

3. WHAT IS THE HIGHER EDUCATION SECTOR ACHIEVING? KEY PATTERNS IN GRADUATE OUTPUT

3.1 BACKGROUND

There have been some major achievements in the higher education sector since the political transition. There has been extensive and widely commended policy development, aimed not only at undoing the network of apartheid legislation but also at positioning the sector in relation to international trends. The policy development has not been uncontroversial, with criticism including argument that there has been an absence of 'clear direction and ... a major policy-driver' (Cloete and Bunting 2000:79). However, a central achievement is that a single system has been established out of the fragmented and often dysfunctional previous dispensation. There has also been substantial growth in overall numbers as well as widening of access, with black enrolment having doubled since 1993, reaching 60% as early as 2000 (CHE 2004: 64-71).

However, given the high stakes involved in higher education's contribution to development, it is essential to focus on the collective outcomes of the sector, to assess the extent to which they are meeting key needs. This section provides a quantitative analysis of some key aspects of current undergraduate performance, with particular reference to graduate output. The primary purpose is not to offer a comprehensive critique of the sector but rather to identify performance patterns that may point to underlying obstacles in the system, indicate priority areas for improvement, and provide a basis for developing strategies that can make a substantial difference to outcomes.

Undergraduate cohort studies – that is, the tracking and analysis of the performance of specific student intakes through to completion or termination of their undergraduate studies – are used as the basis of the analysis since longitudinal data of this kind offer the most comprehensive and reliable means of identifying performance patterns. A disadvantage of cohort studies is time lag, but institutional experience indicates that the patterns are broadly persistent.

National cohort data have only recently become available, in the form of studies of the 2000 and 2001 intakes of first-time entering undergraduate students conducted by the DoE. The performance of the 2000 cohort has been tracked for five years, while four years of data are available for the 2001 cohort thus far. The analysis in this paper is derived from data produced in these studies, and we are indebted to the Department for their pioneering work as well as their co-operation in providing the data for further analysis.

Cohort studies of the whole first-time entering intake at national and institutional level, as produced by the DoE, provide an overview of performance. However, disaggregating the data – by race, qualification type, subject classification (CESM¹) and other relevant categories – is key to identifying patterns that cast light on underlying problems and hence challenges for improvement. In our experience, an important analytical category is the qualification (e.g. BSc, BCom), and in some cases

¹ CESM stands for Classification of Educational Subject Matter, a term used in the Higher Education Management Information System.

specific programmes within the qualification (e.g. BSc in Computer Science). At present, however, national data on individual qualifications can only be constructed through aggregating programme codes that are specific to each institution, and are not yet available. The detailed analysis in this paper thus focuses on first-order CESMs.² The CESMs used have been selected on the basis of enrolment size and the significance or illustrative value of the disciplines they cover.

To put the performance patterns into perspective, some implications of South Africa's higher education participation rates should be taken into account first, as outlined below.

3.2 PARTICIPATION RATES AND THEIR IMPLICATIONS

Rates of participation in higher education are a relatively crude measure, and international comparisons are difficult because what counts as higher education can differ considerably from context to context. They also do not in themselves say anything about how successful a system is in facilitating student learning and producing good graduates in sufficient numbers. However, it is widely accepted that participation rates are important, and relationships have been found between levels of participation and of economic development (see for example DoE 2001:2.2; Sadlak 1998). Participation rates inform government higher education policy in various contexts.

A measure that is commonly used is the gross participation rate – that is, the total higher education enrolment (of all ages) expressed as a percentage of the 20-24 age group. In terms of this measure, South Africa's participation rates are low. At the time of the NPHE (2001), South Africa's overall participation rate was estimated at 15%, while the benchmark for countries at a comparable level of economic development was 20%. The NPHE thus set a target of '20% of the age group 20-24 in public higher education ... over the next 10-15 years' (DoE 2001:2.2). Recent calculations based on 2005 HEMIS data and population estimates indicate that the overall participation rate has thus far grown only marginally, to just under 16%.

More disturbing are the major discrepancies between the participation rates of the main population groups in South Africa, which are striking despite the widening of access since 1994. The calculations referred to above indicate that the rates are approximately as follows:

Gross participation rates: Total enrolment in 2005 as percentage of 20-24 age-group	
Overall	16%
White	60%
Indian	51%
Coloured	12%
Black	12%

These discrepancies are exacerbated by disproportionately low enrolment of black people (and in some cases women) in key SET, professional and graduate programmes, which is both a socio-political problem and a major contributor to the skills shortages in these areas that have been identified by government and the private sector (for example in the NPHE and Jipsa).

2 A brief account of the methodology used in this analysis and of the limitations of using CESMs, particularly in their current configuration, is given in Appendix I.

The participation rates have major implications for the higher education sector. First, while there is a body of opinion in the academic community that a significant proportion of the intake are not fit to be in higher education, the low participation rates make it clear that, in the interests of development, the sector must be able to accommodate at least the students who are currently gaining access.³ This is particularly true of the black and coloured intakes: the great majority of the current students in these categories are in the top decile of their group in terms of achieved performance in prior learning. In fact – given that the participation is expressed as gross rates and includes appreciable numbers of mature students – well under 12% of the black and coloured 20-24 age groups are participating in higher education. It must be a cause of concern, for political, social and economic reasons, if the sector is not able to accommodate a higher and more equitable proportion of the majority population group.

Second, while the DoE may not at present regard overall expansion of enrolment as a priority, growth in participation in the ‘science and economic-based fields’ is seen as essential for meeting national needs. If such growth is to occur, a significant number of students who are not currently gaining access to programmes in these areas (particularly black students, who are most seriously under-represented) will need to be successfully accommodated. Increasing the intake into these fields will be a particular challenge because of the persistently low levels of school performance in mathematics and science in South Africa, as discussed in section 6.1.1 below.

The overall implication is that the success of the present student intakes, at least, is critical for national development. In the face of this, the view that many current students ‘do not belong in higher education’ is not tenable.

Successful higher education planning and provision depend to a large extent on agreement on the size and, as importantly, the profile of the student body that the sector needs to accommodate. In the absence of this, there is no sound basis for determining what kinds and levels of provision should be put in place to meet the real learning needs, and thus realise the potential, of the student intake. In the South African context, recognising the implications of the low and racially skewed participation rates is critical to evaluating the effectiveness of the current system and determining what can be done to improve it. The participation rates therefore form an essential backdrop to the analysis of student performance undertaken in this paper, and will be referred to regularly in the course of it.

The following sections provide an overview of how the higher education sector is performing in its core function of undergraduate education, as reflected in key student performance patterns derived from analysis of the DoE’s cohort studies. The body of the paper uses performance data only for the 2000 cohort. The reasons for this are:

- The 2001 cohort study is not fully sector-wide since data from some institutions have not been available because of merger complications; also, only four years of data are currently available. Therefore, since they are not directly comparable, the two cohort studies cannot be aggregated into a single analysis.

³ The extent of selection that has taken place in relation to the students who currently gain access is illustrated in Section 6.1.1, which shows that only 5% of the cohort entering schooling (Grade 1) in 1995 obtained a Senior Certificate endorsement, the statutory requirement for entry to degree study.

- The patterns in the 2001 study are very similar to those in the 2000 cohort. In the interests of brevity, 2001 data are thus not included in the body of the paper but selected tables are provided in **Appendix 2**.

At the time of writing, studies of later intakes have not been undertaken by the DoE, partly because of data complications arising from the institutional mergers.

3.3 SOME KEY PERFORMANCE PATTERNS IN THE 2000 COHORT

Please note: The pre-merger institutional categories are used at times in this paper because they applied when the 2000 and 2001 cohorts entered the sector. Notwithstanding the changes in the institutional configuration, the sector-wide performance analysis remains valid since the same qualification types are still offered. Thus, depending on the context, ‘technikons’ can be taken as standing for ‘technikon-type programmes’ and so on.

3.3.1 Overall completion rates

The 2000 cohort study conducted by the DoE presents a disturbing overall picture. By the end of 2004 (that is, five years after entering), only 30% of the total first-time entering student intake into the sector had graduated. 56% of the intake had left their original institutions without graduating, and 14% were still in the system. The breakdown by institutional type is as follows:

2000 intake cohort: All first-time entering students

Institutions	Grad within 5 years	Still registered after 5 years	Left without graduating
Universities excluding UNISA ⁴	50%	12%	38%
UNISA	14%	27%	59%
All universities	38%	17%	45%
Technikons excluding TSA	32%	10%	58%
Technikon SA	2%	12%	85%
All technikons	23%	11%	66%
All institutions	30%	14%	56%

The category ‘left without graduating’ refers to students who left their original institution without completing a qualification, as a result of withdrawal, ‘dropout’ or academic exclusion. The DoE emphasises that a significant proportion of the students in this category (estimated at 10% of the university students and 11% of the technikon students) transferred to other institutions. It is not at present possible to track the subsequent performance of these students in order to arrive at a total completion rate for the cohort. If, however, 70% of the transferring students and those still

⁴ Figures for the University of the North (now Limpopo) not available.

registered after five years eventually graduated, the cohort completion rate would reach about 44%. This would mean that the number of students 'lost' to higher education from this cohort would exceed 65,000.

Some disaggregation of these figures provides a more nuanced view, as set out in the tables below.

As would be expected, performance in the distance education institutions is markedly lower than in the contact institutions. For this reason, a number of the tables in this paper exclude figures for UNISA and Technikon SA (TSA), though a caveat about this is discussed later.

Performance in university programmes

The contact universities (that is, excluding UNISA) represented the best-performing section of the sector. Even so, by the end of 2004 only 50% of the 2000 intake had graduated. In individual universities, the attrition after five years ranged widely, from 25% to 64%.⁵

Performance of the cohort in some key CESMs and qualification types illustrates the position in more detail.

The following table covers students entering four-year professional Bachelors degrees (which are commonly highly selective):

Professional first B-degrees, by selected CESM: All first-time entering students excluding UNISA

CESM	Grad within 5 years	Still registered after 5 years
04: Business/Management ⁶	60%	7%
08: Engineering	54%	19%
12: Languages	42%	13%
13: Law	31%	15%

The following table covers three-year degree programmes:

General academic first B-degrees, by selected CESM: All first-time entering students excluding UNISA

CESM	Grad within 5 years	Still registered after 5 years
04: Business/Management	50%	7%
15: Life and Physical Sciences	47%	13%
16: Mathematical Sciences	51%	9%
22: Social Sciences	53%	6%
12: Languages	47%	7%

⁵ Excluding Medunsa, where, partly because of the types of programme offered, 46% of the intake were still registered after five years.

⁶ This category contains significant numbers of students who transferred to and completed three-year degrees within the period, so the completion rate for the qualification type may be somewhat inflated.

If UNISA is included, performance drops somewhat in relation to completion rates and duration of registration, as illustrated in the following table:

General academic first B-degrees, by selected CESM: All first-time entering students including UNISA

CESM	Grad within 5 years	Still registered after 5 years
04: Business/Management	31%	15%
15: Life and Physical Sciences	44%	13%
16: Mathematical Sciences	50%	10%
22: Social Sciences	43%	10%
12: Languages	44%	8%

OBSERVATIONS ON THE GRADUATION DATA FOR UNIVERSITY PROGRAMMES

- Among the key CESMs and qualification types analysed in the contact universities, there are only two cases where the loss from the intake may be less than 40%. The two cases concerned are the highly selective professional Bachelors in Business/Management and Engineering, where under 25% of the graduates after five years were black.
- Assuming that some 70% of the students who change institutions, or are still registered after five years, will eventually graduate, the number of students lost from the 2000 intake into the contact universities, the most selective sub-sector, is estimated at 15,000.
- Since distance education students can be expected to take longer to complete programmes, it is reasonable to show contact institution figures separately for measures involving duration of studies (as in the tables above). It is nevertheless important not to exclude the distance education institutions from any assessment of the overall output performance of the sector since these institutions (now the merged UNISA) have large enrolments and thus account for a substantial proportion of the participation rate. (In the 2000 cohort, UNISA and Technikon SA students made up 32% of the total first-time entering intake.) Particularly since participation rates are low overall, the performance of distance education students is critical to the graduate output of the sector as a whole.

Performance in technikon programmes

The performance of the 2000 technikon cohort was notably lower than that of the university intake. By 2004 66% of the technikon intake had left or transferred without graduating, and 23% had graduated. If Technikon SA is excluded as being a special case, completion after five years rises to 32%, with 10% still studying. In individual contact technikons, the attrition after five years ranged from 44% to 72%, so was high across the board.

The following tables cover students entering three-year national diploma programmes:

National diplomas, by selected CESM: All first-time entering students excluding Technikon SA

CESM	Grad within 5 years	Still registered after 5 years
o4: Business/Management	33%	8%
o6: Computer Science	34%	11%
o8: Engineering	17%	14%
21: Social Services/Public Administration	29%	6%

National diplomas, by selected CESM: All first-time entering students including Technikon SA

CESM	Grad within 5 years	Still registered after 5 years
o4: Business/Management	21%	7%
o6: Computer Science	23%	9%
o8: Engineering	15%	12%
21: Social Services/Public Administration	12%	8%

OBSERVATIONS ON THE GRADUATION DATA FOR TECHNIKON PROGRAMMES

- Among the key CESMs and qualification types analysed in the contact technikons, there are no cases where the loss from the intake may be less than 50%.
- Assuming that some 70% of the students who change institutions, or are still registered after five years, will eventually graduate, the number of students lost from the 2000 intake into the contact technikons is estimated at 25,000.
- 29% of total first-time entering technikon enrolment in 2000 was in TSA, which had a particularly high attrition rate.
- Students in technikon-type programmes on average have lower levels of school attainment, and the performance of the intake will commonly be attributed to this. However, given that this category comprises a major proportion of the group that should benefit from higher education, performance in this subsector is a particular concern. There are not yet indications of whether the institutional mergers will change this situation.

3.3.2 Equity of outcomes

As articulated in the higher education White Paper (DoE 1997), equity has two essential elements: equity of access and equity of outcomes. Despite substantial growth in black enrolment, there are continuing obstacles to equity of access arising from the relative shortage of qualified black candidates, especially in programme areas that are seen as priorities for economic development (see section 6.1.1 below). It is therefore critical for the sector to create conditions that facilitate the success of the full range of students who do gain entry.

The DoE cohort studies do not disaggregate performance by race, so overall comparisons are not available. However, in our view overall comparisons of this kind are less meaningful than comparisons at the CESM or, ideally, the programme level. This is because it is evident that improvements in representivity in overall enrolment in the sector can mask the persistence of significant racial (and gender) skewing in specific subject areas, particularly in more selective or high-status programmes. A key question is to what extent the sector is progressing towards representivity in graduate output in all the main subject areas and qualification types, in the national interest.

This paper does not attempt to answer this question comprehensively but rather to illustrate key patterns related to equity of outcomes in the selected CESMs, as set out in the tables below.

The following three tables compare black and white completion rates in the universities after five years. In most cases the percentage of black students still registered after five years is higher than that for whites, so it is possible that the gap between the completion rates may ultimately be slightly smaller than that shown here.

Graduation after 5 years in professional first B-degrees, by selected CESM and race: First-time entering students excluding UNISA

CESM	Black	White	Ratio w/b ⁷
04: Business/Management	33%	83%	2.5
08: Engineering	32%	64%	2.0
03: Law	21%	48%	2.3
12: Languages	26%	65%	2.5

Graduation after 5 years in general academic first B-degrees, by selected CESM and race: First-time entering students excluding UNISA

CESM	Black	White	Ratio w/b ⁹
04: Business/Management	33%	72%	2.2
15: Life and Physical Sciences	31%	63%	2.0
16: Mathematical Sciences	35%	63%	1.8
22: Social Sciences	34%	68%	2.0
12: Languages	32%	68%	2.1

The inclusion of UNISA does not make a substantial difference to the white/black five-year completion ratios in the CESMs studied, as illustrated in the following table:

7 This is the ratio between the white and black 5-year completion rates. For example, in Law the white completion rate was 2.3 times higher than the black completion rate.

Graduation after 5 years in general academic first B-degrees, by selected CESM and race: First-time entering students including UNISA

CESM	Black	White	Ratio w/b ⁹
04: Business/Management	22%	43%	2.0
15: Life and Physical Sciences	30%	59%	2.0
16: Mathematical Sciences	33%	62%	1.9
22: Social Sciences	26%	58%	2.2
12: Languages	31%	58%	1.9

These tables do not reflect the relative size of enrolment by race but a brief comment on the relative numbers of graduates is given below.

As shown in the next table, the position in the National Diplomas is again notably different, but see the observations below. (As in the case of the university programmes, inclusion of the distance education data reduces the ratios slightly in some CESMs, but the overall patterning remains.)

Graduation after 5 years in National Diplomas, by selected CESM and race: First-time entering students excluding TSA

CESM	Black	White	Ratio w/b ⁹
04: Business/Management	31%	44%	1.4
06: Computer Science	33%	43%	1.3
08: Engineering	16%	28%	1.8
21: Social Services/Public Administration	29%	23%	0.8

OBSERVATIONS ON EQUITY OF OUTCOMES

- Among the CESMs and qualification types analysed in the contact university programmes, in almost all cases the black completion rate is less than half the white completion rate. This serves to negate gains made in black enrolment: even in the CESMs where black enrolment exceeds white, the absolute number of black graduates is lower than that for whites in all the cases studied. This indicates the significant loss of black students, in particular, in these selective programme areas.
- Among the CESMs analysed in the contact technikon programmes, black and white completion rates are much closer, and the great majority of the enrolment and the graduates here are black. However, completion rates are low across the board, so, since these are areas of large black enrolment, the loss of black students is particularly high.
- The significance of racial disparities in outcomes, together with low black participation, for improving the overall output of the sector is discussed in section 4 below.

3.3.3 Quality and responsiveness

Quantitative analysis, such as is drawn on in this paper, does not in itself say anything about the quality and standards of the provision offered in the sector. Given the historical absence of effective system-wide quality assurance in South Africa, there are concerns, assumptions and prejudices about discrepancies in quality that may or may not be well-founded but nevertheless find expression in, for example, student choice of institution, the acceptance or otherwise of student or credit transfer between institutions, and employer attitudes towards graduate recruitment. It is believed that, as South Africa's quality assurance system matures and a stable qualifications framework is established, greater transparency and objectivity in educational outcomes will be facilitated.

In the meanwhile, various indirect indicators of the quality and appropriateness of provision have to be relied on, such as the international mobility of South African graduates for purposes of work or further study, and feedback from employers and professions. An important indicator that has recently come to the fore is the existence of significant and racially skewed graduate unemployment alongside the widely-reported shortage of high-level skills (see for example Moleke 2005). This suggests a mismatch between the output of the sector and the needs of the economy. It is not clear whether the underlying cause is graduate quality and attributes, lack of responsiveness of programmes to contemporary needs, or the mix or 'shape' of the graduate output, or a combination of such factors. Whatever the causes, they are likely to be related in some way to the factors that underlie the unsatisfactory performance patterns outlined above.

3.4 PERFORMANCE PATTERNS IN THE 2001 COHORT

Detailed analysis of the DoE's data on the 2001 cohort is not offered in this paper for the following reasons:

- As a result of the recent mergers, complete longitudinal performance data from some institutions have not been available for the 2001 intake, so there is not a proper basis for comparison with the 2000 intake.
- There are currently only four years of data on the 2001 intake. While this would allow for some comparison with the 2000 cohort, the high proportion of students still registered after four years means that analysis of completion rates has more limited value.

However, in so far as comparison is meaningful, it is evident that the patterns in the 2001 cohort are similar to those for 2000. Selected tables on the 2001 cohort are provided in **Appendix 2** by way of illustration.