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STEM EDUCATION AND GENDER EQUALITY IN WEST AFRICA: CHALLENGES, OPPORTUNITIES, AND BEST PRACTICES

February 1st, 2024

INTRODUCTION

Organized by the Citizen Think Tank for West Africa, WATHI, with the support of the Embassy of Ireland in Senegal, this round table is part of a strategic reflection on the future of education in West Africa. It also comes at a time when the African Union has declared 2024 the "Year of Education", representing a major opportunity to mobilize member states around the Continental Education Strategy for Africa (CESA 16-25) and the Sustainable Development Goals, notably SDG 4.

In this context, ECOWAS adopted a human capital development strategy in 2022 aimed at strengthening education, training, and gender equality as key drivers of human development.

Achieving the primary aspiration of the African Union's Agenda 2063, "A prosperous Africa based on inclusive growth and sustainable development," requires massive investments in education. This implies a profound transformation of educational systems to develop the human and social capital of the continent, placing innovation, science, and technology at the heart of public policies.

In West Africa, STEM disciplines (science, technology, engineering, and mathematics) have gradually emerged as a priority, both to meet future labour market needs and to support the digital transition of the continent. However, this transition cannot be inclusive without particular attention to girls' education. Promoting their access to STEM at all levels of the education system is not only a matter of social justice but also an imperative to unleash the region's full innovation potential. Encouraging girls to engage in STEM, removing sociocultural barriers, and strengthening public policies accordingly are essential to building a more equitable and competitive society.

This virtual round table explored the specific challenges facing West Africa on this issue, while highlighting opportunities and best practices that could inspire positive change in STEM education and promote greater inclusion of girls in these strategic fields.

INVITED PANELISTS

Maïmouna Fognon Koné, Director of Dynex Africa, an NGO creating educational centers dedicated to science learning reserved for girls in disadvantaged neighbourhoods, Côte d'Ivoire

Pulchérie Matsodoum Nguemté, PhD in biotechnology and environment, Founder of «She STEM in Africa,» dedicated to girls' and women's access to STEM, Cameroon

Mouhamed Moustapha Fall, President of the African Institute for Mathematical Sciences (AIMS) — Senegal

Chioma Agwuegbo, Executive Director TechHerNG, Nigeria

Cherif Ndiaye, Founder of the web platform Écoles au Senegal

Noreen McMorrow, Senior Post-Primary Inspector at the Ministry of Education in Ireland

Note: QUICKs are short documents produced by WATHI's virtual round tables. They present the main findings and courses of action and are intended to fuel public debate, collective action, and decisions by political authorities.

KEY FINDINGS

- New opportunities with STEM: 60% of Africa's population is under 25, around 800 million young people. Yet, the majority of African countries struggle to provide employment opportunities for this population. However, changes brought about by the technological revolution are opening up new opportunities in the labour market. Investing in STEM (science, technology, engineering, and mathematics) is therefore crucial to prepare a skilled youth capable of driving sustainable development in West Africa. For it is well-trained human capital that is the driving force behind prosperity.

- Rapidly changing jobs: A recent study indicates that by 2030, 60% of current jobs may disappear, replaced by emerging technology-related jobs like robotics and artificial intelligence. STEM-based education will enable young Africans not only to adapt but to become agents of change offering sustainable solutions to local challenges.

- Disparities between countries in STEM development: Significant gaps exist across African countries concerning STEM development. Examples like Kenya, Morocco, and Rwanda show that targeted investments in science and technology education can yield tangible results.

- Local solutions to structural problems through STEM: STEM offers concrete tools for tackling the continent's major challenges, such as poverty, food insecurity, and climate change. African innovations in health, finance, and digital education are proof of this. For instance, a Nigerian oncologist developed an early breast cancer screening method adapted to local contexts. Mobile banking and online educational apps are further illustrations of STEM's positive impact.

- Persistent gender inequalities: Across the continent, only 10% of STEM students are women, and they represent only one-third of the workforce in these areas.

- Multiple obstacles to girls' inclusion in STEM: Despite emerging platforms introducing girls to STEM, socio-cultural and economic barriers still limit their access to this field. Child marriage, poverty, patriarchal norms, lack of female role models, and absence of family or institutional support all contribute to underrepresentation. In West Africa, gender stereotypes and social expectations still often discourage girls from pursuing scientific studies.

- An education system poorly adapted to girls' realities: Curricula do not always consider girls' specific realities such as child marriage or managing menstrual health. Furthermore, STEM teaching infrastructure is limited and teachers often lack specialized training.

- Progress but persisting disparities: In some countries like Senegal, noted efforts have been made to promote girls' access to scientific subjects; girls slightly outnumber boys in secondary school science (51.6%). However, they remain a minority in higher education (40%) and even more so among PhD candidates (25%). This decline over the course of their academic journey reflects the specific difficulties encountered by girls, often linked to gender discrimination.

- Persistent inadequacy between education and the labour market: Youth unemployment in Africa also results from misaligned training programs and market needs. There is an urgent need to reform education systems to better align training provision, particularly in STEM subjects, with local and regional economic opportunities.

- The case of Nigeria: an example of intersecting challenges. Low government engagement in STEM education combined with insecurity, massive school dropout, and lack of teacher training exacerbate the education crisis. Poverty pushes many families to withdraw children from school, especially affecting girls.

RECOMMENDATIONS

- Integrating STEM into early childhood education programs: Through playful and interactive approaches, children will become familiar with scientific and technological concepts at an early age. This early introduction encourages critical thinking and problem solving.

- Strengthening public-private partnerships to finance and specialize STEM education: Collaboration between governments, private companies, and civil society organizations can contribute to better STEM education by providing financial resources, technical expertise, and internship or employment opportunities.

- Harmonizing educational strategies at the sub-regional level: Given common challenges, it is essential to develop coordinated strategies within ECOWAS and foster experience-sharing among countries. Best practices developed in Senegal, Benin, or Côte d'Ivoire could be shared for enhanced effectiveness.

- Facilitating access to funding and ease administrative constraints to scale STEM: education by supporting innovation and creating environments conducive to experimentation, research, and creativity.

- Aligning training programs with labour market needs by revising curricula to meet the demands of the labour market: Curricula must be revised to meet the requirements of new occupations related to emerging technologies. A better match between training provision and market demand will help reduce youth unemployment.

- Promoting gender equality in STEM: Reducing socio-cultural and professional barriers is a priority. This involves combating sexist stereotypes in education and society, emphasizing the importance of scientific careers for all, and encouraging mixed-gender participation in all disciplines.

- Implementing targeted policies to encourage girls to engage in STEM: The West African governments need to adopt concrete measures to encourage girl's engagement in STEM. This requires scholarships and targeted funding; programs supporting girls' schooling; actions to prevent child marriage and gender-related school dropout.

- Highlighting female role models in STEM: Organizing communication campaigns, mentoring programs, and events showcasing women scientists and engineers can inspire young women to pursue these careers.

- Investing in infrastructure and teacher training: The development of STEM requires equipping schools with modern equipment (labs, computers, digital tools) and training teachers in inclusive, gender-sensitive, and diverse pedagogical methods.

- Strengthening civil society's advocacy role to ensure inclusive, equitable education: Civil society organizations should continue monitoring, raising awareness, and pressuring authorities to uphold the commitments made for education.

QUOTES FROM PANELISTS

"Access to education for girls and women, especially in STEM, has been an important driver of Ireland's development." **Noreen McMorrow, Senior Post-Primary Inspector, Irish Ministry of Education**

"It is crucial to prioritize STEM education due to a persistent gap in terms of gender and access to technology education." **Maïmouna Fognon Koné, Director of Dynex Africa**

"In Africa, only 10% of STEM students are women, and they make up just a third of the workforce in these fields." **Pulchérie Matsodoum Nguemté, PhD in biotechnology and environment**

"Barriers to women's flourishing include child marriage, limited access to financing, and social traditions." **Pulchérie Matsodoum Nguemté, PhD in biotechnology and environment**

"In higher education, girls represent less than 30% despite many passing the high school diploma; the dropout rate after the diploma remains high." **Cherif Ndiaye, Founder of the platform Écoles au Senegal**

"It's essential to dismantle all stereotypes about STEM and demonstrate that careers in these fields represent the future." **Maïmouna Fognon Koné, Director of Dynex Africa**

"STEM education is essential to correct technological and economic inequalities between and within countries." **Maïmouna Fognon Koné, Director of Dynex Africa**

"Countries like Kenya, Morocco, and Rwanda have made targeted investments leading to concrete advances, such as local mobile phone manufacturing." **Pulchérie Matsodoum Nguemté, PhD in biotechnology and environment**

"To face future challenges in data science, AI, and robotics, we need not physical strength but well-trained scientific minds." **Mouhamed Moustapha Fall, President of the African Institute for Mathematical Sciences (AIMS), Senegal**

"Education is not only a national development driver in Ireland but also a tool for gender equality." **Noreen McMorrow, Senior Inspector of Post-Primary Schools, Department of Education (Ireland)**

"Our countries' development relies on revaluing STEM education." **Pulchérie Matsodoum Nguemté, PhD in biotechnology and environment**

"Security issues and famine hinder education access in some regions." **Chioma Agwuegbo, Executive Director, TechHerNG**

"Education system engagement must consider households' socio-economic situation." **Chioma Agwuegbo, Executive Director, TechHerNG**

"In some Nigerian areas, schools become inaccessible due to insecurity, causing children to stop attending." **Chioma Agwuegbo, Executive Director, TechHerNG**

"Africa's population is 60% under 25, about 800 million young people. Compared with Europe's 700 million, development depends on training this youth, notably through STEM." **Mouhamed Moustapha Fall, AIMS Senegal**

"Senegal makes significant efforts to promote STEM, although inequalities remain." **Cherif Ndiaye, Founder of the platform Écoles au Senegal**

"Today, more girls than boys' study scientific subjects in Senegal." **Cherif Ndiaye, Founder of the platform Écoles au Senegal**

"Children should be introduced to STEM at the youngest age." **Mouhamed Moustapha Fall, AIMS Senegal**

"Young people must be able to envision the opportunities offered by STEM careers." **Noreen McMorrow, Senior Inspector of Post-Primary Schools, Department of Education (Ireland)**

"Democracies must rely on science for informed decision-making and to strengthen energy autonomy." **Noreen McMorrow, Senior Inspector of Post-Primary Schools, Department of Education (Ireland)**

"Ireland has implemented educational policies based on clear priorities and interventions to produce a highly skilled workforce." **Noreen McMorrow, Senior Inspector of Post-Primary Schools, Department of Education (Ireland)**

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