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**Keeping geosciences curricula at the tertiary level relevant - a South African example, School of Geosciences, University of the Witwatersrand
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The South African economy has historically been linked to mining and mineral resources. This is especially true in Gauteng, the home of the University of the Witwatersrand (WITS), which continues to produce most of the graduates for this industry. Over the past years, however, the state system of education has gone through a period of dysfunction that it is struggling to rectify [1], several changes to government policy have been implemented affecting the “size and shape” of student bodies, and fluctuations in the economy have impacted on the ability of the mining sector to support and absorb geoscience graduates.

These challenges have resulted in the School of Geosciences critically evaluating the courses taught at all levels. In the eighties, class sizes were smaller and less diverse and changes to the curriculum involved “flipping the course content” in some courses (macro-scale to micro-scale (rocks before crystallography), instead of the other way round. In the nineties, universities had to address issues around access, increasing access to previously disadvantaged population groups which resulted in increases in class size, changes in the demography of students and the necessity for bridging programmes and integrated tutorial systems. The 2000s saw a restructuring of courses, scheduling perceived cognitively less demanding concepts (e.g. stratigraphy) into second year and the more cognitively demanding concepts into third year (e.g. structural geology). These changes were made in anticipation of the introduction of the National Senior Certificate (NSC). The NSC meant that students from all provinces from 2008 onwards would write the same NSC examinations and therefore receive the same school leaving certificate. This had direct implications regarding the number of school leavers who would potentially qualify for university entrance, supposedly levelling the playing fields. Concurrent with the introduction of the NSC, legislation was passed requiring the private sector to contribute to Social Corporate Investment programmes designed to support the preparation of NSC students for University entrance. In 2012 the School of Geosciences, in consultation with the mining sector, introduced stand-alone, integrated mapwork courses at both 2nd and 3rd year, designed to enhance subject specific skills development and field competence. More recently (2014), publication of a research report [2, 3] commissioned by a major mining company, revealed that skills required by industry (e.g. “art of negotiation”) do not necessarily match what is being developed in university courses offered. Also, Government has implemented the Higher Education Qualification Sub-Framework (HEQSF) Alignment which requires all universities to introduce a third major at 2nd year level.

WITS School of Geosciences embarked on a major curriculum restructuring programme to address both the need for enhanced “soft skills” development as well as additional subject specific skills development (e.g. introducing a geochemistry course specifically designed to develop analytical and interpretive tools), streamlining and reorganising all courses so that students will, from 2017 onwards, be able to complete 2 full majors in Geology (Geology and Applied Geology) together with one other major at 2nd year. This presentation includes a discussion on the processes followed by the School, the streamlining strategy, the re-evaluation of skills development within courses, as well as a renewed focus on Applied Geology.

References:

- [1] Maphai, V. (2014): Key note address at the SA Mining and Education Stakeholder Conference, 23rd May, Wits School of Governance, Parktown, Johannesburg.
- [2] Besharati, N. (2014): The impact of mining operations, corporate social initiatives, school interventions and other social-economic factors on education outcomes in South Africa. Challenges in evaluating development effectiveness

Platinum and Passes: Research Report presented at the SA Mining and Education Stakeholder Conference, 23rd May, Wits School of Governance, Parktown, Johannesburg.

[3] Sideropoulos, E. (2014): Introduction to the SA Mining and Education Stakeholder Conference, 23rd May, Wits School of Governance, Parktown, Johannesburg.

