

Mining schools in South Africa have taken advantage of the global slowdown to significantly roll back skills shortages in the mineral sector, but academia and business need to boost their educational partnerships to avoid being caught short by the next recovery.

The output of graduates in mineral-related disciplines rose substantially in recent years – driven in part by increased involvement of the private sector in university course offerings. The Mining Qualifications Authority reported in 2011, for instance, that graduations in chemical engineering had risen 13.5 per cent annually, followed by geology at 13.3 per cent, metallurgical engineering at 12.9 per cent, mechanical engineering at 9.9 per cent, and electrical engineering at 7.8 per cent. While this is by no means enough to eradicate the shortages our industry faces, it is an encouraging trend that demonstrates what can be achieved by effective partnerships.

Each of the four mining universities in South Africa – Wits University, the University of Pretoria, the University of Johannesburg, and the University of South Africa – have forged links with companies, parastatals, and government departments to improve their outputs. The Wits School of Mining Engineering worked with corporate donors to initiate a staff development scholarship, with private sector donors to increase the number of fully-funded students, and with government to secure bursaries for first-year students. The Wits Mining Advisory Council, active now for over three years, helps keep programmes relevant to academic, professional, and industry needs.

One key challenge has been the growth of the School's undergraduate student body from 268 in 2005 to 531 in 2012. This year has seen over 300 first-year students enrolling – the largest ever intake at the School. This growth is not sustainable unless it is matched by a growth in resources. Effective partnerships are important in this regard. Indeed, these partnerships are vital in ensuring that a progressively higher percentage of the total intake will complete their studies successfully. The universities are of course aiming not just for higher intakes, but for more graduations at the end of each year. However, greater numbers of students enrolling for a degree is no guarantee of higher output of graduates; the larger classes may in fact even undermine the pass rate if the necessary resources are not appropriately applied.

Skills shortages have a negative impact on the mining industry, including the following:

- Safety is compromised when competencies are low
- It is difficult to develop new projects – the lifeblood of the sector's future
- Projects that do go ahead are often over budget and behind schedule – leading to further costs in litigation and earnings losses
- Productivity and profitability suffer if operations are not satisfactory
- More strain is placed on the workforce, resulting in higher wage demands.

While the pool of mining engineers will generally stay within the mining industry, there is also strong demand for other minerals-related skills (in the disciplines of geology, chemical engineering, and metallurgy, for instance) from many other non-mining sectors of the economy. If the location, conditions, and pay scales in these sectors are better, then mining stands to lose the graduates it has supported.

There is, therefore, a possibly more pressing need for specialized skills in such fields as ventilation, rock engineering, mine planning, mineral resource evaluation, and mineral asset

valuation. It is in these essential areas that chronic shortages continue to hamper the development of the industry and may well frustrate its ambitions to be safe, healthy, and profitable into the future.

The progress made by universities in preparing more graduates each year can be measured in more than just numbers, however. The gender and racial transformation of the graduate body has also been overwhelmingly positive.

The demographics of graduating mining engineers have changed dramatically – while the first black student registered for mining at Wits only in 1983, the student body has today become almost entirely black. The percentage of women in the mining school has also increased drastically, exceeding 30 per cent in 2010.