



Evaluation of Education Policy in Sub-Saharan Africa under the Context of Sustainable Development Goal 4 (SDG4)

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Abstract. This paper investigates education policies in 16 sub-Saharan countries within the framework of attaining Sustainable Development Goal 4 (SDG4). Sub-Saharan Africa is one of the regions worldwide that encounters the most significant difficulties in education, confronted with the challenges of low penetration of education and poor education quality. This research employs advanced text analysis methods, including large-scale language models, to systematically assess and compare the education policies of these countries. The findings reveal substantial disparities in education policies throughout the region, with countries such as Uganda and South Africa making moderate progress, while others fall behind in achieving universal access to education. The study emphasizes the significance of investment in education, vocational education, and cross-border cooperation in addressing educational poverty. The analysis underlines the necessity of a comprehensive and multi-faceted approach for achieving SDG 4, highlighting the crucial role of policy innovation and international cooperation in initially alleviating educational poverty.

Keywords: Education Policy, SDG4, Sub-Saharan Africa.

1 Introduction

Sub-Saharan Africa confronts education challenges in penetration, quality, and gender equality. According to (UNESCO & African Union, 2023), the region maintains an alarmingly high rate of out-of-school children, with one-fifth of primary school-aged children and over half of secondary school-aged adolescents being excluded from education (Inoue et al., 2015)[7]. Enrollment remains low, with many disadvantaged children marginalized. Although countries like Rwanda and Kenya have implemented free primary education policies, the persistent disparity in resource distribution between urban and rural schools, as noted by (Bold et al., 2017)[4], severely limits the effectiveness of these initiatives. Gender inequality further exacerbates the educational challenges. Patriarchal norms create disparities in opportunities and attainment between boys and girls. (UNESCO, 2023) estimates 9 million girls in Sub-Saharan Africa will

never attend school, versus 6 million boys (Shabaya & Konadu-Agyemang, 2004)[21]. Moreover, quality is compromised by inadequate infrastructure and a chronic teacher shortage.

Previous research has illuminated the interplay between regional complexity, economic dynamics, and implementation. (ABEBE, 2019)[1] critiqued the "one-size-fits-all" approach of international donors, highlighting how debt burdens and aid reliance constrain national autonomy in education budgeting (Lewin, 2020)[10]. In contrast, (Mbiti, 2016)[13] showed localized innovations like mobile learning in Tanzania address infrastructure deficits. Yet a gap persists in evaluating how SDG4-aligned policies navigate Sub-Saharan Africa's diverse contexts for scalable impact.

Scholars call for strengthening education via digital technologies, flexible models, and better data collection (UNESCO & African Union, 2023). Recommendations include compulsory secondary education, expanded infrastructure, adaptive curricula, better teacher quality, and financial and academic support for children (Hu, 2023). However, the implementation of these initiatives is hindered by regional complexity, including cultural diversity, economic constraints, and uneven development. Limited financial capacity restricts scale and sustainability, while economic instability undermines long-term policy implementation.

In 2015, the UN adopted the 2030 Agenda with 17 SDGs. SDG4 states: "ensure inclusive and equitable quality education and lifelong learning for all". It contains 10 sub-goals covering multiple targets (Saini et al., 2023)[20]. Higher education faces distinct SDG4 challenges (Ferguson & Roofe, 2020)[6].

Sub-Saharan Africa has made slow progress on SDG4 (Fig.1). With low net enrollment and completion rates, the gender gap widens at higher education levels. Large gaps exist in qualified teachers and infrastructure (Zickafoose et al., 2024[25]; UNESCO, 2016[23]).

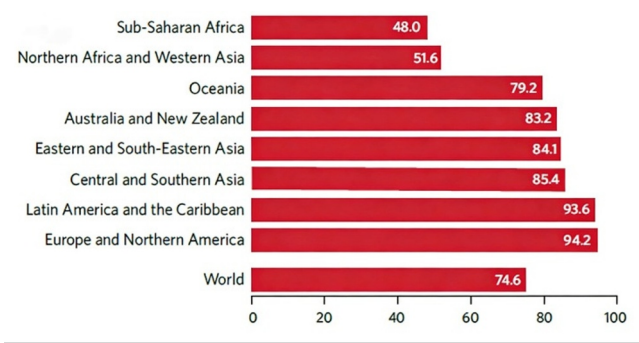


Fig. 1. Participation rate in organized learning (one year before the official primary entry age), 2020 (percentage).

Therefore, this paper attempts to conduct an in-depth analysis of the education-related policies of sub-Saharan African countries using text analysis. This study will use the official and authoritative Sustainable Development Goal 4 indicators to examine the education policies of these countries, and analyze their effectiveness, advantages

and disadvantages. The policy measures of different countries in sub-Saharan Africa in improving education poverty reveal successful cases and best practices to provide reference for other countries. Specific policy improvement suggestions are put forward to help sub-Saharan African countries improve the problem of education poverty under the framework of SDG4. The aim is to provide innovative suggestions for education policies in sub-Saharan Africa and promote education reform through research.

2 Methodology

Content analysis converts policy text into quantifiable data. In addition, natural language processing technologies such as word frequency statistics can summarize and analyze text content.

This study first uses NLTK to process and clean the education policy texts from 16 sub-Saharan African countries, and then uses collections. Counter to extract keywords from the coded data to analyze the educational status reflected in the education policies of these countries, and study the role of education policies in achieving SDG4 in sub-Saharan Africa.

2.1 Data Collection

Due to limitations, data for some countries could not be fully obtained. This study used multiple resources, including official websites and UNESCO. This study collected 119 policies; 5 were unusable. The remaining 114 serve as valid data.

2.2 Data Processing and Cleaning

To ensure the accuracy of the results, this study was conducted in English. Therefore, some French texts were translated into English using Google Translate. This study used Python and NLTK (Bird et al., 2009) to process the English texts. This study tokenized the texts by English periods and deleted data with fewer than five words.

3 Results and Discussion

3.1 Current Status of Education Policies in Sub-Saharan Africa

Sub-Saharan Africa's education policies under the SDG4 framework exhibit a persistent tension between policy commitments and implementation realities. The word cloud (Fig.2) highlights terms like "education," "training," "development," and "school." However, the less frequent appearance of terms such as "management," "policy," "system," and "implementation" points to significant challenges in governance and policy execution. This lexical gap reveals a structural disconnect between policy intent and practice, indicating that while progress has been made in some areas, systemic issues continue to impede comprehensive development.



Fig. 2. Word cloud of education policy text

In terms of free primary and secondary education, countries like Nigeria and Kenya have successfully implemented free primary education policies, with Kenya's Free Primary Education Program boosting primary enrollment by 30% since 2003 (Bruns & Rakotomalala, 2003). Nevertheless, secondary education remains severely underfunded, with a regional enrollment rate of 42%. Even in countries like Senegal and Ghana, which have extended compulsory education to age 16, significant rural-urban disparities persist, revealing that formal policy alignment with SDG4 does not guarantee equitable outcomes due to weak implementation and uneven resourcing (Akyeampong & Xu, 2023).

Regarding early childhood development, the integration of early childhood education (ECE) into national frameworks varies widely across the region. South Africa has achieved an ECE enrollment rate exceeding 70%, reflecting sustained investment, institutional coordination, and clear quality standards in its national ECE strategy. In contrast, Chad and the Central African Republic lack structured ECE programs, resulting in preschool enrollment rates below 20% (Bijaoui, 2021)[3]. Cultural norms that prioritize informal care further complicate efforts to expand access to quality early education, particularly in pastoralist communities. The policy success depends not only on stated goals but also on state capacity and local cultural adaptation.

Technical and vocational training initiatives in Tanzania and Botswana reflect a commitment to equipping youth with practical skills. However, resource constraints severely limit the scalability of these programs. Tanzania's Vocational Education and Training Authority reaches only 15% of the youth population (ILO, 2020). This gap between policy rhetoric and real coverage illustrates weak systemic delivery across the region.

Consistent with the word cloud's imbalance, digital literacy programs in Rwanda and Botswana align with the goal of providing skills for employment, yet urban-rural divides in access to technology persist. In Malawi, rural schools have a computer access

rate of just 12% compared to 48% in urban areas (Kayange, 2020), revealing that policy design often fails to address rural infrastructure deficits, including electricity and teacher capacity.

While primary education has seen improvements in gender parity in countries like Uganda and Zambia (SDG4.5), significant gaps remain in secondary education, especially in conflict-affected regions. In Nigeria's northern states, cultural norms and insecurity contribute to a mere 22% secondary enrollment rate for girls (see also Msafiri & Lianyu, 2022)[15], so legal and policy commitments to gender equality are undermined by weak enforcement and ongoing social barriers.

Adult literacy programs in Senegal and South Africa have achieved moderate success (SDG4.6), but linguistic diversity in countries like Cameroon and Mozambique poses challenges to curriculum delivery (Altinyelken, 2010)[2] and widespread literacy improvement (Stranger-Johannessen, 2017). Spoken English deficits compound this issue (Sikubwabo et al., 2024)[22]. This shows that uniform policies cannot accommodate linguistic complexity, and many states lack the capacity to develop context-appropriate curricula.

Education infrastructure also exhibits stark regional disparities. In Mozambique, 63% of schools lack electricity, while South Africa and Botswana have nearly universal electrification. Such disparities not only affect the quality of education but also hinder the region's ability to provide a consistent learning environment for all students. School management also affects retention (Mphale, 2014)[14].

3.2 Challenges in Achieving SDG4

Systemic barriers persist in governance. In Cameroon, decentralized education systems lack coordination, leading to inconsistent educational standards (Mekolle, 2024). Teenage marriage similarly harms retention in Zambia (Maseka, 2022)[11]. In Nigeria's northern states, weak oversight contributes to a 35% teacher absenteeism rate (Nwoke et al., 2024). Only 40% of Sub-Saharan African countries have comprehensive education monitoring systems (UNESCO, 2023; Chen et al., 2024[5]).

Chronic underfunding persists: Zambia allocates just 12% of its budget to education, well below the SDG4-recommended 20% (IMF, 2022). Reliance on volatile external aid further exacerbates instability, as seen in Ghana's education sector, which lost 30% of donor funding after the COVID-19 pandemic (OECD, 2023).

In the Sahel, child marriage reduces girls' secondary enrollment by 40% (Tsipi, 2024). In Uganda's rural schools, language barriers resulting from the exclusion of local dialects in instruction contribute to a 58% adult illiteracy rate (Altinyelken et al., 2014). These deeply ingrained norms and cultural practices require targeted interventions to promote inclusive education.

Prolonged droughts in Ethiopia and Kenya led to the closure of 2,000 schools in 2022 (UNICEF, 2023). In South Sudan, 72% of schools were damaged by conflict, displacing 1.8 million children (HRW, 2023). COVID-19 responses varied by state capacity (Masiya et al., 2021)[12]. These environmental and conflict-related disruptions highlight the need for resilient education policies that can withstand external pressures.

The region faces a critical shortage of 15 million teachers, and in Côte d'Ivoire, 60% of primary teachers lack formal training (African Union, 2022). Ethiopia's competency-based reform shows both potential and obstacles (Negasi, 2015)[16]. Additionally, while some countries like Kenya and South Africa are advancing e-learning, internet penetration in Burkina Faso remains below 10%, widening the digital divide (ITU, 2023).

3.3 Opportunities and Best Practices

Educational poverty and resource shortages are core challenges. About 50% of schools lack basic facilities, teacher shortage is prominent (Juju, 2020[8]; Junaid & Maka, 2015[9]). Girls, rural children, and conflict-affected children face severe limits. Poor families cannot afford education; armed conflicts close schools – e.g., Boko Haram attacks left millions out of school. Even when enrolled, learning is poor: 90% of 10-year-olds cannot complete basic reading comprehension.

Countries should try to increase the share of domestic education budgets and attract private sector investment. Benin and Rwanda show targeted spending works (Prady & Sy, 2019)[19]. Similarly, in fragile countries, "safe schools" should be established and teachers should be trained to deal with crises, and learning assessment data (such as PASEC) should be used to optimize policies.

For example, Rwanda has implemented a universal education policy, achieving a nearly 100% primary school enrollment rate through free basic education, school feeding programs and teacher training; Kenya has promoted low-cost tablets and online learning resources through a digital learning revolution proposed by the government in cooperation with EdTech companies; and Senegal has implemented community education committees to enable local communities to participate in school management, improve education transparency and parental participation, etc. (Oluwadamilola, 2018)[18]. Ghana's STAGE project helps out-of-school girls (van de Waal et al., 2024)[24].

3.4 Impact of Regional Dynamics

Politically, education policies in sub-Saharan Africa are often interrupted by changing priorities and conflicts. In Nigeria, South Sudan, and DRC, school closures and displacement are common. Budget misappropriation further undermines investment in school infrastructure and teacher training.

Economically, about 40% of children drop out due to tuition, uniforms, or transport costs. Ghana's free secondary education raised enrollment by 20% but created fiscal pressure, leading to teacher shortages and facility deficits—highlighting the challenge of economic sustainability. Emerging donors like China add complexity (Nordtveit, 2011)[17].

4 Conclusion

The evaluation reveals persistent systemic challenges and fragmented progress. Despite efforts to align national strategies with SDG4 targets, structural barriers like chronic underfunding, teacher shortages, and infrastructural deficits remain pervasive. Countries like Uganda and South Africa have demonstrated moderate advancements through targeted interventions, while others like Chad and the Central African Republic lag due to conflict-driven instability and resource constraints. Current spending in low-income African nations averages below 15% of national budgets, far short of the 20% recommended by international bodies. Furthermore, regional dynamics, including climate-induced disruptions and political fragility, exacerbate inequalities. However, opportunities exist in scaling vocational training, leveraging international collaborations and adopting data-driven policy reforms to address localized needs. Ultimately, achieving SDG4 in sub-Saharan Africa demands a harmonized approach combining equitable funding, conflict mitigation, and cross-border knowledge exchange.

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