



BRIDGING THE SKILLS GAP THROUGH AI: INNOVATING VOCATIONAL HOME ECONOMICS FOR NIGERIA'S KNOWLEDGE ECONOMY`

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Abstract

Nigeria is currently confronted with a widening skills gap that undermines the employability of its graduates and the productivity of its economy. Vocational education, particularly Home Economics, was designed to equip learners with practical skills for self-reliance, entrepreneurship, and sustainable living. However, the discipline has become outdated due to obsolete curricula, inadequate teacher capacity, limited infrastructure, and declining student engagement. These challenges have reduced its relevance in addressing unemployment and poverty in Nigeria. This paper examines how Artificial Intelligence (AI) can be harnessed to reimagine Home Economics as a future-ready discipline aligned with Nigeria's transition into a knowledge economy. Using Technological Determinism, Experiential Learning, and Constructivist Learning theories as conceptual lenses, the study explores how AI applications—such as virtual simulations, adaptive learning platforms, and intelligent tutoring systems—can modernize the curriculum, personalize instruction, and foster entrepreneurship. It also highlights AI's potential to promote inclusivity through assistive technologies and strengthen digital literacy among learners. The analysis identifies systemic barriers to AI adoption, including infrastructural deficits, funding limitations, and cultural perceptions of vocational education. In response, a multi-pronged strategic framework is proposed, emphasizing curriculum redesign, teacher professionalization, infrastructure development, industry partnerships, and phased implementation. The expected impacts include improved student outcomes, enhanced teacher effectiveness, job creation, gender inclusivity, and alignment with Sustainable Development Goals (SDGs) 4, 5, and 8. The study concludes that integrating AI into vocational Home Economics is not merely an educational innovation but a strategic necessity for Nigeria's sustainable development. By equipping students with entrepreneurial, digital, and practical skills, AI-enhanced Home Economics can bridge the skills gap, reduce unemployment, and position Nigeria as a competitive player in the global knowledge economy.

Keywords: Artificial Intelligence, Vocational Education, Home Economics, Knowledge Economy, Skills Gap, Nigeria, Sustainable Development

Introduction

Vocational education has historically been recognized as a cornerstone of Nigeria's national development strategy. From the period of independence in 1960 to the present, the Nigerian government has consistently emphasized vocational and technical education as a means of producing skilled manpower for economic growth and self-reliance (Okoro, 2011). Unlike general education, vocational education is designed to equip learners with practical and applied skills, enabling them to participate productively in the workforce and contribute to the economy. Within this broad framework, Home Economics emerged as a unique and vital discipline, covering key areas such as food and nutrition, clothing and textiles, consumer education, family living, and home management. Its objective has been not only to prepare individuals for domestic responsibilities but also to empower them with

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entrepreneurial and income-generating skills. Despite this relevance, the discipline has struggled to maintain its role in contemporary Nigerian society. For decades, Home Economics has been taught primarily through traditional methods, with a heavy emphasis on rote learning and outdated practices. This has hindered its ability to meet the demands of the 21st-century labor market. For example, while global industries are embracing digital technologies, automation, and artificial intelligence (AI) in areas like food processing and fashion design, Nigerian students are still learning hand sewing, basic cookery, and manual budgeting practices (NERDC, 2013). Such a mismatch has created a widening gap between school outputs and labor market requirements, thereby contributing to Nigeria's unemployment crisis. The scale of this crisis cannot be overstated. According to the National Bureau of Statistics (NBS, 2022), youth unemployment in Nigeria stands at over 42% for individuals aged 15–35. Many of these unemployed youths are graduates of the formal education system, underscoring the inadequacy of traditional curricula in preparing learners for today's knowledge-driven economy. Vocational education, particularly Home Economics, was expected to be a solution by producing job-ready graduates. Instead, it has struggled to retain its relevance, with declining student interest, poorly trained teachers, and inadequate infrastructure. This situation threatens the ability of Nigerian education to contribute meaningfully to sustainable development. At the same time, global changes are reshaping how education is conceived and delivered. Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the 21st century. Defined broadly as the capacity of machines to perform tasks that typically require human intelligence—such as reasoning, problem-solving, and learning—AI is revolutionizing industries, labor markets, and educational systems worldwide (Russell & Norvig, 2016). In countries such as China, Finland, and the United States, AI is already being applied in classrooms to provide adaptive learning platforms, intelligent tutoring systems, and predictive analytics that improve student performance (Holmes, Bialik, & Fadel, 2019). These innovations demonstrate the potential of AI to address persistent educational challenges, especially in resource-constrained settings. For Nigeria, integrating AI into vocational education, and particularly Home Economics, offers enormous promise. Imagine a Home Economics classroom where students practice cooking in a virtual kitchen, design garments using AI-based fashion software, or learn budgeting through AI-driven financial planning applications. These innovations could transform how the subject is taught and perceived, making it more engaging, relevant, and aligned with industry expectations. Furthermore, AI has the capacity to personalize learning experiences, ensuring that each student—regardless of background or ability—receives support tailored to their unique needs (Luckin et al., 2016). Such an approach could significantly improve learning outcomes and restore student enthusiasm for Home Economics. Beyond improving individual learning outcomes, AI integration into Home Economics also aligns with Nigeria's broader developmental goals. The nation's Vision 2050 and the United Nations Sustainable Development Goals (SDGs) emphasize the importance of building human capital, promoting innovation, and preparing citizens for active participation in a global knowledge economy (United Nations, 2015). By equipping students with both traditional vocational competencies and modern digital skills, AI-enhanced Home Economics can contribute to economic empowerment, gender equality, and sustainable livelihoods. For instance, women and youths trained in AI-supported catering, textile production, or consumer services could create small businesses that provide jobs, stimulate local economies, and reduce poverty. This paper therefore seeks to explore how AI can bridge the skills gap in vocational Home Economics in Nigeria. It is structured into eight sections: an introduction; a conceptual framework outlining the relationship between AI, the knowledge economy, and relevant learning theories; an analysis of current challenges in Home Economics; a discussion of the potential of AI in



bridging skills gaps; a proposed strategic framework for AI integration; an assessment of expected impacts; policy recommendations; and a conclusion. By synthesizing evidence from theory, global practices, and the Nigerian context, this study argues that AI represents not just a tool but a catalyst for rebranding and revitalizing Home Economics as a future-ready discipline central to Nigeria's knowledge economy.

Conceptual Framework

Understanding Artificial Intelligence (AI) in Education

Artificial Intelligence (AI) is broadly defined as the simulation of human intelligence processes by machines, particularly computer systems (Russell & Norvig, 2016). These processes include learning (the acquisition of information and rules for using it), reasoning (using the rules to reach conclusions), and self-correction. In educational contexts, AI is no longer a futuristic concept but a practical reality shaping how teaching and learning occur across the globe. AI technologies in education fall into several branches. Machine learning allows systems to analyze student performance data and adjust instruction to meet individual needs. Natural language processing (NLP) powers applications such as chatbots that answer students' questions or translate materials into local languages. Computer vision can be used in vocational settings, for example, to assess the accuracy of garment designs or food presentations through image recognition. Robotics can simulate complex practical tasks in safe, controlled environments. Collectively, these AI applications offer new ways of delivering personalized, efficient, and scalable education (Holmes, Bialik, & Fadel, 2019). In vocational Home Economics, these AI applications can be transformative. Virtual kitchens, powered by AI, allow students to simulate cooking experiences without the cost and resource wastage of physical kitchens. AI-based software can generate garment patterns, predict fashion trends, and even provide virtual fitting experiences for textile students. Budgeting and consumer education can be enhanced with AI-driven financial literacy apps that simulate income management and help students understand spending behavior in real time. Such applications would radically modernize Home Economics and make it competitive with digital-driven industries.

The Knowledge Economy and Nigeria's Development Agenda

The concept of a knowledge economy refers to an economy where knowledge, creativity, innovation, and digital competence drive productivity and growth. In contrast to resource-dependent economies, knowledge economies emphasize human capital development and the use of technology to improve efficiency and competitiveness (World Bank, 2019). Nations that succeed in building knowledge economies prioritize education, research, and digital literacy. Nigeria, with its youthful population and abundant human resources, has set ambitions through documents like the Vision 2050 plan and the National Policy on Science and Technology Education (FRN, 2020). Both highlight the urgent need to diversify the economy away from oil and toward innovation-driven industries. For this to happen, vocational education must be modernized to prepare learners with the skills needed in a digital future. Integrating AI into Home Economics aligns directly with these national goals. Instead of producing graduates with limited domestic skills, the system can produce digital entrepreneurs who contribute to the food, fashion, and service industries, while also driving innovation and sustainability.

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Theoretical Perspectives

Several theories provide a conceptual foundation for this study.

1. **Technological Determinism Theory:** Smith and Marx (1994) argue that technological advancements are the primary forces that drive societal change. Applying this lens, the adoption of AI in Home Economics is not just an optional innovation but an inevitable shift that will redefine the subject's relevance. With AI integration, Home Economics moves from being perceived as a gendered domestic subject to becoming a digitally empowered discipline aligned with economic realities.

2. **Experiential Learning Theory:** Proposed by Kolb (1984), this theory emphasizes that learning is a process whereby knowledge is created through the transformation of experience. Home Economics has always been rooted in practical, hands-on learning. AI strengthens this foundation by providing simulations and interactive experiences that allow students to practice, reflect, and apply their learning in real or virtual environments. For example, a student can experiment with meal planning in an AI-powered app, reflect on the nutritional outcomes, and adjust choices accordingly.

3. **Constructivist Learning Theory:** Constructivism posits that learners construct knowledge through interaction with their environment and experiences. AI supports this theory by creating environments where students can actively engage, explore, and co- create knowledge. For example, textile design students could collaborate virtually on AI platforms, experimenting with patterns and styles while receiving instant feedback. This interactive learning environment promotes creativity and innovation— core skills for thriving in a knowledge economy (Adedoyin, 2021).

By synthesizing these theories, this paper frames AI not merely as a tool but as a catalyst that can transform Home Economics into a discipline that bridges the gap between traditional vocational training and the needs of a modern, knowledge-based economy.

Current Challenges in Vocational Home Economics in Nigeria

1. Outdated Curriculum

One of the most pressing challenges facing vocational Home Economics in Nigeria is its outdated curriculum. While the Nigerian Educational Research and Development Council (NERDC) has attempted to revise frameworks, much of the content remains tied to traditional practices such as manual sewing, basic cookery, and simple home budgeting (NERDC, 2013). These skills, though useful, fail to prepare students for participation in a rapidly digitizing economy. For instance, while global industries now use AI-based design tools, automated kitchen technologies, and advanced financial planning software, Nigerian students remain confined to learning with chalkboards, outdated textbooks, and inadequate practical equipment. This mismatch perpetuates the skills gap between graduates and labor market demands.

2. Teacher Training and Capacity

Teacher competence is central to the success of any educational reform. Unfortunately, Home Economics teachers in Nigeria often lack the digital literacy and technological skills required to integrate Information and Communication Technology (ICT), let alone AI, into their classrooms (Okeke & Eze, 2010). Continuous professional development programs are either unavailable or insufficient, leaving educators dependent on outdated pedagogical methods. Many teachers themselves were trained under obsolete curricula, which further limits their ability to reimagine Home Economics as a modern,



entrepreneurial subject. Without investing in teacher retraining and digital upskilling, any attempt to integrate AI into the subject will likely be ineffective.

3. Student Engagement and Perceptions

Students' perception of Home Economics has also contributed to its declining relevance. For decades, the subject has been viewed as one designed primarily for girls, or as a "soft" option for students considered academically weak. Such stereotypes reduce enrollment and discourage young learners—especially boys—from seeing Home Economics as a pathway to meaningful careers (Okoro, 2011). In addition, the lack of modern teaching methods and exposure to digital tools has made the subject less attractive to tech-savvy youths, who increasingly prefer disciplines that align with global digital trends. Consequently, student engagement and motivation are alarmingly low, threatening the future of the discipline.

4. Infrastructural Deficits

Infrastructure remains a fundamental barrier to vocational Home Economics education in Nigeria. A survey conducted by Agbo and Iwuchukwu (2018) found that fewer than one-third of schools offering Home Economics had access to ICT facilities such as computer labs or reliable internet connectivity. The situation is even worse in rural areas, where electricity supply is often irregular and basic facilities are lacking. Without such infrastructure, integrating AI or even basic digital tools into Home Economics remains unrealistic. The digital divide between urban and rural schools widens educational inequality, leaving large segments of Nigeria's population excluded from opportunities for digital vocational training.

5. Funding Limitations

Adequate funding for vocational education has always been a challenge in Nigeria. Home Economics, in particular, suffers from chronic underfunding, as policymakers often prioritize science, technology, engineering, and mathematics (STEM) fields. Schools lack the resources to maintain laboratories, update equipment, or procure teaching aids that reflect modern practices. This financial neglect creates a cycle in which Home Economics remains outdated, undervalued, and underfunded. For AI integration to become feasible, significant financial commitments will be required not only for infrastructure but also for teacher training, curriculum development, and research.

6. Societal and Cultural Barriers

Beyond institutional challenges, cultural and societal attitudes toward vocational education also play a role. Many Nigerian families still perceive vocational education, including Home Economics, as inferior to white-collar professions such as medicine, law, or engineering (World Bank, 2019). This perception discourages talented students from pursuing vocational pathways, further stigmatizing the subject. The gendered association of Home Economics as a "women's subject" compounds the problem, limiting diversity and innovation in the field.

7. Comparative African Context

When compared to other African nations, Nigeria lags behind in modernizing its vocational education. Countries such as Kenya and South Africa have begun incorporating digital technologies into vocational training, with South Africa implementing ICT-based entrepreneurship modules in its Technical and Vocational Education and Training (TVET) programs (UNESCO, 2022). Nigeria's slow pace of innovation risks leaving its youth unprepared for regional and global competition. Without urgent reforms, the country may continue to experience brain drain, as young people seek opportunities in nations with better educational systems and employment prospects.



Potential of AI to Bridge the Skills Gap

1. Curriculum Innovation

One of the greatest potentials of Artificial Intelligence in Home Economics lies in curriculum modernization. Traditional teaching often emphasizes theory with limited opportunities for practical application due to constraints such as lack of resources, overcrowded classrooms, and inadequate facilities. AI can bridge this gap by offering virtual simulations that replicate real-life scenarios. For instance, a virtual kitchen lab could allow students to practice food preparation, food safety, and nutrition planning without requiring physical ingredients or laboratory space.

Similarly, textile students could use AI-based design software to generate garment patterns, forecast fabric usage, and visualize clothing styles in three dimensions. These innovations make the curriculum more engaging, cost-effective, and aligned with industry trends (Holmes, Bialik, & Fadel, 2019).

2. Personalized Learning

AI has the capacity to transform the learning experience from a one-size-fits-all model into a highly individualized journey. Adaptive learning platforms can analyze students' strengths and weaknesses and then generate customized learning paths. For example, a student struggling with food budgeting could receive additional digital exercises and feedback until mastery is achieved, while an advanced learner in garment construction could be guided to explore higher-level fashion technology applications (Luckin et al., 2016). This level of personalization ensures that all learners, regardless of background or ability, can succeed and remain engaged. Such innovation is particularly valuable in Nigeria, where classrooms are often overcrowded and teachers are unable to provide individualized attention.

3. Promoting Entrepreneurship and Innovation

Another powerful application of AI in Home Economics is its ability to foster entrepreneurship. Many graduates of Home Economics aim to create small businesses in catering, tailoring, or crafts. With AI tools, these businesses can be more innovative and competitive. For instance, AI-driven e-commerce platforms can help students market their products online, while AI-powered inventory systems can track supplies and minimize waste. In catering, AI can assist in menu planning, recipe optimization, and cost control. In textiles, AI can predict fashion trends and help students create designs that appeal to consumers. These entrepreneurial skills are critical for reducing unemployment and fostering Nigeria's economic diversification (Nwachukwu, 2021).

4. Enhancing Inclusivity and Accessibility

AI also has the potential to make Home Economics more inclusive and accessible. Students with disabilities, who often face barriers in traditional learning environments, can benefit from AI-powered assistive technologies. For example, speech-to-text applications can support students with hearing impairments, while text-to-speech systems can aid visually impaired learners. Real-time translation tools can also assist students from diverse linguistic backgrounds, ensuring broader participation in vocational training (UNESCO, 2022). This inclusivity aligns with the United Nations' Sustainable Development Goal 4, which calls for inclusive and equitable quality education.

5. Strengthening Digital Literacy

Integrating AI into Home Economics will also indirectly strengthen digital literacy among Nigerian students. As learners interact with AI-powered platforms, they develop transferable skills such as navigating digital interfaces, analyzing data, and using software applications. These competencies are not only vital for Home Economics but also highly valued across all sectors of Nigeria's knowledge



economy. By embedding AI into vocational training, Nigeria can create a workforce that is adaptable, digitally competent, and globally competitive.

6. Practical Examples and Case Studies

Globally, examples exist of AI transforming vocational education. In Finland, vocational institutions have adopted AI-powered tools for personalized training in culinary arts and design. In China, AI-driven education platforms are used in textile and fashion design schools to forecast consumer demand and support innovation. Nigeria can adapt these models to local contexts, ensuring that Home Economics students are exposed to modern tools while preserving cultural relevance, such as designing clothing inspired by traditional Nigerian fabrics or creating AI-supported recipes based on indigenous diets.

Strategic Framework for AI Integration

1. Curriculum Redesign

The first step in integrating AI into Home Economics is to redesign the curriculum to reflect 21st-century realities. Current syllabi emphasize manual tasks that, while foundational, are insufficient in a global economy dominated by digital innovation. The curriculum must therefore include AI literacy, digital financial management, and sustainable consumer practices. For example, modules on nutrition should introduce students to AI-driven diet planning applications, while textile and fashion modules should incorporate digital design software that allows students to create and test designs virtually. By embedding AI within competency-based curricula, learners will graduate with both traditional vocational skills and modern digital competencies (Adedoyin, 2021).

2. Teacher Training and Professional Development

Teacher competence is critical for effective implementation. Without skilled educators, even the most innovative curriculum will remain underutilized. Continuous professional development programs should focus on ICT and AI integration, with workshops, online certifications, and partnerships with technology companies. Teachers need to develop not only technical skills but also pedagogical strategies for using AI to enhance experiential learning. For instance, teachers should be trained on how to use adaptive platforms to monitor student performance, or how to integrate AI into lesson planning and assessment. Partnerships with universities, NGOs, and professional associations can help sustain these initiatives (Ayanwale, Ayeni & Adebajo, 2020).

3. Infrastructure Development

Infrastructure is the backbone of AI adoption. Schools must be equipped with stable electricity, reliable internet, and ICT labs with AI-ready devices. This requires collaboration between government and private sector partners to ensure that resources are available and maintained. For rural schools, innovative solutions such as solar-powered ICT labs or mobile AI-enabled training centers could be developed to bridge the urban-rural divide. Without infrastructure investment, the promise of AI integration will remain aspirational (UNESCO, 2022).

4. Development of AI-Enhanced Learning Materials

To make AI relevant in Nigeria's cultural context, localized learning materials must be developed. For example, AI-based nutrition apps could feature recipes that incorporate local foods such as yam, cassava, and plantain. Textile design software could integrate African fabrics and motifs such as Ankara or Aso Oke. Such culturally grounded content would ensure that students not only gain global skills but also learn to innovate within Nigerian traditions. This localization also increases student engagement by making learning relatable and practical.



5. Pilot Projects and Research-Based Implementation

Before large-scale implementation, pilot projects should be launched across diverse contexts, including urban, peri-urban, and rural schools. These pilots would test the feasibility of AI integration, identify challenges, and generate data for refining strategies. For instance, a pilot might involve testing AI-enabled budgeting apps in Home Economics classes in Lagos, while another tests virtual kitchens in Enugu. Lessons learned from these pilots should inform national rollouts. Collaboration with research institutions and development agencies will be critical to ensuring that implementation is evidence-based (Nwachukwu, 2021).

6. Industry Collaboration and Partnerships

Home Economics is closely tied to industries such as fashion, food processing, and hospitality. Collaboration with industry stakeholders can ensure that AI integration aligns with labor market needs. Fashion-tech companies could provide training on AI-enabled design software, while agritech firms could introduce students to AI-powered food production and supply chain tools. Hospitality companies could collaborate on developing smart service management systems. Such partnerships bridge the gap between education and industry, ensuring that students graduate with skills directly relevant to employment and entrepreneurship (Ogunyemi, 2020).

7. Phased Roadmap for Implementation

To ensure sustainability, a phased approach should be adopted:

- Short-term (1–2 years): Teacher training workshops, curriculum reviews, and pilot projects.
- Medium-term (3–5 years): Infrastructure scaling, national rollout of AI-enhanced curricula, and integration into teacher education programs.
- Long-term (5+ years): Continuous innovation, periodic curriculum updates, and expansion of AI integration into broader vocational and technical education. Such a roadmap ensures that implementation is realistic, scalable, and adaptable to Nigeria’s dynamic socio-economic context.

Expected Impacts

1. Impact on Students

The most immediate beneficiaries of AI integration into vocational Home Economics are the students themselves. By interacting with AI-powered simulations, adaptive learning platforms, and intelligent tutoring systems, students will gain personalized educational experiences that respond to their individual strengths and weaknesses. This will improve learning outcomes significantly compared to the one-size-fits-all approach currently dominant in Nigerian classrooms. For example, a student struggling with textile design could receive additional AI-guided exercises, while a high-performing student could be given advanced design challenges. Such differentiation promotes equity and ensures that every learner can achieve their potential (Luckin et al., 2016). Beyond academic achievement, AI will enhance digital literacy, a vital skill in the 21st-century economy. As students use AI-powered apps for budgeting, design, or nutrition planning, they will also learn how to navigate digital platforms, analyze data, and make informed decisions. These transferable skills are crucial not only for Home Economics but for Nigeria’s broader knowledge economy, where innovation and adaptability are key. Furthermore, students will acquire entrepreneurial skills through exposure to AI-driven e-commerce tools, enabling them to start small businesses even before graduation. This practical orientation addresses Nigeria’s unemployment crisis by shifting students from job-seekers to job-creators.



2. Impact on Teachers

Teachers stand to gain considerably from AI integration. Many of the burdensome administrative tasks that consume teachers' time—such as grading, record-keeping, and lesson planning—can be automated using AI tools. This will free teachers to focus on the creative and mentoring aspects of instruction. For example, AI systems can generate real-time data on student performance, allowing teachers to adjust their methods more effectively. Professional development opportunities will also improve teacher confidence and competence in using technology, thereby enhancing their overall pedagogical skills (Holmes, Bialik, & Fadel, 2019). Moreover, AI can serve as a continuous feedback system for teachers, helping them reflect on their teaching practices. Data-driven insights into student engagement and outcomes can guide teachers toward adopting more effective instructional strategies. In the long run, this will create a cadre of digitally skilled educators who can mentor future generations of Nigerian students in an increasingly digital society.

3. Impact on Society

The societal impacts of AI in vocational Home Economics are profound. By equipping youths with digital and entrepreneurial competencies, AI integration will help reduce Nigeria's high rates of unemployment and underemployment. Home Economics graduates, empowered with AI-supported skills in catering, fashion, interior design, and consumer services, will be better positioned to create businesses that provide jobs and contribute to economic growth. This transformation could play a significant role in diversifying Nigeria's economy away from overdependence on oil revenues (World Bank, 2019). In addition, Home Economics has historically been a field dominated by women. AI-enhanced Home Economics offers an opportunity to promote gender equality by rebranding the subject as a discipline for both males and females. With digital tools making the subject more engaging and relevant, more young men may be drawn into the field, thereby breaking down gender stereotypes. At the same time, young women trained in AI-supported Home Economics can gain the confidence and skills needed to participate actively in the digital economy, contributing to greater inclusivity and empowerment.

4. Alignment with Sustainable Development Goals

AI integration into Home Economics aligns strongly with global development agendas. Specifically, it supports:

- **SDG 4 (Quality Education):** By modernizing Home Economics and making it inclusive and adaptive, AI ensures equitable access to quality learning.
- **SDG 5 (Gender Equality):** By breaking gender stereotypes and promoting equal participation, AI in Home Economics enhances opportunities for women and men alike.
- **SDG 8 (Decent Work and Economic Growth):** By equipping learners with entrepreneurial and digital skills, AI fosters job creation and supports sustainable economic development. Through these alignments, Nigeria not only strengthens its education system but also positions itself as a country committed to global sustainability targets (United Nations, 2015).

5. Long-Term National Impact

In the long term, integrating AI into vocational Home Economics could contribute to Nigeria's vision of becoming a knowledge economy by 2050. As more students graduate with AI-enhanced skills, the workforce will become increasingly innovative, creative, and adaptable. This shift could reduce dependence on foreign expertise, curb brain drain, and empower Nigerian industries to compete globally. Additionally, AI adoption in Home Economics can spill over into other vocational fields such as agriculture, carpentry, and hospitality, thereby creating a ripple effect across the education system.



Ultimately, the expected impact is a generation of young Nigerians who are digitally competent, entrepreneurial, and self-reliant—a workforce capable of driving the nation’s sustainable development and global competitiveness.

Policy Recommendations

1. National Policy Reform

The integration of Artificial Intelligence into vocational Home Economics requires deliberate national policy reform. The Federal Ministry of Education should mainstream AI adoption into the National Policy on Science and Technology Education and the National Policy on Vocational and Technical Education. This will ensure that AI integration is not treated as an isolated innovation but as a systemic transformation across Nigeria’s educational framework (FRN, 2020). Clear policy directives should mandate curriculum redesign, teacher retraining, and infrastructure development to support AI-enhanced learning. Such policy reform will also provide legitimacy and attract funding from international development partners.

2. Dedicated Funding and Resource Allocation

AI adoption cannot succeed without substantial financial commitment. Nigeria must establish dedicated funding lines for AI integration in vocational education, with contributions from government budgets, Tertiary Education Trust Fund (TETFUND), and private sector partners. Innovative financing models, such as public-private partnerships (PPPs), should be encouraged to fund ICT infrastructure, teacher training, and development of localized AI applications. International donor agencies like UNESCO, the World Bank, and UNICEF could also be engaged to provide financial and technical support. Furthermore, schools could adopt cost-sharing mechanisms where communities contribute modestly to sustaining AI-based resources.

3. Gender-Responsive Policies

Home Economics has traditionally been perceived as a female-oriented subject. While this perception has marginalized male students, it has also reinforced gender stereotypes. AI integration presents a unique opportunity to rebrand Home Economics as a gender-neutral discipline. National policies should therefore emphasize gender inclusivity, ensuring that both boys and girls are encouraged to enroll in AI-enhanced Home Economics programs. Scholarships, mentorship programs, and entrepreneurship grants should particularly target girls and women to promote gender equity in the digital economy. This aligns with Nigeria’s obligations under SDG 5 (Gender Equality) and the African Union’s Agenda 2063.

4. Infrastructure Investment and Maintenance

A key challenge to AI adoption is the absence of reliable infrastructure in Nigerian schools. National and state governments must prioritize investment in ICT labs, broadband internet, and stable electricity supply, especially in rural and underserved areas. In addition, sustainable models for maintaining infrastructure should be developed. Too often, ICT projects in Nigeria fail not because of poor design but because of lack of maintenance. Policies should therefore include provisions for regular upgrading of equipment, training of technical staff, and monitoring of resource utilization.

5. Teacher Professionalization and Continuous Training

Teachers are central to the success of AI integration. Policies must mandate continuous professional development (CPD) programs that expose teachers to AI tools, digital pedagogies, and emerging technologies. Such training should be institutionalized, perhaps through collaboration with teacher



training colleges and universities. Incentive structures—such as promotions, certifications, and financial rewards—could motivate teachers to embrace AI training. By professionalizing teaching with a focus on AI literacy, Nigeria can ensure that educators are prepared to lead the next generation of digital learners (Ayanwale et al., 2020).

6. Monitoring, Evaluation, and Accountability

To ensure that AI integration achieves its intended outcomes, strong monitoring and evaluation (M&E) systems must be established. Policymakers should develop data-driven frameworks for tracking progress in AI adoption, identifying challenges, and adjusting strategies accordingly.

Regular audits of ICT resources, teacher competencies, and student outcomes should be conducted. Schools should be required to submit periodic reports, while independent evaluators, including NGOs and academic researchers, could provide oversight. This accountability framework ensures transparency and long-term sustainability (UNESCO, 2022).

7. Ethical and Legal Considerations

AI adoption in education raises important ethical and legal issues. Data privacy, for example, is a critical concern when using AI platforms that collect student information. Policies must include strict guidelines on data protection, cyber-security, and responsible AI use. Additionally, efforts should be made to prevent algorithmic bias that could disadvantage students based on gender, language, or socio-economic background. Nigeria should align its AI-in-education policies with global standards to ensure inclusivity, fairness, and accountability.

Conclusion

The integration of Artificial Intelligence into vocational Home Economics in Nigeria represents both a challenge and an opportunity. At its core, Home Economics has always been about equipping individuals with life skills, entrepreneurship capabilities, and practical knowledge for self-reliance. However, in its current form, the subject is constrained by outdated curricula, undertrained teachers, inadequate infrastructure, and societal perceptions that diminish its value. These limitations have widened the gap between what students learn in school and the skills demanded in the labor market, contributing to Nigeria's broader unemployment and underemployment crises. Artificial Intelligence offers a viable pathway for bridging this gap. By embedding AI into Home Economics, Nigeria can modernize curricula, personalize learning experiences, and expose students to digital entrepreneurship opportunities. AI-powered simulations in cooking, textiles, and budgeting not only make learning more interactive and engaging but also reduce resource wastage and expand access for students in resource-constrained environments. Adaptive systems ensure that learners at different ability levels are adequately supported, while AI-driven business tools prepare graduates to thrive as entrepreneurs in the digital economy. The broader impacts of such integration are equally significant. For students, AI enhances learning outcomes and digital literacy, preparing them to participate effectively in Nigeria's knowledge economy. For teachers, it provides opportunities for professional growth, improved pedagogy, and reduced workload. For society, it promises job creation, poverty reduction, gender empowerment, and alignment with global development agendas such as the Sustainable Development Goals. In the long term, AI-enhanced vocational Home Economics can serve as a model for transforming other vocational disciplines, catalyzing systemic educational reform in Nigeria.



Nevertheless, realizing this vision requires deliberate action. Policymakers must enact reforms that prioritize AI integration, allocate dedicated funding, and ensure continuous teacher training. Infrastructure investment, particularly in ICT facilities, electricity, and internet access, is non-negotiable. Partnerships with industry and international organizations will be critical to provide technical expertise and contextualized AI applications. Equally important is the need to address ethical concerns, including data privacy and equitable access, to ensure that no learner is left behind. Ultimately, the success of AI in vocational Home Economics will depend on Nigeria's willingness to embrace change and innovation. The transformation of this discipline is not merely an educational matter—it is a strategic pathway for national development. By equipping young Nigerians with digital, entrepreneurial, and life skills, the country can harness its demographic dividend and position itself as a competitive player in the global knowledge economy. In this sense, reimagining Home Economics through AI is not just about reforming a subject; it is about rethinking Nigeria's future.

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