Policy Paper

Science, Technology, Engineering and Mathematics (STEM)

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Contents

Acknowledgements

I. Executive summary

1.   Peace and security issues are major factors that impinge on sustainable development in

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[1] *Pillars of Peace: Understanding the Key Attitudes and Institutions that Underpin Peaceful Societies* (2013).

3.

to address how science, technology, engineering and
mathematics (STEM) education can be an enabler

Children at Radi School in southern Niger use tablets in the classroom. This initiative provides every child with access to technology for equal learning opportunities. (Frank Dejongh/UNICEF)

6.   Some African countries have limited capacity in terms of the technical skills training that is imperative for the technicians needed to support science, technology and innovation-based economic activities. Such low STEM skill output negatively affects science, technology and innovation-enabled and knowl-

of these gaps, there is a lot of effort being made by African Governments to promote STEM education, particularly as it relates to mathematics and science.

7.   STEM is not only critical for Africa to leapfrog towards sustainable development, but can also play a very relevant role in promoting peace and stability

promotion of durable peace and sustainable development in Africa, the Secretary-General states that the continent must overcome considerable deficiencies in reaching —the targets of Sustainable Development Goal 4 relating to secondary, tertiary and vocational education, often with marked disparities along gender,

thinking, creativity and innovation to create applications that can be commercialized and create jobs is desired by all countries. Entrepreneurship and social entrepreneurship initiatives led by young women and men have shown increased potential in responding to the prevalent social and economic challenges. Enterprises led by young women and men not only trigger the necessary drive for local innovation and sustainable development, but also contribute to job creation, reduce inequalities and contribute to economic growth and the creation of sustainable inclusive and equitable societies (United Nations, 2020).

16.

science, technology and innovation and information and communications technology in Africa, which are high on the agenda of the African Union and its New Partnership for Africa's Development and of the 2030 Agenda, there is a need to enhance STEM education. Such education must enable Africans to be entrepreneurial and innovative so as to incubate solutions

mindsets and build human capital in order to empower African youth, scientists, researchers and innovators so as to develop a world class science, technology and innovation environment and achieve inclusive and

2063, States members of the African Union envision a prosperous Africa based on inclusive growth and sustainable development. That dream is possible but requires concerted efforts to reform African countries' curricula and related implementation practices along the education to employment pipeline, from the classroom to industry and everyday life.

17.   There are existing frameworks in support of

19.   Significant initiatives are being undertaken by African countries as part of global, continental and regional compacts to strengthen STEM education. Among these are the World Bank programme on Africa Higher Education Centers of Excellence; the Pan African University and Mwalimu Nyerere Scholarship

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structures is in part is due to the overriding challenges of merely ensuring access to education, where countries prefer to ensure that children have access to at least some form of education for literacy, basic numeracy and the acquisition of basic employable skills. As a result, many countries in conflict or post-conflict situations, such as South Sudan, Somalia ("Somaliland")

23.   However, in spite of the efforts to allocate a substantial amount to the education sector, African Governments have allocated limited funding towards science and technology. Earmarked funding for science is either meagre or non-existent in many African countries. The effect is a widening gap between STEM progress in Africa and that of more advanced countries, thus exacerbating the prevailing disparities in income and development, in spite of Africa's positive economic performance.

24.   The emphasis on STEM education at the policy level in most countries is yet to be met with sufficient funding for relevant interventions to be implemented at the grass-roots level, especially in rural areas, where in some cases, even basic permanent classrooms are yet to be constructed. The lack of permanent

Pillar 4
Acceptance of the rights of others

Gender gap

28.
involved in STEM has significantly increased at the global level. However, despite these encouraging signs, women are still underrepresented in science, as women account for only about 30 per cent of the world's researchers and for even lower percentages at higher decision-making levels, according to recent

29.   M,21a——(JC**6**eÅd(h)-10.2 (e (m) 0r(c)-14.3r(s)-4.8 (e)-16p(e)-12.6r(s)-4.8 (e)-7.3 (s)-71 9.W (m) 0 (e)-12.6 (t)4.2 (e)-12

[7]   *The Equality Equation: Advancing the Participation of Women and Girls in STEM* (Washington, D.C., 2020).
[8]
Africa 2016–2025". Available at https://issuu.com/fawe/docs/gender_equality_strategy_for_the_co.

the strategy encourages state and non-State actors to create an enabling environment for promoting innovations for girls and young women and to revise regulations and other school requirements linked to time on task, teacher/pupil ratio, class design and class size. The strategy calls for creating and developing a mindset of creative confidence in technology, for girls and boys, through education and training.

33.   Several efforts have been made to bridge the gender gap in STEM, which should be scaled up. For example, scholarships are being offered by Governments and institutions to girls and young women, including support from teachers, peer-to-peer support and financial support in the form of tuition payments, and they are another significant layer in developing and implementing interventions to enhance girls and women's participation in STEM. The Forum for African Women Educationalists model for gender-responsive pedagogy, mentoring girls and sensitizing key stakeholders has yielded significant results in several countries, including Burkina Faso, Eswatini, Kenya, Mali and Mozambique.

Youth

34.   Africa has a huge competitive advantage, with 60 per cent of its population being below the age of 25,[9]

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olution has ushered in a wide range of jobs in STEM fields. Even though STEM education should be equally available for all children, there is a need to focus on out-of-school youth, who are the key players in peacebuilding, in order for them to acquire STEM-related skills of critical thinking and inventiveness. According to UNESCO, of all the regions, sub-Saharan Africa has the highest rates of education exclusion. Over one fifth of children between the ages of 6 and 11 are out of school, as are one third of youth between the ages

Statistics data, almost 60 per cent of young people between the ages of 15 and 17 are not in school.[10] High dropout rates are primarily due to poverty. However, violence, poor quality of education and a misperception regarding the benefits of obtaining an education

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[9]

with industry, employability and entrepreneurship are strengthened so as to maintain relevance and increase the positive development outcomes.

students to be researchers, fosters collaboration, transforms mindsets and attitudes and builds stronger communities. When students are allowed to challenge the status quo, conduct research and discuss their

development, including both initial and continuing professional development in STEM fields, is another challenge to be overcome.

Pillar 8
Low levels of corruption

42.   Corruption, like low-quality education, is a real

that a 1 per cent increase in the measure of local government corruption is associated with an increase of between 0.4 per cent and 0.9 per cent in the percentage of students affected by poor human or physical school resources in local public schools. This statistical evidence suggests that tackling such issues in local governance can help education systems in Africa.

43.   -
ble peace and sustainable development in Africa, the Secretary-General stated that corruption has been found to worsen poverty and impede peacebuild-

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tutions, fragile governance and weak accountability
mechanisms continue to provide fertile groutt245 (h)-108 (e)-6e-5.5 @0.00182i14 (d-4.7 @.5 (t)-3.6 (hr0245 (h)-108 (e)2 (t)84

III. Recommendations

46.   The policy paper presents the following recommendations for promoting STEM education as an enabler for development and peace:

Policies

(a)   The promotion of STEM education can and should inform policymaking on a wide range of issues pertaining to development, peace and security. The promotion of STEM education and its impact on policymaking shall be established by anchoring STEM education in various existing frameworks and working instruments that the continent and its partners have adopted over the years;

(b)   Specific STEM policies are necessary, in addition to the more common science, technology and innovation policies. This is because such policies focus more on research and development and are not usually sufficient to cover STEM education;

(c)   STEM policies need to be better articulated and strengthen multisectoral approaches so as to reinforce the appreciation of the value of STEM and promote the relevance of STEM offerings in schools and colleges and enhance dynamic linkages between education and training in STEM on one hand, and the labour market and industry on the other hand;

(d)   There is a need to develop enabling policies to: (i) reduce the gender gap in STEM at all levels of education and research; (ii) increase the visibility and participation of, and respect for, women in STEM; (iii) build capacity for data collection on gender in STEM, identify gaps in the policy mix and improve national science, technology and innovation policies related to gender, based on evidence; and (iv) improve tools to measure the status of women and girls in science (UNESCO, n.d.);

(e)   Policy and programmatic measures should be institutionalized so as to safeguard gender equity in STEM in both the education system and the workplace;

(f)   Furthermore, there is a need for more specific policy, with monitoring and evaluation and earmarked funding; collaboration among different stakeholder groups and sectors to jointly achieve a policy outcome in development; and follow-up of implementation;

(g)   The promotion of STEM must not be to the exclusion of certain social sciences that provide knowledge and skills that are essential to peacebuilding and social values;

Funding

(h)   The requisite funding for infrastructure, equipment and teaching and learning processes for STEM education should be allocated in national budgets by African Governments;

(i)

distribution of resources is needed to ensure that all people, including those in rural areas, have access to tools and equipment that can enable STEM education to be implemented in schools;

Curricula

(j)

is essential that African Governments build buy-in from major stakeholders and follow up on the process with articulate, scientific and strategic reviews. Teachers in particular need to be involved in the process; their training and capacity-building must be among the first interventions before the roll-out of new curricula. Participatory approaches are essential in informing and bringing on board the general population, parents and industry;

(k)   Continuous professional development is particularly important for all teachers in order to ensure optimal pedagogic, philosophical and content competence;

(l)   Given the difficulty associated with STEM subjects, the availability of resources must be accompanied by mentorship and information clarifying the relationship between STEM subjects, STEM skills and the world of work;

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