

Bridging the Gap: Girls' Education, STEM Participation, and Science Communication in Zambia

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Abstract

Diversity is important in every field, particularly in STEM, which plays a critical role in addressing global challenges such as health, climate change, scientific research, and sustainable energy. Increasing girls' participation in STEM is therefore important. However, girls' education and engagement in STEM in Zambia face persistent structural, socio-cultural, and institutional barriers. Although gender parity exists at the primary level (1.03), girls' representation declines at secondary school (0.94 in 2020), with completion rates as low as 26.5–26.7% in some provinces. High teenage pregnancy rates, 27.6% nationally, reaching 36.2% in rural areas and 43% in Southern provinces, along with poverty, early marriage, and gendered social norms, contribute to school dropout and perpetuate cycles of intergenerational poverty. These challenges extend into higher education, where female enrolment in STEM is markedly low: in 2020, women comprised only 33.8% of natural resources students, 17.8% in technology, and 32.1% in mathematics and natural sciences. Limited role models, inadequate infrastructure, low awareness of STEM careers, and insufficient science communication further restrict girls' engagement and aspirations. Addressing these barriers through mentorship, community outreach, effective science communication, and targeted initiatives, including support from larger bodies, is critical to promoting gender equity and increasing women's representation in Zambia's STEM workforce. As part of this effort, we conduct STEM outreach programs that use astronomy as an entry point, engaging both girls' and mixed schools to inspire interest in STEM fields. These activities also allow us to collect data on the challenges schools and pupils face that limit participation in STEM fields. Preliminary results show the importance of both male and female mentorship programs in supporting and motivating the next generation of scientists and astronomers.

Introduction

- Diversity in education is important. Both male and female participation is important.
- Various challenges affect the performance.
- Astronomy is an interdisciplinary field and therefore an ideal gateway for introducing students to STEM fields.
- Community outreach, effective science communication and mentorship are key.

The main aim is to motivate young people (especially girls) by introducing them to STEM career paths, connecting them with role models, and building excitement to participate in STEM fields.

Methodology

- Conduct STEM outreach with scientists in different field
- Connect students with role models
- Discuss different aspects of STEM careers and challenges

Objective

Results and Analysis



Figure 1: Outreach program at Twatasha Combined School



Figure 2: Girls cooperatively assembling a Galileo scope for the first time. Exciting faces.)



Figure 3: Outreach program at Trident College

- Very few people know about Astronomy/Physics.
- Increased interest in joining STEM fields. Community is more aware of astronomy as a career path.
- Most underprivileged schools have no access to any science or computer lab, which may affect the interest in Science.

Summary and Future Work

- ▲ School and community outreach programs are important in enhancing future participation in STEM and Astronomy.
- ▲ Both male and female role models are important.
- ▲ Both female and male mentorship programs are important in grooming the next generation of scientists.
- ▲ Conduct more outreach programs in underprivileged schools and communities.