CAPACITY BUILDING FOR WOMEN IN ENGINEERING BODIES IN SUB-SAHARAN AFRICA

BEST PRACTICE REPORT

NOVEMBER 2020

WomEng
WOMEN IN ENGINEERING

GCRF AFRICA CATALYST

About GCRF Africa Catalyst: Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa

The aim of this project was to assist engineering institutions to establish/strengthen Women in Engineering (WIE) bodies within respective professional engineering institutions (PEIs), leveraging WomEng's skills and experience in developing and running women in engineering programmes across 22 countries. WomEng provided training and development for WIE body members; including leadership and entrepreneurship training, diversity training, continuous relevance amongst engineering professionals, and execution of critical outreach programmes pioneered by WomEng, namely GirlEng for secondary school Science, Technology, Engineering and Mathematics (STEM) awareness and Fellowship; a leadership, employability and networking skills building programme for tertiary level engineering students. The key focus of this project was to improve the capacity of engineering bodies to promote gender diversity and relevance within engineering and engineering professionals in Africa. This project was powered by the Royal Academy of Engineering GCRF Africa Catalyst grant.

Project locations: eSwatini, Malawi, Tanzania, Zimbabwe

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Organisation: WomEng
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Special Thanks To

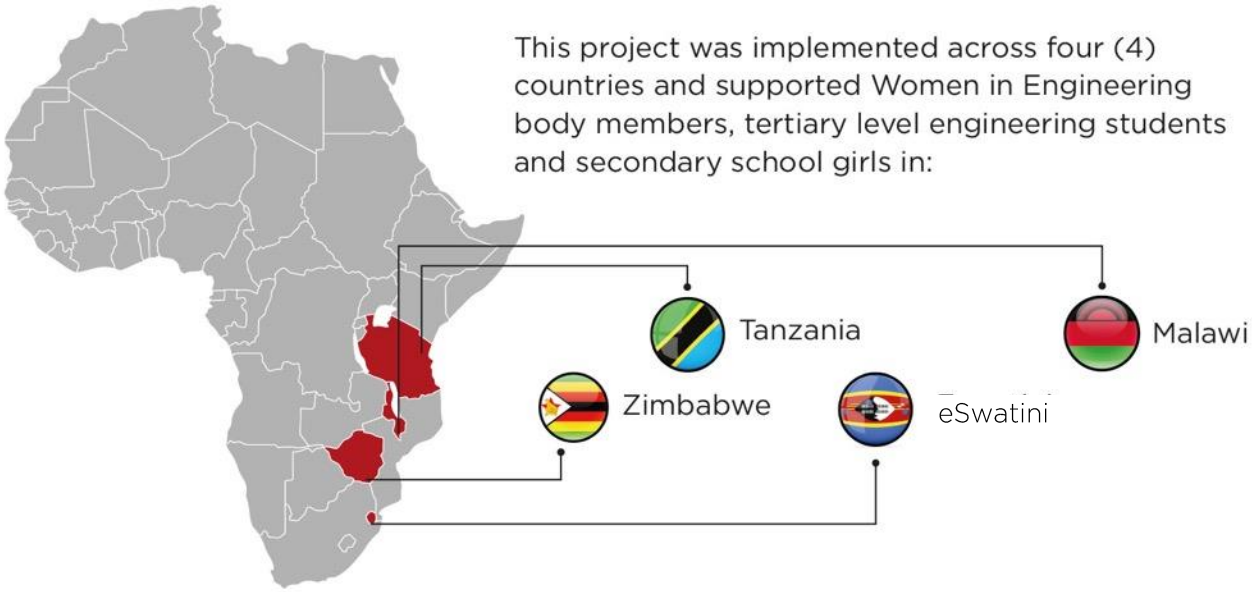
Executive Summary

In 2018, WomEng, as a recipient of a grant from the Royal Academy of Engineering GCRF Africa Catalyst programme, initiated "Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa" as a response to the low participation levels of women in engineering across the continent. It is estimated that women make up less than 10% of the engineers in sub-Saharan Africa. Engineering is a key driver for sustainable development, growth and economic development, yet the continent's full workforce potential is not being utilised. Most professional engineering institutions are committed to developing gender diversity and inclusion by establishing dedicated Women in Engineering chapters/committees/bodies (hereon referred to as "bodies"), however progress has been relatively slow. In 2020, the COVID-19 pandemic accelerated the need for engineering innovation across sub-Saharan Africa; making our mission to build diverse and inclusive engineering talent pipelines even more vital and supporting the transformation of the engineering industry around the world.

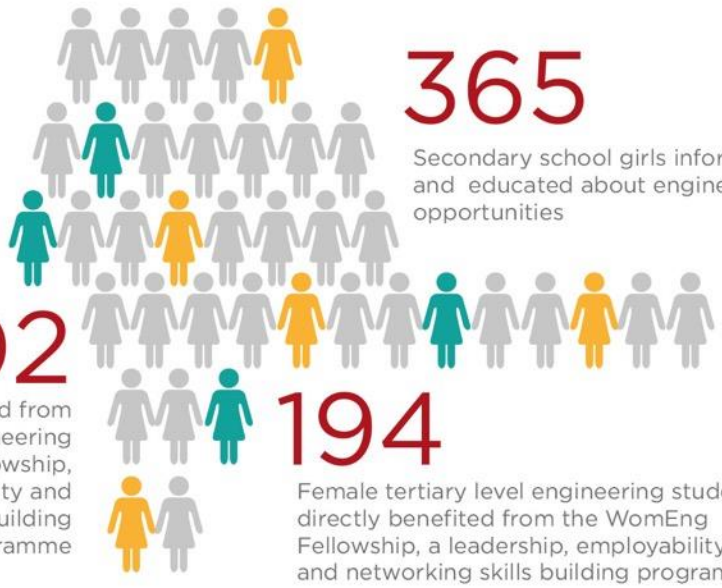
This report is a culmination of learnings and insights from working with Women in Engineering (WIE) bodies in eSwatini, Malawi, Tanzania and Zimbabwe between January 2018 and September 2020 building on 15 years of experience in diversity and inclusion in engineering. The key focus of this project was to improve the capacity of engineering bodies to promote gender diversity, inclusion and relevance within engineering and among engineering professionals in the selected countries. The focus of the project was engaging with the entire engineering institution around diversity and inclusion, developing core leadership capabilities for women in the engineering bodies, building local capacity and support for our pipelining future women in engineering. As such, a series of gender diversity workshops, leadership development and capacity building for WIE members and outreach initiatives for secondary school and tertiary level engineering students were conducted with the respective WIE bodies.

The project objectives:

1. Strengthen institutional capacity of relevant stakeholders by building capabilities within Women in Engineering bodies.
2. Increase understanding of the engendered challenges and barriers to entry women face in the engineering industry and develop pro-active support.
3. Support development of women in engineering pipelines.
4. Advance leadership capacity of women in engineering chapters to attract, develop and retain girls and women in engineering.
5. Increase knowledge among Women in Engineering bodies about effective practices for improving gender diversity and inclusion in engineering.
6. Build on scarce data on women in engineering in Africa.
7. Provide a roadmap and best practice guideline to develop and support diversity and inclusion within engineering bodies.



Impact in Numbers



108

Women in Engineering body members trained with capacity building skills

365

Secondary school girls informed and educated about engineering opportunities

402

Total applications received from female tertiary level engineering students for the WomEng Fellowship, a leadership, employability and networking skills building programme

194

Female tertiary level engineering students directly benefited from the WomEng Fellowship, a leadership, employability and networking skills building programme

Impact by Stories

"I am grateful as this development is going to have an impact on enrolment. I am a lecturer at Masvingo Polytechnic, Zimbabwe in the automotive engineering department. We have been having challenges reaching out to girls but with the outreach programmes we are going to run, it will be easier to reach out to girls even in remote areas." - Kumbirai Maravanyika, Zimbabwe Institution of Engineers, Women in Engineering Member

"I learnt skills that I never acquired during my undergraduate studies e.g. networking skills and interview tips. I also met and interacted with people from other engineering disciplines."
- Catherine Chaima, Malawi, Fellowship Beneficiary

"Getting to know women who are engineers as I thought there were none" – Secondary school girl, eSwatini, GirlEng #AskAnEngineer Beneficiary

While the diversity and inclusion challenges in engineering is global, there is no one-size fits all solution for transformation of engineering bodies in sub-Saharan Africa. Partnering with global organisations like WomEng however amplifies impact for local Women in Engineering bodies across the continent by thinking global, acting local. Our key learnings provide a framework for scaling impact across the continent by identifying commonalities, key lessons learnt and experiences on the ground in developing and strengthening Women in Engineering bodies. This is built on the understanding that the challenge is layered. There are global commonalities around the barriers to entry for women in engineering as well as local nuances that have to be considered when developing and implementing diversity and inclusion strategies to transform the engineering industry.

Building resilient Women in Engineering bodies is critical for amplifying impact.

Key capabilities for organisations to nurture for resilience:

1. Leadership and Culture: Build leaders that people want to follow at all levels of the organisation; leaders that uphold values, paint a vision, are visible and accessible and are able to build a team.
2. Networks and Relationships: Invest in building sustainable trust-based relationships with a broad range of organisations locally, regionally and globally.
3. Adaptability: Learn. Unlearn. Relearn. Encourage continuous learning within the organisation to build innovation and creativity.

Women in Engineering bodies have the ability to increase the engineering talent pipeline by promoting engineering as an opportunity for girls through outreach programmes.

Key strategies for delivering impact:

1. Expose girls to role models that look like them
2. Train facilitators to tell compelling personal stories
3. Talk to factors that influence girls' career choices
4. Create engaging & relevant curricula
5. Inspire career exploration
6. Involve the community

Women in Engineering bodies also have the ability to develop a new generation of confident engineering leaders that can thrive in industry.

Key strategies for delivering impact:

1. Develop skills for the future of work
2. Challenge innovative, entrepreneurial thinking
3. Break through perceived challenges
4. Bridge the gap between student and industry
5. Develop a supportive peer network

Recommendations

Based on the findings in this report, we believe there are three (3) priority actions that if tackled by women in engineering bodies, will achieve sustained growth in changing mindsets, ways of working and culture, namely:

1. **Build stronger communities:** We need to rethink how we support our communities across the continent to share and connect with each other; to find mentors and become mentors; to document experiences and lessons.
2. **Develop collaborative industry partnerships:** Women in engineering bodies need to leverage the business case for gender diversity and inclusion in engineering to develop strategic industry partnerships which could lead to a sustainable source of funding.
3. **Drive policy change:** Women in engineering bodies need to driving policy change globally in order to lobby governments on the ground.

This project, Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa has successfully highlighted the positive impact created when champions at all levels work together. WomEng will continue to create global advocacy and support for a diverse and inclusion engineering industry, while empowering local women engineers on the ground to develop the next generation of women engineers and truly transform the sector.

About WomEng

WomEng is global, award-winning, values-driven organisation for women in engineering by predominantly women engineers, who have developed programmes to address the barriers facing women in the engineering sector from school level all the way through to industry and ownership. Being a dynamic organisation, WomEng has been able to meet the changing demands and needs of the global engineering industry through effective lobbying, advocacy, capacity building and engagement of the sector. WomEng delivers cost effective, impactful programming and has a successful track record, since 2006, in developing programmes that work in supporting diversity and inclusion in the engineering industry. WomEng's unique model ensures lasting impact created by skilled, passionate and committed people through a series of training and development initiatives, experiential learning opportunities and empowerment of local women engineers across the world to support WomEng's vision of a diverse and inclusive engineering industry.

Contents

Introduction

Capacity Building for Women in Engineering Bodies in sub-Saharan Africa started in January 2018. It was funded by the Royal Academy of Engineering Africa Catalyst Phase 2 grant programme to support the capacity building of engineering institutions in sub-Saharan Africa. We (WomEng) set out on a mission to improve the capacity of Women in Engineering bodies to promote the relevance of gender diversity and inclusion within engineering in sub-Saharan Africa. Three (3) years later, as this project draws to a close in 2020, the world looks very different, however the mission is now even more important than ever before.

About WomEng

WomEng is a global, award-winning, values-driven organisation working to create a more diverse and inclusive engineering and tech industry. Founded in South Africa in 2006, WomEng works internationally by developing targeted programmes and interventions that address the barriers facing women in the engineering sector from school level all the way through to industry and ownership. Beyond the focus on increasing the numbers through our proactive and needs driven approach, WomEng programming is creating the next generation of engineering leaders in society.

WomEng has worked beyond only building talent pipelines for women by starting to build entrepreneurship and innovation challenges to raise the opportunities for entrepreneurship within the engineering and technology industry. From 2006 to 2020, WomEng has run programmes in twenty-two (22) countries and has reached over 50 000 girls and women in STEM.

WomEng has been able to meet the changing demands and needs of the global engineering industry through effective lobbying, advocacy, capacity building and engagement of the sector. WomEng takes both a top down approach by lobbying and advocating for transformation of the sector, as well as a bottom up approach by building a diverse and inclusive engineering industry starting at a school level all the way to supporting female founders and innovators to increase ownership of the sector.

WomEng's unique model ensures lasting impact created by skilled, passionate and committed people through a series of training and development initiatives, experiential learning opportunities and empowerment of local women engineers across the world. It is the only organisation of its kind to look holistically at the challenges and develop robust scalable solutions. *Exhibit 1* outlines our pipeline solution of programmes.

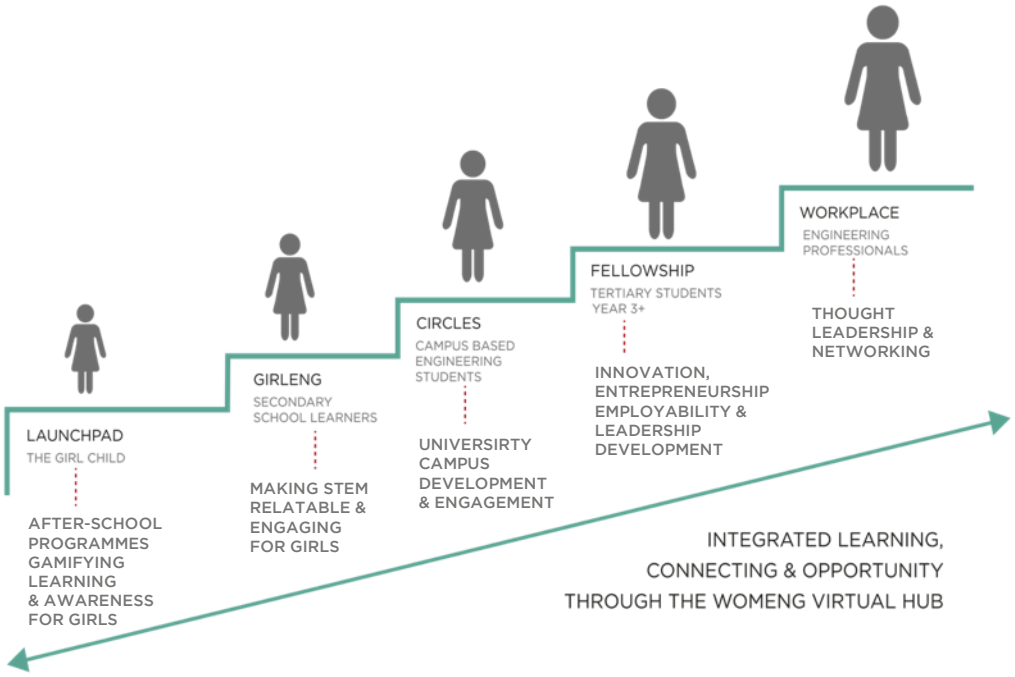


Exhibit 1. WomEng Pipeline of Programmes

Accelerated Need for Engineering Talent in the Next Normal

The COVID-19 pandemic has accelerated the need for innovative problem solving and engineering demand particularly in sub-Saharan Africa. Harnessing sub-Saharan Africa's full engineering talent capabilities is vital to enable the development of infrastructure, and support countries in a post COVID-19 recovery. A better and more sustainable future requires gender diversity and inclusion to solve the current problems we face at a global, regional and local level. Progress on gender diversity and inclusion in engineering however has to date, remained slow.

The engineering industry requires the participation of women at all levels. Women in engineering, however, are grossly under-represented. Globally, female engineering graduates are still below 25% (UNESCO, 2015). In sub-Saharan Africa particularly, women make up less than 10% of engineers in industry, detailed in the next section of this report. While there is positive growth of women entering the industry, there is an untold story of attrition or the "leaky pipeline" of women leaving. When women make up 50% of the population (World Bank, 2019) and are considered the world's most powerful consumers, controlling 70 - 80% of all consumer purchasing power (Forbes, 2019), it is a missed opportunity to have so few women at the engineering design table. This also has far reaching consequences on the way infrastructure is designed, often without consideration for the primary users, leading to women having to spend more time, money and effort accessing the same services as male counterparts.

Sub-Saharan Africa's Opportunity

In the next five years, sub-Saharan Africa will become more populous, youthful, urban, mobile, educated, and networked. Equipping youth, in particular girls and women in sub-Saharan Africa would be a catalyst to social and economic development. McKinsey and Co. (2019) notes if Africa steps up its efforts now to close gender gaps, it can secure a substantial growth dividend in the process. In a realistic "best-in-region" scenario in which the progress of each country in Africa matches the country in the region that has shown most progress towards gender parity, the continent could add $316 billion or 10% to GDP in the period to 2025. Leveraging the power of professional engineering institutions to drive gender diversity and inclusion allows for regional and national impact. Professional engineering institutions are critical actors in accelerating growth for gender diversity and inclusion in engineering across sub-Saharan Africa as they are mandated by national acts and policies, creating far reaching change in their respective countries. Across sub-Saharan Africa, professional engineering institutions are establishing Women in Engineering bodies to promote and develop girls and women in engineering. Women in Engineering bodies have the potential to amplify impact through collective advocacy and action, however many initiatives struggle to gain scalability due to lack of funding, lack of wider visibility within the engineering body and additional unpaid workload.

About Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa

Through this project, Capacity Building for Women in Engineering Bodies in sub-Saharan Africa, we have the opportunity to shift the needle on gender diversity and inclusion in engineering.

Between January 2018 – September 2020, WomEng worked in partnership with the Cambridge Institute for Sustainability Leadership and professional engineering institutions' Women in Engineering bodies in four (4) countries, namely eSwatini, Malawi, Tanzania and Zimbabwe to design, test and learn how we can accelerate growth for women in engineering. The project objectives included:

1. Strengthening institutional capacity of relevant stakeholders by building capabilities within Women in Engineering bodies.
2. Increasing understanding of the engendered challenges and barriers to entry women face in the engineering industry and develop pro-active support.
3. Supporting development of women in engineering pipelines.
4. Advancing leadership capacity of women in engineering chapters to attract, develop and retain girls and women in engineering.
5. Increasing knowledge among Women in Engineering bodies about effective practices for improving gender diversity and inclusion in engineering.
6. Building on scarce data on women in engineering in Africa.
7. Providing a roadmap and best practice guideline to develop and support diversity and inclusion within engineering bodies.

The professional engineering institutions and their respective Women in Engineering bodies/chapters (hereon referred to as bodies) includes:

1. **eSwatini:** WomEng eSwatini (non-profit organisation) & Registration Council for Architects, Engineers, Surveyors and Allied Professionals (AESAP)
2. **Malawi:** Malawi Institution of Engineers (MIE) – Women in Engineering
3. **Tanzania:** Institution of Engineers Tanzania (IET) – Women Chapter
4. **Zimbabwe:** Zimbabwe Institution of Engineers (ZIE) - Women in Engineering

This project was implemented through a series of steps, working closely with partner Women in Engineering bodies to build organisational and outreach capacity.

This report documents the key learnings and insights over the last three (3) years; setting a precedent for scaling capacity building initiatives for Women in Engineering bodies across the continent. The strategies tested in this project were conducted in a pre-COVID-19 pandemic world, notably with a heavy reliance on in-person programme. However, the framework of strategies presented are still relevant and adaptable to the new normal of a digitally accelerated world. The key questions we aim to answer include:

Why is gender diversity and inclusion in engineering in Sub-Saharan Africa critical?

Sustainable engineering talent pipelines in sub-Saharan Africa require gender diversity and inclusion. The region is a fast-growing economic region highly reliant on engineering capabilities to sustain economic growth. Utilising the continent's full workforce potential is critical for sustainable development however shifting mindsets and culture poses the largest barrier.

How can Women in Engineering bodies deliver impact more effectively?

Building resilient Women in Engineering bodies is critical to amplify advocacy and action across the continent.

What can Women in Engineering bodies do to increase impact for young girls?

Promoting engineering as an opportunity for girls builds personal aspirations while changing the mindsets of society.

What can Women in Engineering bodies do to sustain women in engineering?

Developing engineering students that can thrive in the workplace.

Image: A beneficiary from WomEng Fellowship Tanzania, 2020.

Chapter 1
Sustainable Engineering Talent Pipelines Require Diversity & Inclusion

Women constitute more than half of sub-Saharan Africa's human capital, but are one of its most underutilised resources. According to the OECD (2008), "in failing to make the best use of their female populations, most countries are underinvesting in the human capital needed to assure sustainability. Although women account for over one-half of the potential talent base throughout the world, as a group they have been marginalised and their economic, social and environmental contributions go in large part unrealised."

Sub-Saharan Africa is a land of vast opportunities and challenges. In the next five (5) years, sub-Saharan Africa will become more populous, youthful, urban, mobile, educated, and networked (DNI, 2020). Sub-Saharan Africa has the largest youth population in the world coupled with a large need for engineering talent. According to the United Nations (2015), there are 1.2 billion youth aged 15-24 globally, accounting for one out of every six people (17%) worldwide. Equipping youth, in particular girls and women in sub-Saharan Africa would lead to exponential social and economic development. With the rise of digital technology specifically, the Global System for Mobile Communication (2019) estimates that if as many women as men used mobile internet worldwide, the global GDP could rise by $700 billion. With Africa contributing 2% (World Bank, 2019) to the global GDP, this translates to $14 billion added to Africa's GDP by increasing digital access for Africa's women alone. It could be inferred that increasing formal tertiary education in engineering and technology could increase this number further.

The continent however, faces many challenges in terms of development. Sub-Saharan Africa is considered one of the poorest regions in the world. According to the United Nations (2020), "GDP growth is inching up in Africa but is inadequate to meet development needs in most sub regions". A long history of civil wars, political volatility, corruption and the split of the region along language lines between English, French and Portuguese adds to sub-Saharan Africa's development complexities. Economic and social development are showing signs of growth with key success indicators including literacy, income levels and girls access to education. In order to sustain growth, the severe lack of engineering capacity in the region needs to addressed.

The participation of women in engineering in sub-Saharan Africa remains low. Gender diversity and inclusion for sustainable development while increasingly on the agenda, has a long way to go. According to the World Economic Forum's Global Gender Gap report (2020), gender parity will not be attained for another 99.5 years. The Global Gender Gap report measures economic participation and opportunity, educational attainment, health and survival and political empowerment.

The four (4) Africa Catalyst project countries represent a wide degree of differences in terms of population size, culture and development. It is acknowledged that these countries do not represent sub-Saharan Africa as a whole, however, they provide a sample demographic with the opportunity to scale learnings from these countries to other countries and regions on the continent. In terms of gender gaps between the Africa Catalyst countries, Zimbabwe comparatively has the smallest gender gap while Malawi has the largest gap. ***Exhibit 2,*** details the rank and score out of 1, as noted by the World Economic Forum (2020)

Exhibit 2. Gender Gap Rating in Africa Catalyst countries. Region: sub-Saharan Africa (WEF, 2020)

Country	Rank		Score (1 = gender parity)
	Regional (n=34)	Global (n=135)	
Zimbabwe	6	47	0.730
Tanzania	11	68	0.713
eSwatini	14	83	0.703
Malawi	23	116	0.664

Insights in this section are derived from desktop research and engagements with our Africa Catalyst Women in Engineering bodies during gender diversity and leadership development training workshops hosted in 2018/19.

We aim to answer the following questions:

1. What is the current state of gender diversity and inclusion in engineering in sub-Saharan Africa with a focus our Africa Catalyst project countries?
2. How is progress being hindered?
3. How can change be managed?

Diversity is Growing, Progress is Slow

It is estimated that women make up less than 10% of engineers in sub-Saharan Africa. Accurate data on the percentage of women participating in the engineering sector is very limited as in the case with data challenges across the continent. There are currently no formal studies or census on the number of women in engineering across sub-Saharan Africa. According to UNESCO (2015), "though women are least present in engineering fields, the share of women graduating as engineers has risen in sub-Saharan Africa (between 2006 – 2014)". Women are however failing to reach the top of leadership in the engineering sector which is mirrored across all sectors based on data from McKinsey and Co. (2019) on women in leadership roles. Only about 6% of CEOs, 22% of executive committee members and 25% of board members are women, globally. The challenge remains that girls and women are being attracted into the engineering industry, but we need to address the "leaky pipeline" challenge. This refers to losing women in middle management which has implications on the number of women that ultimately make it to senior level and board positions globally.

Exhibit 3 and 4 outline data obtained from existing data and professional engineering institutions in our Africa Catalyst countries, to estimate the capacity of women participating as engineers in industry.

Exhibit 3. Percentage of female engineering graduates in Africa Catalyst countries

Country	University Engineering Graduates (% Female)	Reference Year	Source
eSwatini	-*	-	
Malawi	9.3%	2007	World Bank
Tanzania	-	-	
Zimbabwe	21.4%	2013	UNESCO

* "-"indicates no available data

Exhibit 4. Percentage of female members as part of professional engineering bodies in Africa Catalyst countries

Country	Professional Engineering Institution (PEI) Members [Total No. of Members]	Women in Engineering Body Members/ No. of Female Members Registered with PEI	% Membership of Women in PEI
eSwatini	-*	40	-
Malawi	403	35	8.7%
Tanzania	4 388	297	6.8%
Zimbabwe	9 302	625	6.7%

* "-"indicates no available data

eSwatini

In eSwatini, the official professional engineering institution, Registration Council for Architects, Engineers, Surveyors and Allied Professionals (AESAP), is newly established (2017/2018). Prior to this, eSwatini relied on South Africa's Engineering Council of South Africa (ECSA) to register engineers in the country. No data had been recorded until 2018 on the number of engineers in the eSwatini. In 2018, WomEng also officially launched a local body in eSwatini. WomEng eSwatini, is registered as a separate non-profit organisation. The establishment of WomEng eSwatini was based on interest and demand from local women in engineering with support from the US Embassy. The number of members stated in *Exhibit 4* represents the number of members in the WomEng eSwatini network (2018). WomEng eSwatini is creating a sustainable pipeline of women engineers in eSwatini to register with AESAP.

In 2020, WomEng eSwatini Director, Bongekile Matsenjwa became the first registered female engineer with AESAP. The continued relationship between WomEng eSwatini and AESAP looks positive for ensuring gender diversity and inclusion is continuously on the engineering talent agenda in eSwatini. It also showcases the different models and approaches countries can take by either creating internal bodies to institutions or leveraging partnerships with external organisations to reach the same mandate.

Malawi

In Malawi, prior to 2019, the country had two engineering bodies, namely the Malawi Board of Engineers (MBE) and Malawi Institution of Engineers (MIE). MBE regulated the engineering profession under the Engineers Act, 1972 while MIE was established as a charitable trust in 1998. The objectives of MIE included representation, advocacy, lobbying and protecting the interests of engineers and of the general public in Malawi. Eng. Theresa Mkandawire, the first president of the Malawi Institution of Engineers, was also the first woman in Malawi to graduate with a distinction in civil engineering in 1993.

Exhibit 5 provides a detailed breakdown of engineers per category and gender as per the Malawi Board of Engineers statistics (2018).

Exhibit 5. Breakdown of Engineers Per Category and Gender In Malawi (Malawi Board Of Engineers, 2018)

Registration Category	No. of Members	No. of Female Members	% Female Membership
Registered Engineers	185	7	3.8%
Graduate Engineers	172	26	15.1%
Technician Engineers	33	2	6.1%
Engineering Technicians	13	-	0.0%
Total	**403**	**35**	**8.7%**

In 2019, the Malawi Parliament passed the Malawi Engineering Institution (MEI) Bill which has become the Malawi Engineering Institution Act, 2019. The MEI Act, 2019, repeals and replaces the Engineers Act, 1972 and provides a new legal framework that will be able to comprehensively deal with challenges and new developments in the engineering profession. This act also merges the two engineering bodies providing the opportunity to make gender diversity and inclusion a national priority and management of gender diversity statistics more unified.

Tanzania

While the first female engineers in Tanzania graduated in 1976, official statistics show that by 2009 only 4% of all registered engineers in the East African country were women (Reuters, 2016). In 2016, the percentage of women engineers increased to 6.8%. Tanzania has two (2) professional engineering institutions namely the Engineering Registration Board, Tanzania and Institution of Engineers, Tanzania (IET). The number of members at each institution differs slightly as registration processes are separate. According to IET, the number of female members in 2018 was 261. The majority of these engineers fall in the civil engineering discipline (38% of female engineering members) and electric and electronics engineering (23% of female engineering members).

Zimbabwe

The Zimbabwe Institution of Engineers (ZIE) and Engineering Council of Zimbabwe (ECZ) are two (2) separate bodies that oversee the registration and standards of engineering in Zimbabwe. ***Exhibit 6*** provides a detailed breakdown of engineers per category and gender as per the ZIE membership statistics (2018).

Exhibit 6. Breakdown of engineers per category and gender in Zimbabwe (Zimbabwe Institution of Engineers, 2018)

Category	Total No. of Members	No. Female Members	% Female Members
Applicant	228	17	7%
Associate Member	134	0	0%
Fellow	322	7	2%
Graduate Member	1661	113	7%
Graduate Technician	556	30	5%
Honorary Fellow	14	2	14%
Member	2 400	105	4%
Other (not categorised)	118	4	3%
Past President Fellow	27	1	4%
Past President Honorary Fellow	5	0	0%
Student	2 792	288	10%
Technician	945	55	6%
Technician Temp	92	1	1%
Technologist	7	2	29%
Technologist Temp	1	0	0%
Total	**9 302**	**625**	**6.7%**

According to ZIE - Women in Engineering (WIE), participation of ZIE WIE members has been increasing. There are now +260 active women members in 2018/19 compared to 35 in 2016. ZIE WIE also noted that though the representation of women in the ZIE Board has gone down from 29% (for 2014 to 2016) to 22% (for 2016 to 2018), the number of women councilors from the WIE division appointed to the Engineering Council of Zimbabwe (ECZ) increased from 1 to 4 (an increase from 10% to 40%). In 2017, six (6) female engineers out of 26 engineers (23%) were appointed to University Councils by the former President of the Republic of Zimbabwe.

From the data provided, it can be concluded that diversity in the engineering industry is growing however progress is slow. While women first graduated with engineering degrees in some countries over 40 years ago, the percentage of women in the engineering industry currently still hovers below 10%. This is an example of how diversity is increasing but inclusion is decreasing.

Unpacking Barriers to Growth

Through the duration of the project, a series of gender diversity training and leadership development workshops were hosted with Women in Engineering body members from our Africa Catalyst countries. Discussions centered around understanding the key barriers to accelerating gender diversity and inclusion in engineering within these countries. Members were challenged to imagine what a diverse and inclusive engineering workforce would ideally look like compared to lived experiences and the current status quo. *Exhibit 7* highlights three (3) key barriers identified by Women in Engineering body members.

Exhibit 7. Barriers to Gender Diversity and Inclusion in Engineering

Barriers to Gender Diversity and Inclusion in Engineering

- Patriarchal culture has a strong-hold in sub-Saharan Africa
- Lack of visibility of female engineering role models in industry
- Workplace policies and practices lack inclusion

Patriarchal Culture has a Strong Hold In Sub-Saharan Africa

Patriarchy as defined by the Oxford Dictionary is a system of society in which the father or eldest male is head of the family and descent is reckoned through the male line. As such, patriarchal culture has a strong hold in sub-Saharan Africa. According to the United Nations Development Programme (2016), "perceptions, attitudes, and historic gender roles" limit women's access to health care and education, and lead to disproportionate levels of family responsibility, job segregation, and sexual violence. Patriarchal culture has a strong influence on the following aspects:

1. **Gendered roles defined by society:** Men have traditionally been seen as the breadwinners, laborers, "hunters" in society while women have been conditioned to be responsible for domestic duties in the household and chief nurturers of offspring. An article by BCG (2019), notes that "the home management load is constant, underrecognized, unpaid - and it falls disproportionately on women, limiting their ability to focus on their careers and rise into leadership roles." Women are still 1.9 times more likely than men, on average, to have primary responsibility for household chores. In African societies, more women are now entering the formal workplace however this most often comes with still having to shoulder the unpaid burden of maintaining society's expectation of women as primary care givers in the household.

2. **Education:** Poverty is a major barrier to education for girls in sub-Saharan Africa. In families that cannot afford education for all the children, boys are often prioritized over girls to receive formal education as this is connected to the patriarchal ideology of men being the heirs to their family legacy. Investing in boys' education is seen as an investment for the future breadwinner whereas girls are often assumed to be married off to another family at an early age, thus not yielding long term economic progress for the family. According to the World Economic Forum (2016), "cultural norms and practices underpin the higher education degree specialisation of men and women and are a key driver of occupational segregation."

3. **Limiting self-belief:** Women in Engineering body members from Zimbabwe and Tanzania mentioned noticing many women who do not fully value themselves personally and professionally as compared to men. One member added that it is for this reason that women are bound to take less big risks professionally compared to their male counterparts. This is further substantiated by McKinsey and Co.'s report The Power of Parity (2020) which states that "some women limit their own prospects, being reluctant to take risks, network with colleagues, and advocate for their own advancement." In patriarchal societies, women are traditionally expected to be submissive. With generational grooming, women are starting to see themselves as equal to male counterparts however many still lack confidence to be assertive or struggle with imposter syndrome.

Lack of visibility of female engineering role models within industry

The lack of visibility of female engineers within industry creates a barrier in effectively attracting young girls to pursue engineering pathways and retaining professional women in engineering. Based on the concept of 'seeing is believing', role models have an impact on various levels including:

- Getting women inspired.
- Men see that women can do it.
- Community members see different possibilities.
- Changing the culture around women in the workplace and in "unconventional jobs".

With less than 1 in every 10 engineers being a women in industry, Women in Engineering body members across all Africa Catalyst countries note that they often felt isolated; causing many to consider moving into other industries. In addition to this, Women in Engineering body members noted the added pressure faced on those who aim to serve as active role models and mentors; balancing such activities with pre-existing domestic and professional responsibilities. This can cause fatigue on the limited number of women in engineering. This is one of the reasons that we see attrition of women in middle management leading to the "leaky pipeline" effect.

Video Box 1

Shelter Majowa, a member of Zimbabwe Institution of Engineers, shares her story of increasing the visibility of women in engineering and manufacturing to inspire more girls and women.

Play Video

Workplace policies and practices lack inclusion

"I think there should be policies that allow for flexible times if both the man and woman are engineers with a home. They should be allowed to choose shifts that accommodate their family life. As a technician, my company should allow me to choose the morning shifts. This is because at 4pm I should be able to go home to my kids. Currently, our policies are silent on that." – Zimbabwe Institution of Engineers, Women in Engineering Member

In sub-Saharan Africa, women have only been in the formal engineering workplace over the last one (1) to two (2) generations. The workplace culture and policies in place have been in existence for much longer. A member from the Institution of Engineers, Tanzania Women Chapter noted that there are still instances where women are obliged to reveal whether they are mothers before being granted a project. Based on lived experiences from Women in Engineering members, many women have faced unwillingness from companies to let engineers who are mothers or intend on becoming mothers in the foreseeable future to lead big projects.

Leveraging Change

Tackling gender diversity and inclusion requires changing mindsets and culture. Change leadership harnesses the power of the people, the driving forces, visions and processes that fuel large scale and sustainable transformation. Three (3) levers for change have been identified to amplify and accelerate gender diversity and inclusion in engineering. The levers are not meant to be a formula, but represent aspects that require attention and planning for successful change management. No single approach will resolve everything. A variety of interventions and initiatives are needed to improve the status quo and shift the needle on parity.

Leveraging Compelling Storytelling

People need to make sense of the change before they can change. According to McKinsey and Co. (2011), telling the compelling story of change is essential to the success of any transformation effort. Stories reflect our values and our actions and have been critical to the passing down of traditions between generations. If we want to change traditions, we need to change our stories. What we tell ourselves over time is what we begin to believe.

Leveraging Talent and Skills Development

"I got more confidence on inspiring women engineers, learnt how to be a good speaker, a good leader" – Institution of Engineers, Tanzania Women Chapter member; feedback from leadership development workshop hosted by WomEng in 2019.

Actively cultivating skills in women increases personal self-belief and confidence as leader, promoting leadership growth. Studies show that diverse teams lead to innovative solutions (Royal Academy of Engineering, 2015). When more women are included at a board level, companies are resilient and more profitable. By shifting the understanding and showcasing the value that women bring to the sector from a narrative of business growth rather than an equality perspective, the result is a more effective moving of the needle in companies hiring women even in the absence of affirmative action or gender target policies.

Leveraging Technology

According to the World Bank (2020), "digital technologies can be game changers in the crisis, and we are encouraging more investment not just in digital infrastructure and platforms, but also in skill and in creating an enabling regulatory environment."

Data from Hootsuite (2020) shows that 34% of sub-Saharan Africa's population has some form of internet access in 2020 with a year on year increase of 10%. Mobile phones have been game changers across the continent with high adoption rates and greater access to opportunity. In sub-Saharan Africa, mobile cellular subscriptions equate to 81% of the total population with a year on year growth of 5.6%. Social media penetration rates are still considerably low in sub-Saharan Africa (16%). However, exponential growth is predicted. The year on year growth for social media between January 2019 and January 2020 was 12%. However, when interrogating the data, there is a gender split on usage with women having less access in the household.

The COVID-19 pandemic has accelerated the requirement for using technology to connect with people and develop skills online. The Zimbabwe Institution of Engineers, Women in Engineering body utilises a WhatsApp and a Telegram group for all members. This is used to keep in touch with each other regularly, using mediums aside from email. This connects members more instantaneously and less formally, creating low resistance for sharing of opportunities and engagement. In eSwatini, WomEng eSwatini has leveraged Facebook Live sessions on WomEng's global platform in 2020 to grow reach and raise the profile of engineering in eSwatini.

In Summary

Women are one of the most underutilised resources for economic development in sub-Saharan Africa. Less than 10% of engineers in sub-Saharan Africa are women. Though there has been progress in terms of gender diversity and inclusion in engineering over the last 40 – 50 years, progress is slow, and there is still a long way to go in terms of inclusion in the sector. The key barriers to accelerating growth, identified by Women in Engineering body members include:

- The entrenched patriarchal culture and mindset that has a stronghold in sub-Saharan Africa.
- Lack of visibility of female engineering role models in industry creates a feeling of being an island for young female engineers.
- Workplace policies and practices lack inclusion.

To accelerate gender diversity and inclusion, the following levers are recommended:

- Impactful storytelling
- Talent and skills development
- Accelerated use of technology

Image: A Zimbabwe Institution of Engineers, Women in Engineering member sharing programme planning strategy for outreach programmes, Zimbabwe, 2018.

Chapter 2
Women in Engineering Bodies Amplify Impact

In this section we aim to answer the following questions:

1. Why do we need to build the capacity of Women in Engineering bodies?
2. What are the key organisational challenges currently facing Women in Engineering bodies?
3. How do we build resilient organisations?

Advancing Collective Advocacy & Action Across Sub-Saharan Africa

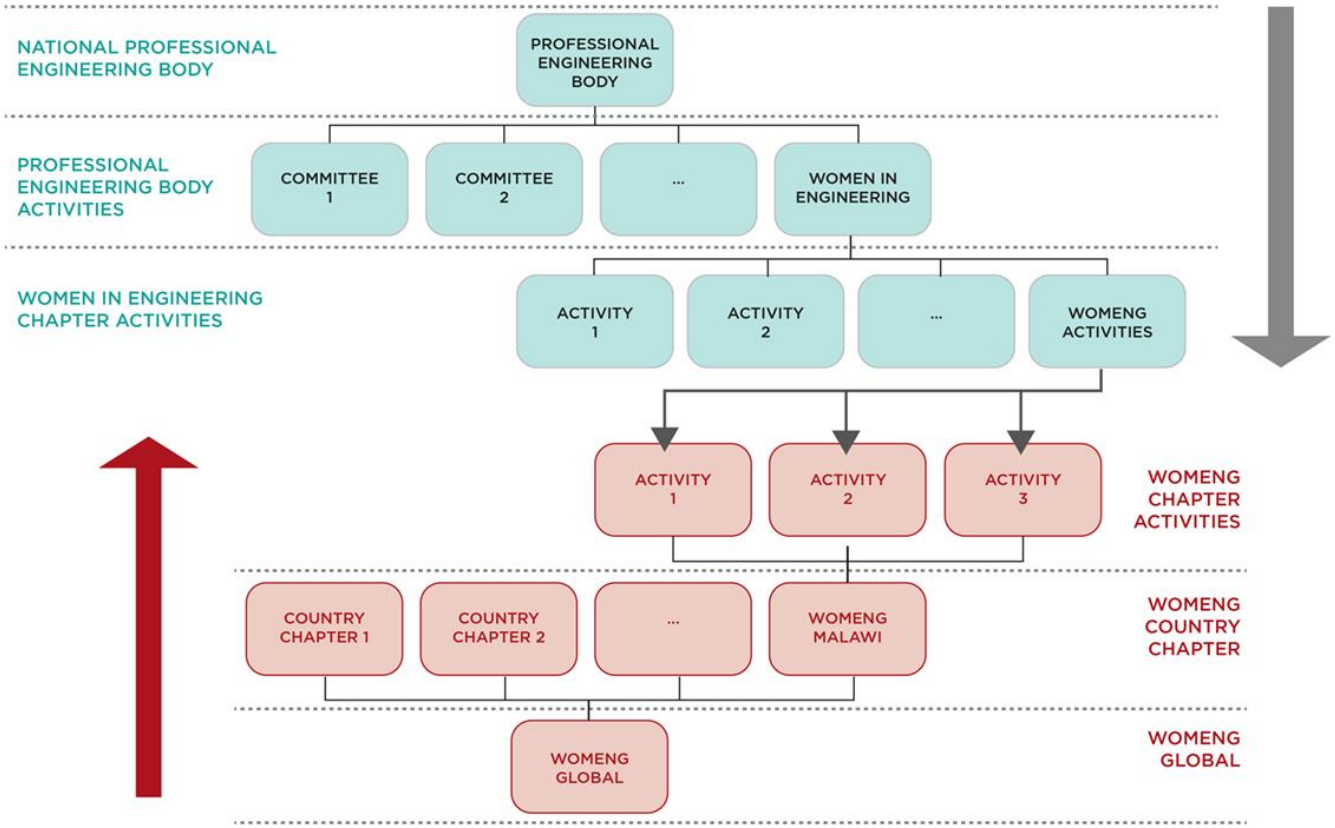
"Nothing can stand in the way of the power of a million voices calling for change" - President Barack Obama

Changing mindsets and culture requires strong advocacy and action. Advocacy means giving a person support to have their voice heard and understand their rights. Women in Engineering bodies across sub-Saharan Africa have an overarching role to play in supporting the development of engineering capacity by attracting and developing girls and women into the engineering industry. Women in Engineering bodies serve as change agents, providing collective advocacy and action to increase the profile of women in a male-dominated industry. However, change does not happen on its own. There needs to be a deliberate and structured approach to change including:

- A willingness to change, especially at leadership levels.
- Financial resources dedicated to creating a new normal.
- Passionate individuals who are supporting the change.

Taking collective action across the continent to strengthen the profile of women in the engineering profession can amplify and accelerate the impact of gender diversity and inclusion. In developing a unified voice across the continent, professional engineering institutions have a powerful role to play. WomEng has worked to build and support women in engineering pipelines around the world. Leaning on its expertise and building with the end in mind, *Exhibit 8* highlights a model for collaboration developed by WomEng to work with professional engineering institutions across the continent.

Exhibit 8. WomEng - Women in Engineering Body Integration Model



Professional engineering institutions in sub-Saharan Africa are typically statutory bodies mandated by National Engineering Acts to carry out various activities in upholding and strengthening the practice of engineering within respective countries. The rise of Women in Engineering bodies within the professional engineering institutions allows for gender diversity and inclusion to become a key growth strategy for the institutions. Each Women in Engineering body is typically made up of members from the professional engineering institutions, with a number of specific objectives and activities e.g. outreach and continuous development programmes for girls and women as well as building advocacy on global platforms like the World Federation of Engineering Organisations (WFEO).

With WomEng being a global, independent organisation, working extensively across the continent, harnessing expertise in gender diversity and inclusion in engineering, it is envisioned that we are able to supplement current efforts by existing Women in Engineering bodies. WomEng, established in South Africa, has to date worked in over twenty-two (22) countries since 2006 actively building a more gender diverse and inclusive engineering and technology workforce. WomEng operates globally, with country chapters and ambassadors set up in a number of countries to implement WomEng developed programming. WomEng activities in each country are adapted and localised based on the specific needs and level of gender diversity and inclusion development.

The proposed 'think global, act local' partnership model between WomEng and various Women in Engineering bodies will provide collective knowledge sharing across the continent through WomEng, while Women in Engineering bodies in each country could localise frameworks developed to meet the needs on the ground.

For the duration of this project, WomEng worked with key members in each Women in Engineering body to design, test and implement leadership development and outreach initiatives powered by WomEng. Post the Africa Catalyst project, it is envisioned that these relationships will be maintained through appointed champions within each Women in Engineering body. WomEng will continue to serve as a supervisory, support and mentoring, as well as provide access to a community of like-minded engineering professionals around the world.

Unpacking Key Organisational Challenges

Our Africa Catalyst Women in Engineering bodies are at the beginning of their journey (on average less than 10 years since establishment), requiring much needed support and guidance to grow impact and reach. WomEng eSwatini was officially established in 2018 as a direct outcome of this project. In Zimbabwe, the Women in Engineering body of Zimbabwe Institution of Engineers was first established in 2011 and officially launched in 2015 at the World Federation of Engineering Organisation's Africa Engineering Week hosted at Victoria Falls. The Malawi Institution of Engineers – Women in Engineering body was established in 2011. In Tanzania, the Institution of Engineers, Tanzania - Women Chapter was also officially launched in 2002.

During gender diversity and leadership development training sessions hosted with each Women in Engineering body, members were asked to map key organisational growth challenges. Key organisational growth challenges identified included:

1. **Volunteer-based Structure:** All Women in Engineering bodies are fully volunteer-based from student members to senior executives. This creates a constraint on capacity and engagement of members. For individual members (all women), participation in the Women in Engineering bodies' activities have to be balanced with full-time professional engineering careers and domestic commitments. A member from Institution of Engineers, Tanzania noted that many engineering graduates are also reluctant to register with the engineering body as there are no monetary benefits tied to membership.
2. **Lack of Funding for Projects:** Women in Engineering body members noted how a lack of funding has hindered implementation of activities. Zimbabwe Institution of Engineers, Women in Engineering members mentioned that a lack of funding has been a reason that members are unable to attend international conferences and meetings, as compared to previous years. Members also mentioned that without funding, carrying out activities within the Zimbabwe Institution of Engineers, Women in Engineering body has been a challenge. The economic situation particularly in Zimbabwe has deteriorated over the duration of this project, creating increased limitation on the type of activities the organisation can carry out.
3. **Digital Transformation:** Access to internet is limited in most regions outside the metropolitan cities in each of the countries. This has limited the work of Women in Engineering bodies to in-person programmes where possible which costlier and limited to access.
4. **Leadership and Talent Development:** Leadership and talent development is based on funding availability. Organisations have limited leadership development programmes dedicated to gender diversity and inclusion.

Developing Resilient Organisations

In early 2020, the COVID-19 pandemic created a global disruption. Markets on all continents were affected and resulted in incalculable losses for countries, organisations, and people. This section highlights key examples of how Women in Engineering bodies have been working to survive and thrive pre- and during the COVID-19 pandemic. *Exhibit 9* highlights three (3) key actions identified to develop resilient organisation.

Exhibit 9. Key Actions for Developing Resilient Organisations

Key Actions for Developing Resilient Organisations

- Develop a strong sense of leadership and culture within the organisation
- Harness the power of networks and relationships
- Be ready to adapt to constantly changing circumstances

Develop a strong sense of leadership and culture within the organisation

It is critical to build leaders that people want to follow at all levels of the organisation. Leadership skills are constantly evolving, requiring leaders at all levels to often self-evaluate and actively improve personal leadership skills. Members from all levels of leadership ranging from executive members to student members participated together in the leadership development and training workshops hosted for the various Women in Engineering bodies by WomEng. This was purposeful to create a culture of visibility and accessibility of leaders while collectively developing organisation roadmaps; preparing leaders at all levels of the organisation to understand the challenges, seek opportunities and make decisions, and create a strong sense of internal stakeholder alignment. More importantly, on a continent rife with ageism culturally and in the engineering professional, it was important to support and map a pathway for the next generation of leadership within the institutions.

Action: Build leaders that people want to follow at all levels of the organisation; leaders that uphold values; paint a vision; are accessible and can build a team.

Image: Malawi Institution of Engineers, Women in Engineering and WomEng members mapping outreach plans, Malawi, 2018.

Harness the power of networks and relationships

"If you want to go fast, go alone. If you want to go far, go together" – African Proverb.

Internal (member engagement) and external relationships (partnerships) are critical to ensuring sustainability. Few organisations have sufficient in-house resources to manage every eventuality. Relationships need to be proactively nurtured. The way an organisation operates during day-to-day influences the extent to which people and organisations will be prepared to help during times of adversity.

During leadership development training sessions hosted with the Women in Engineering bodies, members were asked to map out existing and wish list networks. In Zimbabwe, the Women in Engineering body frequently engages with members using instant messaging services like Telegram and WhatsApp, for sharing news updates and opportunities. In Malawi, this project built gravitas and paved the way for the team to build partnerships with other institutions e.g. Rice University, expanding outreach programmes in Malawi. In eSwatini, WomEng eSwatini is developing strong relationships with the Royal Swazi Science and Technology Park and the University of eSwatini, two important organisations in engineering in eSwatini.

Action: Invest in building and sustaining trust-based relationships with a broad range of organisations locally, regionally and globally is key to the success of not just the Women in Engineering bodies but the entire professional engineering institutions.

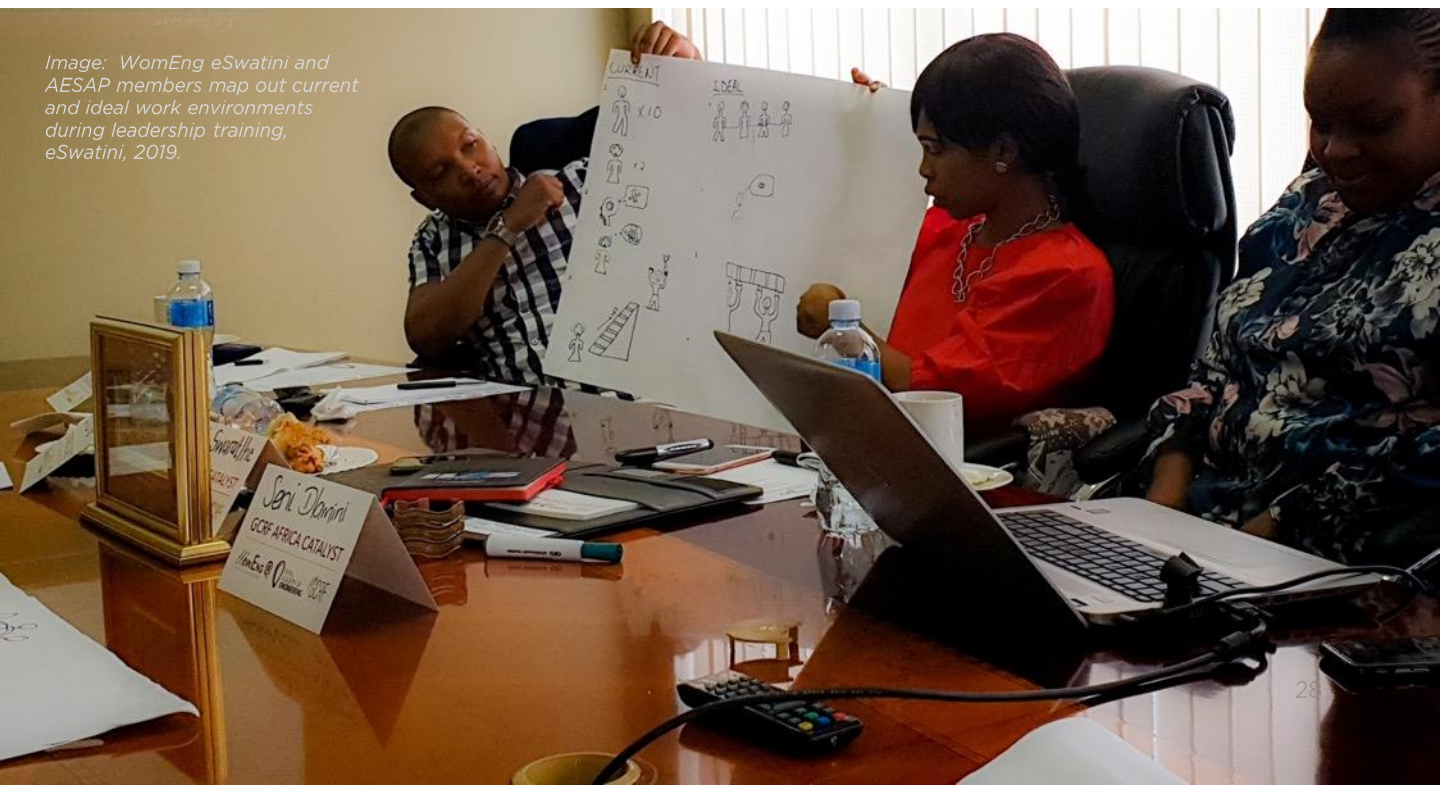


Image: WomEng eSwatini and AESAP members map out current and ideal work environments during leadership training, eSwatini, 2019.

Be ready to adapt to constantly changing circumstances

The COVID-19 pandemic is only one of several crises Women in Engineering bodies will have to endure. Many other obstacles have come before COVID-19; many are yet to arrive. Organisations taking a proactive approach in seeking new opportunities (adopting a learning mindset) to fulfil their vision and mission are more likely to thrive.

An example of adaptation is WomEng eSwatini. Since April 2020, WomEng eSwatini has been hosting Facebook Live sessions with leaders in the eSwatini engineering sector. This has kept the community engaged during the lockdown. while raising the profile of the engineering sector in eSwatini. New models of working will emerge in a world where we will learn to live with COVID-19 and its health protocols.

Action: A digital world has started happening more rapidly due to COVID-19. Learn to adapt to online mechanisms for productivity. Be aware that other global crises on the horizon e.g. dealing with inequality (social and economic) which has been exposed even more due to COVID-19 and climate change. Embrace a new better normal.

In Summary

Women in engineering bodies serve as change agents, providing collective advocacy and action to increase the profile of women in a male-dominated industry. Key organisational growth challenges identified:

1. Volunteer-based structure
2. Lack of funding for projects
3. Digital transformation
4. Leadership and talent development

Three (3) key actions identified to develop resilient organisation:

1. Develop a strong sense of leadership and culture within the organisation
2. Harness the power of networks and relationships
3. Be ready to adapt to changing circumstances

Image: Institution of Engineers, Tanzania Women's Chapter members map outreach plans, Tanzania, 2019.

Image: WomEng eSwatini Director, Bongekile Matsenjwa presenting at WomEng Fellowship eSwatini, 2020.

Chapter 3
Building Leadership Capacity for Women in Engineering Bodies

Successful organisations understand the role capacity building plays to effect change and fulfil their mission. Building the leadership capacity in women in engineering bodies is critical to ensuring a culture that drives sustainable, continuous improvement, makes for effective institutions and supports the longevity and resilience of institutions. Research shows that institutions with diverse leadership outperform homogenous ones. Leadership development aids current and future leaders of an organisation to learn new leadership techniques including communication, motivation methods and technical skills, preparing a generation of leaders to face tomorrow's challenges.

WomEng approaches leadership development through a holistic top-down and bottom-up approach, aimed at building a culture of continuous improvement. According to BCG (2020) driving a culture of continuous improvement, requires a culture shift that enables leadership, accountability and consistency. In this project, Capacity Building for Women in Engineering Bodies in sub-Saharan Africa, WomEng focused on sensitising the top management (currently majority male) to the value of diversity and inclusion, developing the leadership capabilities of institution members, and providing tailored support developed understanding the nuances and institutional dynamics in each country and catalysing action.

Leadership development sessions were designed to be cross-functional and cross-level, having representatives from every department of the institution, where possible. Key organisation stakeholders were sought for inclusion in leadership training sessions and included:

- Leadership/executive committee members from partner Professional Engineering Institutions. This included women and men from the various institutions
- Members from the Women in Engineering body, if the body already existed
- Operational members that would be responsible for implementing the outreach programmes within the country

Three (3) phases of leadership development were implemented with Women in Engineering body members on this project while adopting top-down and bottom-up approaches:

- **Phase 1:** Leadership development with senior executive members from each Professional Engineering Institution and Women in Engineering body
- **Phase 2:** Mapping gender diversity and capacity with leaders on a personal, organisational and societal level
- **Phase 3:** Build the capacity of operational members in the Women in Engineering bodies to plan and implement outreach programmes

Top-Down Approach

Top-down leadership is typically found as the key decision-making process in traditional organisations such as professional engineering institutions. According to the BCG's (2020) approach to culture change, the top-down leadership development approach enables leaders to identify the behaviours needed and determine how to implement them. The leadership team is engaged and is critical in addressing behaviours. This role includes:

- Defining target culture/behaviours needed to achieve desired performance.
- Diagnosing current culture/behaviours and identifying gaps with targets.
- Performing context analysis to identify drivers of the current and desired behaviours.
- Defining initiatives to change the context.
- Monitoring behaviours.

Phase 1 leadership development was run by WomEng and its partner, the Cambridge Institute for Sustainability Leadership (CISL) during the project stakeholder commencement meeting. Senior executive leaders from each project country came together to engage on challenges, opportunities and map the way forward for capacity building. The key objective of this executive leadership session included:

- Understanding how to create sustainable engineering institutions for the 21st century.
- Developing a deeper understanding of change management and change leadership.
- Developing a high-level organisational specific project roadmaps.

It was seen as vital to include male leadership representatives as part of the process to ensure an understanding of diversity and inclusion and for the development of stakeholder commitment to the project across project partner stakeholders and countries. This type of leadership development aided in sensitizing and reinforcing the thinking of executive leaders from professional engineering institutions and built on a collective commitment for gender diversity and inclusion as strategic imperative.

Image: Phase 1 Leadership Development at Stakeholder Commencement Meeting, South Africa, 2018.

Bottom-Up Approach

The bottom-up approach to leadership development focuses on operational improvement. In the context of women in engineering bodies, this typically relates to attracting and developing champions on the ground to effect change in terms of gender diversity and inclusion in engineering. These champions then develop a team around them galvanised by the common goal of diversity and inclusion through a programmatic approach, and providing an opportunity for younger engineers to be trained and supported through the process.

Phase 2 and Phase 3 leadership development was conducted in each of the project countries with a wider audience made up of members from each Women in Engineering body.

The key objectives achieved in Phase 2 leadership development included:

- Understanding the barriers to change and the pathway to a systemic change with a focus gender diversity in the engineering sector in each country.
- Challenging participants regarding gender-specific barriers and unconscious biases which lead to institutionalised barriers.
- Actively participating in and supporting the design of a roadmap to improve partnerships, systems and culture to ensure that we attract, retain, leverage and develop women in engineering in the best possible way.

The key objectives achieved in Phase 3 leadership development included:

- Leadership development and strengthening of the Women in Engineering body's existing structure.
- Training on how to conduct a WomEng secondary school outreach and university level programme.
- Developing a coherent outreach strategy using the WomEng framework and operationalising the strategy by developing a road map and plan for outreach.

The leadership training increased the confidence and empowerment of women and broadened professional and peer networks. "The workshop has helped me to build some of the qualities that a good leader should have; having a hardworking spirit, commitment and how a leader should portray his or her everyday workings", noted Jennifer Chimwaza, Malawi Institution of Engineers member.

Image: Phase 3 Leadership Development Training in Malawi, 2018.

Video Box 2

Success Story: Leading as a WomEng Champion, Faith Mzandu

Faith Mzandu from Lilongwe, Malawi is a civil engineer and a change maker, empowering young aspiring females towards STEM (Science, Technology, Engineering and Mathematics) education and influencing the next generation of engineering leaders in Malawi.

Faith's journey with WomEng began in late 2016, as a participant on the WomEng Emerging Engineer Leadership Programme hosted in Johannesburg, South Africa. As a new engineering graduate striving to bring about change in the industry, Faith was pivotal in launching the Malawi chapter of WomEng in 2017. Working as the key connector between WomEng and the Malawi Institution of Engineers, Faith initiated the first leadership training hosted by WomEng for members from the Malawi Institution of Engineers Women in Engineering and student chapter by raising funding from the Malawi Institution of Engineers to bring WomEng activities to Malawi.

Faith's vision of bringing WomEng activities to Malawi and drive as a self-starter was catalysed by this project, providing the necessary leadership development for more Women in Engineering body members and funding for scaling outreach programmes. Since 2017, WomEng Malawi has reached over 3 000 girls and women through STEM education and awareness initiatives using toolkits provided to teams.

As a result of Faith's leadership development and experience with WomEng, she was appointed as a member of the Advisory Board for the first ever African Drone and Data Academy(ADDA) run by Virginia Tech University(USA) and funded by UNICEF in Lilongwe, Malawi. Faith is also Technical Services Director for a leading local Engineering Consultant, David Consulting Engineers Limited on local and international (Ethiopia) projects.

During our Africa Catalyst Festival of Learning hosted in September 2020, Faith Mzandu shared her experience and lessons in leading as a WomEng Champion. She continues to work towards a shared vision of bringing WomEng Malawi across the country and to inspire the next generation of Malawian women in engineering.

Play Video

Image: A secondary school girl from Kisarawe participating in the GirlEng #AskAnEngineer workshop, Tanzania, 2019.

Chapter 4
Promoting Engineering as an Opportunity for Girls

A common objective of Women in Engineering bodies is to promote engineering as opportunity for girls. Delivering impactful programming is vital.

The future of the girls and women in Sub-Saharan Africa lies in access to opportunities through which they can reach economic security. Jobs in engineering and technology are growing at exponential rates, most notably in developing regions such as sub-Saharan Africa. The Future of Jobs report by the World Economic Forum (2016) reported that 65% of children entering primary school today will ultimately end up working in completely new job types that don't yet exist. The rise of technology as a complement to current jobs highlights the growth expected over the next 10 years. Science, Technology, Engineering and Mathematics (STEM) skills will be critical to the jobs in the future. STEM skills also provide relatively higher paying entry level jobs in the job market, globally. Promoting engineering career opportunities to girls requires a futuristic outlook, noting that the girls we reach today, will only be entering the formal workplace in the next 10 years. Our job is to help girls envision future opportunities and how they could make an impact using STEM skills.

To take full advantage of these opportunities girls must be aware of, interested in and feel confident enough to pursue a career in engineering and technology.

In this section, we aim to answer the following questions:
1. How can we showcase STEM opportunities to girls?
2. What are the key strategies to designing secondary school STEM programmes?

Designing STEM Interventions for Girls in Sub-Saharan Africa

"Getting to know women who are engineers as I thought there were none";

"I have found a role model. I now know more about chemical engineering";

"That a girl child is precious too"

These were some of the responses secondary school girls gave in response to outreach programmes hosted with Africa Catalyst Women in Engineering bodies on this project. In 2019, WomEng worked with our Africa Catalyst Women in Engineering bodies in designing and implementing secondary school outreach programmes in each country. Our GirlEng #AskAnEngineer programme was used as a framework for STEM awareness activities in each country.

The GirlEng #AskAnEngineer programme falls under our #1MillionGirlsinSTEM global campaign. WomEng conceptualised the #1MillionGirlsInSTEM campaign, and in partnership with UNESCO, launched it at the United Nations Headquarters in New York in 2017. Under this commitment, WomEng and its ambassadors around the world run a variety of STEM awareness programmes for girls to showcase engineering and technology as a catalyst to move the needle on gender parity in the engineering and tech industry.

The key objective of the outreach programmes in each Africa Catalyst country was to work with our partner Women in Engineering bodies to develop best practice strategies for future events based on key learnings from the events hosted through this project. While the challenge of attracting more girls into STEM is universal, there are local nuances, different cultural dynamics and barriers to entry unique to each country. As such, the framework sets out the model, and the local bodies adapt the content reframing the outreach within local contexts.

A framework for STEM awareness initiatives

Since 2009, WomEng has been developing the GirlEng #AskAnEngineer programme with the aim to:

- Increase awareness about engineering.
- Showcase Women in Engineering and Technology.
- Make STEM fun, engaging and relatable to secondary school girls.

GirlEng #AskAnEngineer workshops are open workshops with the aim of showcasing a variety of engineering careers. Female engineering students and professionals share their stories with secondary school girls, talking about the work they do and more importantly what informed their choice of engineering as a career. The workshops also include a session on the future of work as well as our LaunchPad activity, a career mapping exercise to reimagine careers choices, create self-awareness and develop personal branding.

The framework for the GirlEng #AskAnEngineer workshop is based on 10+ years of running similar programmes across 22 countries with over 50 000 girls. The first cohort of girls who attended a GirlEng #AskAnEngineer workshop iteration in 2009 graduated as engineers in 2014 in South Africa. Proving that if you inspire girls, and create an awareness around engineering, mentor and provide support, one can change the career trajectory for girls.

Expected outcomes of this workshop includes:

- Increasing awareness of the diverse career opportunities in STEM.
- Evoking an interest in STEM.
- Breaking down stereotypes.
- Building a girl's confidence/sense of self.
- Meeting role models and mentors.

Key sessions include:

1. **The Future of Work and the World:** This discussion session is conducted at the beginning of the workshop to introduce girls to ideas of what the world will look like in the future when they will be in the workplace. It entails a presentation by a WomEng-trained facilitator presenting an outlook of the future and the role that engineers and STEM professionals play to make it possible, followed by open Q&A and open discussion.
2. **#AskAnEngineer Sessions:** Typically five (5) to six (6) female engineers have ten (10) minutes each to talk about their engineering careers. Speakers come from various engineering backgrounds followed by a Q&A session. There are typically two (2) sessions separated by an intermission.
3. **LaunchPad Activity:** The aim of this activity is to create STEM awareness through career mapping using our trademark WomEng pink hard hat as a canvas. A facilitated discussion is done by a WomEng-trained facilitator. This is followed by girls working with flash mentors on transforming their pink hard hats based on career aspirations. WomEng flips the narrative from "*What do you want to be when you grow up?" to "What change do you want to make in the world?".* Key concepts covered by the facilitator include reimagining career choices, creating community changemakers, self-awareness and personal branding.

Our strategy applies girl-centric and culturally responsive design; setting up a global framework to be localised based on a regional or demographic background of the girls on our programmes.

Image: GirlEng #AskAnEngineer workshop, Zimbabwe, 2019.

Developing and implementing outreach programmes in Africa Catalyst countries

Using the GirlEng #AskAnEngineer framework as a guideline to create disruptive solutions that promote equity for all girls and underrepresented racial minorities, we worked with our Africa Catalyst Women in Engineering bodies to map, develop and implement localised GirlEng #AskAnEngineer workshops in each country with a target audience of 100 participants per workshop.

Each Africa Catalyst Women in Engineering body decided on:

1. **Location and Venue:** Where to host the workshop based on a local needs analysis
2. **Marketing:** Schools/communities to reach out to for selection of participants.
3. **Speakers/Facilitators:** The types of disciplines to be discussed and allocation of speakers/facilitators.
4. **Logistics Planning:** Included catering for participants, transport arrangements, venue set up, etc.

WomEng provided the following support:

1. **Event Planning Toolkit**: This included resources with WomEng's methodologies for running a GirlEng #AskAnEngineer workshop including event planning, logistics and communication.
2. **Training for Facilitators and Planning Team:** In-person training sessions were run with team members on key planning considerations. Speakers and facilitators were further supported with specific guidelines.
3. **Marketing:** Call for applications and general marketing for events were posted on the WomEng website and social media platforms.
4. **LaunchPad Toolkits:** This consisted of a branding kit for each participant namely, a pink hard hat; information guide about engineering, craft kit and bag as shown in *Exhibit 10.*

Exhibit 10. WomEng LaunchPad Toolkit Contents

Image: A girl brands her hard hat with her career aspirations at the GirlEng #AskAnEngineer workshop, Malawi, 2019.

Exhibit 11 summarises the similarities and differences among the four (4) secondary school level outreach programmes hosted in each Africa Catalyst countries.

Exhibit 11. Overview of GirlEng #AskAnEngineer Workshops per Country

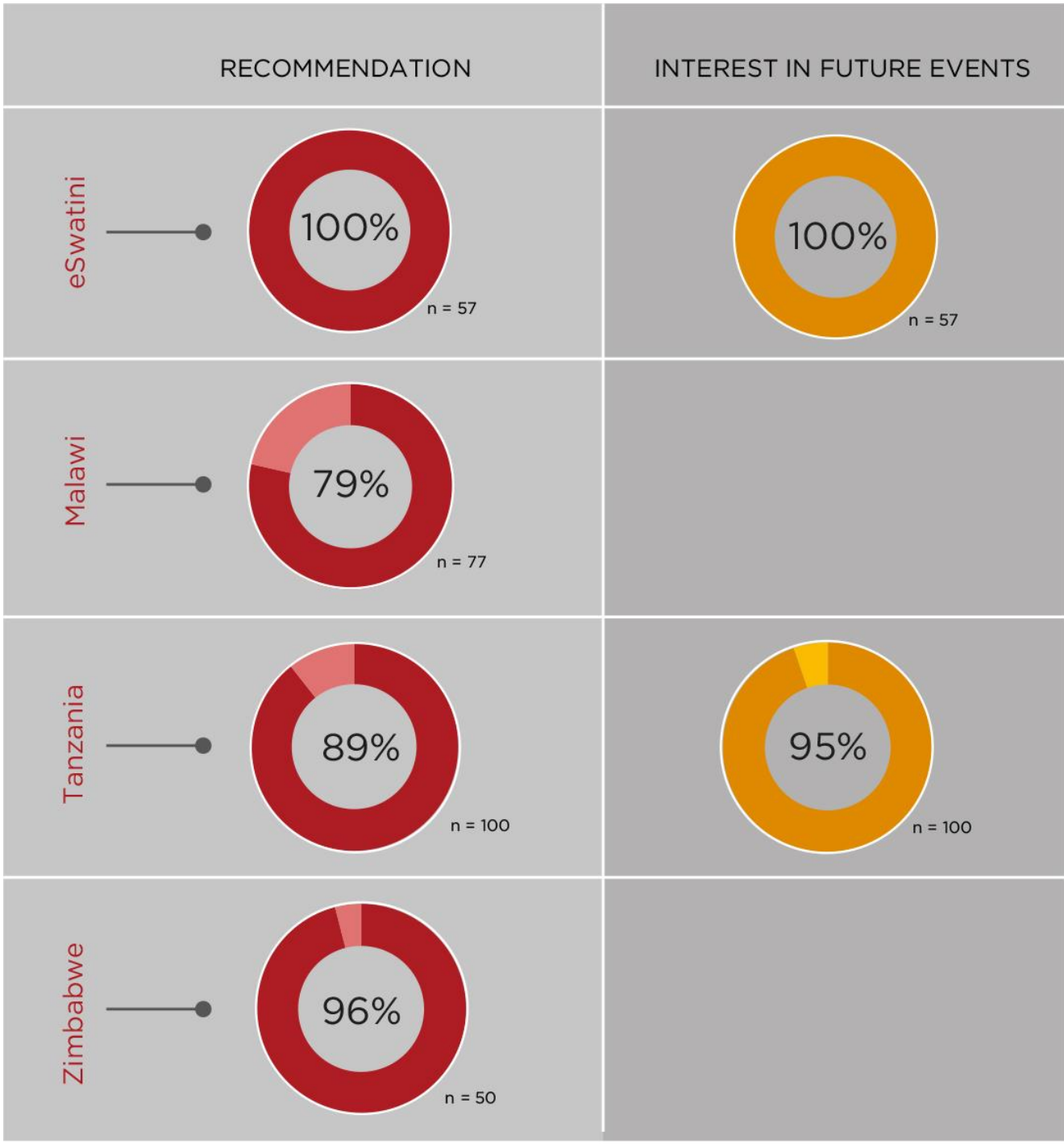
	eSwatini	Malawi	Tanzania	Zimbabwe
Age Group	14 – 18 years old	14 – 18 years old	14 – 18 years old	14 – 18 years old
Event Date	28 September 2019	10 May 2019	28 August 2019	12 June 2019
Location	Matsapha (Urban)	Chikwawa (Rural)	Kisarawe (Rural Majority)	Gweru (Urban)
Speakers/Facilitators	Members from WomEng eSwatini	Speakers were young graduates and members from the Malawi Institution of Engineers	Young members from Institution of Engineers, Tanzania	Young members from Zimbabwe Institution of Engineers
Programme Duration	4 hours (08h30 – 12h30)	4 hours (08h30 – 12h30)	7 hours (09h00 – 16h00). The team extended the programme to provide girls with extended exposure to engineers as they travelled from far distances.	4 hours (08h30 – 12h30)
No. of Participants	67	98	100	100
Special Features	WomEng eSwatini worked closely with Catalyze Swaziland to market the workshop to schools surrounding Matsapha. The University of eSwatini sponsored their facilities to host the event. This provided secondary school girls with first hand exposure to the university environment.	The event was hosted at Chikwawa High school. A number of teachers accompanied students attending from surrounding schools. Much interest was expressed by teachers to continue sharing information with students at school.	The event was hosted at a high school in Kisarawe. The event was attended by the district Governor. Majority of the event was conducted in Swahili.	The event was hosted at Gweru Polytechnic University. Participants were taken on a tour of Gweru Polytechnic University. This provided first-hand exposure to engineering departments including workshops and laboratories.
Evaluation	Hard copy post-event feedback forms were completed by participants at the end of the workshop	Hard copy post-event feedback forms were completed by participants at the end of the workshop	Hard copy post-event feedback forms were completed by participants at the end of the workshop	Hard copy post-event feedback forms were completed by participants at the end of the workshop

Overall Success

Based on feedback from participants in all four (4) countries, the workshops received an average recommended rating of 90%.

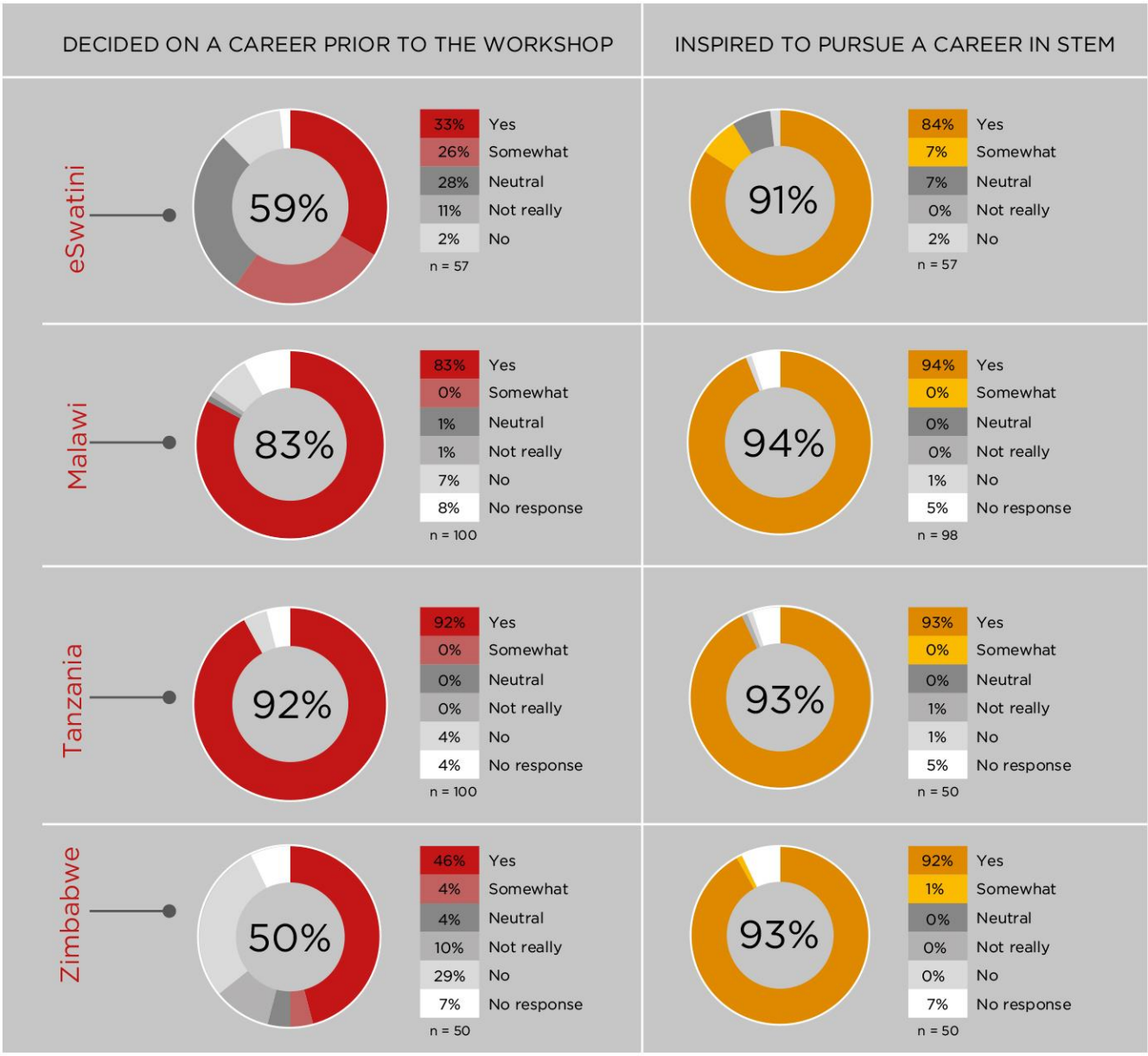
97% of respondents noted their interest in future events. *Exhibit 12* details the rating per country provided by participants.

Exhibit 12. Recommendation and Interest in Future Events from GirlEng Participants



76% of participants noted that they had made some sort of a decision on a career path prior to the workshop. 93% of participants further noted that they were strongly inspired to pursue a career in STEM post the workshop. This is reflected in *Exhibit 13*. These results show how effective small interventions are in changing the perceptions for girls into STEM careers, and tracks with the results WomEng has seen across its GirlEng programmes around the world.

Exhibit 13. Influence of GirlEng #AskAnEngineer Workshop on Thinking About Careers



Appendix A provides a detailed report of feedback from participants per country.

In the sub-sections to follow, we highlight exemplary practices based on challenges and lessons learned during these outreach programmes.

Strategy #1: Expose Girls to Role Models that Look Like Them

"I have never seen a woman being an engineer but today, it has been proven that women can also be engineers", GirlEng #AskAnEngineer Malawi participant.

A programme designed to empower girls must provide powerful, positive role models. These are the people who girls use as references for whom they will become and whose behaviour they will emulate. Role models are able to dispel stereotypes and boost confidence which is a major factor that holds girls back from STEM studies and careers.

A girl needs to see confidence, leadership and accomplishment in other women in order to envision herself with those qualities. When girls are able to relate and see women who come from similar backgrounds, they are able to develop more easily imaginable visions of success; attainable and replicable goals in their minds. Importantly, the message it sends the community to start to dismantle stereotypes and beliefs held around girls educational attainment and access to jobs in male dominated professions.

All GirlEng #AskAnEngineer workshops hosted in our Africa Catalyst countries consisted of Women in Engineering members that came from similar backgrounds as the participants. Speakers and facilitators also spoke in local languages to ensure participants understood them. In post-event feedback received, an average of 25% of participants, globally noted being exposed to women who are engineers as a highlight of the workshop.

Video Box 3

Michelle Maphosa, a civil engineer and a speaker at the GirlEng #AskAnEngineer workshop hosted in Zimbabwe shares her perspective on the importance of role models

Play Video

Strategy #2: Train Facilitators to Share Compelling Personal Stories

In Chapter 1 of this report, we briefly discussed the importance of compelling storytelling. This is key when our role models/speakers/facilitators on the GirlEng #AskAnEngineer programmes engage with girls.

Sharing compelling personal stories changes mindsets and are memorable. We have found that girls want to hear a story of change. In our GirlEng #AskAnEngineer workshops, the total duration of each speaker timeslot is typically 10 minutes. This is followed by a group Q&A session, providing more time for girls to ask questions. Stories from speakers do not have to provide all the details. The purpose of a compelling story is to spark interest; to tell one impactful story. Part of WomEng's capacity building for the local Women in Engineering bodies includes leadership training on the power of storytelling, and providing our participants with confidence building training to share their stories. This is an important component in ensuring the success of the programme.

There are many ways in which to structure one's talk to grab the audiences' attention. Below are a few guiding questions to develop a compelling story including:

1. Start by making your talk relatable or intriguing to the audience. Share an idea that best describes your engineering discipline.
2. Provide a brief general description of your engineering discipline – What is it about? What fields can you specialise in?
3. Describe how/why you decided to choose this engineering discipline as your career.
4. What do you do on a day-to-day basis? Any exciting projects that you have worked on?
5. What do you love most about your career?
6. What challenges did you faced along the way?

Additional Tips for Facilitators

1. Add personal experiences from your career. This often connects speakers more to the audience. Speakers come across as more relatable.
2. There is no need for sugar-coating. Girls want to hear about your successes, hardships and lessons learned.
3. Keep your story short so that girls can ask more probing questions. This helps keep girls engaged.

Image: Faith Mzandu sharing a story about drone technology at the GirlEng #AskAnEngineer workshop, Malawi, 2019.

Strategy #3: Talk to Factors that Influence Girls' Career Choices

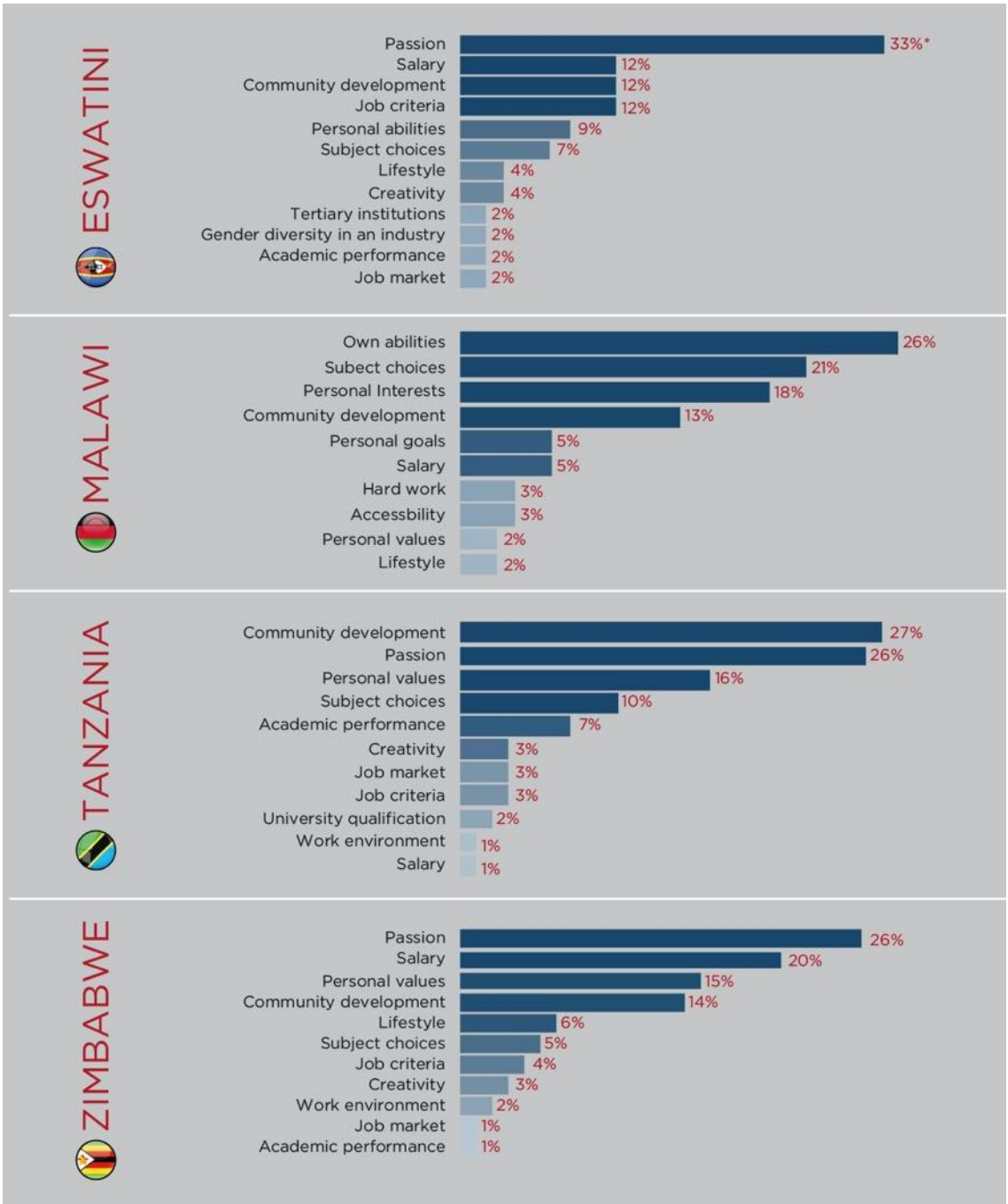
In post event feedback, participants were asked "What factors are you considering when choosing a career?". The most common factors influencing girls career choices, across the Africa Catalyst countries include:

1. **Potential impact on community development:** How can I help my community?
2. **Salary:** What is my earning potential?
3. **Passion:** Does this career align with my passions?
4. **Personal values:** Does this career align with my personal values?
5. **Subject choices/academic performance:** Can I study towards a career path based on what I am currently studying at school?

The prioritisation of the influencing factors varied from country to country. *Exhibit 14* highlights the most popular factors per Africa Catalyst country.

Exhibit 14. Factors that influence girls' career choices per Africa Catalyst country

* % mentions by respondents



Video Box 4

Stella, from Kisarawe, Tanzania shares how the GirlEng workshop has helped her realise that she has to work hard in order to change the vision of her culture.

Play Video

Strategy #4: Create Engaging and Relevant Curricula

"Branding my hard hat and being able to express my thoughts through something so simple yet so significant." – participant feedback from GirlEng #AskAnEngineer Zimbabwe.

Creating engaging and relevant content for the demographic being served is critical to maintaining engagement with girls. Offer hands-on, open-ended participation for girls to stay engaged.

Our GirlEng LaunchPad activity engages girls in mapping out their career aspirations. During this session, girls engage on three key questions:

1. **What problems do I want to solve?** This question engages girls to think about their communities and their role within the community. Girls also learn about the United Nations Sustainable Development Goals.
2. **What are my core values?** This question engages girls' thinking about how a career can fit their personality and aspirations. Building strong value systems for girls builds overall confidence in mapping direction.
3. **What do I want to be known for?** This question raises the concept of personal branding.

Based on discussions, girls brand their hard hats, creating a vision board/mind map of the type of career they wish to pursue.

In terms of relevance, content and stories were tailored according to the demographic, particular urban and rural context. In eSwatini, participants came from urban areas with access to information about different types of engineering. Participants were seeking deeper; more personal insights from facilitators that shared their stories. In Malawi, many girls were fascinated with simply seeing a female engineer for the first time.

The focus on the Sustainable Development Goals (SDGs) is an integral part of the programme. At the current rate of progress, the SDGs will not be met. We need a collective engineering effort to meet the goals. This is why WomEng incorporates SDG understanding across its programming so students have a keen understanding, and can become local champions to reach the goals.

Image: Girls branding their hard hats at GirlEng #AskAnEngineer workshops, Tanzania (top-left) and eSwatini (right), 2019.

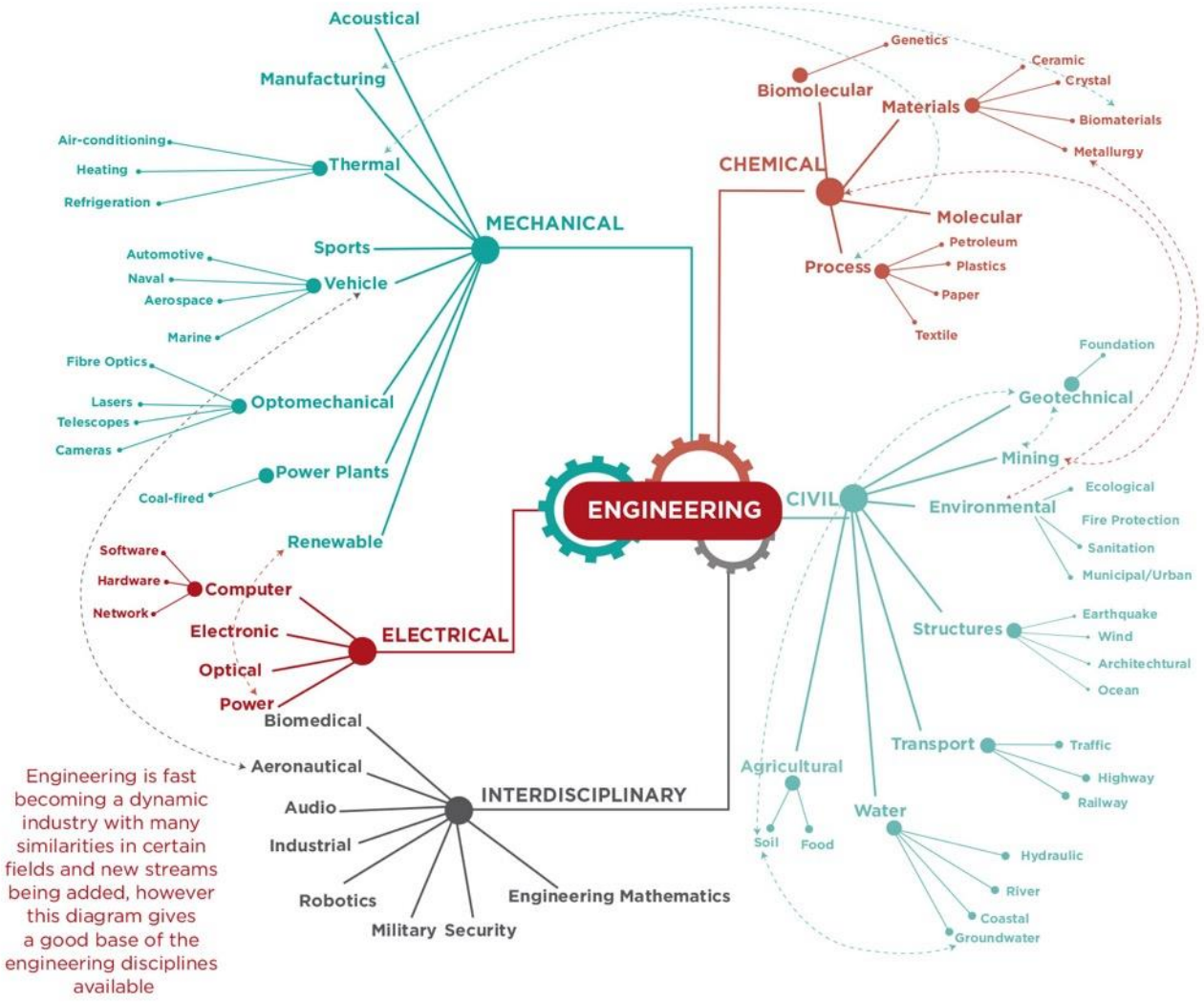
Strategy #5: Inspire Career Exploration

Start shifting the narrative from "What do you want to be when you grow up?" to "What problems do you want to solve?". In the future of work, engineering is considered more of a skill set than simply thought of as a job role.

As the world changes, digital being the biggest driver of change, it is important to showcase the interconnectedness of the world, and career choices. Data from the World Economic Forum shows that people will change careers on average five times within their lifetimes. As longevity increases, and new careers become available, we need to provide young women with the toolkits to be adaptable to change, and think about leveraging their energy and skills to be problem solvers and critical thinkers.

As part of the information resources provided to girls, *Exhibit 15* highlights the interconnectedness between engineering disciplines.

Exhibit 15 Interconnectedness Between Engineering Disciplines



Strategy #6: Involve the Community

In all project countries, participants were accompanied to the GirlEng #AskAnEngineer workshops by teachers and guardians. During engagements with teachers (men and women), Women in Engineering body members noted that teachers found the sessions to be useful as well. Teachers noted their enthusiasm for the information shared and requested follow on resources for them to take back to their schools. While this was not initially planned for during the implementation of the GirlEng #AskAnEngineer workshops, it has been noted as an area for improvement in programming and scalability of awareness.

In Tanzania, the GirlEng #AskAnEngineer workshop was attended by the District Commissioner, Hon. Jokate Mwegelo, an activist for girls' education in the area. The District Commissioner's presence and support for the girls raised the profile of the event and possibly the importance of this event for the participants.

This highlighted the need to take a holistic approach and involve a number of stakeholders within the education ecosystem at a school level. These programmes provide an opportunity for the Women in Engineering bodies to grow their networks.

Image: Teachers and team members with Hon. Jokate Mwegelo, District Commissioner at the GirlEng #AskAnEngineer workshop, Tanzania, 2019.

In Summary

In this section, we outlined key strategies for designing STEM awareness programmes for girls. These strategies are summarised in *Exhibit 16.*

Exhibit 16. Key Strategies for Designing STEM Awareness Programmes

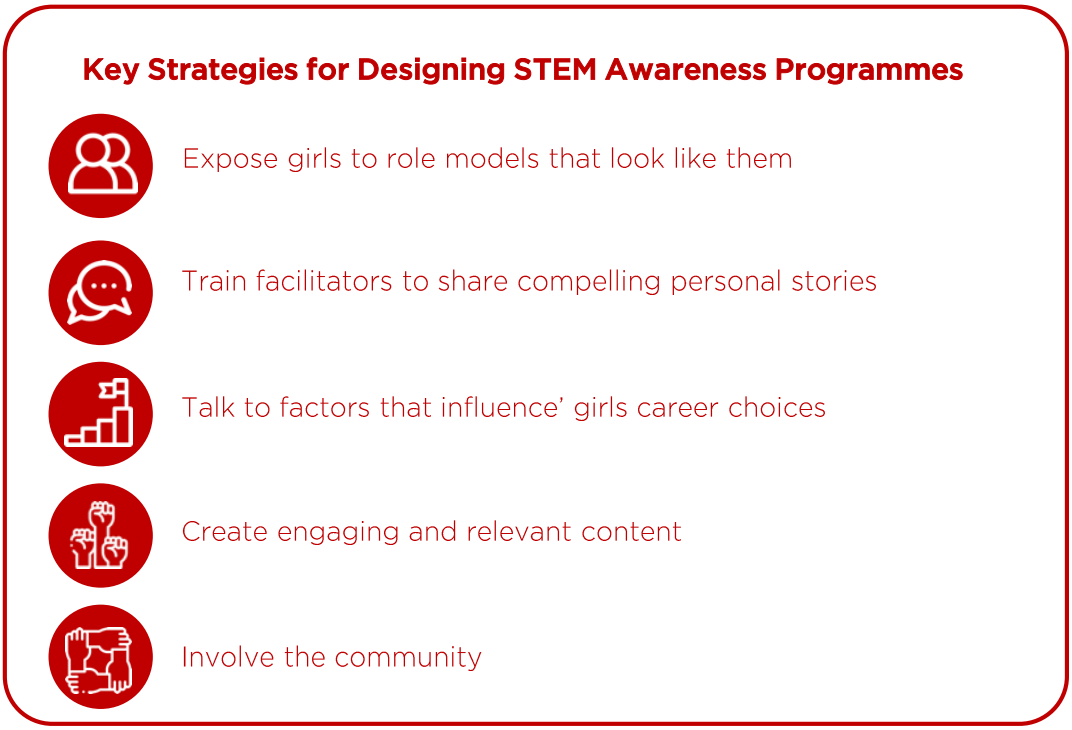


Image: A beneficiary speaking at WomEng Fellowship, eSwatini, 2020.

Chapter 5
Developing Engineering Students to Thrive in the Workplace

Preparing engineering students for the transition into the formal workplace requires more than just a formal qualification from a tertiary institution. The "leaky pipeline" metaphor describes the way in which women become underrepresented minorities in the STEM fields as many either change industries or quit working all together. The leaky pipeline metaphor also highlights the importance of building confident leaders that can deal with a number of challenges currently faced by Women in Engineering towards career advancement. To have a thriving workforce, we need to prepare engineering professionals to become resilient in the workplace; beyond just technical knowledge.

Additionally, industries around the world are understanding the value and opportunity that diverse workforces are bringing to organisations. It is the opportunity to have innovative thinkers, problem solvers and an inclusive workforce which can offer higher profitability for business. The opportunity to include women is at the heart of diversity and inclusion strategies.

In this section, we aim to answer the following questions:

1. What do students need to prepare for the workplace?
2. What are the key strategies to designing interventions for engineering students to prepare for the workplace?

Designing Interventions to Prepare Engineering Students for Industry

"My highlight was the fact that we had female engineers who had gone through similar challenges as we now are experiencing but still excelled in their career life.";

"Learning about how to conduct yourself and formal communication in the workplace. And how to prepare your CV.";

"I have learnt to be confident and creative"

These were some of the responses female tertiary level engineering students gave in response to outreach programmes hosted with Africa Catalyst Women in Engineering bodies on this project.

In 2019/20, WomEng worked with our Africa Catalyst Women in Engineering bodies in designing and implementing tertiary level outreach programmes in each country for engineering students. Our WomEng Fellowship programme was used as a framework for leadership, employability and networking skills activities. The key objective of hosting the outreach programmes in each Africa Catalyst country was to work with our partner Women in Engineering bodies to develop best practice strategies for future events based on key learnings from events hosted.

The impact of WomEng Fellowship is to challenge and transform top engineering students into leaders by providing leadership, employability and networking skills. The target audience for this programme is typically penultimate year of undergraduate to full-time postgraduate female engineering university or university of technology students.

A framework for skills development programmes

WomEng facilitators, trainers and thought leaders take students on a journey of "imagineering" and learning to building confidence through discussion, interactive and self-reflection sessions.

The expected outcomes:

1. Increase leadership, employability and networking skills.
2. Introduce innovation and design thinking.
3. Develop entrepreneurship and critical thinking skills.
4. Increase connections for high-skilled graduates to employers, business mentors and funding.
5. Develop insights on industry and employers of choice for female engineers.

A public call for applications is made to our target audience. Fellows are then selected as top female engineering, built environment and technology students. Workshop sessions with leading experts that discuss gaps and challenges in the world and career development are conducted.

WomEng fellows have been successful in obtaining employment, felt more confident in applying for opportunities and even starting their own ventures. The Fellowship programme opens up a realm of possibilities for the students all along the engineering value chain.

Developing and implementing outreach programmes in Africa Catalyst countries

Using the WomEng Fellowship framework as a guideline to create disruptive solutions that promote equity for all girls and underrepresented racial minorities, we worked with our Africa Catalyst Women in Engineering bodies to map, develop and implement localised 2-day WomEng Fellowship programmes in each country with a target audience of 50 participants per country. A total of 402 applications were received from all project countries collectively for 200 allocated spaces. The most number of applications were received in Zimbabwe (161 applications).

Exhibit 17, provides a breakdown of applications per country and summarises the similarities and differences among the four (4) tertiary level outreach programmes hosted in each Africa Catalyst countries. An over-subscription of approximately 50% of applications were received for the programme compared to available spaces highlight the demand for such programmes.

Exhibit 17. Overview of Fellowship Programme per Country

	eSwatini	Malawi	Tanzania	Zimbabwe
Qualification Level	Full time students in engineering and built environment. Final and penultimate year undergraduate Postgraduate	Full time students in engineering and built environment. Final and penultimate year undergraduate Postgraduate	Full time students in engineering and built environment. Final and penultimate year undergraduate Postgraduate	Full time students in engineering and built environment. Final and penultimate year undergraduate Postgraduate
Event Date	28 – 29 Feb 2020	03 – 04 Oct 2019	06 – 07 Mar 2020	14 – 15 Jun 2019
Location	Mbabane	Blantyre	Zanzibar	Gweru
Speakers/ Facilitators	Members from WomEng eSwatini and AESAP	Members from the Malawi Institution of Engineers	Members from Institution of Engineers, Tanzania	Members from Zimbabwe Institution of Engineers
No. of Applications Received	44	115	83	161
No. of Participants	44	50	50	50
Evaluation	Electronic feedback forms were completed at the end of the event.	Electronic feedback forms were completed at the end of the event.	Electronic feedback forms were completed at the end of the event.	Electronic feedback forms were completed at the end of the event.

Each Africa Catalyst Women in Engineering body decided on:

- **Location and venue:** Where to host the workshop based on a local needs' analysis
- **Marketing:** Institutions to reach out to for marketing of applications
- **Speakers/Facilitators:** Allocated speakers for sessions noted in the previous section
- **Logistics planning:** This included catering for participants, transport arrangements, venue set up, etc.

WomEng provided extensive marketing support and training for facilitators and the planning team. In-person training sessions were run with team members on key planning considerations. Speakers and facilitators were further supported with specific guidelines and resources.

Refer to *Appendix B* detailed insights on the WomEng Fellowship programme per country.

In the sub-sections to follow, we highlight exemplary practices based on challenges and lessons learned during these outreach programmes.

Strategy #1: Develop Skills for the Future of Work

According to the World Economic Forum (2018), the growing skills outlook for 2022 includes:

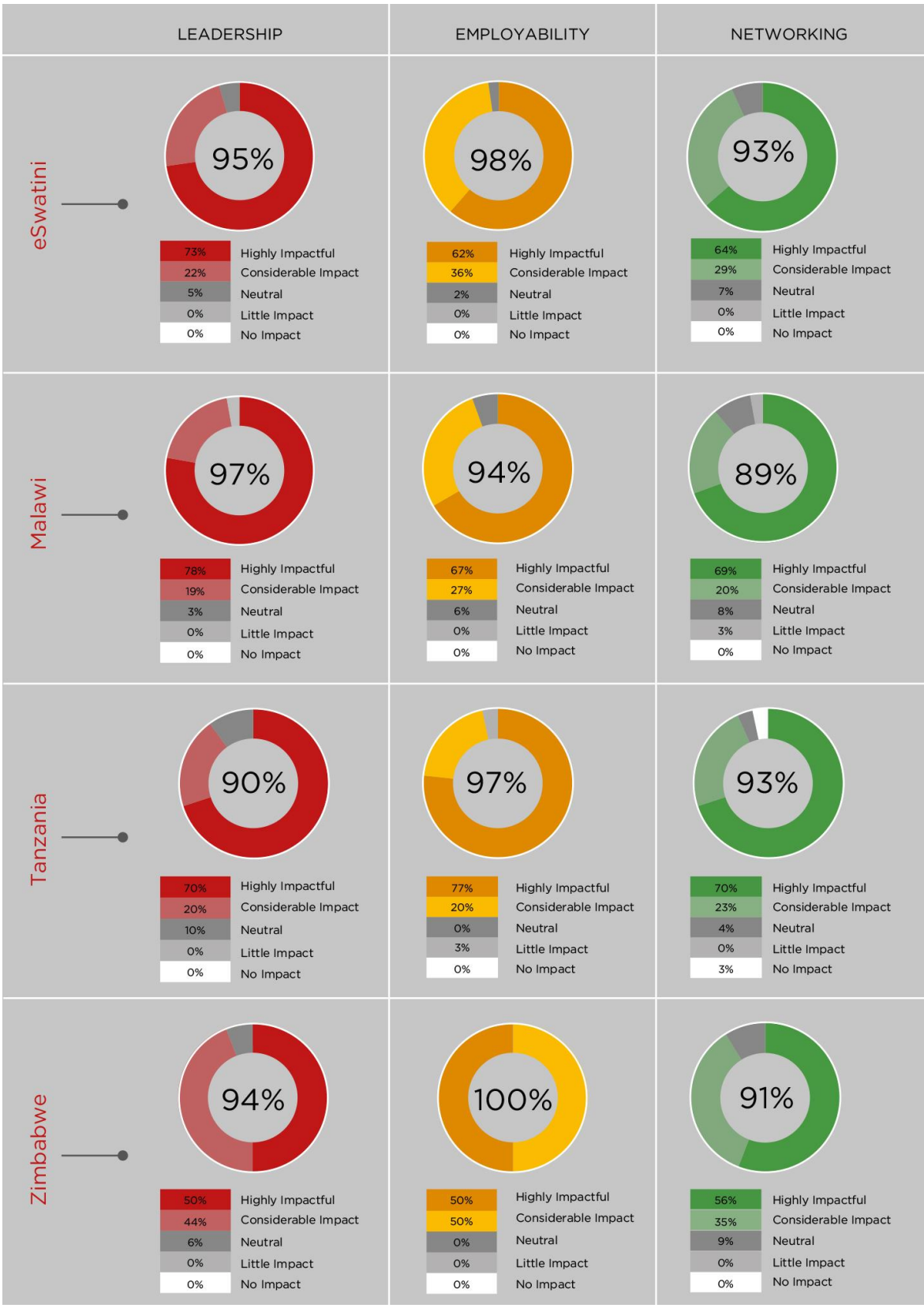
1. Analytical thinking and innovation
2. Active learning and learning strategies
3. Creativity, originality and initiative
4. Technology design and programming
5. Critical thinking and analysis
6. Complex problem solving
7. Leadership and social influence
8. Emotional intelligence
9. Reasoning, problem solving and ideation
10. Systems analysis and evaluation

The skills noted above refer to skills of increasing demand. Developing confident engineering leaders that will thrive in the workplace, requires future-proofing students with skills for the future of work. Technical ability is no longer enough. The focus of our Fellowship programmes in each Africa Catalyst country was to develop leadership, employability, networking skills.

Based on feedback from Fellows, *Exhibit 18* highlights skills development ratings for Fellowship in each country. The skills rated focused on leadership, employability and networking skills that were delivered through the various sessions and activities. Fellows were asked to rate Fellowship in terms of the skills they developed based on a rating scale where 1 = No impact to 5 = Highly Impactful. In *Exhibit 18,* the % rating per outcome is a sum of the % of responses that received a rating of 4 out of 5 or more i.e. considerable to highly impactful.

Image: Participants engage during WomEng Fellowship, Tanzania, 2020.

Exhibit 18. Skills Development Rating by Fellowship Participants.



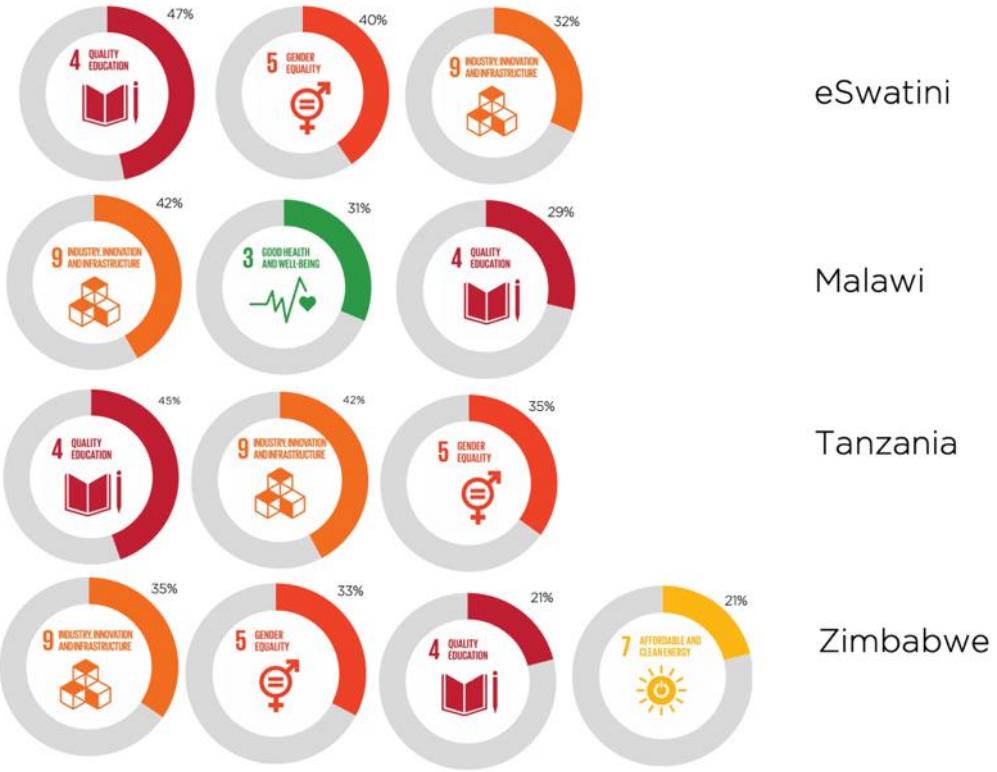
Strategy #2: Challenge Innovative, Entrepreneurial Thinking

The innovation challenge was considered a key highlight by participants across the various countries. The Innovation Challenge focuses on transforming participants' academic, theoretical knowledge into real-world applications that make business sense. In developing students' real-world sensitisation of engineering problems, the United Nation's Sustainable Development Goals provides a global, unifying framework for driving change through innovation.

The Sustainable Development Goals are 17 Goals focusing on social, economic and environmental issues provide a unifying global effort requiring substantial engineering capacity. During the application process, applicants were asked to select the top three (3) goals that they would like to work on as engineers.

The top three (3) SDGs that applicants were driven to work towards, per country is detailed in ***Exhibit 19.*** The % of mentions by applicants is detailed.

Exhibit 19. Top Sustainable Development Goals



By giving the fellows the entrepreneurial tools, confidence building and support we are able to shift the status quo of female innovators in Africa. From the training we have three (3) success stories of fellows who have gone on to, not just start businesses, but also have been selected for prestigious prizes for their businesses. These include:

1. **Catherine Chaima, Malawi:** Selected as a finalist for the Royal Academy of Engineering Africa Prize for Engineering Innovation 2020.
2. **Grace Ghambi, Malawi:** Grace continues her growth at WomEng by being selected as a fellow on our WomEng Africa Innovation Fellowship 2020, a business academy and incubator for female founders.
3. **Saida Nyasasi, Tanzania:** Saida continues her growth at WomEng by being selected as a fellow on our WomEng Africa Innovation Fellowship 2020, a business academy and incubator for female founders.

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3. **Saida Nyasasi, Tanzania:** Saida continues her growth at WomEng by being selected as a fellow on our WomEng Africa Innovation Fellowship 2020, a business academy and incubator for female founders.

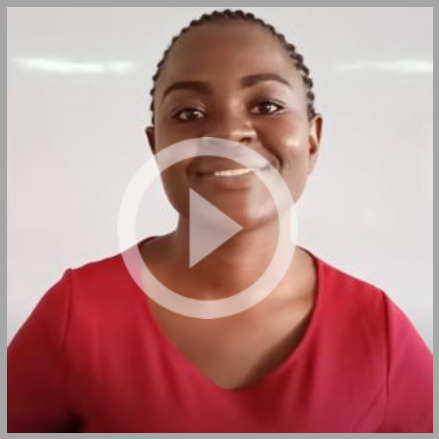
Video Box 5

Success Story: Growing with WomEng, Grace Ghambi

Grace Ghambi is an electrical engineering student at Malawi Polytechnic and founder of (1) Focus Action Result, a non-profit organisation focused on capacity building training for people to make sanitary products and (2) Drone Tales, providing information about drone technology and data analysis in Malawi. To date, Grace has also reached out to over 60 000 people in Malawi with motivational talks.

Grace started her journey with WomEng in 2019 as a beneficiary of Fellowship Malawi, the outreach component on this project. Grace noted this experience as a great opportunity for developing her employability and innovation skills. In 2020, Grace was selected as one of fifty fellows for Africa Innovation Fellowship, a pan-African female founders accelerator.

“I had no idea what a start-up vision board was about. Through this programme, I have not only learnt what a start-up vision board is but how I can execute it... I have now gone back and trained my team on the skills we got”, notes Grace Ghambi



Grace has exemplified the WomEng vision of creating a knowledge multiplier effect by sharing the skills she has developed, with others.

Play Video

Strategy #3: Break Through Perceived Challenges

The biggest perceived challenge female tertiary level engineering students across all four (4) Africa Catalyst countries have about preparing to work in industry is the uncertainty of one's capabilities being judged based on their gender. During the application process for the Fellowship programme, 400+ students responded to the question "What do you think are your biggest challenges in preparing to work in the engineering industry?" The top results based on % of mentions for each country is highlighted in *Exhibit 20.* Female engineering students still maintain a deeply entrenched fear that their capabilities as an engineering professional will be questioned due to being a woman. Building confident engineering leaders requires breaking through perceived challenges. Encourage engagement between those in industry and students regularly to break stereotypes, change mindsets and build confidence.

Exhibit 20. Biggest perceived challenges identified by female tertiary level engineering student in preparing to work in the engineering industry

eSwatini

Thriving in the engineering industry as a female without being questioned whether I am capable of conducting the work	43%*
Developing valuable skills for the workplace in a short space of time	9%
Being undermined in the workplace because of my age	7%
Not having enough confidence to deal with the pressure and challenges	7%
Limited job opportunities	5%

Malawi

Thriving in the engineering industry as a female without being questioned whether I am capable of conducting the work	32%
Lack of practical skills that might make us less valuable in the job market	22%
Gaining work experience in order to be eligible to get a job	13%
Lack of job opportunities in the country	9%
Educating others about the skills and services a person in my discipline provides	4%

Tanzania

Thriving in the engineering industry as a women without being my capability being questioned	22%
Lack of practical skills that might make us less valuable in the job market	15%
Gaining work experience in order to be eligible to get a job	10%
Understanding technologies that are constantly evolving	10%
Lack of job opportunities for female engineers	7%

Zimbabwe

Thriving in the engineering industry as a women without being my capability being questioned	43%
Lack of job opportunities in the country	9%
Lack of practical skills that might make us less valuable in the job market	7%
No access to the latest technology in the country	7%
Lack of resources to improve practical skills in the field	5%

** % of mentions by respondents in each country.*

Image: Panel discussion with engineering leaders in industry about handling workplace challenges and gender bias at WomEng Fellowship, Malawi, 2019.

Strategy #4: Bridge the Gap Between Students and Industry

Women in engineering bodies can play a vital role in connecting students to companies in the engineering industry. To create a three-way win Women in Engineering bodies should actively engage companies as partners for future Fellowship level programmes.

The three-way win:

- Women in engineering bodies raise funds through corporate partnerships to host Fellowship programmes.
- Students gain insights and awareness of companies in industry. Students also grow their network and increase employment opportunities.
- Companies gain access to a database of women in engineering while increasing brand awareness as an employer of choice for women in engineering.

During the application process for the Fellowship programme, 400+ students responded to the question "What is the top company you would like to work for?" The top results based on % of mentions for each country is highlighted in *Exhibit 21.* Women in engineering bodies have the agency to bridge the gap between students and industry players.

Exhibit 21. Top companies female tertiary level engineering students want to work for.

eSwatini

1	Royal Swazi Sugar Corporation
2	eSwatini Electricity Company
3	Inyatsi Construction
4	Google
5	Coca-Cola

Malawi

1	Ilovo Sugar
2	Mota-Engil
3	Malawi Electricity Generation Company
4	Waterboards in Malawi
5	Electricity supply Corporation of Malawi

Tanzania

1	Estim Construction
2	Tanzania Electric Supply Company
3	Tanzania Bureau of Standards
4	United Nations
5	Vodacom

Zimbabwe

1	Zimplats Mining
2	Econet
3	Zimbabwe Power Company
4	Mimosa Mining Company
5	Zimbabwe Energy Regulatory Authority

Strategy #5: Develop a Supportive Peer Network

During the Fellowship programme, WhatsApp groups were established for each cohort of Fellows. Engagement on the groups between participants and senior Women in Engineering members have been on-going post the Fellowship. The platform is regularly used (weekly) to share opportunities, advice and motivation among peers.

The number of members currently on each group (including senior WIE members):

- eSwatini: 50
- Malawi: 51
- Tanzania: 56
- Zimbabwe: 52

Establishing engaging and supportive peer networks reduce feelings of isolation and encourage confidence building for women in engineering. The Fellowship programme brings together female tertiary level engineering students from various institutions and regions, helping fellows grow their network of support even before fully entering the industry.

Image: Beneficiaries at WomEng Fellowship, Zimbabwe, 2019.

In Summary

In this section, we outlined key strategies for designing interventions to prepare engineering students for industry. These strategies are summarised in *Exhibit 22.*

Exhibit 22. Key Strategies for Interventions to Prepare Students for Industry

Key Strategies for Interventions to Prepare Students for Industry

Develop skills for the future of work

Challenge innovative, entrepreneurial thinking

Break through perceived challenges

Bridge the gap between student and industry players

Develop a supportive peer network

Image: Beneficiary at WomEng Fellowship, Malawi, 2019.

Toward a Diverse, Inclusive and Sustainable Future

WomEng will continue playing the role of mentor, and support for our Africa Catalyst Women in Engineering bodies as part of our global mandate to ensure sustainability and development of women and girls in the engineering and technology industry. We have not only developed capacity in each country but have supported the strengthening of engineering institutions, provided opportunities for young women to become engineers and have supported the next generation of female founders and innovators. This project has produced some notable key outcomes which include:

- **eSwatini**: Establishment of a new women in engineering body through strong stakeholder engagement. At project inception, no such body existed.
- **Zimbabwe:** Expansion of Women in Engineering body member reach and engagement nationally, having trained and supported women engineers across the country.
- **Tanzania:** Raising of the profile of women in engineering through community development, and supporting the next generation of women in engineering
- **Malawi:** Members are going beyond traditional engineering thinking and raising the profile of new technologies for women in engineering including drone technology, focussing on engineering innovation and entrepreneurship using our WomEng Entrepreneurship methodologies.
- **Regional:** Scaled capacity building for women in engineering bodies to new countries in sub-Saharan Africa, using the framework and learnings to support more women across the continent.

Though a similar framework for capacity building was implemented across all project countries, the key outcomes highlight that there is no blanket solution for developing girls and women in engineering across sub-Saharan Africa. In this section, key outcomes and learnings are briefly highlighted from each Africa Catalyst Women in Engineering body. These insights were shared by stakeholders during our Africa Catalyst Festival of Learning event hosted in September 2020 as a close out meeting with stakeholders.

Image: Institution of Engineers, Tanzania – Women's Chapter members at WomEng Fellowship, Tanzania 2020.

Establishing a Women in Engineering Body

eSwatini - The early stage concept of WomEng eSwatini was established in mid-July 2017 through a shared interest and invite to WomEng from the US Embassy in eSwatini with the aim to raise the profile of women in engineering in the country. Through a networking event and early-stage leadership development training by WomEng, a group of highly motivated women in engineering in eSwatini emerged as WomEng champions. In early 2018, WomEng eSwatini officially registered as a non-profit organisation (a separate entity to WomEng) with a vision to have women in engineering actively participate and drive economic development in the region.

This Africa Catalyst project catalysed the establishment of and support for the organisation, providing members with key resources and proofs of concept to engage with stakeholders on the strategic importance of gender diversity and inclusion in engineering. Through the duration of this project, some of the key achievements from WomEng eSwatini include:

- Reaching more than 1 000 girls across eSwatini through STEM awareness initiatives.
- Hosting a number of in-person networking events for professionals in engineering.
- Raising the profile of engineering through a series of Facebook Live events hosted on WomEng's global platform.

Pivotal to WomEng eSwatini's sustained growth has been the strategic partnerships with organisations including but not limited to:

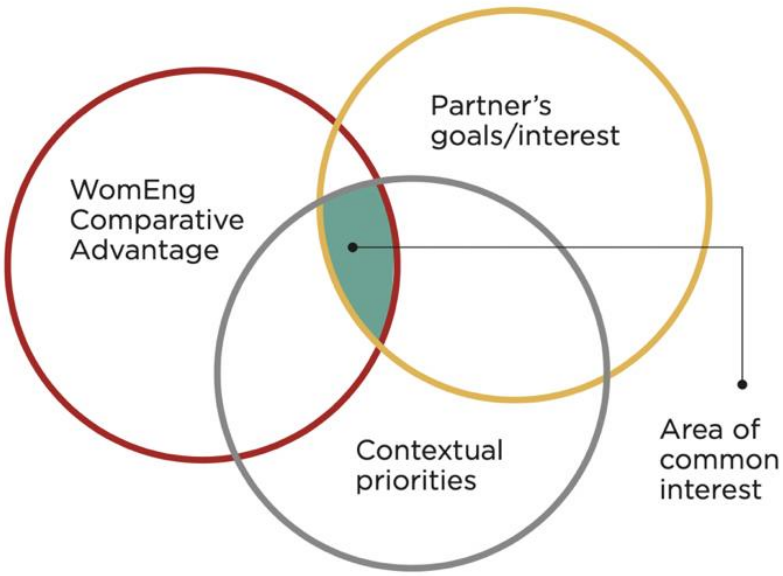
- WomEng (Global)
- Registration Council for Architects, Engineers, Surveyors and Allied Professionals (AESAP)
- US Embassy in eSwatini
- The University of eSwatini
- Royal Swazi Technology Park

Image: WomEng eSwatini and AESAP engaging on challenges for gender diversity and inclusion, eSwatini, 2019.

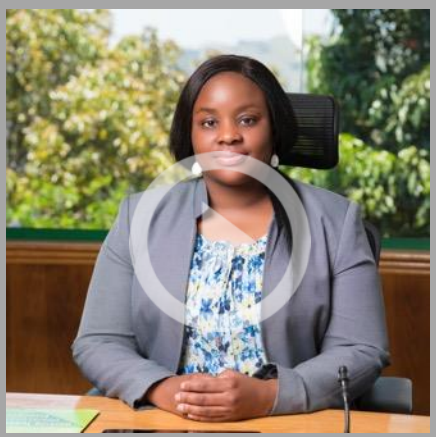
Exhibit 23 outlines the key approach developed by WomEng eSwatini in engaging with stakeholders in developing and adapting partnerships as a newly established organisation. Partnerships with a clear and strong area of common interest are most likely to succeed. This can be achieved by finding an intersection between:

- **Women in Engineering Body 's (e.g. WomEng) Comparative Advantage:** Have a clear list of goals, resources required and your organisation's unique selling point.
- **Partner's Goals/Interests:** Make a list of potential partners you would be interested in working with and then do further research on the partners' goals and interests.
- **Contextual Priorities:** Develop a strong understanding of the context within which you are working. This can include a geographic, industry, economic and social focus.

Exhibit 23. WomEng eSwatini Partnership Approach



Video Box 6



Lindiwe Dlamini, a senior WomEng eSwatini members shares more about expanding impact through stakeholder engagement and building strategic partnerships.

Play Video

Expanding National Member Reach and Engagement

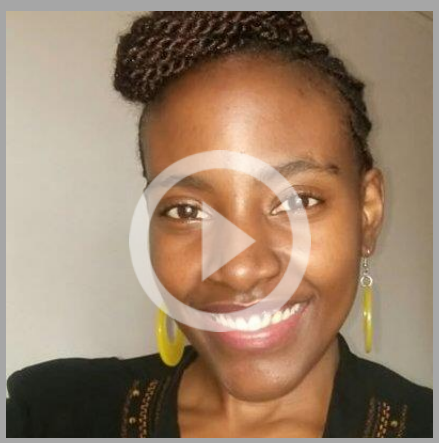
Zimbabwe - The Zimbabwe Institution of Engineers, Women in Engineering body have reported an exponential increase in national member reach and engagement as a key outcome of this Africa Catalyst project.

The leadership development and outreach programmes hosted in Zimbabwe over the last three (3) years have increased interest, awareness and action from members in sub-chapters across various regions of Zimbabwe.

This project has catalyzed member reach and engagement nationally in Zimbabwe in a number of ways including:

- In 2019, WomEng paid for twenty-nine (29) student memberships and one (1) graduate membership for direct beneficiaries of the WomEng Fellowship programme hosted in Gweru, Zimbabwe.
- Fellows have used their experience and shared the knowledge learnings with peers through engagement sessions in the months after the Zimbabwe Fellowship. Due to funding constraints, only 50 students were selected, but they have used the opportunity to share their experiences with others who were unable to attend.
- Fellows (tertiary-level engineering students) returned to their hometowns across Zimbabwe and have begun mentoring relationships with girls in their high schools.
- Graduate members have leveraged online platforms to actively engage with mentees and mentors. This includes utilising WhatsApp groups for flash mentoring session and supporting mentorship sessions in areas with poor network and connectivity.
- Members have adapted the WomEng GirlEng resources provided on this project to create educational resources relevant to high school girls in Zimbabwe.
- Members have started blogs and written articles, spreading awareness of gender diversity and inclusion in engineering.
- The chapter in Mutare, a region in Zimbabwe, has been reactivated. This has seen a number of students in the region come forward and participate in activities within the region.
- There is an increased interest from the main professional engineering institution in the women in engineering body activities.

Video Box 7



Lodrina Masiyazi, a senior member of Zimbabwe Institution of Engineers Women in Engineering body shares how this project has catalyzed membership growth and engagement in Zimbabwe

Play Video

Raising the Profile of Engineers Through Community Development

Tanzania - In September 2019, WomEng and the Institution of Engineers (IET) Tanzania Women in Engineering body hosted the high school outreach programme, GirlEng #AskAnEngineer workshop in Kisarawe District, Coast Region of Tanzania. This outreach event contributed to the continuous community development efforts by IET Women in Engineering members in this region.

The Kisarawe District is a largely rural region in Tanzania where the culture has traditionally not placed any value on girls' education. In the last 2 years, the District Commissioner, Hon. Jokate Mwegelo, an activist for girls' education in the area, committed to building the first secondary school for girls in the region, Kisarawe Girls Secondary School, now "Jokate Mwegelo Girls Secondary School". Through a fundraising drive at the beginning of the project, the IET Women in Engineering body members pledged their engineering skills and services to the project working alongside the Tanzania Women Architects for Humanity (TAWAH).

The IET Women in Engineering members provided design and supervision services predominantly for the civil and structural infrastructure design of the school in a voluntary capacity. While highly skilled engineers themselves, this also supported the belief of setting an example for the girls in the area by showcasing that women can engineer such structures. The goal was to create an ideal school for girls by considering aspects of inclusiveness, safety , connectivity, and sustainability with a focus of extra curricula activities and healthy living (TAWAH, 2020). The school is located in Mhaga Village in Kibuta ward and will be able to accommodate 460 girls.

In response to the efforts by the IET Women in Engineering members, the surrounding village was inspired with the work of the engineers and in return donated a piece of land to IET Women in Engineering Body. The IET Women in Engineering body intends developing the land for self-sustaining projects that could generate funding for the organisation.

Video Box 8

Eng. Ester Christopher, a senior member of Institution of Engineers Tanzania Women in Engineering body shares the growth and successes of the organisation over the last three (3) years and speaks further about the Kisarawe community development project.

Play Video

Thinking Beyond Traditional Engineering

Malawi - The Malawi Institution of Engineers (MIE) Women in Engineering members are making strides in bringing greater awareness to innovation and new technology for high school girls, tertiary-level engineering students and women in industry. This is required for the unlocking of key future skills and drivers for growth.

Through partnerships with institutions such as the Rice University and Rotary Club, the Malawi Institution of Women in Engineering members have strongly focused on creating STEM awareness for girls in predominantly rural areas. Using WomEng LaunchPad toolkits, MIE Women in Engineering members have been able to host awareness initiatives in areas across Malawi namely, Lilongwe, Kasiya, Lunzu, Thyolo, Chikwawa, Chiradzulu and Mangohci, sharing information about the future world of work and new technologies. To date, MIE Women in Engineering members led by Faith Mzandu have reach out to more than 3 000 girls beyond this project.

MIE Women in Engineering members are going beyond simply participating in industry and are now making strides in innovation and new technology. A large focus on the fellowship programme is entrepreneurship in engineering. From the programme, Catherine Chaima, Grace Ghambi and Tadala Mtumuni, Fellowship Malawi beneficiaries have raised their profiles as engineering entrepreneurs and innovators. Catherine Chaima, was shortlisted for the 2020 Royal Academy of Engineering's Africa Prize for Innovation and made history by being the first Malawian woman among the finalists of this competition which is globally recognised. She started Cathel, a soap she makes with local agricultural waste as part of the ingredients. Grace Ghambi is currently a fellow on WomEng Africa Innovation Fellowship 2020 programme, incubating female founded companies. Grace is the founder of Focus Action Result, training for people to make sanitary products and Drone Tales, providing information about drone technology and data analytics in Malawi. In 2020, Tadala Mtimuni was placed as a 3rd place winner at the Malawi Innovation Design Competition hosted by Malawi University of Science and Technology and Malawi Polytechnic at which Faith Mzandu was also appointed as a judge. These fellows continue to showcase the endless possibility of female engineers when we invest time, funding and support all along the engineering value chain, and the work WomEng does to transform the sector.

As a result of the impactful work being implemented by Faith on WomEng programmes in Malawi, she was appointed as an advisory board member for the African Drone and Data Academy run by the Virginia Tech University and funded by UNICEF in Lilongwe, Malawi. One of Faith's key roles as an advisory board member is to ensure that there is a 60% intake of women participants with an undergraduate degree in STEM on all cohorts of this project. The programme focuses on teaching and developing drone technology.

Video Box 9

Faith Mzandu, WomEng Malawi Lead further shares the growth and successes of the collaboration between Malawi Institution of Engineers Women in Engineering and WomEng over the last three (3) years.

Play Video

Scaling Capacity Building for Women in Engineering Bodies Across Sub-Saharan Africa

WomEng - This project, developed and implemented under the Royal Academy of Engineering Africa Catalyst Phase 2 grant, has set a precedent for capacity building for Women in Engineering bodies. In January 2020, WomEng was awarded a Royal Academy of Engineering Africa Catalyst Phase 3 grant for Capacity Building for Women in Engineering Bodies in West Africa. This project will expand capacity building initiatives to women in engineering, focusing on West Africa, namely Sierra Leone, Ghana and Nigeria. WomEng will be working with the following institutions to further capacity building initiatives across the continent:

- Women in Engineering (WinE), Ghana
- Association of Professional Women Engineers of Nigeria
- Sierra Leone Women Engineers

A key difference between our partner women in engineering bodies in Africa Catalyst Phase 2 and Phase 3 is the maturity of the organisations. In Africa Catalyst Phase 2, we worked with women in engineering bodies in Eswatini, Malawi, Tanzania and Zimbabwe. These women in engineering bodies are considered relatively young in terms establishment (approximately 5 years since establishment). Comparatively, in Africa Catalyst Phase 3, our partner women in engineering bodies are more mature. Women in Engineering (WinE), Ghana was established in 1999 (21 years old). The Association of Professional Women Engineers of Nigeria (APWEN) was formally established in 1983 (37 years old). Sierra Leone Women Engineers (SLWE) was established in 2015 (5 years old) however Eng. Trudy Morgan, SLWE President and now also President of Sierra Leone Institution of Engineers, brings more than 30 years of experience in the engineering industry.

While the maturity of women in engineering bodies in Africa Catalyst Phase 3 changes the type of content included in the leadership development sessions, the focus on building capacity is required and remains the core focus. Mature institutions allow for a shift from establishing the institution to further increasing the impact through widespread reach and digital advocacy. Working with a diverse number of women in engineering bodies across sub-Saharan Africa is paving the way for developing more tailored capacity building and leadership development solutions for women in engineering bodies.

Image: Beneficiary from WomEng Fellowship, Tanzania, 2

Conclusion

The intended impact for this project was to improve the capacity of engineering bodies to promote gender diversity and relevance within engineering and engineering professionals in Africa. This was successfully achieved by:

1. **Strengthening the institutional capacity of relevant stakeholders through training and leadership development:** Over 100 women in the engineering bodies and additional stakeholders have participated in this project. The first leadership session was run by WomEng and its partner the Cambridge Institute for Sustainability Leadership. This executive session focused on the leadership development of senior leaders within the institutions, following which, local leadership sessions were run in each country with a bigger team. In many of the countries, the leadership training was covered by local media as well. The institutions now have stronger, more equipped Women in Engineering bodies who are able to run effective outreach programmes, as well as students who are able to support on these activities.
2. **Increasing knowledge among engineering bodies about effective practices for improving gender diversity in engineering:** During this process 365 secondary school girls across 4 countries increased their awareness about engineering opportunities with over 90% of girls on the programme wanting to pursue a career in STEM. 200 tertiary level students increased their leadership, employability and networking capabilities through the fellowship programme. This flagship employability and entrepreneurship programme has already yielded results with three (3) companies developed, and featured in the Africa Prize for Engineering Innovation and the Africa Innovation Fellowship programme.

A key learning on this project was that there are no blanket solutions that exist for sub-Saharan Africa. Each country has a unique mix of challenges and opportunities that require customised solutions. However, it does show that we can change the status quo for women and girls in Africa through proactive support, mentoring and funding innovative models to create awareness, develop capacity and showcase opportunity. WomEng has shown that these models can be effectively scaled and that there is power in building a community for women in STEM in Africa.

As such, our new phase of Africa Catalyst, Capacity Building for Women in Engineering Bodies in West Africa will build on the work established under this project, focusing on developing matured Women in Engineering organisations in Ghana, Nigeria and Sierra Leone.

Recommendations

This project, Capacity Building for Women in Engineering Bodies in sub-Saharan Africa has set a precedent for increasing knowledge on the successes, challenges and lessons learned in raising the profile of women in engineering in sub-Saharan Africa. WomEng's mission of developing a gender diverse and inclusive engineering workforce continues by supporting diversity and inclusion in the engineering industry while attracting more girls and women into the sector on the continent and actively influencing the entire value chain from entry through to ownership.

Based on the findings in this report, we believe there are three (3) priority actions that if tackled by women in engineering bodies, will achieve sustained growth in changing mindsets, ways of working and culture, namely:

1. **Build stronger communities:** Professional women in engineering in sub-Saharan Africa are estimated to make up below 10% of the engineering workforce. As minorities and champions of minorities, we can come together in communities to support advocacy and outreach initiatives. We need to rethink how we support our communities across the continent to share and connect with each other; to find mentors and become mentors; to document experiences and lessons and share these real-life stories. The development of virtual groups on social media is one such example of breaking through the limitations of geography and access to leaders.
2. **Develop collaborative industry partnerships:** Gender diversity makes business sense with clear rationale to leverage the potential of the full workforce and reflect diversity in the customer base. Women in engineering bodies need to leverage the business case for gender diversity and inclusion in engineering to develop strategic industry partnerships which could lead to a sustainable source of funding. Partnering with global organisations like WomEng amplifies impact for local Women in Engineering bodies across the continent by thinking global, acting local.
3. **Drive policy change:** Women in engineering bodies need to be driving policy change globally through being able to lobby governments on the ground. To amplify impact, women in engineering bodies need to work collectively on global platforms to raise the profile of women in engineering. Organisations such as the World Federation of Engineering Organisations of which WomEng holds a seat on the Committee of Women in Engineering and Federation of African Engineering Organisations provide platforms for regional and global policy development.

Driving long-term prosperity for a gender diverse and inclusive engineering industry in sub-Saharan Africa requires champions at local, national, regional and global levels. This project, Capacity Building for Women in Engineering Bodies in Sub-Saharan Africa, has successfully highlighted the positive impact created when champions at all levels work together and so, the work continues. It demonstrates the effectiveness of the WomEng framework in attracting girls into engineering, supporting female engineering students through employability and entrepreneurship skills uplift, developing leadership capacity and developing and supporting female led innovation across the continent. WomEng will continue to drive global advocacy and support for a diverse and inclusive engineering industry, while empowering local women engineers on the ground to develop the next generation of women engineers and truly transform the sector.

Methodology

Project Plan

The aim of this project was to increase capacity for engineering bodies to run development and outreach programmes and in the process, building stronger engineering talent pipelines. Critical to the execution of this project, WomEng outlined six (6) steps over between January 2018 – September 2020 that ensured the project delivers meaningful and impactful results. These activities are detailed as follows:

- **Step 1:** The first key activity was a stakeholder commencement meeting hosted in April 2018. All Women in Engineering body chairs were brought to this event for diversity and leadership training. This included Women in Engineering body chairs and the head of the engineering bodies.
- **Step 2:** Map engineering capacity and diversity within the countries in partnership with the engineering bodies. This entailed desktop research based on existing data from the respective engineering bodies to develop a bottom-up needs development approach to running training and development.
- **Step 3:** Leadership and diversity training was provided to Women in Engineering body members to build capacity within each body.
- **Step 4:** Develop and map outreach plan. WomEng provided a supporting role in developing a plan to host local programmes for secondary school girls and university students, extending the pipeline of new entrants within the engineering profession and bodies. The GirlEng project for secondary school girls, aims to create awareness and make STEM fun, engaging and relatable . The GirlEng mission is to attract and mentor girls into engineering fields. The Fellows Programme, to develop leadership, employability and candidacy of female engineering university students.
- **Step 5:** Execution of secondary school and tertiary level outreach programmes in the project countries.
- **Step 6:** Aggregate results and develop best practice. Key deliverables included the development of this best practice report and a stakeholder close out meeting, Africa Catalyst Festival of Learning.

Each step was strategically designed to further understand, ideate, plan and execute activities that foster best practice, development and relevance of the engineering bodies amongst engineering professionals in sub-Saharan Africa. It follows the model successfully launched by WomEng in South Africa and Kenya, which has worked with over 25 000 women and girls to date, increasing participation of female engineering students and ultimately the number of engineers entering and registering within the industry.

Stakeholders

This project was made possible through partnerships with a number of organisations. The key stakeholders are as follows:

- **WomEng** – responsible for project delivery and management. WomEng developed the outreach curriculum and assisted professional engineering institutions to develop strong Women in Engineering bodies.
- **Cambridge Institute for Sustainability Leadership** is the UK partner organisation – provided leadership development and training for engineering bodies.

Beneficiary Partners: These bodies institutionalised and supported the Women in Engineering chapters in project countries:

- **Malawi - The Malawi Institution of Engineers:** WomEng had initiated the Women in Engineering body in 2017 by running the first iteration of leadership development for senior women leaders. This project built upon existing efforts.
- **eSwatini – Registration Council for Architects, Engineers, Surveyors and Allied Professionals (AESAP) and WomEng eSwatini:** Prior to this project, WomEng had newly established WomEng eSwatini, a non-profit organisation in eSwatini as a response to improve engineering education and career development for women in eSwatini. Alongside this, in 2018, eSwatini had just launched AESAP, the first official professional engineering institution in eSwatini for registering engineers. WomEng eSwatini and AESAP have been working in parallel to develop the engineering workforce in eSwatini.
- **Tanzania – Institution of Engineers, Tanzania**
- **Zimbabwe – Zimbabwe Institution of Engineers**

Beneficiary partners were selected based on demand expressed to WomEng by stakeholders in the noted project countries. Each beneficiary partner also has different maturity levels and structural dynamics, allowing for testing of programmes over a wider range of institutional types.

Data Collection and Analysis

Quantitative and qualitative methods were utilised during the data collection and analysis. Data was collected through the following means:

- **Surveys:**
  - Post-event feed from high-school level programmes in each of the project countries
  - Application forms from tertiary level programmes in each of the project countries
  - Post-event feedback
- **Existing Data:**
  - Women in Engineering bodies shared existing data on the body.
  - Desktop research using reports from sources such as UNESCO, World Economic Forum, BCG and McKinsey and Co.
- **Observations:**
  - Data was collected through participatory action activities conducted during the leadership development and training workshops

Limitations

Data gaps in existing literature: As noted in an Africa Study Report by the Royal Academy of Engineering (2006), "Engineering capacity is not currently measured in Africa and there is no consensus on how it could be measured or how the impact of initiatives might be assessed." Existing data on the number of Women in Engineering in sub-Saharan Africa is still very limited as many professional engineering institutions in Sub-Saharan Africa do not have a strategy in place to measure this metric. The beneficiary partners on this project track number of engineers based on registrations to the institutions which is not mandatory for all engineers.

Sample demographic: The demographic of the high-school beneficiaries on the outreach programme vary from country – to -country based on need and suggested target audiences expressed by beneficiary partners. In Malawi and Tanzania, school girls from more rural locations participated in the programme versus eSwatini and Zimbabwe in which girls from more urbanised areas participated.

Language barriers: In Malawi and Tanzania, English is typically not the first language spoken. This could have affected the delivery of secondary school programmes in these countries. Facilitators and speakers on the secondary school outreach programmes in these countries did utilise local languages however the language medium used for the feedback forms was in English.

Appendices

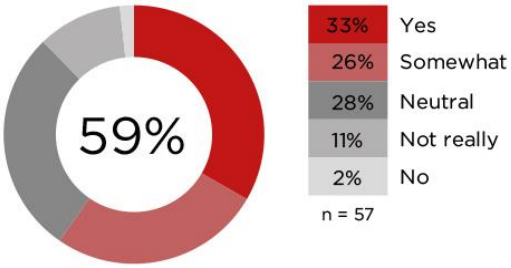
Appendix A
GirlEng #AskAnEngineer Programme Insights

eSwatini

On 28 September 2019, WomEng and WomEng eSwatini hosted a GirlEng #AskAnEngineer workshop for 67 secondary school girls in Matsapha, eSwatini. The data presented below provides an evaluation of feedback received from 57 attendees (85% overall response rate).

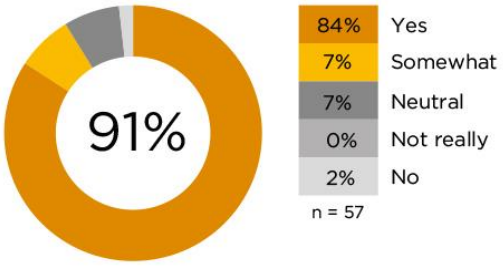
Impact Rating

Decided On A Career Prior To The Workshop



59% of respondents had somewhat or a good idea of what career they wanted to pursue before this workshop.

Inspired To Pursue a Career In STEM



91% of respondents were somewhat to really being inspired to pursue a career in STEM post this workshop.

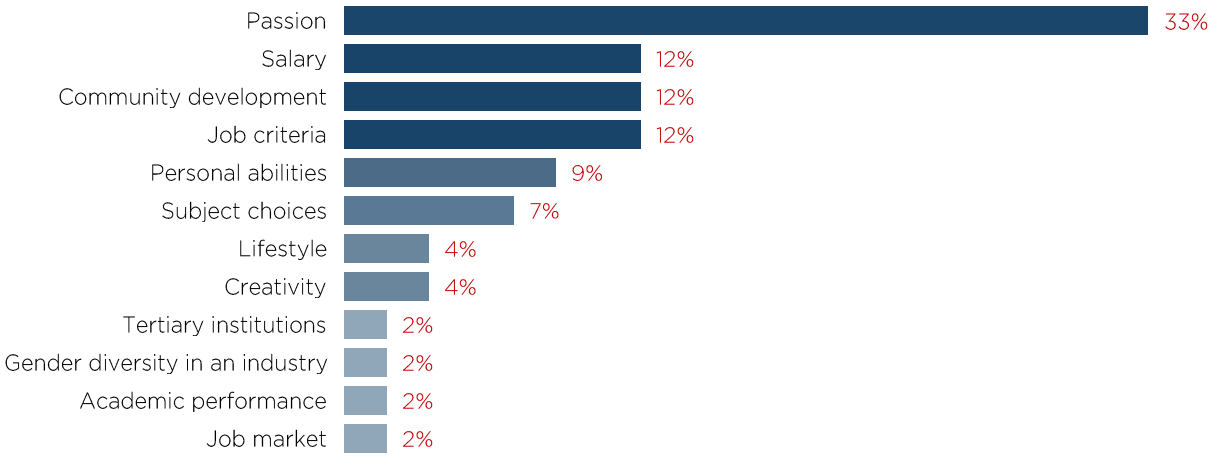
Workshop Highlights

Participants were asked "What is the most interesting thing you have experienced today?" (n = 57)

LaunchPad activity | "Branding my helmet."	28%
Learning more about STEM, specifically engineering | "Having to learn about most of the types of engineering especially electrical engineering."	28%
Inspired by the speakers | "Motivation from each speaker."	26%
Meeting females in STEM | "Having a little chat about electrical engineering with an electrical engineer who is a lady."	9%
Learning about gender diversity in engineering | "Realising that girls can study engineering and actually pass and become engineers themselves."	7%
Connecting with students from other schools | "Getting to meet girls from different schools and interacting with them."	2%

Influencing Factors For Career Choices

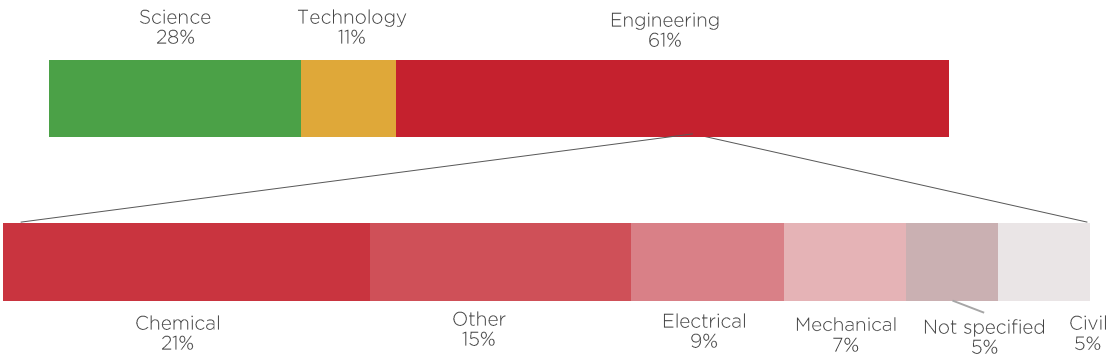
Attendees were asked what factors are they considering when choosing a future career.



eSwatini

Consideration of STEM Careers

Attendees were asked “Are you thinking of choosing a career in STEM? If yes, what field of study/studies?” 100% of respondents provided a positive response. . Below is a breakdown of fields noted from the yes responses. Engineering fields were the most notable and further broken down into specified fields.



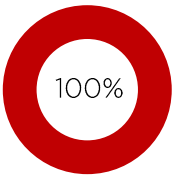
Suggestions to the Team

Attendees were asked to provide the team with suggestions on how the workshop can be improved. The top 5 most mentioned suggestions are listed below based on 82% of mentions from all respondents.

Reach: Encourage more girls to pursue a career in STEM	40%
Workshop Frequency: Host more workshops globally, specifically in rural areas	23%
Practical activities: Include more practical activities	17%
Variety: Include a variety of STEM disciplines in the programme	13%
Workshop duration: Extend the duration of the workshop	6%

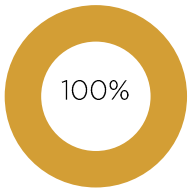
Recommendation Rating

100% of respondents that would recommend this workshop to their friends.



Interest in Future Events

100% of respondents interested in attending future events.

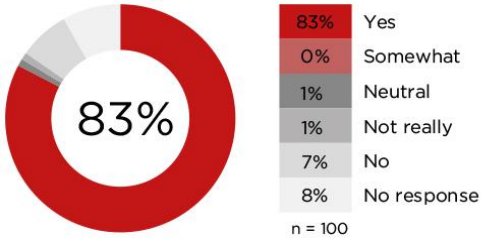


Malawi

On 28 March 2019, WomEng and Malawi Institution of Engineers, Women in Engineering hosted a GirlEng #AskAnEngineer workshop for 98 secondary school girls in Chikwawa, Malawi. This insight report provides an evaluation of feedback received from 98 attendees (100% overall response rate).

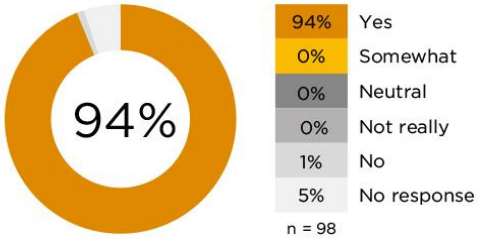
Impact Rating

Decided On A Career Prior To The Workshop



83% of respondents had a good idea of what career they wanted to pursue before this workshop.

Inspired To Pursue a Career In STEM



94% of respondents were inspired to pursue a career in STEM post this workshop.

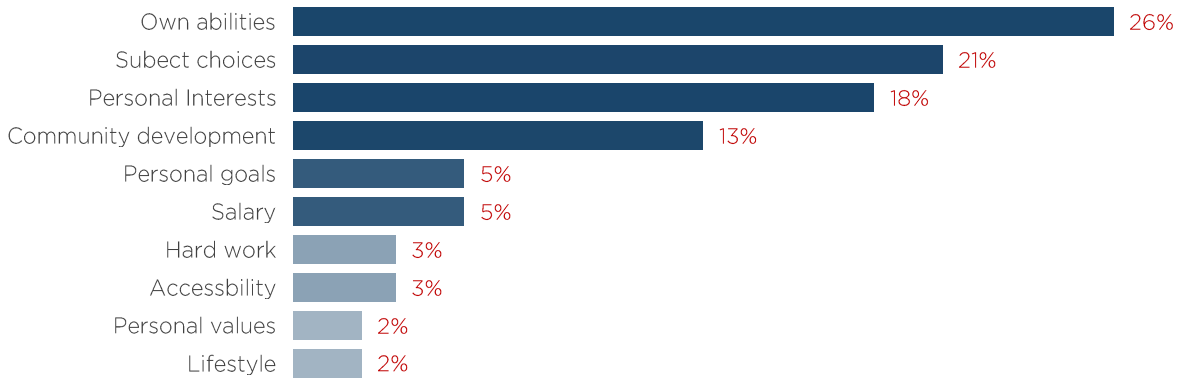
Workshop Highlights

Attendees were asked “What is the most interesting thing you have experienced today?” The top 5 highlights mentioned by 94% of the respondents are listed below.

Learning about engineering | "I know about engineering and what they do according to their branches."	37%
Women empowerment | "Girls can do everything, even engineering."	22%
Inspired by the speakers | " I have models that motivated me and my friends."	16%
Inspired to work hard | " I have experienced that I must work hard in Science subject."	16%
Freedom of choosing a career | "For today, I am encouraged when I see a role model come from college that thing makes me to choose best career that I want."	3%

Influencing Factors For Career Choices

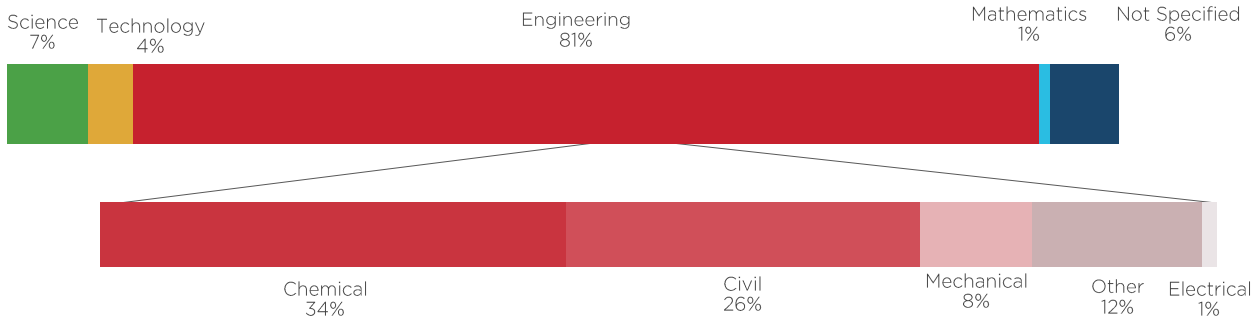
Attendees were asked what factors are they considering when choosing a future career. 94% of all respondents responded to this question.



Malawi

Consideration of STEM Careers

Attendees were asked “Are you thinking of choosing a career in STEM? If yes, what field of study/studies?” 99% of respondents provided a positive response. Below is a breakdown of fields noted from the yes responses. Engineering fields were the most notable and further broken down into specified fields.



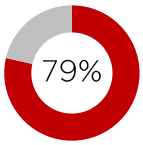
Suggestions to the Team

Attendees were asked to provide the team with suggestions on how the workshop can be improved. The top 5 suggestions mentioned by 87% of all respondents are listed below.

Service: Encourage the team to engage more	27%
Reach: Encourage more girls to pursue a career in STEM	27%
Relatable content: Ensure that the programme is structured in a manner that is relatable to the girls in attendance	16%
Engineering club: Establish engineering clubs in school	12%
Simulation: Include a simulation of various engineering disciplines presented at the workshop	5%

Recommendation Rating

79% of respondents interested in attending future events. 21% did not provide a response for this question, This could be a result of the respondents not understanding the question.

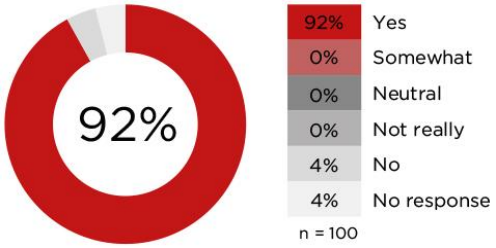


Tanzania

On 28 August 2019, WomEng and Institution of Engineers, Tanzania Women Chapter hosted a GirlEng #AskAnEngineer workshop for 100 secondary school girls in Kisarawe, Tanzania. This insight report provides an evaluation of feedback received from 100 attendees (100% overall response rate).

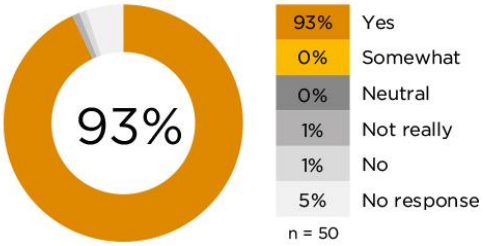
Impact Rating

Decided On A Career Prior To The Workshop



92% of respondents had a good idea of what career they wanted to pursue before this workshop.

Inspired To Pursue a Career In STEM



93% of respondents were inspired to pursue a career in STEM post this workshop.

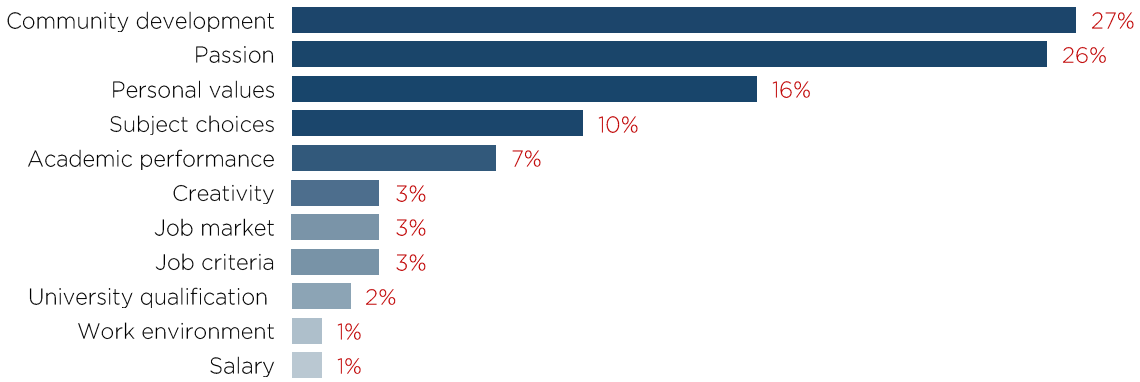
Workshop Highlights

Attendees were asked "What is the most interesting thing you have experienced today?" The highlights mentioned by all the respondents are listed below, resulting to a 100% response rate for this question.

Learning more about STEM, specifically engineering | "Gained more knowledge and information about engineering."	58%
Informative and thought provoking workshop | "Discussions and critical thinking."	19%
Gender diversity in the engineering industry | "I am happy to see women engineers."	9%
Inspired by the guest speakers | "I've been motivated much that I can pursue anything in my life."	8%
Engaging with female engineers and students from other schools | "I make friendship with other students."	6%

Influencing Factors For Career Choices

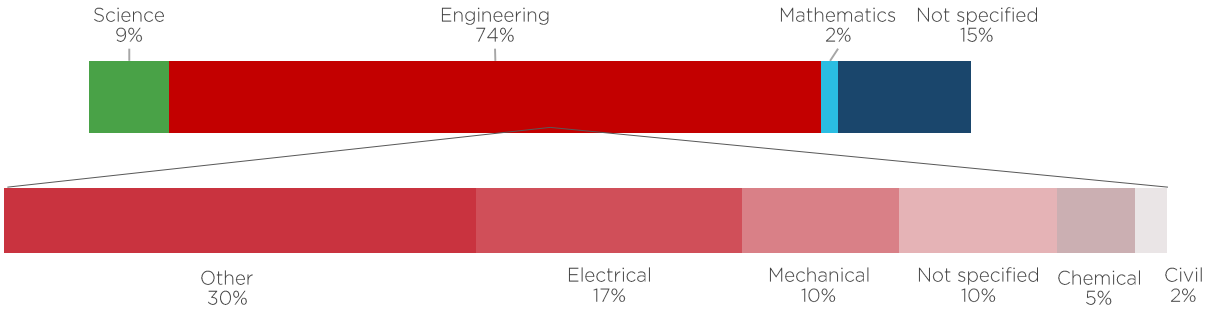
Attendees were asked what factors are they considering when choosing a future career. 100% of all respondents responded to this question.



Tanzania

Consideration of STEM Careers

Attendees were asked "Are you thinking of choosing a career in STEM? If yes, what field of study/studies?" Below is a breakdown of fields noted from the yes responses. Engineering fields were the most notable and further broken down into specified fields.



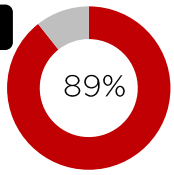
Suggestions to the Team

Attendees were asked to provide the team with suggestions on how the workshop can be improved. The suggestions mentioned below were provided by 93% of respondents. 7% of the respondents did not provide a response for this question.

Workshop frequency: Host more workshops and increase the duration of workshops	33%
Reach: Encourage more girls to pursue a career in STEM, specifically engineering	27%
Additional Resources: Provide information on how to develop the community, specifically the schooling system	18%
Nothing: No improvements required	12%
Simulation: Include a simulation of all the disciplines presented at the workshop	2%
Session duration: Reduce time allocation for presentations	1%

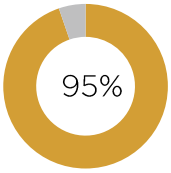
Recommendation Rating

89% of respondents that would recommend this workshop to their friends.



Interest in Future Events

95% of respondents are interested in attending future events.

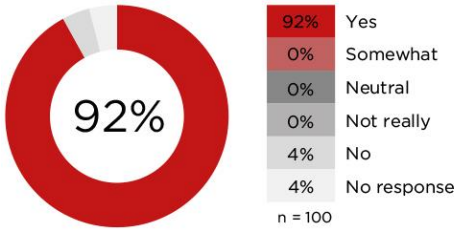


Zimbabwe

On 12 June 2019, WomEng and Zimbabwe Institution of Engineers, Women in Engineering hosted a GirlEng #AskAnEngineer workshop for 100 secondary school girls in Gweru, Zimbabwe. This insight report provides an evaluation of feedback received from 98 attendees (97% overall response rate).

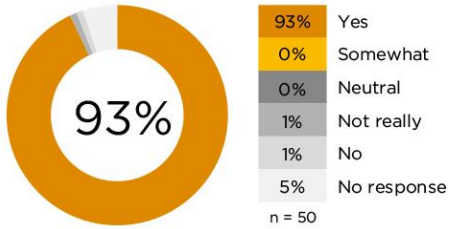
Impact Rating

Decided On A Career Prior To The Workshop



50% of respondents had somewhat or a good idea of what career they wanted to pursue before this workshop.

Inspired To Pursue a Career In STEM



93% of respondents were somewhat to really being inspired to pursue a career in STEM post this workshop.

Workshop Highlights

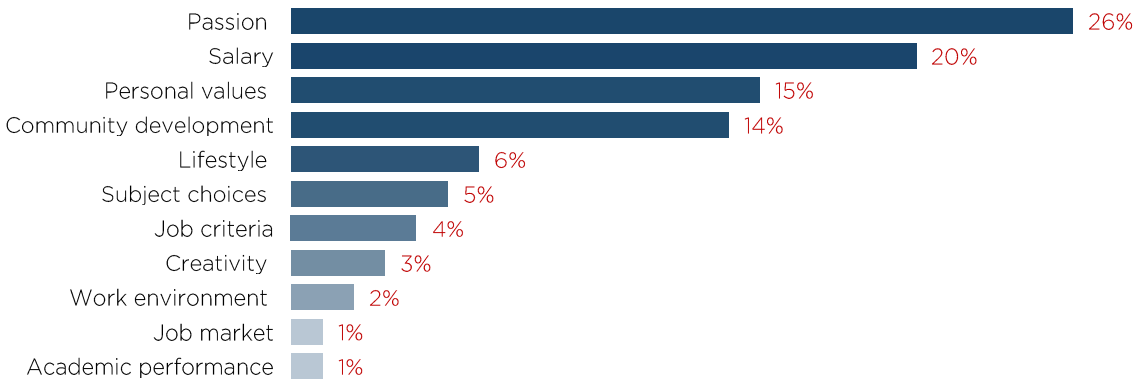
Attendees were asked "What is the most interesting thing you have experienced today?" 99% response rate to this question.

Inspired by the guest speakers and the entire programme | "Listening to the engineers share their stories of how they became what they are today. Being motivated and inspired to keep on aspiring to be an engineer."	27%
Learning about engineering | "I really enjoyed learning about engineering, I really loved the presentation."	21%
Launchpad activity | "Decorating my hard hat and being able to express my thoughts through something so simple yet so significant."	21%
Informative and thought provoking programme | "I have learnt many aspects of life and also that some girls like me made it so far."	16%
Learning about gender diversity in engineering and women empowerment | "Girls can be engineers."	11%
Meeting female engineers | "Meeting other women who do engineering, and they really motivated and inspired me that no matter what challenges you face as a girl nothing can stop you."	2%

Influencing Factors For Career Choices

Attendees were asked what factors are they considering when choosing a future career. All respondents responded to this question.

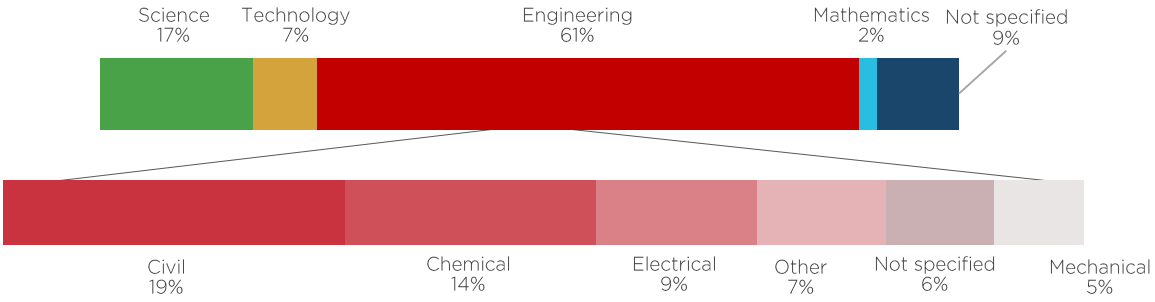
93%



Zimbabwe

Consideration of STEM Careers

Attendees were asked “Are you thinking of choosing a career in STEM? If yes, what field of study/studies?” 100% of all respondents provided a response of which a 100% of respondents said yes. Below is a breakdown of fields noted from the yes responses. Engineering fields were the most notable and further broken down into specified fields.



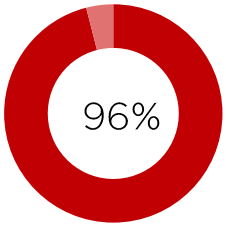
Suggestions to the Team

Attendees were asked to provide the team with suggestions on how the workshop can be improved.
The top 5 suggestions mentioned by 57% of respondents. 14% of respondents did not provide a response for this question, this could be a result of the respondents not understanding the question.

Reach: Invite more students to the workshop	22%
Nothing: No improvement required	19%
Workshop Frequency: Host more workshops globally	6%
Scale: Encourage more girls to pursue a career in STEM	5%
Field trip: Include a field trip to the work space	4%

Recommendation Rating

96% of respondents that would recommend this workshop to their friends.



Appendix B
Fellowship Programme Insights

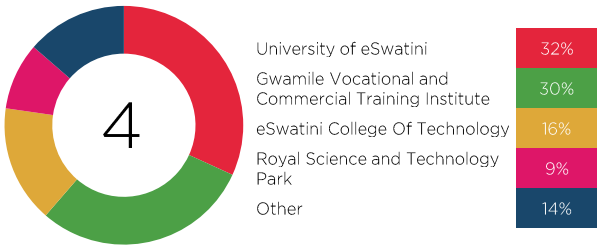
eSwatini

WomEng and WomEng eSwatini and hosted a 2-day Fellowship on 28 – 29 February 2020 in Mbabane, eSwatini. A total of 44 applications were received from female tertiary level engineering students of which 44 were selected to participate in the programme.

Application Profile and Insights

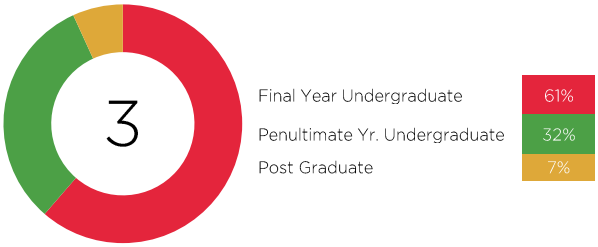
The data in this section profiles 44 applications received (n=44).

Tertiary Institution



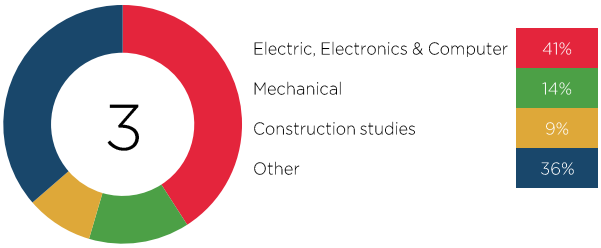
Applications were received from 4 tertiary institutions in eSwatini.

Study Year



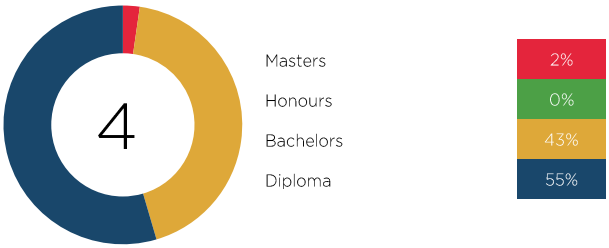
Applications were received from 3 different academic years.

Study Discipline



Majority of applicants were pursuing 3 key engineering and built environment disciplines.

Qualification Type



4 qualification levels were being pursued by applicants.

Perceived Challenges

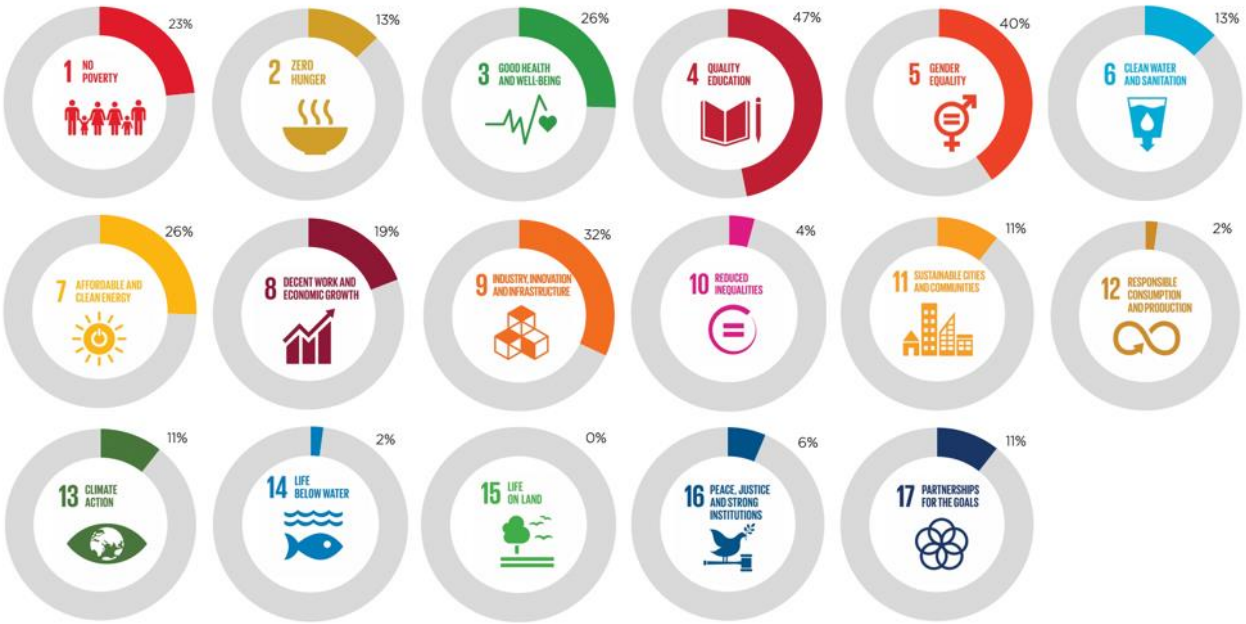
Fellows were asked “As a millennial, what do you think are your biggest challenges in preparing to work in the engineering industry?”. 44 responses were received.

Thriving in the engineering industry as a female without being questioned whether I am capable of conducting the work	43%
Developing valuable skills for the workplace in a short space of time	9%
Being undermined in the workplace because of my age	7%
Not having enough confidence to deal with the pressure and challenges in the engineering industry	7%
Limited job opportunities	5%

Application Insights

Sustainable Development Goals

Tertiary level female engineering students were asked about the Sustainable Development Goals (SDGs) and "Which of the 17 Goals do you intend working on?" Respondents were allowed to provide a maximum of three (3) goals that were considered important to them. The top three (3) SDGs that tertiary level female engineering students in eSwatini are most invested in are: SDG4; SDG5 and SDG9.



Top Companies

Fellows were asked "What is the top company you would like to work for?" The top 5 most common mentions have been listed in order.

1	RES CORPORATION	Royal Swazi Sugar Corporation
2	Eswatini Electricity Company	eSwatini Electricity Company
3	Inyatsi Construction Group Holdings	Inyatsi Construction
4	Google	Google
5	Coca-Cola	Coca-Cola

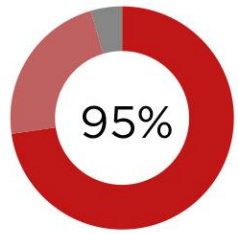
eSwatini

Programme Feedback

Outcome Skills Rating

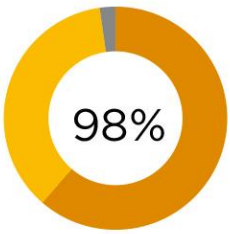
Fellows were asked to rate Fellowship in terms of the skills they developed based on a rating scale where 1 = No impact to 5 = Highly Impactful. The % rating per outcome is based on the % of responses that received a rating of 4 out of 5 or more i.e. considerable to highly impactful.

Leadership



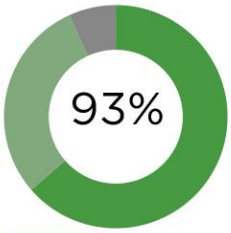
73%	Highly Impactful
22%	Considerable Impact
5%	Neutral
0%	Little Impact
0%	No Impact

Employability



62%	Highly Impactful
36%	Considerable Impact
2%	Neutral
0%	Little Impact
0%	No Impact

Networking



64%	Highly Impactful
29%	Considerable Impact
7%	Neutral
0%	Little Impact
0%	No Impact

Highlights and Lowlights

Fellows were asked to list their highlights and lowlights from their experience of Fellowship. The top 5 most common responses are detailed below, reflecting the total percentage of mentions from Fellows.

Highlights		Lowlights	
Programme sessions: Most notable session was on communicating with influence.	43%	No lowlights	64%
Innovation challenge	18%	Having to speak in front of an audience	9%
Being Inspired by female engineers	14%	The programme duration was short	7%
Gaining self confidence	11%	Innovation challenge	7%
Exposure to a great network	7%	Not being able to engage with all Fellows	2%

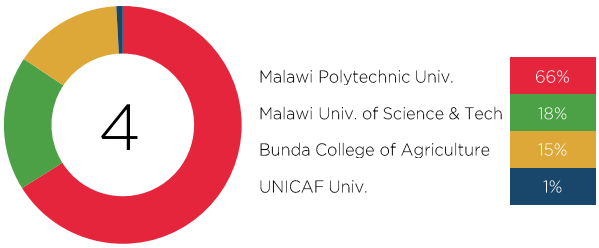
Malawi

WomEng and Malawi Institution of Engineers Women in Engineering body hosted a 2-day Fellowship on 03 – 04 October 2019 in Blantyre, Malawi. A total of 115 applications were received from female university students of which 50 were selected to participate in the programme.

Application Profile and Insights

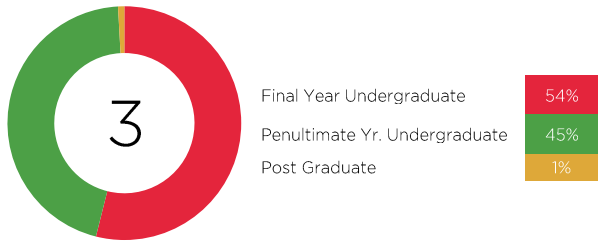
The data in this section profiles 115 applications received. Data reported in terms of percentage of applications.

Tertiary Institution



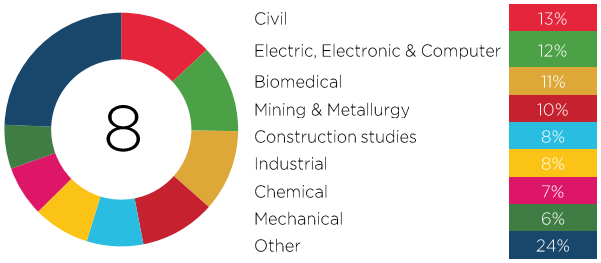
Applications were received from 4 institutions in Malawi.

Study Year



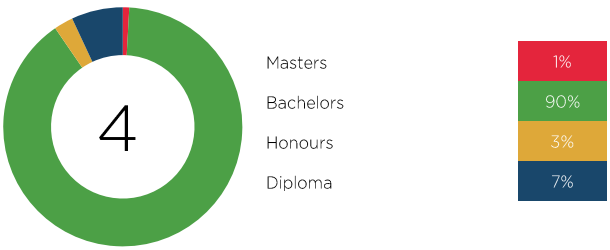
Applications were received from 3 different academic years.

Study Discipline



Majority of applicants were pursuing 8 key engineering and built environment disciplines.

Qualification Type



4 qualification levels were being pursued by applicants.

Perceived Challenges

Fellows were asked "As a millennial, what do you think are your biggest challenges in preparing to work in the engineering industry?". 44 responses were received. Challenges ranked based on % of mentions from respondents

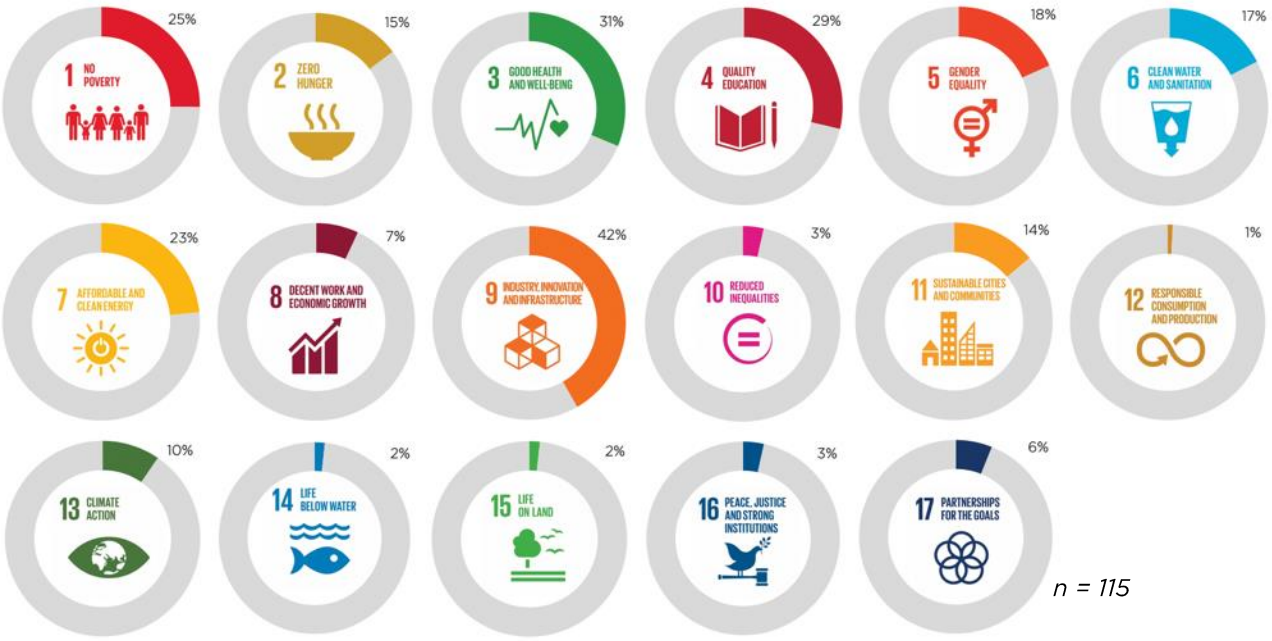
Thriving in the engineering industry as a female without being questioned whether I am capable of conducting the work	32%
Lack of practical skills that might make us less valuable in the job market	22%
Gaining work experience in order to be eligible to get a job	13%
Lack of job opportunities in the country	9%
Educating others about the skills and services a person in my discipline provides	4%

Malawi

Application Insights

Sustainable Development Goals

Tertiary level female engineering students were asked about the Sustainable Development Goals (SDGs) and "Which of the 17 Goals do you intend working on?" Respondents were allowed to provide a maximum of three (3) goals that were considered important to them. The top three (3) SDGs that tertiary level female engineering students in Malawi are most invested in are: SDG9; SDG3 and SDG4.



n = 115

Top Companies

Fellows were asked "What is the top company you would like to work for?" The top 5 most common mentions have been listed in order.

1		Ilovo Sugar
2		Mota-Engil
3		Malawi Electricity Generation Company
4		Waterboards in Malawi
5		Electricity supply Corporation of Malawi

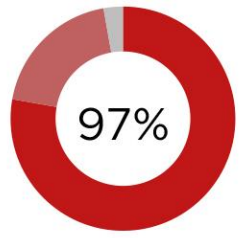
Malawi

Programme Feedback

Outcome Skills Rating

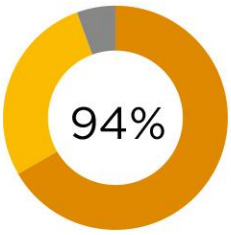
Fellows were asked to rate Fellowship in terms of the skills they developed based on a rating scale where 1 = No impact to 5 = Highly Impactful. The % rating per outcome is based on the % of responses that received a rating of 4 out of 5 or more i.e. considerable to highly impactful.

Leadership



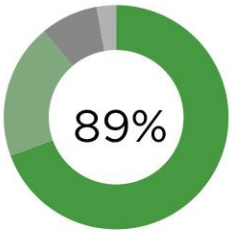
78%	Highly Impactful
19%	Considerable Impact
3%	Neutral
0%	Little Impact
0%	No Impact

Employability



67%	Highly Impactful
27%	Considerable Impact
6%	Neutral
0%	Little Impact
0%	No Impact

Networking



69%	Highly Impactful
20%	Considerable Impact
8%	Neutral
3%	Little Impact
0%	No Impact

Highlights and Lowlights

Fellows were asked to list their highlights and lowlights from their experience of Fellowship. The top 5 most common responses are detailed below, reflecting the total percentage of mentions from Fellows . (n = 36)

Highlights		Lowlights	
Programme sessions on leadership and employability	39%	No lowlights	36%
Innovation challenge	31%	The programme duration was short	17%
The opportunity to network with other female engineers	17%	Limited engagement from some attendees	14%
Panel discussion with David Mzandu	11%	Limited diversity of fields represented by speakers	8%
The overall organisation of the programme	3%	Self reflection was challenging	8%

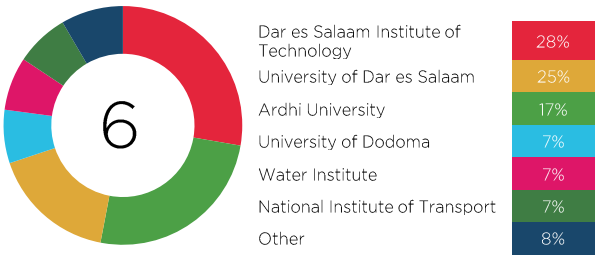
Tanzania

WomEng and Institution of Engineers, Tanzania Women's Chapter hosted a 2-day Fellowship on 06 -07 March 2020 in Zanzibar, Tanzania. A total of 82 applications were received from female tertiary level students of which 50 were selected to participate in the programme.

Application Profile and Insights

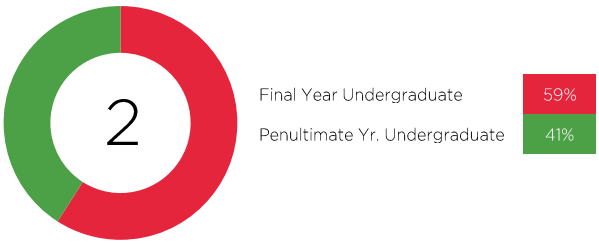
The data in this section profiles 82 applications received. Data reported in terms of percentage of applications.

Tertiary Institution



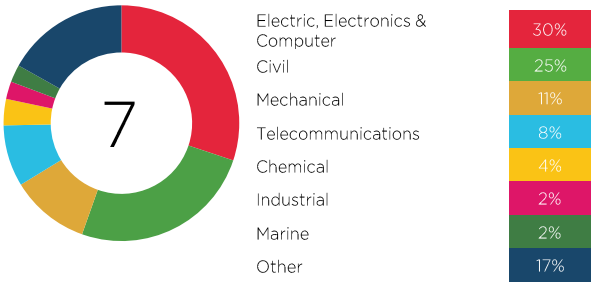
Majority of applicants were studying at 6 tertiary institutions in Tanzania.

Study Year



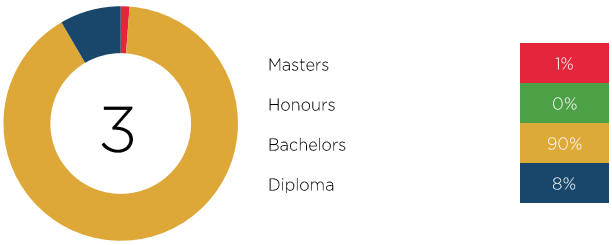
Applications were received from 2 different academic years.

Study Discipline



Majority of applicants were pursuing 8 key engineering and built environment disciplines.

Qualification Type



3 qualification levels were being pursued by applicants.

Perceived Challenges

Fellows were asked "As a millennial, what do you think are your biggest challenges in preparing to work in the engineering industry?". (n=82)

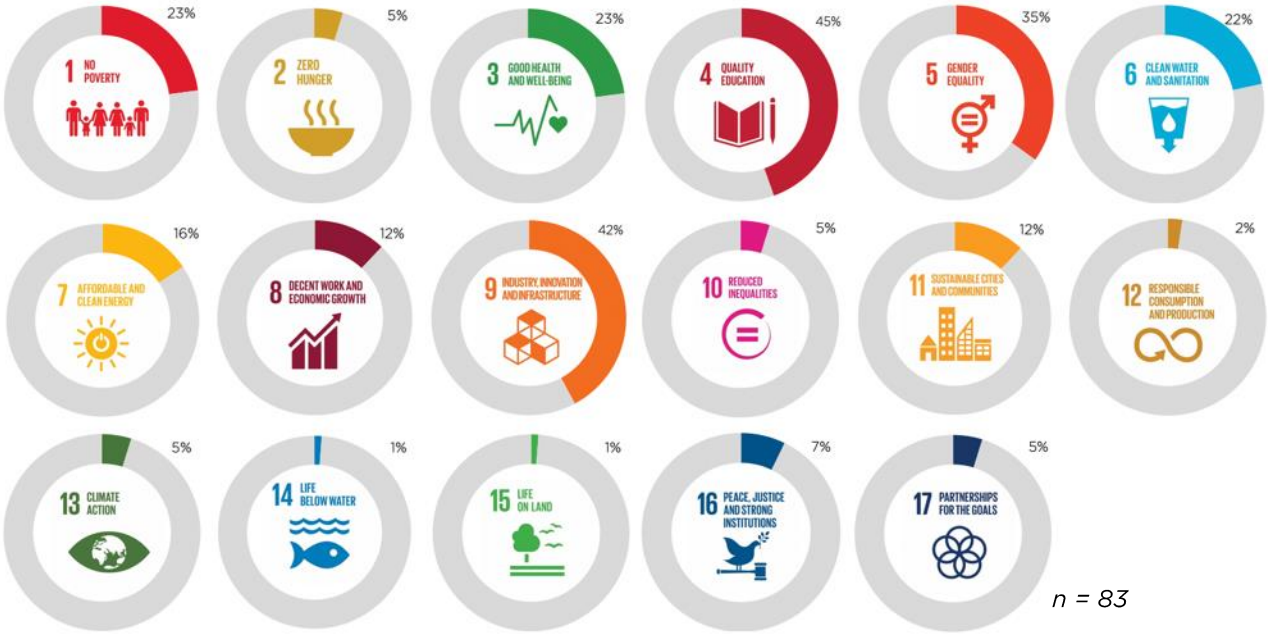
Thriving in the engineering industry as a women without being my capability being questioned	22%
Lack of practical skills that might make us less valuable in the job market	15%
Gaining work experience in order to be eligible to get a job	10%
Understanding technologies that are constantly evolving	10%
Lack of job opportunities for female engineers	7%

Tanzania

Application Insights

Sustainable Development Goals

Tertiary level female engineering students were asked about the Sustainable Development Goals (SDGs) and "Which of the 17 Goals do you intend working on?" Respondents were allowed to provide a maximum of three (3) goals that were considered important to them. The top three (3) SDGs that tertiary level female engineering students in Tanzania are most invested in are: SDG4; SDG9 and SDG5.



n = 83

Top Companies

Fellows were asked "What is the top company you would like to work for?" The top 5 most common mentions have been listed in order.

1	estim	Estim Construction
2	TANESCO	Tanzania Electric Supply Company
3	TANZANIA BUREAU OF STANDARDS tbs	Tanzania Bureau of Standards
4	UNITED NATIONS	United Nations
5	vodacom	Vodacom

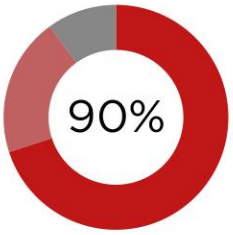
Tanzania

Programme Feedback

Outcome Skills Rating

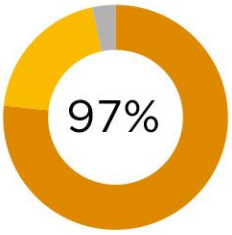
Fellows were asked to rate Fellowship in terms of the skills they developed based on a rating scale where 1 = No impact to 5 = Highly Impactful. The % rating per outcome is based on the % of responses that received a rating of 4 out of 5 or more i.e. considerable to highly impactful. (n = 30)

Leadership



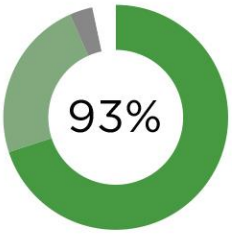
70%	Highly Impactful
20%	Considerable Impact
10%	Neutral
0%	Little Impact
0%	No Impact

Employability



77%	Highly Impactful
20%	Considerable Impact
0%	Neutral
3%	Little Impact
0%	No Impact

Networking



70%	Highly Impactful
23%	Considerable Impact
4%	Neutral
0%	Little Impact
3%	No Impact

Highlights and Lowlights

Fellows were asked to list their highlights and lowlights from their experience of Fellowship. The top 5 most common responses are detailed below, reflecting the total percentage of mentions from Fellows. (n = 30)

Highlights		Lowlights	
Programme sessions on leadership	70%	No lowlights	77%
Innovation challenge	57%	The programme duration was short	7%
Programme sessions on getting workplace ready	57%	Innovation Challenge was difficult	3%
Programme sessions on communicating with influence	17%	Programme session on mentorship	3%
Programme sessions on mentorship	17%	Programme session on communicating with influence and getting workplace ready	3%

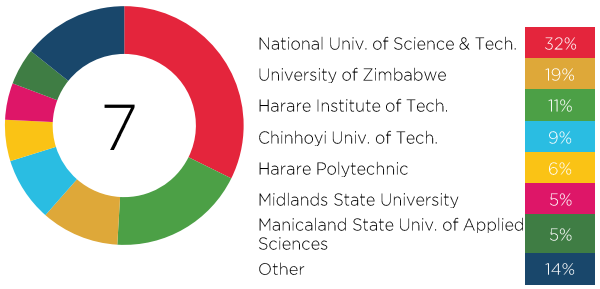
Zimbabwe

WomEng and Zimbabwe Institution of Engineers Women in Engineering body hosted a 2-day Fellowship on 14 -15 June 2019 in Gweru, Zimbabwe. A total of 161 applications were received from female university students of which 50 were selected to participate in the programme.

Application Profile and Insights

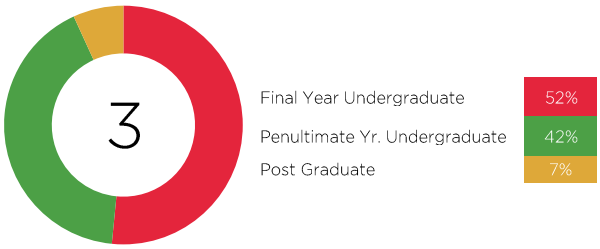
The data in this section profiles 161 applications received. Data reported in terms of percentage of applications. (n=161)

Tertiary Institution



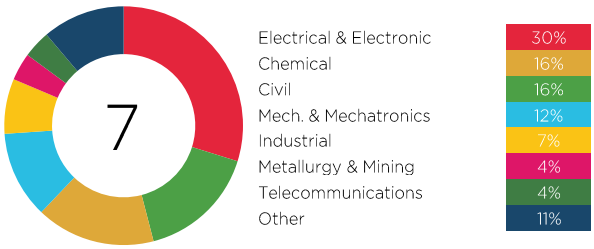
Applications were received from 7 institutions in Malawi.

Study Year



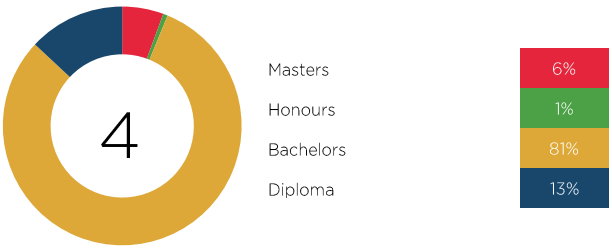
Applications were received from 3 different academic years.

Study Discipline



Majority of applicants were pursuing 7 key engineering and built environment disciplines.

Qualification Type



4 qualification levels were being pursued by applicants.

Perceived Challenges

Fellows were asked “As a millennial, what do you think are your biggest challenges in preparing to work in the engineering industry?”. (n=161)

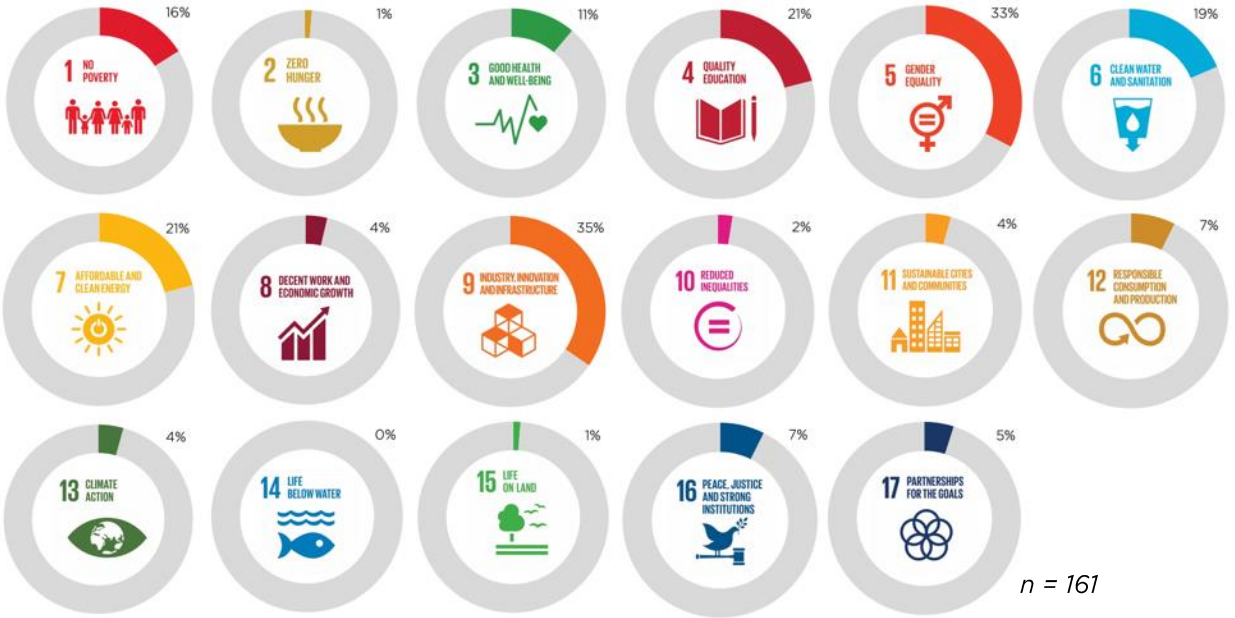
Thriving in the engineering industry as a women without being my capability being questioned	43%
Lack of job opportunities in the country	9%
Lack of practical skills that might make us less valuable in the job market	7%
No access to the latest technology in the country	7%
Lack of resources to improve practical skills in the field	5%

Zimbabwe

Application Insights

Sustainable Development Goals

Tertiary level female engineering students were asked about the Sustainable Development Goals (SDGs) and "Which of the 17 Goals do you intend working on?" Respondents were allowed to provide a maximum of three (3) goals that were considered important to them. The top three (3) SDGs that tertiary level female engineering students in Zimbabwe are most invested in are : SDG9; SDG5 and SDG4 and SDG7.



n = 161

Top Companies

Fellows were asked "What is the top company you would like to work for?" The top 5 most common mentions have been listed in order.

1	ZIMPLATS Member of the Implats Group	Zimplats Mining
2	ECONET Wireless	Econet
3	ZPC ZIMBABWE POWER COMPANY (Private) Limited	Zimbabwe Power Company
4	MIMOSA MINING COMPANY (PVT) LTD	Mimosa Mining Company
5	ZERA ZIMBABWE ENERGY REGULATORY AUTHORITY	Zimbabwe Energy Regulatory Authority

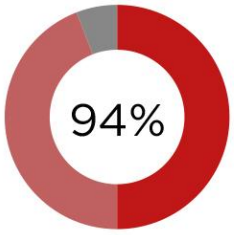
Zimbabwe

Programme Feedback

Outcome Skills Rating

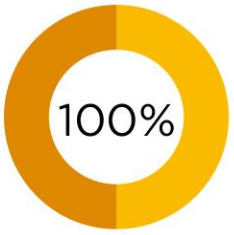
Fellows were asked to rate Fellowship in terms of the skills they developed based on a rating scale where 1 = No impact to 5 = Highly Impactful. The % rating per outcome is based on the % of responses that received a rating of 4 out of 5 or more i.e. considerable to highly impactful. (n=34)

Leadership



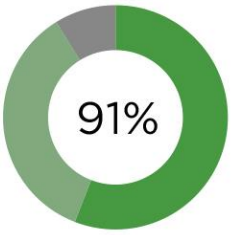
50%	Highly Impactful
44%	Considerable Impact
6%	Neutral
0%	Little Impact
0%	No Impact

Employability



50%	Highly Impactful
50%	Considerable Impact
0%	Neutral
0%	Little Impact
0%	No Impact

Networking



56%	Highly Impactful
35%	Considerable Impact
9%	Neutral
0%	Little Impact
0%	No Impact

Highlights and Lowlights

Fellows were asked to list their highlights and lowlights from their experience of Fellowship. The top 5 most common responses are detailed below, reflecting the total percentage of mentions from Fellows. (n = 34)

Highlights		Lowlights	
Programme session: Mentorship	41%	No lowlights	29%
Innovation challenge	32%	The programme duration was short	18%
Programme session: Networking	21%	Innovation challenge	18%
Programme session: Getting workplace ready	18%	Accommodation and hospitality	9%
Programme session: Communicating with influence	12%	Limited diversity of fields represented by speakers	6%

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