

By Invitation

## HOW TO FIX MATHS AND SCIENCE

Michael Kahn



The deputy president said it, the minister of finance said it repeatedly: school science and mathematics are in crisis. So why the present concern? The simple answer is that failures in these subjects at school, and the general skills hiatus, are now perceived to make 6% economic growth an elusive target.

The best outcome of this concern would be concerted action to address a crisis that has been decades in the making.

Higher-grade maths is the bottleneck for aspiring engineers, scientists, accountants, actuaries and senior science and mathematics teachers. (See table.)

Row one indicates that the number of Senior Certificate candidates fell from 1997 to 2003, and then increased. Row two shows that the number of those opting for maths on higher grade fell between 1997 and 2000. Row three reveals the number of passes hovering around 20 000, or 5% of the Senior Certificate entry (row five). Reduced maths HG entry goes with an increased pass rate (row four).

Prior to 2002, the race of candidates was not recorded, so for 1999-2001 we identified African candidates by using African language as a proxy. This was more than 90% accurate.

About 20 000 Africans take maths HG (row six). Rows seven and eight show that African learners' maths HG passes are disproportionately low in relation to the overall rate. But their number of passes has more than doubled over five years and their pass rate has tripled.

Other research shows that the

duces about 20 000 maths HG passes a year and is running close to capacity.

In 1995 the national audit of science and maths teachers showed shortfalls of 6 000 in each subject. Then came fiscal discipline, the voluntary severance package and the restructuring of teacher education. At the point when every able teacher was needed to build the new, nonracial education system, some of the best left or were pushed out as *makwerekwere* (foreigners).

If there is a political consensus that intervention is required, solutions become possible: but unions and education, treasury and immigration officials must all agree on this.

It all comes down to the three Rs: recruit, retain, and retain. "Recruit" means making the profession attractive to novices. Bursaries and scholarships must be provided; schools of education must be supported; new blood must be attracted to the schools. In the short term (five to 10 years) we must recruit from wherever we can, as the rest of the world does. Demonstrated competence and communication skills must be insisted upon.

"Retrain" means identifying teachers who wish to switch from teaching the humanities to teaching maths or science.

"Retain" means that teachers must feel a sense of belonging and pride in their work. The necessary workspace and equipment must be available.

Get these three Rs right, and the other three will follow. ■

NUMBERS 112

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... are learning at independent schools, former Model C schools or top-end schools that fell under the former houses of Representatives or Delegates. These learners perform on a par with those of other races.

These are the facts, driven by the chalkboard reality of too few competent teachers. The system pro-

Year	1997	1998	1999	2000	2001	2002	2003	2004
1. Senior Certificate entry	659 000	552 000	511 000	489 500	449 400	443 800	440 300	471 100
2. Matric higher grade (MAG)	66 500	60 800	50 100	38 500	34 900	35 600	36 400	39 400
3. Pass	22 800	20 900	19 900	19 300	19 500	20 500	23 400	24 100
4. Pass %	33,9	33,7	39,7	50,1	55,9	57,7	66,1	61,2
5. Pass/60 entry %	4,1	3,7	3,9	3,9	4,3	4,6	5,3	5,1
6. Enter	no data	no data	24 500	20 200	13 800	14 600	16 700	20 900
7. Pass	no data	no data	2 900	3 100	2 700	3 690	4 700	7 800
8. Pass %	no data	no data	11,8	15,3	19,6	22,9	28,1	38,4

Source: ANTIPOOR, BASED ON DATA SUPPLIED BY THE DEPARTMENT OF EDUCATION.