



The Sustainability of Mining Engineering Education in South Africa



The mining engineering departments at the various South African tertiary institutes are responsible for producing the next generation of tech-savvy mining engineers. It is well known that it is an ongoing battle for these departments to attract top students. The problem is not unique to South Africa, however. *Mining Digital* reported earlier this year that mining is no longer seen as a popular career choice and enrolment in mining engineering courses decreased by 63% in Australia since 2014. The Mining Industry Human Resources Council of Canada found in a survey that 70% of the younger generation said they would not consider a career in mining and this was the highest proportion of all the industries included in the survey. This problem is even more complex in South Africa and addressing it will require a multi-pronged approach.

A major difficulty is that the basic education system is not training enough students in the science, technology, engineering, and mathematics (STEM) subjects. Numbers presented to parliament's Portfolio Committee on Basic Education revealed that enrolment for STEM subjects decreased substantially from 2016 to 2020. During this period, mathematics decreased by 40 385, physical sciences decreased by 18 461 and life sciences decreased by 21 940. It is alarming that the various medical, computer science, engineering and pure science faculties at the tertiary institutes now compete to attract the best from this shrinking pool of STEM matriculants. Mining departments typically fall last in line as the best talent is grabbed by the offerings perceived to be more glamorous by the students. Although exceedingly difficult to implement, STEM subjects should assume a central role in the nation's public and private education system. Diane Sengati from the African Institute of Mathematical Science (AIMS) noted *"Most students don't pursue STEM subjects because they think it is very difficult, but the perceived difficulties root from how they have been taught those subjects. If you teach the subject in a friendlier way, it becomes easier and attracts more students"*. Training the teachers is therefore an important initiative for AIMS and it should be aggressively pursued by the government. James Lees of the *Mail & Guardian* wrote that the number of schools not offering science subjects increased from 512 in 2013 to 781 in 2021. This trend must be reversed to increase the pool of young talent.

The mining industry can also assist in making mining studies a more attractive option for students. This includes advocating for mining education and the marketing of its importance in schools and universities. Mining can improve its image and make itself a more desirable choice for students by focusing on the adoption of advanced mining equipment and technologies. Of concern is that the number of bursaries awarded by some mining groups has decreased in recent years. Approximately only 30% of the final year class at our university is currently studying with a bursary and this trend must be reversed.

The third aspect affecting the sustainability of mining departments is the sourcing of skilled staff. The requirements to fill lecturing positions at the universities are perhaps unnecessarily strict, and typically a PhD degree is a minimum requirement for a senior lecturer position. Sourcing mining graduates with a PhD, some teaching experience and a good publications record is exceedingly difficult. Finding a suitable professor candidate is the proverbial hen's teeth. The universities need to be more innovative in this regard and career paths need to be more flexible. The development of younger staff into these roles is becoming more important. Industry can play a supportive role and aspects, such as secondments to industry for practical experience, can be of great assistance. Appointment of senior industry staff in part-time 'extraordinary' lecturer and professor positions has also been successfully used in the past and this should be supported by both industry and the tertiary institutes.

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