

# The Functional Contributions of Science to The Nigeria Basic Education Programme

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## Abstract:

This study explores the functional contributions of science to Nigeria's Universal Basic Education (UBE) programme, emphasising its transformative role in fostering critical thinking, environmental awareness, and societal development. Introduced in 1999, the UBE programme aimed to extend access to foundational education, aligning with global education initiatives and addressing socio-economic disparities. Science, as an integral component of the curriculum, facilitates interactive learning, instilling essential skills like inquiry, analysis, and problem-solving. It supports the UBE's objectives by promoting literacy in environmental sustainability, food security, health, and technological advancements. Science education empowers learners to comprehend and interact meaningfully with their environment, leveraging tools like experimentation and technology to address contemporary challenges, such as climate change and resource management. By fostering a multidisciplinary approach, it enhances integration across subjects, ensuring a holistic educational experience. The study highlights how science supports the UBE's vision of inclusivity and lifelong learning by equipping learners with practical skills and ethical values for personal and societal advancement. Despite significant progress, challenges such as inadequate resources, teacher shortages, and cultural barriers persist, limiting the programme's full potential. Addressing these requires innovative approaches, including enhanced teacher training and integration of digital tools, to sustain the functional contributions of science to basic education in Nigeria.

**Keywords:** Contributions, Science Education, Nigeria, Universal Basic Education (UBE),

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## Introduction

The Universal Basic Education (UBE) programme in Nigeria underscores a commitment to ensuring that every individual has equitable access to comprehensive and inclusive education. Introduced as a successor to the Universal Primary Education (UPE) initiative of 1976, which provided six years of primary education, UBE was launched 23 years later, extending basic education to nine years. This shift was indicative of the evolving understanding of education as a tool for development, reflecting broader global trends that sought to redefine and expand the concept of basic education. Over the last few decades, basic education has been increasingly recognised as a critical foundation for sustainable development, especially in the context of developing nations like Nigeria.

The notion of basic education extends beyond formal schooling. It encompasses a diverse range of educational activities in formal, non-formal, and informal settings, aimed at meeting basic learning needs. This broad definition highlights its inclusive nature, ensuring that education is accessible to diverse groups, including out-of-school children, adults requiring literacy skills, and learners in non-traditional settings. Basic education is not confined to a rigid timeframe; instead, it is conceptualised as a flexible, foundational stage of learning designed to equip individuals with literacy, numeracy, and life skills necessary for personal and societal advancement.

Globally, the emphasis on basic education has gained significant traction, especially after the 1990 World Conference on Education for All (WCEFA) in Jomtien, Thailand. WCEFA defined basic education as encompassing primary education, considered the first stage, and lower secondary education, regarded as the second stage. In many developing nations, basic education also includes pre-primary programmes and adult literacy initiatives. This broader interpretation underscores the importance of equipping individuals with lifelong learning skills, thereby fostering societal progress and economic resilience. In Nigeria, the transition from UPE to UBE reflects an understanding of the critical role education plays in addressing socio-economic disparities. While UPE primarily targeted universal access to primary education, UBE aims to integrate foundational education with broader developmental goals. This includes promoting gender equity, reducing child labour, and addressing literacy challenges among adults. The programme envisions a holistic approach to learning, ensuring that no demographic is excluded, whether due to geographic, economic, or social barriers.

Obayan (2000) elucidates that basic education forms the bedrock for literacy and numeracy, consolidating foundational learning skills and nurturing a capacity for lifelong learning. This approach ensures learners are equipped with the tools necessary for independent thought and adaptation in a rapidly changing world. Furthermore, Jegede (2000) emphasised the need for collaboration between formal and informal educational frameworks to realise the objectives of UBE fully. This integration ensures that all segments of society, including marginalised and underserved populations, can access the benefits of education. The UBE initiative aligns with global movements like the Education for All (EFA) framework led by UNESCO. These efforts highlight the necessity of basic education as a priority for developing nations. Recognising the interconnectedness of education and development, UBE seeks to mitigate barriers to learning and promote inclusivity. Moreover, the programme acknowledges that achieving universal basic education is fundamental to meeting broader global development goals, such as the United Nations Sustainable Development Goals (SDGs),



particularly Goal 4, which aims to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Despite its transformative vision, the implementation of UBE in Nigeria has faced significant challenges. These include inadequate infrastructure, insufficient funding, and a lack of qualified teachers. Furthermore, cultural barriers, such as early marriage and child labour, continue to impede access to education, particularly for girls. Addressing these issues requires a multi-faceted approach, involving stakeholders across government, private sector, and civil society. Enhancing teacher training, improving learning environments, and adopting innovative educational technologies are critical strategies for overcoming these barriers.

### **Goals of UBE**

The Universal Basic Education (UBE) programme in Nigeria was established to address fundamental educational challenges and promote access to quality education for all citizens. The programme's objectives, as outlined in its implementation guidelines, emphasise fostering a strong societal commitment to education, providing free and universal basic education, reducing school dropout rates, catering to diverse educational needs, and ensuring the acquisition of critical life skills and values. The UBE programme seeks to instil a strong conscientiousness for education among all Nigerians. This involves creating awareness about the importance of education as a transformative tool for individual and national development. By fostering a culture that values education, the programme aims to galvanise support from parents, communities, and other stakeholders. Research highlights that societal perceptions of education significantly impact enrolment and retention rates, particularly in underserved areas (Nwafor & Azuh, 2021). Awareness campaigns and partnerships with traditional leaders have been employed to build a collective commitment to education, ensuring the programme reaches every demographic.

Providing free basic education to every Nigerian child of school-going age is a cornerstone of the UBE programme. This initiative addresses financial barriers that prevent children from accessing education, particularly in rural and low-income urban areas. Free education policies are pivotal in reducing inequalities in educational access. Studies show that financial incentives and the removal of fees contribute significantly to higher enrolment and attendance rates (Adesina et al., 2022). However, to sustain the programme's success, challenges such as inadequate infrastructure, teacher shortages, and learning materials must be addressed. One of the primary goals of UBE is to tackle the issue of school dropouts. High dropout rates in Nigeria are often attributed to poverty, early marriage, child labour, and inadequate learning environments. The programme's strategies to combat these issues include school feeding initiatives, conditional cash transfers, and inclusive learning environments. Recent evidence suggests that these interventions have led to improved retention rates, although regional disparities remain a concern (Olatunji & Bello, 2020). A more targeted approach, particularly for marginalised groups like girls and children with disabilities, is essential for achieving this goal.

The UBE programme recognises the need to address the educational needs of out-of-school children and adolescents through complementary approaches. Alternative learning pathways, including non-formal education centres, vocational training, and adult literacy programmes,



have been introduced. These interventions are designed to integrate these children into the education system and equip them with practical skills. According to Adegbite and Onuoha (2019), non-formal education programmes have been instrumental in providing second-chance opportunities for dropouts and equipping them with life skills necessary for self-reliance and employability. The UBE programme aims to equip learners with essential literacy, numeracy, and life skills while fostering ethical, moral, and civic values. These competencies form the foundation for lifelong learning and active citizenship. The integration of these skills into the curriculum ensures that learners are prepared to contribute meaningfully to society. A recent evaluation by Eze and Nwachukwu (2023) emphasised that the incorporation of civic and ethical education into basic education curricula has significantly improved students' understanding of citizenship and moral responsibilities.

### **Conceptualisation of Science**

The term "science" originates from the Latin word *scientia*, which translates to "knowledge." It is a discipline built on the systematic observation of natural events and phenomena, with the aim of uncovering facts and establishing laws and principles grounded in those observations. As a dynamic field of inquiry, science is not merely a collection of facts but a structured process of understanding the natural world through experimentation, observation, and reasoning (National Research Council, 2012). Science is a uniquely human intellectual pursuit designed to explore and interpret the complexities of the world. It involves collecting data, analysing relationships among facts, and identifying patterns or connections that form the basis for scientific laws and theories. For instance, the formulation of the laws of motion and thermodynamics demonstrates how science systematically organises information into coherent frameworks to explain and predict natural phenomena (Chalmers, 2013).

At its core, science is both a process and an outcome. The process is systematic and organised, involving methods such as hypothesis formulation, experimentation, and peer review to ensure credibility and reproducibility. The outcome is the knowledge gained, which deepens understanding of the world and often translates into practical applications. For example, scientific advancements in fields like medicine and environmental science have profoundly improved the quality of life, offering solutions to complex challenges such as disease outbreaks and climate change (Miller & Spoolman, 2016). Moreover, science transcends the mere acquisition of knowledge by fostering critical thinking, innovation, and problem-solving skills. It liberates individuals and societies from ignorance and superstition, encouraging a culture of inquiry and evidence-based reasoning. As such, science enriches lives by broadening perspectives, nurturing imagination, and equipping individuals to make informed decisions. According to UNESCO (2021), the ability to engage with science is essential in a rapidly changing world, where scientific literacy empowers individuals to participate meaningfully in discussions about issues like artificial intelligence and sustainable development.

Science is a multifaceted endeavour that combines intellectual curiosity with rigorous methodologies to explore, understand, and utilise the natural world. By providing tools for inquiry and evidence-based reasoning, science serves as a cornerstone for progress, fostering innovations that shape and enrich human life.



### **Importance of Basic Education**

Basic education is the foundation of personal and societal growth, shaping not just individuals but also the communities they inhabit. It lays the groundwork for acquiring essential skills, knowledge, and values that enable individuals to contribute meaningfully to society. Education has consistently been identified as a critical factor in achieving personal success and societal progress. Research confirms that access to quality basic education significantly impacts an individual's future opportunities, aspirations, and overall development (UNESCO, 2021). A comprehensive basic education equips individuals with the cognitive, emotional, and social tools necessary to navigate life successfully. It is widely recognised that fundamental learning processes foster creativity, critical thinking, and problem-solving skills, which are indispensable in every professional field. Moreover, basic education serves as a gateway to more advanced learning, which is often required for employment. Studies have highlighted that foundational schooling improves the likelihood of economic stability and professional growth, creating a pathway for individuals to excel in their respective domains (World Bank, 2022).

The role of basic education extends beyond personal development to community and national development. By educating children, societies cultivate a generation capable of addressing contemporary challenges such as poverty, inequality, and unemployment. Education empowers individuals to engage in informed decision-making, participate actively in governance, and foster sustainable development. According to UNICEF (2022), a quality basic education equips young people with the knowledge to adopt healthier lifestyles, reduce their vulnerability to diseases, and engage productively in economic and political activities. This transformative power of education underscores its critical importance as a fundamental human right and a public good. Basic education also plays a crucial role in promoting gender equity and reducing socio-economic disparities. Educated women are more likely to delay marriage, have fewer children, and invest in their children's education and health, thus breaking the cycle of poverty. Furthermore, education empowers individuals, particularly girls, to challenge societal norms that perpetuate inequality. Research shows that societies with higher levels of female education experience enhanced economic productivity and improved social outcomes (OECD, 2021).

A rights-based approach to education emphasises inclusivity, addressing systemic inequities that deprive millions of children of their right to learn. This approach ensures that vulnerable groups, including girls, children in rural areas, and those from low-income families, can access quality education. Education not only transforms individual lives but also strengthens societal cohesion by reducing inequalities and fostering shared values (UNESCO, 2022). Basic education is indispensable for individual and collective development. It equips individuals with the skills and knowledge necessary for personal advancement while promoting societal equity and progress. Governments, communities, and stakeholders must prioritise access to quality education to ensure a sustainable and inclusive future.

### **Importance of Science in Basic Education**

Science plays an indispensable role in achieving the objectives of Universal Basic Education (UBE), serving as a foundation for curiosity, environmental awareness, life sustenance, food security, employment generation, and governance. The integration of science into basic education fosters critical thinking and equips learners with the skills needed to address real-





world challenges. Its impact extends beyond the classroom, influencing societal development and individual empowerment.

Science fosters curiosity and exploration by sparking an innate desire to understand the natural world. Its interactive nature encourages learners to ask questions, seek answers, and engage in practical activities that deepen their understanding. The integration of science in basic education helps children and illiterate adults better comprehend their surroundings, including the functions of their sensory organs and the relationships between living and non-living things. Advances in technology have further revolutionised science education, making it more accessible and engaging through the use of interactive tools and digital resources. For instance, learners can now visualise complex scientific processes through simulations, enhancing their understanding and retention of concepts (Ng et al., 2021). The multidisciplinary nature of science also complements subjects like mathematics, geography, and language, promoting a holistic learning experience.

Learning science provides learners with the tools to perceive and interact with their environment in meaningful ways. Through inquiry-based learning approaches such as investigations, exploration, and experimentation, science equips learners with critical skills to address environmental challenges, including climate change, pollution, and deforestation. For instance, education on renewable energy sources and waste management can inspire learners to adopt sustainable practices and advocate for environmental preservation (UNESCO, 2023). This understanding is particularly crucial for individuals in basic education programmes, as it empowers them to protect their communities and contribute to global sustainability.

Science is fundamental to sustaining life on Earth, offering insights into the delicate balance of ecosystems and the interdependence of living organisms. By studying plants and their role in processes like photosynthesis, learners appreciate the importance of biodiversity in maintaining ecological equilibrium. Plants not only generate oxygen but also play critical roles in food production, medicine, and the water cycle. Understanding these concepts enables learners to recognise the consequences of actions such as deforestation and to adopt practices that promote environmental conservation. This knowledge is particularly vital in addressing global challenges like climate change and ensuring the health of future generations (Miller et al., 2019).

Food security is another critical area where science contributes significantly. Virtually all food consumed by humans is derived directly or indirectly from plants, highlighting the importance of agricultural science in addressing the demands of a growing population. Through basic education, learners acquire knowledge about crop cultivation, soil management, and sustainable agricultural practices. These skills are essential for boosting food production, reducing hunger, and ensuring the availability of nutritious food. For instance, advancements in agricultural biotechnology, such as the development of drought-resistant crops, have demonstrated the transformative potential of science in enhancing food security (FAO, 2022).

Science also plays a vital role in public health, contributing to longer life expectancy and improved quality of life. Through vaccination programmes, disease prevention strategies, and advancements in medical technology, science has reduced mortality rates and improved maternal and child health outcomes. Basic education programmes that incorporate science provide learners with essential health knowledge, empowering them to make informed



decisions about nutrition, hygiene, and preventive care. Moreover, a scientifically literate population is better equipped to address emerging health challenges, such as pandemics, through informed decision-making and compliance with public health guidelines (WHO, 2021).

The relationship between science and employment generation cannot be overstated. Science education equips individuals with skills that are highly sought after in industries such as telecommunications, agriculture, healthcare, and technology. For instance, the agricultural sector benefits from scientific innovations that increase productivity, while the telecommunications industry relies on scientific expertise for technological advancements. In Nigeria, scientific literacy has contributed to job creation in diverse sectors, highlighting the economic benefits of integrating science into basic education (Ogunniyi et al., 2020).

Science also contributes to governance and political stability by fostering informed citizenship and encouraging non-violent conflict resolution. Through science education, individuals develop critical thinking skills that enhance their ability to analyse complex issues and participate meaningfully in democratic processes. For example, the knowledge of science was instrumental in the use of technology during Nigeria's recent elections, where citizens utilised biometric systems for voter registration and authentication. This demonstrates how science not only supports technological advancements but also promotes transparency and accountability in governance (Ibrahim et al., 2022).

### **Conclusion**

The integration of science into Universal Basic Education is pivotal for individual and societal development. Science fosters curiosity, enhances environmental awareness, supports life sustenance, improves food security, generates employment, and promotes good governance. By equipping learners with the knowledge and skills to address real-world challenges, science education lays the foundation for sustainable development and a more equitable society. Stakeholders must prioritise the effective implementation of science curricula in basic education programmes, leveraging technology and innovation to maximise its impact.

### **Recommendations**

1. Massive provision of teaching and learning facilities and improvement of existing ones will enhance a more robust influence of science on the implementation of the programme. For example, the use of computers is generally limited to computer awareness and literacy to large extent. The use of computers should be widespread among the students and the teachers.
2. Government policy on enforcing attendance at the UBE programme needs to be vigorously pursued. The lack of commitment and general apathy towards the course of a successful implementation of the UBE has been a problem. Majority of parents in many parts of the country are still involved in keeping their children and wards behind. Also, the girl child education, especially in the sciences, should be emphasized. An enabling law to compel parents to leave no child behind should be enforced. Illiterate adults too need to be encouraged to participate in the BE programme.
3. Students' needs should be taken care of largely by the government and corporate organizations. Experiences still show that parents are largely involved in funding their children expenses. All the tiers of government, private establishments, communities and individual, parents called upon to fund UBE. Although, while it is wrong and misleading





to believe that education can be obtained absolutely free, practical steps should be taken to encourage individual, private organization and local communities to show commitment and financial backings to the ideals of the programme.

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