

# Mathematicians aim to secure the next generation

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A new institute aspires to become a continental centre for mathematics teaching, starting with an advanced diploma course for graduates. It has the potential to address some of the existing problems in mathematics education at school level.

THE AFRICAN INSTITUTE FOR MATHEMATICAL SCIENCES (AIMS) opened its doors in September to its first intake of 29 advanced diploma students from across Africa. The institute is the brainchild of Cambridge cosmologist Neil Turok, who persuaded his father — ANC MP Ben Turok — to donate the hotel in the slightly run-down Cape Town seaside suburb of Muizenberg in which it is housed.

A joint venture between the universities of Oxford and Cambridge, and the three local universities of Cape Town, Stellenbosch and the Western Cape, the idea is to create a continental centre for mathematics teaching at primary, secondary and tertiary levels. But the starting point is an advanced diploma course, which will have two intakes per year: one in February, coinciding with the academic year in southern African universities; and one in September, coinciding with that in most other African, European and North American universities.

The curriculum comprises a series of short modular courses — between four and eight weeks long — on different aspects of mathematics, which will be given by lecturers from around the world. Already more than a hundred potential lecturers have indicated that they are prepared to donate their time in exchange for free board and lodging at the institute, and a dose of southern sea and sun. There is a heavy emphasis on applied, rather than pure mathematics, including topics such as epidemiology, computer-aided drug design, biomechanics and fluid mechanics.

Why choose mathematics over other science subjects? The answer is that not only does it underpin most science, but mathematics has the added advantage of being cheap to teach. The only essential requirements, pointed out director-general in the Department of Science and

Technology, Rob Adam, at the launch, are a pencil, paper and waste-paper basket. And nowadays, perhaps one might add a PC or two.

A diploma is being offered, rather than a master's degree, as the latter has a statutory requirement that at least fifty per cent of its content should comprise a thesis. But the aim of the diploma is to prepare students for entry into doctoral programmes at good-quality universities, either here or abroad. Many African universities emphasize formal learning-dominated approaches — rather than problem-solving ones — and the aim is thus to bridge the gap between undergraduate courses and doctoral entry. Alternatively, diploma graduates can employ their mathematical skills by entering the market place directly.

Students will not only study, but be provided with board and lodging free-of-charge. Estimated annual running costs are between R3 million and R4 million, and are being covered by sponsorship by several corporations, as well as the Department of Science and Technology. The challenge will be to try and ensure that graduates ultimately use their newly acquired skills on the African continent, not as a ticket to emigrate to countries that are not so critically short of expertise.

But perhaps even more important is the institute's potential to address some of the existing problems in mathematics education at the school level. From July next year, AIMS will offer upgrading courses to mathematics teachers — both at primary and secondary school level — who may themselves lack formal mathematics training at tertiary level. Many such upgrading programmes are already offered in South Africa, but the emphasis at AIMS will be different, according to Toni Beardon, who will be responsible for implementing the courses. 'Instead of instructing teachers in the contents of the syllabi that they in turn are required to teach,' she says, 'we shall aim to provide

them with the background and ongoing support that they need to feel empowered to teach pupils how to solve problems.'

This ongoing support will be provided in the form of distance learning. Much material which has already been prepared for the Millennium Maths Project — to which the project is linked — is being transcribed onto compact discs for this purpose, as many school classrooms in Africa lack Internet access.

The timing of the launch was perspicacious, as it represents a tangible illustration of the ideals of the much-vaunted New Partnership for Africa's Development (NEPAD). Several speakers, including Minister of Education Kader Asmal, wasted no time in drawing the connection with the fact that it coincided with the fiftieth anniversary of Hendrik Verwoerd's most infamous remark — made at the passing of the Bantu Education Act in 1953 — that mathematics was an unsuitable subject for 'Bantu' children.

This legacy has led to the situation in which we now find ourselves, in which only 4800 African pupils achieved a higher grade pass in mathematics in the senior certificate school-leaving examinations last year<sup>1</sup>. Many examination candidates do not even have the opportunity to take mathematics or physical science, because their schools do not have the staff who can offer these subjects; many others fail because their teachers are poorly qualified. The requirement for higher grade mathematics has led to a bottleneck at university entrance in degree programmes in science, medicine, engineering, and even commerce.

No-one at the launch, of course, dared mention our government's own complicity in this appalling state of affairs: their first initiative after entering office in 1994, was to offer lucrative severance packages to teachers, resulting in the loss to the education sector of many of the few qualified maths and science teachers we had. Asmal's recent announcement that he intends to try and recruit these teachers back into the system is welcome, as is his re-establishment of undergraduate bursaries for potential teachers.

He will need to do more, particularly in terms of providing financial incentives for recruiting maths and science graduates into the school system, and retaining their services. But almost a decade into our new democracy, it seems as if the legacy of the last half-century is at last beginning to be reversed. □

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<sup>1</sup>Kahn M. J. (in press). For whom the school bell tolls: African performance in school science and mathematics. *Perspectives in Education* 21, No. 4.