

TOOLBOX: Increasing diversity and inclusion

The challenge

Engineering in sub-Saharan Africa (SSA) **lacks diversity in terms of gender, age, and social background**. For example, women make up less than 10% of all engineers in SSA ([WomEng, 2020](#)). This is due to a number of factors, including patriarchal culture, stereotypes, early marriage, high fertility rates, and few role models to look up to. This makes it more difficult for women to participate in training and in the job market, and as a result, it is challenging for them to combine family and an engineering career. In addition, insufficient opportunities to network and build the necessary skills and confidence make it hard for women to compete in a male-dominated profession. Women and disadvantaged groups face the additional challenge of not being able to afford engineering training.

Initiatives

Professional engineering institutions (PEIs) have a critical role to play in promoting gender diversity and inclusion in the profession. Several SSA professional engineering institutions are implementing measures to promote diversity. These are mainly focused on encouraging girls to join the profession and reskilling women to enable them to pursue engineering careers. These initiatives tend to run in collaboration with other organisations (schools, education bodies, and companies). There is evidence that they have helped to increase female membership and engagement with PEI activities, and develop a network of role models to support outreach efforts targeting girls and women.

PEI Women's Chapters and diversity policies

PEIs implement gender mainstreaming and inclusive policies in their activities

Outcomes: increased diversity and raised awareness

PEIs: Institute of Engineers Kenya, Uganda Institution of Professional Engineers, South African Institution of Civil Engineering, Malawi Institution of Engineers, Zimbabwe Institution of Engineers, Institution of Engineers Tanzania, Institute of Electrical and Electronics Engineers South Africa Section, Sierra Leone Women Engineers, Ghana Institution of Engineering, Association of Professional Women Engineers of Nigeria, Architects, Engineers, Surveyors & Allied Professionals Council of Swaziland



Outreach events and networking opportunities

PEIs promote role models for young girls, and organise events for female engineers

Outcomes: young girls consider a career in engineering; female engineers are connected to the industry, they have networking opportunities and remain in the profession

PEIs: Engineers Board of Kenya, Engineers Council of Zimbabwe, Sierra Leone Institution of Engineers, Engineering Council of South Africa



Traineeship schemes

PEIs provide graduate engineers from disadvantaged groups with hands-on experience

Outcomes: women and people from disadvantaged groups acquire skills and confidence; they are more likely to be successful, to register, and to remain in the profession

PEIs: Engineers Board of Kenya, Uganda Institution of Professional Engineers, Engineers Registration Board Tanzania



Mentorship

PEIs facilitate mentorship programmes for young girls and female engineers in their early career

Outcomes: stimulate the personal development and empowerment of female engineering students and professionals

PEIs: Institute of Engineers Kenya, Uganda Institution of Professional Engineers, Association of Professional Women Engineers of Nigeria, Sierra Leone Women Engineers



Scholarship schemes and awards

PEIs confer excellence scholarships and awards/grants

Outcomes: young girls receive engineering training, innovation is stimulated

PEIs: Institute of Engineers Kenya, Uganda Institution of Professional Engineers, Association of Professional Women Engineers of Nigeria, Institution of Engineers Tanzania, Malawi Institution of Engineers, Zimbabwe Institution of Engineers



Case study: Institution of Engineers Kenya (IEK) Women's Chapter

Since 2014, IEK has aimed to attract a greater number of girls and young women into engineering and to retain those already in the profession through its Women's Chapter and **gender mainstreaming programme**. IEK's activities include:

- organising outreach events in schools;
- holding networking meetings for women professionals;
- setting up an online knowledge exchange platform for IEK's female members;
- waiving attendance fees for professional interview preparations, making this crucial training financially accessible for women;
- raising awareness of gender inclusion among employers, and encouraging them to hire more women in senior positions.

Success factors and achievements

For each category of interventions, the table below identifies the implementation challenges and the success factors for these interventions. The table also highlights some of the strongest achievements.

Interventions	Shared Challenges	Success factors	Examples and achievements
<p>Women's Chapters and diversity policies</p> 	<ul style="list-style-type: none"> → Low attractiveness of some engineering disciplines for women (in part due to stereotypes) → Patriarchal structures and stereotypes (for example, men might not allow their wives or daughters to attend engineering events) → Scarcity of female mentors → Limited funding for inclusion projects → Difficulty in maintaining project momentum with stakeholders 	<ul style="list-style-type: none"> → Joining efforts with other women-led PEIs → Assessing the specific needs of the different categories of members to address them through PEI policies and activities 	<ul style="list-style-type: none"> → South Africa – South African Institution of Civil Engineering (SAICE): Gender Inclusivity Think Tank and diversity panel The Gender Inclusivity Think Tank aims to develop a code of practice that addresses gender diversity and inclusion in the built environment industry. SAICE has also established a diversity panel on gender, race, and sexuality, to raise awareness on inclusion, and to discuss and draft opinion pieces and guidelines for employers on a range of issues, such as sexual harassment in the workplace. As a result, the percentage of women registered in SAICE and student chapters has increased. → Malawi, Zimbabwe, Tanzania, Eswatini – Several PEIs: GCRF Africa Catalyst grant for strengthening gender diversity in partnership with WomEng This three-year project aims to increase the capacity of engineering bodies to promote gender diversity and inclusivity in collaboration with WomEng, and increase the number of registered female engineers in SSA. WomEng assists in the training and development of members of these bodies through leadership, entrepreneurship, and diversity trainings. The project also involves developing an execution plan of critical programmes pioneered by WomEng, which include high school STEM awareness programmes and university employability, entrepreneurship and skills building programmes for female engineers.

Interventions	Shared Challenges	Success factors	Examples and achievements
<p>Women's Chapters and diversity policies</p> 			<p>→ Tanzania – Institution of Engineers Tanzania (IET): Women's Chapter The Women's Chapter of IET promotes opportunities for professional development; maintains a database of female engineers; identifies problems faced by female engineers; encourages women to explain and promote the role of engineers in the wider community; sets up training schemes such as professional lectures and short term seminars; participates in building local capacity of engineering skills and technical abilities; encourages female engineers to register with the Engineers Registration Board of Tanzania (ERB) and Corporate Membership of IET; and solicits employment opportunities for female engineers.</p> <p>→ Kenya – Institution of Engineers Kenya: Gender mainstreaming plan and Women's Chapter See case study on page 2</p>
<p>Outreach events and networking opportunities</p> 		<p>→ Collaborating with UNESCO and WomEng</p> <p>→ Encouraging alumni and representatives of industry and government to attend meetings, and act as role models for students</p> <p>→ Earmarking the surplus from event sponsorships to support Women's Chapters</p> <p>→ Understanding students' expectations ahead of outreach activities to cater for different interests</p>	<p>→ Malawi – Malawi Institution of Engineers (MIE), Zimbabwe – Zimbabwe Institution of Engineers (ZIE), Tanzania – Institution of Engineers Tanzania (IET): GirlEng #AskAnEngineer workshop These three PEIs collaborated with WomEng to host a workshop led by young PEI members. The event was attended by around 100 girls aged 14–18. After the workshop, 93% of the girls said they were strongly inspired to pursue a career in science, technology, engineering and mathematics.</p> <p>→ South Africa – South African Institute of Electrical Engineers (SAIEE): Women in Engineering events and webinars Many student chapters have committees that contribute to organising Women in Engineering events, webinars, hackathons (around half of young members promoting hackathons are women), and Coding Weeks. Women active in the field of Electrical Engineering are involved as organisers, competitors and judges. A Chapter also held a discussion entitled 'Breaking the stereotypes', facilitated by women active in the field to encourage women and students from disadvantaged communities to pursue a career in STEM. The event provided a platform for female engineers to interact with others in the industry through a panel discussion.</p>

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<p>Outreach events and networking opportunities</p> 			<p>→ Uganda – Uganda Institution of Professional Engineers (UIPE): Women in Engineering workshop UIPE and the Women in Engineering Chapter of the Institute of Electrical and Electronics Engineers organised a workshop focused on strengthening and retaining women in engineering. Sessions were focused on raising awareness and support for women in the Engineering Profession, on Career Planning, and on Personal Development.</p> <p>→ Kenya – Institution of Engineers Kenya: Women’s Chapter See case study on page 2</p>
<p>Traineeship schemes</p> 		<p>→ Providing a monthly allowance to meet the cost of subsistence for female engineering trainees</p>	<p>→ Tanzania – Engineers Registration Board (ERB): Female Graduate Engineers Capacity-Building Programme This five-year programme, funded by the Royal Norwegian Government, aims to increase the number of female engineers, promote gender balance in professional training, and empower female engineers to confidently hold and manage professional responsibilities in government, industry, and business. Most trainees have obtained relevant jobs in the sector and act as role models for young women. The number of registered female engineers has increased significantly since the start of the programme.</p> <p>→ Kenya – Engineers Board of Kenya (EBK): Graduate Engineer Internship Programme EBK has developed a structured internship program for graduate engineers to enable them to acquire hands-on skills and prepare them for professional practice. EBK is committed to diversity and gender equality and encourages people with disabilities, women, and people from marginalised/ disadvantaged groups to apply.</p>

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<p>Mentorship</p> 			<p>→ Nigeria – Association of Professional Women Engineers of Nigeria (APWEN): Mentorship programmes</p> <p>APWEN’s mentorship programmes aim to inspire girls and help ensure job opportunities for female graduates (for example, Take a Girl to Work Day). These mentorship programmes are beneficial for both mentors and mentees, as they enhance self-awareness, training and career development, and improve networking opportunities.</p>
<p>Scholarship schemes and awards</p> 		<ul style="list-style-type: none"> → Learning from other successful scholarship programmes → Persuading sponsors to champion girls’ inclusion and empowerment → Working with local chapters to track progress of awardees → Giving media exposure to initiatives that contribute to breaking stereotypes → Using WomEng’s expertise 	<p>→ Nigeria – Association of Professional Women Engineers of Nigeria (APWEN): Invent it, Build it</p> <p>This programme awards scholarships to female students who want to pursue a career in STEM. The programmes’ design is based on existing successful scholarship programmes and is backed by sponsor that champion women’s empowerment. The programme also provides schools with laptops for a science and tech laboratory. APWEN organises activities with parents and caregivers (such as guidance and counselling aimed at addressing gender bias), and promotes opportunities for women in engineering. APWEN’s exposure in the media is also contributing to breaking stereotypes around women in STEM, inspiring girls in undertaking an engineering career.</p> <p>→ Malawi – Malawi Institution of Engineers (MIE), Zimbabwe – Zimbabwe Institution of Engineers (ZIE), Tanzania – Institution of Engineers Tanzania (IET): Fellowship workshops</p> <p>Around 50 female top students (per country), who are studying engineering and the built environment and were in their final and penultimate undergraduate year, or undertaking postgraduate education, were selected for a 2-day WomEng Fellowship programme. The programme aimed to transform participants into leaders by building their leadership, employability and networking skills.</p>