CURRICULUM INNOVATION FOR SUSTAINABLE DEVELOPMENT IN AFRICA

Sunday B. Idakwoji, PhD
Department of Educational Foundations, Veritas University Abuja
idakwojis@veritas.edu.ng

Francis R. Ojo, PhD
Department of Science Education, Veritas University

Abstract

Curriculum innovation has become a strategic necessity for achieving sustainable development in Africa. The increasing challenges of climate change, unemployment, poverty, technological transformation, insecurity, and environmental degradation demand educational systems that are responsive, practical, and transformative. This paper examines the role of curriculum innovation in promoting sustainable development across African nations. It discusses the concept of curriculum innovation, sustainable development, and the nexus between education and development. The paper further explores major areas of curriculum reforms in Africa, including digital literacy, environmental education, entrepreneurship education, skills acquisition, indigenous knowledge integration, and competency-based learning. Challenges confronting curriculum innovation such as inadequate funding, poor infrastructure, insufficient teacher preparation, policy inconsistency, and technological gaps are highlighted. The paper concludes that curriculum innovation remains a critical instrument for achieving the Sustainable Development Goals (SDGs) and Africa Agenda 2063. Recommendations including increased budgetary allocation to education and incorporation of innovative pedagogies and ICT competencies into teacher education programmes were made for governments, educational institutions, and stakeholders to strengthen policy implementation, teacher development, and investment in innovative learning systems.

Keywords: Curriculum Innovation, Sustainable Development, Africa, Education Reform, SDGs, Competency-Based Education

Introduction

African countries are currently confronted with numerous developmental challenges, According to Akinsanya,. (2018) and Oloruntegbe & Agbayewa, (2014), these challenges include poverty, unemployment, climate change, food insecurity, political instability, and inadequate technological advancement. The realities of these challenges require educational curricula that significantly promote critical thinking, innovation,

entrepreneurship, environmental consciousness, and practical skills for sustainable living. Education as posited by Idakwoji, (2016) remains one of the most powerful tools for national transformation, including sustainable development. Across Africa, educational systems are increasingly expected to address socio-economic challenges through relevant and innovative curricula. Sustainable development involves meeting present needs without compromising the ability of future generations to meet their own needs. It encompasses economic growth, environmental protection, and social inclusion (Oloruntegbe, & Agbayewa, 2014). The African Union's Continental Education Strategy for Africa (CESA) (2015) emphasizes the transformation of African education systems to promote innovation, creativity, and sustainable development. Likewise, UNESCO has continued to advocate curriculum reforms that integrate sustainability, climate education, digital learning, and lifelong learning approaches across Africa (UNESCO, 2023). All the foregoing is in a bid to bring about development sustainable development in Africa.

Curriculum innovation therefore becomes essential for preparing learners with the competencies, values, and attitudes necessary for sustainable development in the Twenty-First Century Africa.

Concept of Curriculum Innovation

Curriculum innovation refers to deliberate changes and improvements in educational content, teaching methods, learning experiences, assessment procedures, and instructional resources aimed at improving educational effectiveness and societal relevance. It involves introducing new ideas, technologies, pedagogies, and learning approaches into the educational system (Akinsanya, 2018; Fullan, 2016) . Curriculum innovation have been necessary from time to time across cultures and could vary from one culture to another. In Africa currently necessary curriculum innovation would include the following:

a) Integration of digital technologies into teaching and learning
b) Competency-based education
c) Entrepreneurship education
d) Environmental and climate education
e) Science, Technology, Engineering and Mathematics as well as Technical education
f) Inclusive and learner-centered approaches
g) Integration of indigenous knowledge systems

(Akinsanya, 2018: African Union, 2015)

Innovative curricula are designed to equip learners with practical skills, creativity, collaboration, communication abilities, and problem-solving competencies necessary for national development. Hence the necessity for the introduction of the seven innovative subjects in the curriculum (Akinsanya, 2018).

Sustainable Development in the African Context

Sustainable development according to the World Commission on Energy (1987) "Brundtland Report" is that development that "meets the needs of the present without compromising the ability of future generations to meet their own needs." It stands on three related pillars which are economic growth, social inclusion and environmental protection. Sustainable development in Africa refers to the development that meets the present needs of Africa without compromising the ability of the future generations of Africa to meet their own needs. It requires that education accomplishes three tasks, and these require curriculum innovation. The three tasks are:

a) *Meets the present needs of Africa*: Curriculum innovation is necessary here to craft learning that is relevant and problem- solving (relevance plus present problem-solving). African curriculum should no longer be abstract theories but should immediately start addressing the current needs of the continent. Such needs to be addressed include insecurity, unemployment, flooding, desertification, energy access, internet access, corruption and widespread poverty. Infusion and interdisciplinary approaches could be used to come up with a curriculum to accomplish this, for instance health issues, water and climate could be embedded into Mathematics.

   Place-based projects could also be used. For instance, students in Lagos and Accra could study waste management, while those in flood –prone areas and desert- prone places should have aspects of these embedded in Biology, Health Science and Literature

   In this way the curriculum would have shifted from "content coverage" to "competency for life"

b) *Without compromising the ability of the future generations*: Curriculum innovation is required here to building values, future –thinking and competent action. The curriculum has to provide for the teaching of service, stewardship and skills to ensure the safety of resources for the future. The following examples would suffice. Eco-pedagogy (where deforestation could be learnt and then followed up by tree- planting campaign), system –thinking (e.g. studying charcoal use, the tree loss and soil erosion which follow, and the consequent lower farm yield for future farmers) and indigenous knowledge integration (Adding African practices such as rotation farming and sacred groves which are result-yielding science and ethics for sustainability)

c) The three mainstays of curriculum shift in Africa which are: economic (adding skills for preservation and entrepreneurship such as solar installation, recycling and agribusiness instead of just the traditional white collar jobs), social (which

involves citizenship and cultural relevance that is adding indigenous knowledge to teach community responsibility and environmental justice), and environmental (adding experiential learning and inquiry learning involving use of school garden, actual water testing and actual climate data, rather than only memorizing diagrams).

(UNESCO, 2017, World Commission on Energy and Development, 1987)

Sustainable development goals for Africa thus focuses on improving the quality of life while ensuring environmental sustainability and social equity. The concept aligns with the United Nations Sustainable Development Goals (SDGs) and the African Union Agenda 2063.

The African Union and UNESCO (2023) have noted the need for inclusive growth and development in Africa. They recognize education as the major driver for development, and they see sustainable development in Africa as involving poverty reduction, quality education, environmental sustainability, gender equality, economic empowerment, technological advancement, peace and social justice, food security and healthcare improvement. Educational institutions therefore have the responsibility of preparing learners to contribute meaningfully to these developmental goals (UNESCO, 2023; African Union, 2015).

Theoretical Framework

This study has been anchored on Jack Mezirow's Transformative Learning Theory propounded in early 1990s. The Theory's proposition is that learning becomes transformative when learners critically examine and revise their assumptions, beliefs and frames of reference to develop more inclusive and discriminating perspectives. The core points of the theory are the processes of critical reflection, rational discourse, and action including activities that enable learners to question customary or usual ways of thinking and then reconstruct meaning from experience (Mezirow, 1991 and Mezirow, 2000). The relevance of this theory to this study, Curriculum Innovation for Sustainable Development in Africa, is embedded in its emphasis on education as a tool for individual and societal transformation. Regarding Africa, sustainable development demands more than factual contents on Sustainable Development Goals (SDGs). Africa demands a curriculum that disrupts unsustainable mind-sets relating to poverty, environmental degradation, and over-dependence. It should then replace these with values such as stewardship, innovation, and social responsibility.

Transformative learning theory therefore provides a basis for designing a curriculum that is experimental, dialogic and problem-based. It positions teachers as facilitators of critical reflection and learners as active agents of change within their communities. A curriculum innovation that is anchored on this theory would produce graduates who not only understand sustainable development but are committed to advancing development

in line with the African Union Agenda 2063 and Sustainable Development Goal 4.7 ()SDG 4.7 (African Union, 2015)

Curriculum Innovation and Sustainable Development

Curriculum innovation has been established as contributing significantly to sustainable development. According to Akinsanya, (2018) and Tikly, (219) it (curriculum innovation) does so in several ways including the following:

1. Promotion of Environmental Education

Environmental education helps learners understand ecological systems, climate change, biodiversity conservation, and sustainable resource management. African educational systems are increasingly integrating environmental sustainability into curricula to develop environmentally responsible citizens. UNESCO reports indicate growing efforts across African countries to promote climate education and green learning initiatives in various subjects and courses at various levels of education (UNESCO, 2023; 2017).

2. Development of Entrepreneurial Skills

Entrepreneurship education equips students with self-reliance skills, innovation capabilities, and business competencies necessary for employment creation. This type of education helps reduce unemployment and poverty among African youths, and it is curriculum innovation that brings in the contents that teach them. Innovative curricula that integrate vocational and technical education such as catering, phone repairs, machine learning, sewing and block-making enable graduates to become job creators rather than job seekers.

3. Integration of Digital Literacy

Digital transformation has become indispensable in modern education. Curriculum innovation now emphasizes Information and Communication Technology (ICT), artificial intelligence, coding, online learning, and digital research skills. African societies with these curricula and which produce graduates in these fields are climbing up the ladder of sustainable development. UNESCO and African Union educational initiatives strongly advocate technology-driven learning systems for sustainable growth in Africa (UNESCO, 2025, African Union, 2015).

4. Competency-Based Education

Competency-based curricula focus on practical skills, creativity, critical thinking, collaboration, and problem-solving rather than rote memorization. Such curricula

prepare learners for real-life challenges and labour market demands. These are highly needed in Africa.

Many African countries including Kenya, Rwanda, Ghana, and South Africa have introduced competency-based curriculum reforms aimed at improving employability and innovation.

5. Integration of Indigenoowledge

African indigenous knowledge systems promote sustainable agriculture, traditional medicine, conflict resolution, environmental conservation, and communal living. A curriculum innovation that integrates indigenous knowledge promotes cultural identity and locally relevant solutions to development challenges. Integration of these pieces of indigenous knowledge into the curriculum will lead to the production of graduates who would experience significantly less unemployment, who would display more society –helpful or society–friendly attitude, respecting the healthy ways of the society.

6. Promotion of STEM Education

Science, Technology, Engineering, and Mathematics (STEM) education encourages innovation and scientific advancement necessary for industrialization and technological development in Africa. Emerging curriculum innovations increasingly emphasize robotics, renewable energy, agricultural technology, and engineering education to strengthen Africa's global competitiveness and raise the continent's level of development sustainably.

Areas of Curriculum Innovation in Africa

Several researches have been conducted into curriculum innovation in Africa. Among these, a number, including those of Akinsanya, (2018) and Ornstein & Hunkins, (2018) have identified the areas that the innovation covers in education among which are the following.

Green and Climate Education

African schools and universities are increasingly incorporating climate change education, environmental sustainability, renewable energy studies, and ecological literacy into academic programmes. These areas tend to be receiving reasonable studies and research attention based on the current demand for them.

Technical and Vocational Education and Training

Technological and Vocational Education and Training (TVET) programmes now emphasize practical skills acquisition, entrepreneurship, industrial training, and employability competencies for sustainable economic development. International frameworks such as those African Union and the United Nations and its agencies have continued to work to sensitize African governments and their agencies including the schools and universities to this aspect of the curriculum (African Union, 2015; UNESCO, 2025)

Digital and AI Education

Recent educational reforms around the world increasingly include artificial intelligence, coding, robotics, and digital ethics within school curricula to prepare learners for emerging technological realities. Africa tend not to have been left behind in this wind that is blowing in this aspect of curriculum innovation. (UNESCO, 2025 Yusuf, 2020 & African Union, 2015).

Community-Based Learning

Community engagement and service-learning programmes encourage learners to solve societal problems through participatory learning experiences. The recent preponderance of environmental problems or awareness of them has led to much studies on environmental problems including the local ones, leading to efforts aimed at seeking local or community resources to find solutions to them. Erosion, flooding and soil fertility are examples here.

Inclusive Education

Curriculum innovation also promotes gender inclusion, disability inclusion, and equitable access to quality education for marginalized populations. International agencies in Africa including the United Nations and its organs as well as the African Union have continued to campaign for promotion of this are of education in Africa. Inclusive education has received significant attention in African curriculum, and thus inclusivity in educational management, as well as in the values and attitudes of school graduates are on the rise (UNESCO, 2023).

Challenges Facing Curriculum Innovation in Africa

Curriculum innovation is a usual activity in modern societies, as it is a core way of making education responsive to the challenges the society faces. In African societies, it has been on for some time, and its necessity cannot be over-emphasized (Akinsanya, 2018: Ornstein & Hunkins, 2018). Despite its importance however, its effectiveness tends to be grossly lacking. Among reasons adduced for its in-effectiveness, below par

implementation features significantly. And further studies have identified several challenges including the following as hindering its effective implementation:

Inadequate Funding

Many African countries allocate insufficient resources to education, thereby limiting infrastructure development, curriculum implementation, and educational research. Several international organizations have noted the issue of inadequate funding of education among African countries and the consequences. The United Nations and its agencies as well as the African Union have appealed for better funding of education by African countries (UNESCO, 2025; UNESCO, 2026)

Poor Technological Infrastructure

Limited internet access, inadequate electricity supply, and shortage of digital devices constrain the integration of technology into education. Inadequate electricity supply as well as highly limited internet bandwidth are common problems in over 90% of the African countries, and these have noted negative effect on teaching and learning in African schools. Curriculum implementation is thus made less effective.

Insufficient Teacher Preparation

Teachers often lack adequate training in innovative teaching methods, digital literacy, and competency-based instruction. The story of teacher inadequacy in most African countries include a good number of untrained and uncertified teachers, a significant number lacking computer or digital literacy, among others. According to Mosanto and Ntshoe, (2026) Akinsanya, (2018) these inadequacies hinder effective implementation of educational programs and activities.

Policy Inconsistency

Frequent policy changes and weak implementation mechanisms negatively affect curriculum continuity and sustainability. Quite a number of African countries experience frequent education policy changes, but these policies have been known to be poorly implemented. Nigeria for instance is known to have frequently come up with new education policies like those on ICT and free and compulsory basic education (Federal Ministry of Education, 2019; Federal Republic of Nigeria, 2014). These policies have however been known to be poorly implemented.

Resistance to Change

Some educators and institutions resist educational reforms due to attachment to traditional teaching methods. Teachers in educational institutions across African societies display resistance to change, especially technological integration as there is a

general tendency of the older set of teachers to manage teaching and learning with little or no use of modern information and communication technologies.

Large Class Sizes

Overcrowded classrooms hinder learner-centered approaches to studies and practical instruction. Quite a number of African countries including Nigeria have schools characterized by large class sizes, and this makes teaching and learning including general classes as well as practical classes especially difficult to manage (Akinsanya, 2018).

Socio-Economic Challenges

Poverty, insecurity, conflicts, and political instability affect effective educational delivery in African countries. Most African countries particularly the Sub-Saharan African countries face the above listed challenges to a significant level. These socio-economic changes affect schools' attendance in these countries as kidnaping, banditry, farmers- herders clashes and terrorist attacks, among others, make life including school attendance difficult (Akinsanya, 2018).

The foregoing challenges indeed limited the effect of curriculum innovation on sustainable development in Africa and call foe effective ways of overcoming them.

Strategies for Effective Curriculum Innovation

The need for sustainable development in Africa and the place of curriculum innovation in sustainable development calls for ways of ensuring effective curriculum innovation. To achieve sustainable curriculum reforms as well as sustainable development in Africa, several works, including that of Akinsanya, (2018) hold that the following strategies should be employed:

Strengthening Teacher Capacity

Governments and institutions should provide effective continuous professional development for teachers in innovative pedagogies and digital competencies. The teacher, as one of the central factors in every teaching and learning situation, has to be trained in the current best practices of innovative pedagogies and digital competencies. And then he would be much better positioned to expose the learners to the needed curriculum, which outcomes would include sustainable development in Africa.

Increased Educational Funding

Adequate investment in education is essential for the provision of the infrastructure, instructional materials, research, and technological development. For education to deliver optimally the required infrastructure, instructional materials and technology, as well as research need to be provided and employed. They require significant amount of money, which is why education usually demand a most significant portion of each country's national budget. The United Nations -advised 20% and above of the national budget funding for each country's education would be greatly suitable for African countries to realise the sustainable development

Integration of ICT Facilities

Schools should be equipped with internet facilities, computers, digital laboratories, and smart classrooms as well as the requirements that make these facilities work properly. Apart from providing these, they should be engaged to deliver optimally. This is necessary if the curriculum would be implemented in a way that sustainable development would be achieved.

Stakeholder Collaboration

Governments, educational institutions, private organizations, communities, and international development partners should collaborate in curriculum development and implementation in African countries. It is important for all stakeholders in education to work together to identify the challenges that education should prepare learners for in the society, to provide the resources for these and then to ensure that the curriculum implementation is done in the spirit of the planners.

Contextualization of Curriculum

Curricula should reflect African realities, indigenous knowledge systems, and local developmental needs. Curriculum of African countries is supposed to solve African problems, it therefore has to mind the realities of African societies, build on or improve indigenous knowledge systems and work on the needs of the society. This kind of contextualization of the curriculum is the one that will ensure the sustainable development.

Monitoring and Evaluation

Regular assessment of curriculum implementation is necessary in order to ensure effectiveness and sustainability. The objectives, the implementation, and the timelines have to be examined from time to time in relation to the set objectives and expected outcomes. This would point out the extent of coverage, the gap and the new changes to introduce.

The engagement of the foregoing curriculum innovation strategies by African countries will bring about the much needed sustainable development in the continent (Akinsanya, 2018; African Union, 2015: Adeyemi, 2012).

Conclusion

Curriculum innovation remains indispensable for sustainable development in Africa. Educational systems must evolve continuously to address emerging social, economic, environmental, and technological challenges. Innovative curricula that emphasize digital literacy, entrepreneurship, environmental education, competency development, and indigenous knowledge integration will equip African learners with the skills necessary for national transformation. Africa's aspiration for sustainable development can only be achieved through educational systems that are dynamic, inclusive, relevant, and future-oriented. Governments and stakeholders must therefore prioritize curriculum reforms capable of empowering learners for sustainable living and global competitiveness.

Recommendations

In order to ensure seamless curriculum innovation for the much needed sustainable development in Africa, the following recommendations are made:

1. African governments should increase budgetary allocation to education.
2. The relevant government agencies and Teacher training institutions should incorporate innovative pedagogies and ICT competencies into teacher education programmes.
3. Educational curricula should integrate sustainability and environmental education at all levels of education.
4. Schools should adopt competency-based and learner-centered instructional approaches.
5. Greater investment should be made in digital infrastructure and e-learning technologies in order to ensure expansion and modernization.
6. Indigenous African knowledge systems should be integrated into curriculum planning.
7. Collaboration between educational institutions, industries, and communities should be strengthened.
8. Continuous monitoring and evaluation mechanisms should be established for curriculum reforms.

References

Adeyemi, M. B. (2012). Sustainable development and education in Africa. *Journal of Sustainable Development in Africa*, 14(6), 45–58.

African Union. (2015). *Continental Education Strategy for Africa (CESA 16–25).* Addis Ababa: African Union.au-int

African Union Commission. (2015). *Agenda 2063: The Africa We Want.* Addis Ababa: African Union. au.int

Akinsanya, O. O. (2018). Curriculum innovation and sustainable development in Africa. *African Educational Research Journal*, 6(4), 201–210.

Federal Ministry of Education (2019). *National Policy on Information and Communications Technologies (ICT) in Education*. Abuja: federal Ministry of Education

Federal Republic of Nigeria (2014) *National Policy on Education* Lagos: NERDC Press

Fullan, M. (2016). *The New Meaning of Educational Change* (5th ed.). New York: Teachers College Press.

Idakwoji, S. B. (2016). Issues of the Teacher and Improved Educational Achievement in Nigerian Schools. *American International Journal of Research in Humanities, Arts and Social Sciences,* 14 (2) March – May 2016, pp.175 -182.

Mezirow, J. (1991). Transformative dimensions of adult learning. New York: Jossey-Bass

Mezirow, J. (2000). Learning to Think like an adult: Core concepts of transformation theory. In J. Mezirow & Associates 9EDs,)learning as transformation: Critical perspectives on a theory in progress. New York: Jossey- Bass

Masonto, R. X., & Ntshoe, I. (2026). Reimagining innovative teaching strategies, pedagogies and learning environments in global classrooms. Atlantis Press.

Oloruntegbe, K. O., & Agbayewa, J. O. (2014). Environmental education and sustainable development in Africa. *International Journal of African Development*, 2(1), 33–41.

Ornstein, A. C., & Hunkins, F. P. (2018). *Curriculum: Foundations, Principles and Issues* (7th ed.). Boston: Pearson Education.

World Commission on Environment and Development (1987). Our Common Future. Oxford: Oxford University Press. P.43

Tikly, L. (2019). Education for sustainable development in Africa: A critique of regional agendas. *Asia Pacific Education Review*, 20(2), 223–237.

UNESCO. (2023). *Education in Africa: Placing Equity at the Heart of Policy.* Paris: UNESCO.

UNESCO. (2025). *Transforming Learning and Skills Development in Africa.* Paris: UNESCO, UNICEF & African Union.

UNESCO. (2026). Education in Africa. Paris: UNESCO.

UNEP. (2020). *Mainstreaming Environment and Sustainability in Africa Universities Partnership (MESA).* Nairobi: United Nations Environment Programme.

Yusuf, M. O. (2020). Digital learning and curriculum innovation in Africa. *Journal of Educational Technology*, 15(3), 78–92.