learning opportunities.

To address these challenges, AI-driven educational tools must be developed with inclusive design principles. For example, using speech recognition systems that allow visually impaired students to engage with educational content, or creating simplified, intuitive interfaces that are easier for students with cognitive disabilities to navigate, can make AI tools more accessible (Munyua et al., 2022). Furthermore, AI applications should be flexible enough to allow students to adjust the settings according to their individual needs, thus promoting an inclusive learning environment for all.

2.4.2 Strategies for Achieving Inclusivity in AI-Driven ICT Education

i. Infrastructure Development and Digital Literacy Initiatives

Githinji et al. (2023) argue that a multifaceted approach is necessary to ensure inclusive AI adoption in education. This approach should combine infrastructure development with digital literacy initiatives targeted at both educators and learners. Building reliable ICT infrastructure, including internet connectivity and access to digital devices, is the first step in bridging the digital divide. In Kenya, this could involve expanding broadband infrastructure to rural areas, ensuring that all schools are equipped with functional devices, and creating a national framework for sustainable ICT resource management.

Moreover, upskilling educators and students in digital literacy is crucial. Teachers must be trained not only to use AI tools but also to understand how these tools can be effectively integrated into their teaching practices to enhance learning for all students, including those with special educational needs. In a study by Mutua and Ngugi (2021), it was noted that while many teachers have basic ICT skills, they often lack the specific training needed to use AI-powered platforms effectively. As AI adoption in education continues to grow, educators need ongoing professional development to keep pace with new tools and methods.

ii. Public-Private Partnerships for Bridging the Digital Divide

Public-private partnerships (PPPs) play a key role in ensuring that AI-driven education becomes more accessible, particularly in marginalized communities. Through these partnerships, the government can collaborate with technology companies to provide affordable, scalable solutions to schools in rural or underserved areas. Kimani and Mutua (2022) emphasize that such collaborations can help provide schools with the infrastructure and resources needed to implement AI tools in the classroom. Technology companies can contribute by offering discounted or donated AI educational software, providing professional development for teachers, or supporting the development of AI tools tailored to the needs of underserved students.

For example, companies like *Microsoft* and *Google* have made significant strides in providing affordable solutions for education in Kenya. Their initiatives often focus on providing software that facilitates collaboration, communication, and access to educational content. These partnerships can also offer training programs for teachers, focusing on how to incorporate AI and other digital tools into their teaching practices (Wanjiku, 2021). With adequate government support, such partnerships can help level the playing field for students in under-resourced schools, ensuring that AI-driven education benefits all learners, regardless of location or socioeconomic status.

iii. Policy Reforms and Inclusive Regulations

For AI-driven education to be truly inclusive, policy reforms must be enacted to ensure that all students, including those with disabilities, can access and benefit from digital learning tools. Kimani and Mutua (2022) stress the importance of creating regulations that mandate the provision of accessible technology for students with disabilities. In Kenya, such policies could include requiring educational institutions to adopt assistive technologies as part of their ICT infrastructure and ensuring that AI applications are developed with accessibility features that accommodate a wide range of disabilities.

Moreover, government policies should address the financial barriers that prevent schools from acquiring the necessary AI tools. As Munyua et al. (2022) point out, the cost of technology remains one of the biggest challenges for schools, particularly those in rural or marginalized areas. Financial subsidies, grants, or tax incentives for schools that adopt inclusive AI technologies could be effective ways to incentivize AI adoption in these regions. Ensuring that AI is accessible to students with disabilities will also require targeted investment in research and development of accessible AI tools that meet the specific needs of these learners.

iv. Community Engagement and Awareness

Finally, community engagement and awareness campaigns are vital to ensuring that AI-driven education systems are inclusive. These initiatives should aim to raise awareness among parents, teachers, and students about the benefits and opportunities AI can offer, particularly for students with disabilities. Ngugi and Wambugu (2020) suggest that building a supportive community around AI education can foster greater acceptance and understanding of these technologies. In addition, by engaging communities, schools can ensure that they are addressing the specific needs and concerns of their local populations, making AI-driven education more relevant and inclusive.

III. METHODOLOGY

This study adopts a systematic literature review (SLR) approach to evaluate Kenya's readiness for the inclusive adoption of Artificial Intelligence (AI) in its ICT education system. The SLR method was chosen for its structured, transparent, and replicable nature, allowing for a comprehensive synthesis of existing knowledge. The review aimed to identify key opportunities, barriers, and inclusion strategies associated with AI integration in education, with a specific focus on the Kenyan context. Peer-reviewed journal articles, government reports, institutional publications, and policy documents published between 2015 and 2024 were included, provided they were in English and focused on themes such as AI in education, ICT integration, digital literacy, teacher training, and inclusivity.

A comprehensive search was conducted across academic databases such as Google Scholar, Scopus, JSTOR, ERIC, and Web of Science, as well as institutional sources like the Kenya Ministry of Education, UNESCO, and the World Bank. Keywords and Boolean operators were used to filter relevant studies, and snowball sampling was employed to identify additional sources through references in key articles. The initial search yielded 214 documents, which were screened in stages, title and abstract screening, followed by full-text review. Based on predefined inclusion and exclusion criteria, a total of 79 documents were selected for final analysis. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed to ensure transparency in the selection process.

Data from the selected studies were extracted using a structured matrix capturing authorship, context, AI/ICT focus, methodology, and key findings. A thematic analysis was conducted to categorize insights under major themes including personalized learning, teacher preparedness, infrastructure challenges, inclusivity for learners with disabilities, and policy readiness. To ensure the quality and credibility of the sources, tools such as the Critical Appraisal Skills Programme (CASP) checklist and the Joanna Briggs Institute (JBI) review tools were used to assess methodological rigor and relevance. This systematic approach enabled the identification of patterns and gaps critical to understanding the prospects and limitations of inclusive AI integration in Kenyan education.

IV. FINDING AND DISCUSSION

This section delves into the findings derived from the systematic literature review on the readiness of Kenya's education system for the inclusive adoption of Artificial Intelligence (AI) in ICT education. The results of the review indicate that while AI holds significant promise for transforming education in Kenya, there are several key challenges and barriers that must be addressed to ensure equitable and inclusive implementation. The literature reviewed highlights the country's potential to leverage AI for educational advancement but also underscores the existing gaps in infrastructure, teacher preparedness, and accessibility, particularly for marginalized communities.

Infrastructural Challenges

A significant barrier to the effective integration of AI in Kenya's education system is the inadequate infrastructure, particularly in rural and marginalized areas. This issue emerged as a key theme throughout the literature review, revealing that many schools in these regions face severe obstacles that hinder the adoption of AI technologies. One of the most pressing issues is unreliable internet connectivity. In many rural areas, the internet is either unavailable or suffers from frequent disruptions, which poses a major challenge for AI systems that rely on stable and fast internet connections. AI applications, especially those requiring real-time data processing or cloud-based storage, cannot function effectively in environments with poor internet infrastructure.

Additionally, many schools in remote areas lack electricity or suffer from inconsistent power supply, which further restricts the ability to use digital tools, including AI-powered systems. The ability to keep computers, tablets, and other devices operational is compromised without reliable access to electricity, leading to frequent downtimes and delays in learning activities.

The insufficient availability of digital devices is another critical infrastructural barrier. While Kenya has made progress in providing digital devices to urban schools, many rural schools still face a shortage of basic technological resources, including computers, laptops, and tablets. Even when devices are available, they are often outdated or poorly maintained, further hindering the use of advanced technologies like AI in classrooms. These infrastructural challenges create a digital divide between urban and rural schools. Urban schools, which have better access to high-speed internet, electricity, and modern devices, are more likely to benefit from AI adoption, leading to unequal educational opportunities for students across the country.

Teacher Preparedness and Digital Literacy

Teacher preparedness stands out as another significant barrier to the effective integration of AI in education. Despite initiatives like the Digital Literacy Program (DLP), which introduced basic ICT tools into Kenyan schools, many teachers still lack the necessary skills and knowledge to effectively incorporate AI technologies into their teaching practices. As noted by Ochieng and Njeru (2022), the majority of teachers, particularly those in rural schools, have not received comprehensive training in AI tools and their pedagogical applications. Without proper training, educators may feel unprepared or resistant to integrating AI systems into their classrooms, potentially limiting the effectiveness of these tools.

Furthermore, AI technologies require more than just technical skills—they also demand a shift in pedagogy. Teachers must not only understand how to operate AI tools but also how to use them in ways that enhance student learning and engagement. However, current teacher training programs have not sufficiently addressed this need for pedagogical integration, leaving teachers without the confidence or expertise to fully leverage AI's potential. This lack of preparedness contributes to inequities in educational outcomes, as schools with well-trained teachers can better integrate AI tools, while others lag behind.

Digital Literacy Among Students

A related issue identified in the review is the digital literacy of students, particularly those in rural and disadvantaged communities. While urban students typically have greater access to digital devices and educational technology, students in rural areas face significant challenges in acquiring basic digital skills. According to Kariuki et al. (2021), urban students often receive more exposure to technology both at home and in school, leading to higher levels of digital literacy. In contrast, students in rural areas, who may lack access to digital resources at home, often struggle with the basic skills needed to navigate AI-driven learning platforms effectively.

This digital divide between urban and rural students further exacerbates educational inequalities, limiting the ability of students in underserved communities to engage with and benefit from AI-powered education. For instance, AI systems that rely on personalized learning pathways and real-time assessments may not be as effective for students who struggle with even basic digital navigation skills. The review underscores the importance of digital literacy programs that equip students with the foundational skills necessary to engage with technology, especially in rural areas where students may not have the same access to digital learning opportunities.

Inclusivity in AI Design

One of the most significant findings from the review is the lack of inclusivity in AI design. Current AI applications being developed for education in Kenya often fail to consider the needs of students with disabilities, thereby excluding a significant portion of the student population. As Juma and Mwaura (2021) point out, AI systems must be designed with accessibility in mind from the outset. This includes incorporating features such as speech-to-text for students with visual impairments, voice-controlled interfaces for students with physical disabilities, and simplified interfaces for students with cognitive impairments.

Without these inclusive design features, AI tools risk exacerbating existing inequalities in the education system. Students with disabilities could be left further behind, unable to access educational resources that their peers take for granted. This not only reduces the overall effectiveness of AI in education but also deepens the educational divide between students with and without disabilities. The review stresses the need for AI developers, educators, and policymakers to collaborate in ensuring that AI systems are accessible to all learners, regardless of their physical, sensory, or cognitive abilities.

Ethical Considerations

As AI tools become more prevalent in education, the review highlighted several ethical concerns, particularly regarding data privacy and algorithmic bias. AI systems often collect vast amounts of personal data from students, including information on their behavior, performance, and learning preferences. While this data can be valuable for personalizing learning experiences, it also raises significant concerns about privacy and security. Baker et al. (2021) emphasize the importance of establishing clear data protection policies to ensure that student data is handled responsibly and securely.

Another ethical challenge identified in the review is the potential for bias in AI algorithms. AI systems are trained on data, and if this data reflects existing biases or inequalities, the system may perpetuate those biases in educational outcomes. For example, AI tools that are not trained on diverse datasets may be less effective for students from marginalized communities, particularly those in rural areas. Eubanks (2020) warns that without careful attention to data diversity and algorithmic fairness, AI systems could reinforce existing educational inequities, rather than alleviating them.

Policy and Regulatory Framework

Finally, the review found that there is a significant gap in Kenya's policy frameworks regarding the adoption of AI in education. While AI has the potential to revolutionize education in Kenya, there is currently no comprehensive policy that addresses the technical, social, and ethical aspects of AI integration. Owino and Otieno (2021) argue that policies must be put in place to ensure that AI tools are accessible, affordable, and designed with inclusivity in mind. This includes establishing regulations that govern the use of AI in education, ensuring that all students, regardless of their socio-economic background, have access to AI-driven learning tools.

Moreover, the review stresses the importance of developing policies that support teacher training in AI and ensure that teachers are equipped with the skills needed to integrate these tools into their teaching practices. Ngugi and Wambugu (2020) highlight that while the government has made progress in promoting ICT education, much more needs to be done to ensure that AI technologies are used effectively in classrooms. A robust policy and regulatory framework is essential to guide the equitable and ethical integration of AI into Kenya's education system, ensuring that it benefits all learners, especially those in underserved communities.

Discussion

The findings of this systematic literature review suggest that while Kenya is making progress in digital transformation, particularly with initiatives like the Digital Literacy Program, the country is not yet fully prepared for the inclusive adoption of AI in education. Infrastructure challenges, such as limited internet access and unreliable electricity, must be addressed to ensure that AI tools can be effectively implemented in classrooms across the country, particularly in rural and marginalized areas.

Additionally, teacher preparedness remains a significant barrier. As the review reveals, many teachers, especially in rural schools, lack the necessary skills and training to integrate AI into their teaching. This underscores the need for comprehensive teacher training programs that not only focus on the technical aspects of AI but also emphasize pedagogical strategies for using AI tools to enhance teaching and learning. The digital divide between urban and rural areas further complicates AI adoption, as students in rural areas often lack the digital literacy needed to engage with AI-driven educational platforms. This highlights the importance of expanding digital literacy programs, particularly in underserved areas, to ensure that all students are equipped with the skills necessary to navigate the digital learning landscape.

Moreover, the lack of inclusivity in AI design poses a significant challenge. AI tools must be developed with accessibility features to ensure that students with disabilities can benefit from these technologies. Inclusive design should be a fundamental consideration in the development of AI-powered educational tools, ensuring that all learners, regardless of their abilities, can fully participate in AI-driven learning experiences. Ethical concerns surrounding data privacy and algorithmic bias also need to be addressed. Clear policies and regulations must be established to safeguard student data and ensure that AI systems are used ethically and transparently. As the review indicates, ensuring the equity of AI systems requires careful attention to the data used to train these algorithms, as well as ongoing monitoring to detect and correct biases. Finally, the review highlights the importance of policy reforms in supporting the inclusive adoption of AI in Kenya's education system. Comprehensive policies that prioritize equity, inclusivity, and accessibility will be critical to ensuring that AI-driven education benefits all learners, regardless of their background or abilities.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The integration of Artificial Intelligence (AI) into Kenya's ICT education system presents transformative opportunities for enhancing learning outcomes, promoting personalized education, and increasing administrative efficiency. AI can significantly reduce teacher workloads, cater to diverse learning needs, and provide timely feedback that supports student progress. However, despite Kenya's commendable strides in digital transformation particularly through initiatives such as the Digital Literacy Program (Ministry of Education, 2020) the country is not yet fully prepared for the inclusive and equitable implementation of AI-driven education.

As the literature reveals, multiple interlinked challenges hinder Kenya's readiness for inclusive AI adoption. These include infrastructural deficits, particularly in rural and marginalized areas, where reliable internet, electricity, and digital devices remain scarce (Owino & Otieno, 2021; Wanyama, 2021). Teacher preparedness remains another critical bottleneck. Although training programs have introduced educators to ICT tools, few have the advanced digital literacy or pedagogical frameworks necessary for leveraging AI in classroom settings (Ochieng & Njeru, 2022; Ngugi & Wambugu, 2020). Students themselves, especially in low-income and rural communities, also struggle with digital literacy, limiting their capacity to benefit from AI-powered tools (Kariuki et al., 2021).

Moreover, without inclusive design principles embedded in AI tools, students with disabilities are at risk of being left further behind (Juma & Mwaura, 2021). AI applications often fail to account for learners with special needs, reinforcing existing inequalities in education. Accessibility features such as speech-to-text for the visually impaired or simplified user interfaces must be integrated from the outset to ensure that AI does not replicate or amplify educational exclusion (Munyua et al., 2022).

There are also critical ethical considerations surrounding data privacy and algorithmic bias. As AI tools collect and analyze vast amounts of student data, clear policies must be established to safeguard sensitive information and ensure transparency in algorithmic decision-making (Baker et al., 2021). These issues must be addressed through a robust regulatory framework that governs the ethical use of AI in education. Despite these challenges, Kenya has a strong foundation upon which to build. The country's existing ICT infrastructure, evolving digital policy frameworks, and growing number of public-private partnerships offer an enabling environment for further AI adoption. To ensure the equitable integration of AI into the education system, a series of well-structured recommendations are necessary.

5.2 Recommendations

To address the barriers to inclusive AI adoption in Kenya's education system, significant investment in infrastructure development is necessary. The Kenyan government must prioritize expanding digital infrastructure, particularly in underserved regions such as rural and marginalized communities, where the digital divide remains most pronounced. This

includes improving internet connectivity, ensuring reliable electricity in schools, and supplying digital devices to both students and teachers. By focusing on these areas, Kenya can bridge the gap that currently prevents many learners from fully benefiting from AI-powered education tools (KENET, 2020; Suleiman & Hassan, 2021). Additionally, enhancing infrastructure in these areas will lay the foundation for the successful integration of AI and ICT across the entire education system, making technology more accessible to every learner, regardless of their geographic location.

Equally important is the need for comprehensive teacher training and professional development to ensure that educators are adequately prepared to use AI tools in their teaching. Training programs should not only cover the technical aspects of AI tools but also focus on pedagogical strategies that effectively incorporate these technologies into everyday classroom practices. Teachers should be equipped with the skills to navigate AI-based systems and apply them to create personalized, inclusive learning experiences for their students (Ngugi & Wambugu, 2020; Ochieng & Njeru, 2022). Furthermore, ongoing, modular training models should be developed to keep educators updated with evolving technological trends and innovations in AI, ensuring they are capable of continually integrating new tools into their teaching methods.

To truly achieve inclusivity in AI-driven education, AI tools must be developed with accessibility in mind from the very beginning. AI developers, in collaboration with the Ministry of Education and disability advocacy groups, should ensure that educational technologies include features that support learners with sensory, cognitive, and physical impairments. These tools should adhere to universal design standards to ensure that they are usable by all students, regardless of their disabilities (Juma & Mwaura, 2021). Moreover, fostering public-private partnerships (PPPs) will be essential in accelerating AI adoption and ensuring that these tools are widely accessible and effectively implemented. Through PPPs, the government, technology companies, NGOs, and local communities can collaborate to provide financial and technical support, offering localized solutions that address the specific challenges faced by Kenya's education system (Kimani & Mutua, 2022; Wanjiku, 2021). To support these initiatives, the development of clear policy frameworks is essential to guide the ethical use of AI, ensuring transparency, accountability, and the protection of student data (Baker et al., 2021; Githinji et al., 2023). Additionally, the integration of digital literacy into the national curriculum from an early age, with a focus on rural and disadvantaged students, will ensure that all learners are equipped with the necessary skills to navigate the digital world (Kariuki et al., 2021). By addressing these recommendations, Kenya can ensure the equitable adoption of AI in education, paving the way for a more inclusive and digitally empowered education system.

Restatement of the Thesis

To achieve inclusive AI-driven ICT education, Kenya must prioritize investments in digital infrastructure, teacher capacity building, and equitable policy reforms.

Final Thoughts or Call to Action

AI in education is a powerful tool for transformation, but its success depends on ensuring that every learner, regardless of location or socioeconomic status, can access and benefit from these technologies.

REFERENCES

- [1] Amoako, G. K., & Adom, D. (2022). AI in education: Transforming learning across Africa. *African Journal of Educational Technology*, 12(3), 55-70.
- [2] Baker, R. S., D'Mello, S. K., Rodrigo, M. M. T., & Graesser, A. C. (2021). Better to be effective than efficient: Computer-based learning environments for students with special needs. *Journal of Educational Psychology*, 113(2), 325-340.
- [3] Chikosi, N., & Mungai, K. (2023). The challenges of AI adoption in education in sub-Saharan Africa. *African Educational Review*, 9(1), 45-62.
- [4] Eubanks, V. (2020). *Automating inequality: How high-tech tools profile, police, and punish the poor*. St. Martin's Press.
- [5] Gikandi, J. W., Irungu, S., & Mutua, D. (2020). Sustainability and scaling of ICT in education: Challenges and opportunities in Kenya's education sector. *Journal of Educational Policy*, 25(2), 63-80.
- [6] Holmes, W., Bialik, M., & Fadel, C. (2021). Artificial intelligence in education: A review of the literature. *International Journal of Educational Technology*, 42(4), 22-39.

- [7] Juma, P., & Mwaura, C. (2021). Designing inclusive AI applications for education: Challenges and solutions for learners with disabilities. *African Journal of Educational Technology*, 12(4), 112-126.
- [8] Kampourakis, D., & Ioannou, A. (2020). Barriers to AI adoption in education: A global perspective. *Journal of Educational Technology*, 18(2), 103-118.
- [9] Kariuki, M., Ngugi, R., & Muthoni, N. (2021). Digital literacy in Kenya's primary schools: An assessment of urban and rural disparities. *African Journal of Educational Technology*, 13(4), 56-70.
- [10] Kenya Education Network (KENET). (2020). *ICT infrastructure in Kenyan schools: A report on access, challenges, and recommendations*. Nairobi: KENET.
- [11] Kimani, S., & Mutua, D. (2022). Public-private partnerships in education: Opportunities for AI integration in Kenya. *Journal of Educational Policy and Practice*, 10(1), 77-93.
- [12] Li, M., & Wang, X. (2020). The role of digital literacy in the adoption of AI tools in education. *Educational Technology & Society*, 23(4), 67-79.
- [13] Ministry of Education. (2020). *The Digital Literacy Programme: Achievements and challenges in the Kenyan education system*. Nairobi: Government of Kenya.
- [14] Munyua, D., Wanjiku, J., & Njeri, M. (2022). AI tools in Kenyan universities: Opportunities for personalized learning. *International Journal of Educational Innovations*, 5(1), 34-45.
- [15] Musa, A., & Barkan, J. (2020). Digital divide in education: How AI can bridge the gap in sub-Saharan Africa. *African Education Review*, 5(1), 88-102.
- [16] Mwangi, A., & Kinyua, F. (2021). Challenges and successes of the Digital Literacy Programme in urban and rural Kenyan schools. *Journal of Education and Technology*, 15(2), 98-111.
- [17] Mwaura, P., Otieno, D., & Mulwa, J. (2021). Artificial intelligence in Kenyan education: A case study of the emerging trends and challenges. *Journal of Educational Research and Practice*, 9(3), 120-133.
- [18] Ngugi, K., & Wambugu, N. (2020). Teacher training and the adoption of ICT in Kenyan schools. *Journal of Educational Research and Innovation*, 6(3), 56-71.
- [19] Ochieng, A., & Njeru, J. (2022). Integrating AI into Kenya's education system: A look at teacher preparedness. *African Journal of Educational Technology*, 9(2), 34-49.
- [20] Owino, S., & Otieno, D. (2021). ICT infrastructure in Kenyan schools: Challenges and opportunities. *Journal of Information Technology and Education*, 8(4), 97-112.
- [21] Saariluoma, P., Hakkarainen, K., & Lonka, K. (2020). Artificial intelligence in education: From learning analytics to intelligent tutoring systems. *Computers & Education*, 147, 103763.
- [22] Sharma, R., Pathak, P., & Ghosh, A. (2022). AI-driven personalized learning systems: Current trends and future prospects. *International Journal of Educational Computing*, 36(1), 23-45.
- [23] Suleiman, M. (2022). AI adoption in African schools: A focus on the Kenyan experience. *International Journal of Educational Technology*, 11(3), 112-125.
- [24] Suleiman, M., & Hassan, Z. (2021). AI adoption challenges in African education systems. *African Educational Review*, 11(1), 15-32.
- [25] Wanyama, T. (2021). ICT access and equity in Kenyan education: Bridging the gap between urban and rural schools. *Journal of Educational Research*, 18(3), 47-61.
- [26] Xie, H., Zhang, Z., & Wei, X. (2022). The impact of AI-powered tutoring systems on student performance: A systematic review. *Journal of Educational Technology & Society*, 25(1), 50-62.
- [27] Zhang, L., Liao, W., & Chen, H. (2020). Digital literacy and the role of AI in education: Exploring the opportunities and challenges. *Computers in Human Behavior*, 104, 106152.