# Overcoming Policy and Practice Fragility and Enhancing Security of Science, Technology and Innovation Educational Achievement for Females in Uganda

MARY N. OKWAKOL[1], MARGARET STELLA SUUBI UJEYO[2], DENNIS ZAMI ATIBUNI[2], BIIRA SAPHINA[3], PAUL WAAKO[4]

[1] *Director, National Council for Higher Education, Plot M834, Kigobe Road – Kyambogo P.O. Box 76, Kyambogo, Kampala*

[2] *Department of Education, Faculty of Science and Education, Busitema University, P.O. Box 236, Tororo, Uganda*

[3] *Directorate of Quality Assurance, Busitema University, P.O. Box 236, Tororo, Uganda*

[4] *Vice Chancellor, Busitema University, P.O. Box 236, Tororo, Uganda*

**Corresponding Author Email: ujeyosuubi@gmail.com; mujeyo@sci.busitema.ac.ug*

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## Abstract

The Sustainable Development Goals 2030 (SDG 4 and 5) provide for the attainment of quality education for all, including women. Africa Agenda 2063, Uganda Vision 2040, the Third National Development Plan (NDP III) similarly all provide unequivocal reiterations on the need for the provision of quality inclusive education that will drive national socio-economic transformation. This is particularly envisioned through a robust science, technology, engineering and mathematics (STEM) education that fosters relevant science, technology and innovation (STI) knowledge, skills, values, attitudes and competences to constitute the epicentre of the transformation. Promoting the achievement of women in equal measure to men in STEM and STI is critical to the socio-economic transformation agenda. However, there exist gaps in the policy framework and the implementation of STEM education that undermine STI educational achievement, especially for women. This conceptual paper is aimed at examining the fragility of legal and policy frameworks for STEM/STI education and the strategies for enhancing STI educational achievement for females in the Ugandan context. We argue that strengthening the policy implementation of gender-responsive STEM/STI education is a precursor of socio-economic transformation of nations and the entire world. The paper adopts a semi-systematic literature review methodology to examine legal and policy documents for strengths, flaws and implementation gaps with the aim of recommending strategies for enhancing STEM/STI educational achievement for females in Uganda.

**Keywords:** *Education; Gender Policy; Science; Technology; Innovation*

## Introduction

Science, technology, engineering, mathematics and innovation (STEMI) are vital to achieving internationally agreed development goals (Tizikara et al., 2019) and regarded as not only a precursor to industrial development but also to socio-economic development (Bichi et al., 2019; Gonzalez et al., 2020). STEMI help to develop skills and competences and promote innovation, which are necessary for national growth and development (Gonzalez et al., 2020). Tizikara et al. (2019), however, caution that unless the objectives, worries, circumstances and capacities of women and men are taken into account while creating STEMI policies and carrying out STEMI activities, STEMI cannot successfully assist fair and sustainable development. There are many barriers to success in the STEMI professions, particularly for girls and women, which require consideration. According to Tizikara (2019) and UNESCO (2020), women's and girls' capacity for STEMI participation is egregiously underdeveloped and underutilised. Girls and women are underrepresented in educational, entrepreneurial and employment possibilities, in addition to having less access to information and technology (Bichi et al., 2019; Gonzalez et al., 2020; Namatende-Sakwa & Longman, 2013).

According to rankings of gender equality around the world, Uganda's gender gap decreased from 70% in 1996 to 48% in 2017 (Tizikara, 2019). There was 90 % equality in educational attainment. Women's presence in professional and technical fields climbed from 22% in 2006 to an average of 35% in 2014. According to a 2012 UNDP report, women hold 22% of top management positions in the public sector and make up 33% of the entire workforce. The Uganda National Academy of Sciences honour roll lists 65 Fellows, only nine of whom are women.

There are not many disparities between girls' and boys' views about science in the first years of secondary school, according to studies. However, it is important to remember that there are significant leakages along the education pipeline, particularly for girls. According to Tizikara (2019), just 17% of women were represented in the natural sciences, 23% in engineering and technology, 31% in the medical sciences, 20% in agricultural sciences, and 27% in the social sciences, according to the 2015 UNESCO Science Report. According to the 2016 Women in Global Science and Technology (WISAT) assessment of gender and STI in Uganda, there were 39% females overall, with significant heterogeneity within institutions. These statistics follow several initiatives, among which are gender mainstreaming and affirmative action in higher education access, that aim at increasing the participation of girls/women in STEMI (Ampaire et al., 2021; Nabbuye, 2018).

A research study to track and map the career paths of a cohort of engineers who received their degrees between 2008 and 2012 found that just 15% of female engineers were nationally mobile, considerably fewer women were registered, and 34% of female engineers worked in fields unrelated to engineering. According to the Uganda Bureau of Statistics (UBOS, 2017), the majority of women-owned businesses were concentrated in the trade sector (44%), education, health and social work (49%), as well as lodging and food services (65%), highlighting the strong influence of the patriarchal culture that predominates in Ugandan society and the traditional " male" dominance of industries requiring technical skills.

## Availability of data and material for data transparency

All data generated or analysed during this study is included in this published article.

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