

Women, STEMI and Career Scientist Barbie dolls

In honour of Women's Month, we wanted to look at current statistics and trends regarding African women in science, technology, engineering, maths and innovation (STEMI) – and why a Career Scientist Barbie is a win for everyone.

"The mother stood in front of the long passage at the toy store – the 'pink' one. Yes, the girls' section. She had promised herself that she will not get a princess-themed birthday gift for her special girl. For a second, she thought of herself as a little girl dreaming of what she would be when she grew up. Like most girls, she went through the hairdresser, vet, singer, and ballerina stages. But now, standing in front of all the doll boxes, it made sense why. But then, she saw a doll that hadn't been on the shelves when she was a kid - the Career Scientist Barbie!"

Mattel, Inc., the toy company that manufactures Barbie dolls, has been shaping girls' dreams since the 1950s by reflecting societal changes – or influencing them. After their inclusive *Career series*, which added a Scientist and an Astronaut to the mix for the first time, they also paid tribute to the pandemic heroes, the medical experts.

Such efforts stress the world's need for inclusivity and representation. Mattel Inc. has touched on the important concept of *gender equality*, meaning that access to opportunities and rights is unaffected by gender. Not reaching the target of *gender equality* is recognised as holding back the potential to unlock socio-economic development globally. Although the scientific community has made significant progress in this direction, parity is not yet reached, and there is still a long way to go.

But WHY do we want more women in science?

Studies have shown that a higher share of women in the STEMI (science, technology, engineering, mathematics, innovation) workforce establishes the necessary conditions for fostering innovation, creativity and healthy competition.

Our planet's challenges have become more and more complex, and different perspectives are needed to look for sustainable solutions. In designing these solutions, women's involvement will ensure that distinctive female needs and desires are also considered.

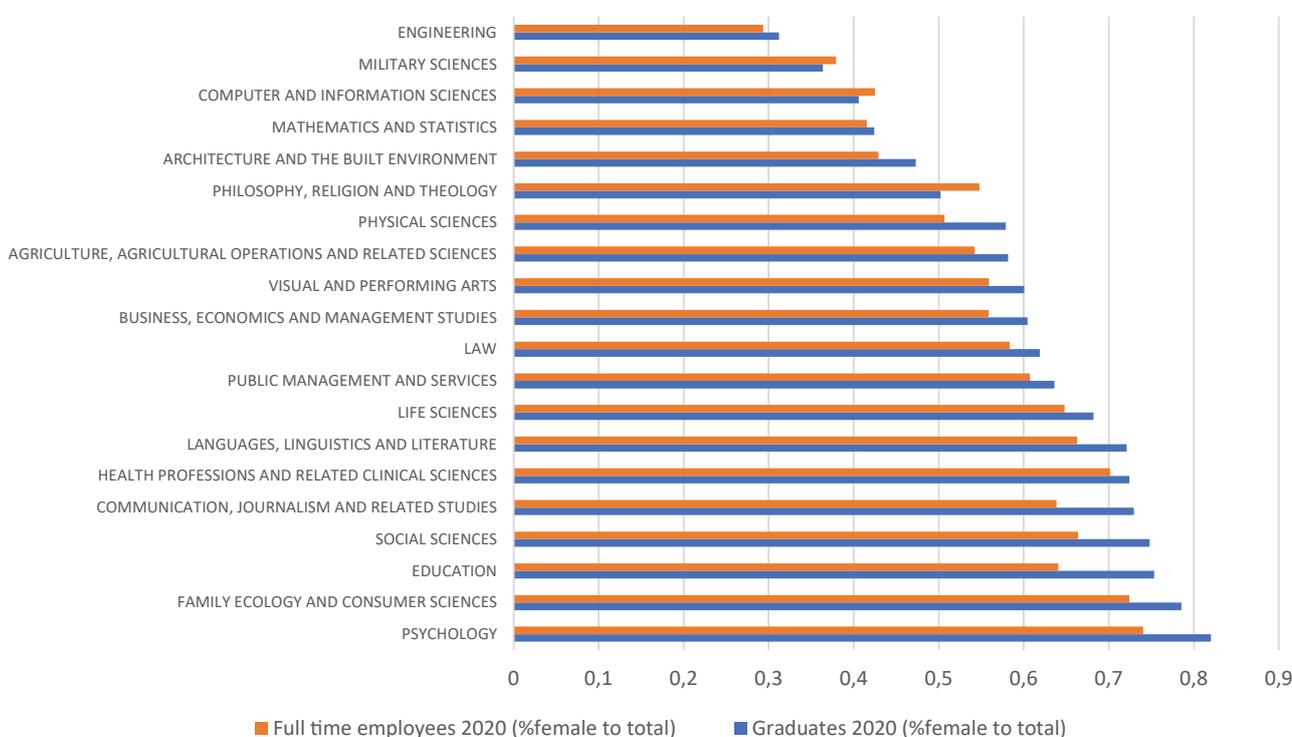
"For instance, a predominantly male group of engineers tailored the first generation of automotive airbags to adult male bodies, resulting in [potentially] avoidable deaths for women and children," according to a 2002 study by researchers of the Massachusetts Institute of Technology (MIT).



Women in STEMI statistics:

<p>About 50% of girls compared to 58% of boys achieve 30% or higher in Mathematics in the National Senior Certification Examination.</p>	<p>Only 6% of all engineers in South Africa today are women.</p>
<p>(https://pmg.org.za/committee-meeting/34342/ and UNESCO Science Report: Towards 2030, 2015)</p>	<p>(Engineering Council of South Africa: https://alltogether.swe.org/2022/02/where-are-south-africas-women-engineers/)</p>
<p>South Africa has 28% of the 32% of women in STEMI careers in Sub-Saharan Africa.</p>	<p>In South Africa, only 13% of graduates leaving tertiary institutions with STEMI subjects are women.</p>
<p>(UNESCO: https://www.iol.co.za/education/sa-narrows-the-gap-of-women-in-stem-careers-ranking-highest-in-sub-saharan-africa-edc9d70b-c5ad-42d7-b86b-b6511a213f1b)</p>	<p>(Tuta-Me: https://www.skillsportal.co.za/content/women-stem-why-it-matters-and-how-improve-status-quo)</p>
<p>Mean years of schooling for girls was 9.66 years – much lower than the 12.15 for boys in 2019.</p>	
<p>(UNESCO dataset)</p>	

Figure 1: The percentage share of women to the total for Full-time employees and Graduates in 2020 for South Africa per field of specialisation. The lowest numbers are observed for STEMI-related fields: Engineering, Computer and Information sciences, Mathematics and Statistics, Architecture and the Built Environment, and Physical sciences.



Source: Directorate: Higher Education Management Information Systems (HEMIS), Department of Higher Education and Training, 2020

The World Economic Forum (WEF) in 2020 expressed an urgent need to increase the supply and visibility of women with technical skills to close the gender gap in future professions.

What is needed to attract girls to science?

- Conducive school environment and support

It is crucial to expose young girls to STEMI activities at school. The school environment is significant to developing girls who can succeed in STEMI subjects. Training,

schooling and support (e.g. tutoring) can promote their skills and confidence in considering a career in science. But that starts with the unbiased provision of information to students: “Girls who took calculus in high school were more than three times as likely as girls who did not take calculus in high school to major in a STEMI field in college,” according to MIT study.

Higher education institutions can influence female students with small changes. For example, broader overviews of the skills requirement and career options **stressing the importance of gender equity can add to**



female retention in scientific fields. The same is possible with the revision and updating of faculty culture to integrate female scientists more efficiently.

- Get rid of stereotyping

Historical stereotypes still remain in today's society: that boys are better than girls in maths and science is the typical one. Even if not explicitly stated by educators and parents, it is usually implicit in how girls are treated or even in the narratives used. Many experiments show that when test administrators tell classes that girls and boys are equally capable in maths, the differences in progress and performance between girls and boys decrease.

The opposite happens when a gender question is asked before a test, making the students focus on gender differences. Another stereotype points to the wrong perception that there are fields for men, such as engineering and natural sciences and for women, such as arts and humanities. Preference aside, the past perception was that the gender concentration in scientific fields was due to differences in physical or mental abilities. "However, recent gains in girls' mathematical achievement demonstrate the importance of culture and learning environments in cultivating abilities and interests," according to the MIT study.

- Inspiring and relatable role models

Exposing girls to successful female role models can help counter negative stereotypes because girls see that people like them can be successful. Girls need to believe that they belong in STEMI careers. According to research, female role-model sessions and mentorship can influence young women's decisions regarding their field of study.

Young women need to relate with their role models, which means women in STEMI carry the responsibility to showcase their struggles and successes, in order to inspire future generations to also do great things for society.

Conclusions

The good news is that many of the key drivers of gender disparities in STEMI are known and solvable. We need to scale up programmes and interventions, such as South Africa's 'Take-a-girl-child to work day'. We need to be gender-responsive from primary school years to ensure learning and skill competency in STEMI subjects are equal for girls and boys. The narratives must change for both girls and boys – the way we use "girl" in phrases needs to be reconsidered: "You scream like a girl" and "you are weak like a girl" needs to be eliminated from our kids' vocabulary because words have power.

The toy industry has gotten the message and keeps passing it on. The next generation needs representation, the next generation needs to dream big dreams, and needs inspiration.

"The mother got the Career Scientist Barbie for her little one, but she was not optimistic about her liking it. It was a different doll to most, not only in the theme but in clothing and body posture, as well... Fast forward a few years, and the little girl still loves that doll!"

It might be slower than we'd like, but the world is nevertheless changing – one doll at a time.

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