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EDUCATION

What if SA is losing its best potential scientists?

EVERY YEAR, South Africa celebrates its top matric achievers. We applaud young innovators at science fairs, honour coding champions and marvel at teenagers who build robots from scrap metal or invent life-saving technologies from their bedrooms.

We tell ourselves that talent is our greatest natural resource. But what if our greatest scientific discovery never happens? What if the engineer who could solve our energy crisis spends his evenings selling fruit at a taxi rank instead of studying mathematics because their family depends on their income? What if the climate scientist who could protect our water security never reaches university because years of load-shedding robbed them of the opportunity to learn?

Perhaps South Africa's greatest loss is not our skills shortage – perhaps it's the scientists, engineers, doctors and innovators we never get to meet.

We celebrate the extraordinary stories of the few who break through. But we rarely ask a more uncomfortable question: how many brilliant young people never even make it to the starting line?

Talent is often described as equally distributed. Opportunity is not. For thousands of South African learners, brilliance is competing against circumstances that have nothing to do with intelligence.

A future marine biologist cannot do their homework after spending hours collecting water, caring for younger siblings or preparing meals while their parents work.

A gifted coder cannot learn programming without reliable internet access or a functioning computer. A future epidemiologist cannot concentrate in class because hunger has become a daily companion. These are not isolated stories. They represent a silent erosion of South Africa's future knowledge economy.

The legacy of prolonged load shedding has left educational scars that extend well beyond blackouts. Years of interrupted learning disproportionately affected learners who don't have access to generators, private tutors, stable internet or quiet study spaces. While affluent households found alternatives, millions of children lost hours of learning every day.

Educational inequality does not end there. There are a number of persistent challenges – firstly, school quality remains one of the strongest predictors of educational success in South Africa. Two learners with identical intelligence can have vastly different futures depending solely on the school they attend, the availability of laboratories, qualified mathematics teachers or functioning libraries.

Then there's geography. For many rural learners, university isn't simply another step in education – it requires leaving behind family support, travelling hundreds of kilometres, finding accommodation and surviving financially in unfamiliar cities. For some, the barriers are simply too great.

Safety is another challenge. Many learners travel dangerous routes to school every day. Some wake before dawn and return after sunset. Others miss classes because gang violence, community unrest or unsafe public transport makes attendance impossible. It's difficult to imagine scientific curiosity flourishing where survival itself becomes the daily priority.

And then there's gender. If South Africa is losing talent generally, it is losing extraordinary scientific potential among young women. Girls continue to navigate barriers that rarely appear in discussions about STEM (science, technology, engineering and mathematics) education.



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Many carry a disproportionate burden of unpaid household responsibilities, spending hours caring for siblings, cooking, cleaning or supporting elderly relatives before they even begin their homework. Others miss school because of inadequate menstrual hygiene facilities or lack of access to sanitary products. Early pregnancy, gender-based violence, child marriage in some communities, harassment during daily commutes and persistent stereotypes about mathematics and engineering continue to narrow pathways into scientific careers.

Even those who excel often face subtle messages that science is not "for girls". The tragedy is not simply that girls are underrepresented in laboratories. It is that South Africa never benefits from the discoveries they might have made. History repeatedly reminds us of what happens when opportunity finally meets talent: Dr Glenda Gray transformed HIV research and public health; Professor Quarraisha Abdool Karim reshaped global HIV prevention; Dr Tebello Nyokong revolutionised photodynamic cancer therapies; Dr Maurine Musie improved maternal and neonatal healthcare by integrating evidence-based medicine with indigenous knowledge; 16-year-old Bohlale Mphahlele developed the Alerting Earpiece device, which is disguised as a stylish earring and has a hidden panic button that silently takes photos of an attacker and sends the live GPS location to trusted contacts and police.

None of these scientists succeeded because talent alone was sufficient – they succeeded because, at critical moments, opportunity existed.

Now imagine the names we will never know: the young woman whose breakthrough could have revolutionised artificial intelligence; the engineer who could have redesigned South Africa's electricity grid; the agricultural researcher who could have developed smart agricultural solutions to help small-scale farmers tackle global warming and climate change.

Their discoveries disappear long before any laboratory experiment begins. By the time universities recruit postgraduate students or research councils award scholarships, the talent pipeline has narrowed dramatically.

Potential has been filtered out – not by merit – but by poverty, inequality and circumstance. South Africa often speaks about the "brain drain" as though our greatest loss occurs when graduates leave for opportunities overseas.

But there's another, quieter brain drain. It happens in classrooms where learners fall behind because of poor hygiene or sanitary conditions; at taxi ranks when transport costs become unaffordable; in homes where gifted children become caregivers instead of students; when hunger replaces concentration; when girls shoulder responsibilities that their brothers never carry – it happens long before anyone earns a degree.

If South Africa truly wants to become a knowledge economy, we need to shift our focus from celebrating exceptional survivors to protecting exceptional potential. That means investing in quality schools, reliable infrastructure, safe public transport, nutrition programmes, digital access, after-school academic support, mentorship and financial assistance that reaches students before they disappear from the education system. It also means removing the barriers that prevent girls from entering and remaining in STEM fields.

The greatest scientific breakthrough our country never celebrates may not be the one that failed in the laboratory – it may be the scientist we failed to protect.

The opinions expressed in this article are solely those of the author and do not necessarily reflect the views of the University of Pretoria. The views expressed do not necessarily reflect the views of The Star or the National Media Group.

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