

# **Widening access to a South African university: an approach used to redress inequality of the past education system**

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## **SUMMARY**

South Africa suffers the effects of a highly discriminatory educational system of the past when a large percentage of the educational budget was spent on a small portion of the population. The country's need for qualified people in the fields of science and technology is vast. There is no time to wait for natural correction. Students admitted to university from disadvantaged backgrounds have little chance of success. This causes understandable resentment, wasting time, effort and money. In 1991 Wits University set up the College of Science to provide basic training in Mathematics, Physical, Life and Earth Sciences for students with poor school marks but potential to succeed at university. Students not meeting Science Faculty criteria are given special entrance tests. Those judged to have potential are admitted to a two year course in the College of Science. Students passing these two years are admitted to the second year of the B Sc. degree. Our experience with this special programme suggests that the following are satisfactory methods for this category of learners for the future; extended time to learn biological content integrated with skills, reduced lecturing time, more small group tutorials. The Biological Sciences results have been encouraging. Students who would not have been admitted to university have graduated with B Sc., B Sc. Honours, M Sc. and Ph. D degrees.

**KEY WORDS** widening access; integration of skills and content; disadvantaged

South Africa today suffers from the results of a highly discriminatory educational system of the past where a large percentage of the educational budget was spent on a small and select portion of the population. One of the major promises of the new government elected in South Africa in 1994 was to bring better education to all the people of the country. Unfortunately, when the new government came to power there was no shadow education programme ready for implementation and the system in place has many shortcomings. The problems requiring attention are vast and it will take considerable time to turn education around. The inherent discipline and collective will required to make the education system work has vanished in some schools. This is a legacy from the time when students of schools, colleges and universities were political activists and lead the struggle against apartheid. These institutions were a focus of discontent, and anarchy became the accepted norm.

In South Africa the majority of disciplines at most universities and colleges have used the regionally organised school leaving examinations as an indicator of student potential. These results have therefore been used as a criterion of excellence for admission to tertiary education (university exemption). It has become apparent over the years that this examination system is a poor indicator of educational potential, particularly among weaker students. To date no alternatives have been put in place. Analysis of the results of these examinations also gives cause for concern. The overall trend is a reduction in number of students passing the examination and a steady and worrying decline in the number obtaining university exemption (Table 1).

**Table 1. COMPARISON OF SCHOOL LEAVING EXAMINATION RESULTS<sup>1 2 3</sup>**

Year	Number writing examination	Number passing examination	University entrance	% pass
1994	495 408	287 343	88 497	18
1995	531 453	283 742	78 821	15
1996	518 032	278 958	79 768	15
1997	555 267	261 400	69 007	12
1998	553 151	279 986	71 808	13
1999	511 159	249 831	63 725	12

What is of even greater concern are the numbers of students who choose to write science subjects and the very low numbers that succeed in passing. These are the people who will continue in science and technology, including engineering and medicine. Relatively large numbers write Biology but the pass rate is in the region of 40%. Fewer students (less than a quarter) attempt Mathematics and the pass rate just over 20% and even fewer attempt Physics and Chemistry (grouped as Physical Sciences) and the pass rate in most years is below 20% (Table 2). This means that the overall scientific training in the school leaving population is very limited and this is cause for concern. School places are limited and failures are seldom allowed to repeat their final year. Those that are allowed to rewrite have a poor record of success. This means that student aspirations to continue with any form of tertiary education are defeated at school level.

<sup>1</sup> Monica Bot, *An analysis of the 1999 Senior Certificate examination results* to be published. Johannesburg, Education Foundation, 1999.

<sup>2</sup> Jennifer Shindler and Monica Bot, "An analysis of the 1997 Standard 10 examination results" in *Edusource Data News*, No.20, Johannesburg, Education Foundation, 1997.

<sup>3</sup> Jennifer Shindler and Monica Bot, "An analysis of the 1997 Standard 10 examination results" in *Edusource Data News*, No.24, Johannesburg, Education Foundation,

**Table 2. COMPARISON OF STUDENTS PASSING SCIENCE SUBJECTS<sup>1 2 3</sup>**

Year	Mathematics	% pass rate	Biology	% pass rate	Physics & Chemistry	% pass rate
1997	102 472	20	219 124	42	81 031	16
1998	117 827	21	245 406	44	103 081	19
1999	122 225	24	202 583	40	102 896	20

The country's need for qualified people is vast and there is no time to wait for a natural correction, particularly in the fields of science and technology, while the education system is improved. Students admitted to university from disadvantaged backgrounds have little chance of succeeding and this causes understandable resentment and wastes time, effort and money.

How can this problem be addressed effectively?

There is a basic assumption by tertiary education institutions in South Africa that potential to succeed in science and biology exists in at least some students who perform poorly in school leaving exams. How can this potential be unlocked? Around the country our education providers have various academic support programmes in place to deal with the problem. They can be classified as follows.

- Foundation Year  
Here all students in need of academic support are given an introductory year before starting their tertiary education.
- Extended Programme  
Here the students are registered for their chosen qualification but allowed to carry a reduced course load per year and therefore take longer to complete their studies.
- Academic Support Programme  
Students register for their chosen qualification but attend additional tutorials to address learning problems.

These efforts have met with varying success around the country. The University of the Witwatersrand has been concerned about this problem since 1970 and our efforts at academic support have evolved through each of the above programmes in turn.

In 1991, the Faculty of Science at Wits University as a group, analysed the strengths and weaknesses of the above models, and decided to set up the College of Science to provide basic training in Maths, Physical, Life and Earth Sciences for students with poor school marks but potential to succeed at university.

The College is a virtual structure with a small central administration co-ordinating a teaching staff appointed to the college but housed in the academic departments. Five members of staff, Dr D. Mycock, Ms G. Carter, Ms G. Cron, Ms D. Osberg, Ms C. Still form the Biological Sciences team that is housed in the Department of Animal Plant and Environmental Sciences.

Students who do not meet the Science Faculty entrance criteria are given special entrance tests and those judged to have potential are admitted to a two year course in the College of Science where they study basic science subjects, Mathematics, Physical Science and Biological Science or Earth Science. Students who successfully pass these two years are deemed to have the necessary skills and knowledge to allow them to cope with the second year of a normal degree where they follow their subject of choice.

Special feature of the College programme include:

- extended time to learn biological content integrated with skills,
- reduced lecturing time,

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- more small group tutorials.
- specifically rewards skills development

The system has now been in place for ten years and we feel that it is very successful. The results have been encouraging, particularly in the Biological Sciences. Students who would not have been admitted to the Science Faculty under normal conditions have graduated with B Sc., B Sc. Honours and M Sc. & Ph. D degrees (Table 3).

Particular effort has been put into developing skills training in the context of biological content. A manual with the series of exercises used has been published.<sup>4</sup> This set of tutorials incorporates both practical and intellectual skills in a graded series of exercises. It covers subjects such as biological classification, hierarchical organisation, use of the microscope, measurement and scale, 2 and 3D perception as well as note-taking and other writing skills. We have had notable success with improving writing and communication skills. These have been noted particularly by external examiners.

**Table 3. SCIENCE GRADUATES FROM STUDENTS ENTERING COLLEGE 1991-1996** <sup>5</sup>

Yr. of intake		B.Sc							Hons	MSc/PhD
	Total	1994	1995	1996	1997	1998	1999	Total		
1991	141	23	21	11	1	1		57	24	6
1992	149		22	21	9	2		55	16	8
1993	134			17	16	6	6	45	17	6
1994	105				25	17	9	51	7	1
1995	128					15	14	29	10	
1996	142						8	8		
<b>Total</b>	<b>799</b>	<b>23</b>	<b>43</b>	<b>49</b>	<b>51</b>	<b>41</b>	<b>37</b>	<b>245</b>	<b>74</b>	<b>21</b>
*			2	8	3		6	19	9	

\* = students graduating from other faculties

Hons = B Sc (Honours)

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Students in the past felt that they were being discriminated against when it was suggested they join the programmes listed above. Students currently registered have a very positive attitude to the College of Science. This is a direct reflection of the very professional attitude that staff bring to their teaching duties. There is none of the “add on” approach that characterised our earlier efforts at providing academic support.

The college staff work closely with mainstream course teachers so that the courses are equivalent. One of the major benefits of the whole exercise is that the creative teaching methods developed by the College staff feed back into mainstream teaching. We have also had to rethink what students should learn and how they should be assessed.

<sup>4</sup> Deborah Osberg, *College of Science Biology Skills*. Johannesburg, Witwatersrand University Press, 1998.

<sup>5</sup> Marissa Rollnick, *College of Science Annual Report*, Johannesburg, University of the Witwatersrand, 1999.

The development of the College of Science is not without problems. Because of the very high staff to student ratio the running costs are very high. This also means there are limited possibilities for adoption in a country where funding for education is relatively limited. One way to try and overcome this is to implement a distance learning programme. Plans for this are already in place.

What are the possibilities for the future? This is meeting to examine the way forward for biological education in the new century. Our present experience convinces us that the combination of skills teaching with content is particularly effective in present situation in the South African context and would probably suit other countries facing similar education problems. It is probably inappropriate in more developed countries where the education levels are much higher and school teaching is more effective. The presentation of a graded learning programme and increased staff student ratio is a sure way to improve student learning.