

5. INDICATORS OF THE NEED FOR SYSTEMIC CHANGE

Aspects of the cohort studies and other data provide indicators of systemic faults – that is, aspects or stages of the formal educational process where substantial obstacles to student progression are evident. Interruption of progression may of course arise from students' not surmounting legitimate and necessary hurdles, such as gaining knowledge and skills that are essential for functioning at the next educational level. Since it is accepted, at least in practice, that not everyone will progress through all the educational levels available, 'hurdles' that discriminate fairly between students are built into the educational process, not only for criterion-referenced assessment of attainment but also for regulating the flow of students through the range of educational levels.

What this study is concerned with, however, is systemic faults which represent unnecessary and counter-productive obstacles to student progression. Obstacles of this kind can arise from structures or practices that are embedded in the traditional education system to the extent that their effectiveness, or their suitability for changed circumstances, goes largely unquestioned.

An example of a structural obstacle is lack of effective educational continuity, or articulation, between consecutive educational levels. What constitutes appropriate articulation is a complex and often contested matter. For example, many would accept that moving to a higher educational phase (such as from secondary to tertiary, or undergraduate to postgraduate education) should make significant new intellectual demands on the student. What is contested is the nature and level of the demands – commonly associated with what are regarded as appropriate 'entry standards' or expectations for each major phase.

Effective articulation is not just about aligning formal entry requirements; rather, it is achieved by ensuring appropriate forms and levels of provision at the interface between educational types or phases, and by providing appropriate support for students making the transition. Articulation is thus a critical matter for educational planning as well as theory. To ensure appropriate continuity in the system (and therefore appropriate output in each major phase), provision for articulation must take account of the approximate size and shape of the student body that each major phase needs to be able to accommodate successfully. If there is not sufficient continuity, too few students will successfully make the transition to the higher educational level, with predictable effects on output. It follows that provision for articulation (and related educational structures and approaches) must be aligned with participation and output needs, and changed appropriately if these needs change.

Articulation is one example of a structural aspect of the educational process where unnecessary obstacles to student progression can occur. A range of aspects of educational practice, in teaching and assessment, can have similar effects. Because such obstacles are often embedded in the system, recognising indicators of systemic faults is an important stage in planning for positive change. The following are examples of indicators that can be identified in quantitative data analysis, as pointers to key areas for qualitative research and developmental action.

5.1 SHORTAGE OF QUALIFIED ENTRANTS IN KEY SUBJECT AREAS

As discussed earlier, while it is recognised that detailed forecasts of specific occupational requirements are not possible in contemporary conditions, there is reasonable agreement on broad areas of need for high-level knowledge and skills. As noted, the NPHE identified an 'endemic shortage in South Africa of high-level professional and managerial skills...[particularly] in the science and economic-based fields' (DoE 2001:2.1.1). Current work by Jipsa and other bodies on identifying scarce skills broadly supports the NPHE view (see for example Jipsa 2006; Mail and Guardian 2006b: 1-2).

The growth of graduate output in these areas is constrained by shortages of candidates who have the standard qualifications for entry to the relevant programmes. As discussed further in section 6.1.1, enrolment in degree programmes where growth is most needed is limited in particular by poor performance in mathematics and science in the school sector. This is reflected in the small numbers of matriculants passing mathematics on the higher grade, which is a minimum requirement for admission to key SET and Business/Management degree programmes. The problem is again compounded by racial skewing: for example, in 2003 black matriculants made up under 30% of higher grade mathematics passes. This contributes to disproportionately low black participation in key programmes. In 2005, for example, despite substantial increases in recent years, black enrolment was under 50% in professional bachelors degrees in Engineering and Business/Management, and was about 50% in first degrees in the Mathematical, Life and Physical Sciences (calculated from HEMIS data).

In summary, participation in key subject areas is low overall, and particularly so in the black group, from which future growth should largely be expected. Application profiles suggest that the situation arises from shortages of qualified candidates rather than lack of student aspirations. Few would believe that the enrolment figures reflect the potential within the population, so the situation is an indicator of unsatisfactory articulation between secondary/further and higher education. The problem is twofold: the schools are not producing more well-prepared candidates and the higher education sector is not geared to successfully accommodating more than a very small proportion of the potential candidate pool in key subject areas.

The problem is generally attributed to the continuing deficiencies and inequalities in the school system. This paper will argue, however, that the higher education sector itself has a key role to play in establishing educational structures that enable talented, motivated but underprepared students to enter and succeed in the programme areas 'in which future demand is likely to be the greatest' (see section 6).

5.2 GRADUATION IN REGULATION TIME

One of the most striking findings arising from analysis of the cohort data is the low proportion of the intake who graduated in minimum or 'regulation' time – that is, three years for general

academic bachelors and national diploma programmes, four years for certain professional bachelors degrees, and so on. This bears out a pattern that has shown up in institutional data over a longer period.

The DoE cohort studies do not separate out three- and four-year programmes or show completion rates after three years. However, as an earlier version of the 2000 cohort study shows, even after four years of study and excluding the distance education institutions, under one-third of the intake (36% of university students and 26% of technikon students) had graduated. The majority of the students would have been on three-year programmes. The following table summarises the position.

Graduated within 4 years: All first-time entering students

All programmes	22%
Universities excluding Unisa	36%
Technikons excluding TSA	26%

The ITLS project has analysed ‘efficiency’ rates in key CESMs. The following tables show the proportion of the 2000 intake graduating in regulation time in selected qualification types and CESMs, excluding distance education.

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

CESM	Grad in 4 years
04: Business/Management ⁹	46%
08: Engineering	32%
12: Languages	30%
13: Law	22%

CESM	Grad in 3 years
04: Business/Management	24%
15: Life and Physical Sciences	21%
16: Mathematical Sciences	24%
22: Social Sciences	29%
12: Languages	28%

⁹ This category contains substantial numbers of students who transferred to and completed three-year degrees within the four-year period, so the rate of completion in regulation time may be somewhat inflated.

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

CESM	Grad in 3 years	Grad in 4 years (cumulative)
04: Business/Management	18%	28%
06: Computer Science	14%	27%
08: Engineering	5%	11%
21: Social Services/Public Administration	13%	25%

Broken down by race, rates of completion in regulation time show patterns similar to those in the ‘equity of outcomes’ tables provided earlier. The following tables show the patterns.

Graduated in regulation time: Professional first B-degrees, excluding UNISA

CESM	Black	White
04: Business/Management ¹⁰	22%	70%
08: Engineering	14%	42%
12: Languages	14%	55%
13: Law	14%	33%

Graduated in regulation time: General academic first B-degrees, excluding UNISA

CESM	Black	White
04: Business/Management	11%	43%
15: Life and Physical Sciences	11%	35%
16: Mathematical Sciences	13%	33%
22: Social Sciences	14%	43%
12: Languages	13%	52%

Graduated in regulation time: National diplomas, excluding TSA

CESM	Black	White
04: Business/Management	16%	33%
06: Computer Science	12%	25%
08: Engineering	3%	12%
21: Social Services/Public Administration	13%	18%

An additional ‘efficiency’ indicator is the number of students graduating in regulation time expressed as a proportion of the total number of graduates in the cohort. The following tables show three-year regulation time graduates as a percentage of the total graduating within five years in the selected CESMs in contact institutions. (The percentages would of course decrease if the ‘final’ completion rate, including graduates from the transferring and ‘still-registered’ groups, were used as the denominator.)

¹⁰ This category contains substantial numbers of students who transferred to and completed three-year degrees within the four-year period, so the rate of completion in regulation time may be somewhat inflated.

Graduates in regulation time as % of total graduates within five years: General academic first B-degrees, excluding UNISA

CESM	Grad 3/Grad 5
04: Business/Management	49%
15: Life and Physical Sciences	44%
16: Mathematical Sciences	46%
22: Social Sciences	55%
12: Languages	59%

Graduates in regulation time as % of total graduates within five years: National diplomas, excluding TSA

CESM	Grad 3/Grad 5
04: Business/Management	55%
06: Computer Science	41%
08: Engineering	26%
21: Social Services/Public Administration	47%

In all the CESMs studied, the percentages were lower for black students, by at least 10 percentage points in the university programmes. Fewer than half of the total black graduates completed in regulation time in all but one of the CESMs.

OBSERVATIONS DRAWN FROM THE TABLES IN THIS SECTION

- The overall performance patterns of the 2000 cohort indicate that only one in five first-time entering students graduate in regulation time. When distance education institutions are discounted, well under one-third of the intake complete in the formal time provided for by the system. Only one in three of the intake into the contact institutions graduate even within four years.
- In the CESMs analysed, including subject areas that are highly selective, a minority completed in regulation time; it is only in professional Business/Management degrees (where a significant number of students switched from four- to three-year programmes) that the contact students' completion rate exceeded 32%.
- In many cases, including all the SET CESMs analysed, fewer than half of all the students who actually graduate in the cohort completed in regulation time.

- The disparities between black and white performance on these ‘efficiency’ measures are at least as marked as they are in completion rates. In the contact universities, in all but one of the CESMs covered, black students made up under 25% of all graduates in regulation time.
- These performance patterns provide further evidence that the current system is not working effectively for the majority of the students who are (and need to be) in higher education. Curricula, as formally planned, are being followed by only a fraction of the intake, particularly in the case of the student groups where growth is most needed. This points to a mismatch between systemic educational structures and national as well as individual student needs.
- The fact that the great majority of the intake are not able to graduate in the time formally expected thus provides evidence not only of the outcomes of schooling but also of articulation failure between secondary/further and higher education. If the system were designed to enable an appropriate proportion of the population to enter and succeed in higher education, regulation-time completion rates should be at least twice the current rates overall. In the case of the black student intake, these rates would need to be four or more times higher if they were to reflect efficient accommodation of even the current (low) level of participation.
- The figures support the contention that the traditional timeframes provided for undergraduate degrees and diplomas, and the associated funding arrangements, are not realistic or valid for the majority of students in higher education. This paper will argue that inappropriate curriculum structures are a key factor affecting effective teaching and learning, and consequently that the formal qualifications framework and funding arrangements – which largely determine the curriculum structures – are in themselves an obstacle to improving the performance of the sector. This topic is discussed in section 7.1 below.

5.3 FIRST-YEAR ATTRITION

The 2000 cohort study confirms that the greatest attrition occurs at the end of the first year of study. For first-time entering students, the overall rate was 29%, made up of 25% for the universities and 34% for the technikons (22%, 19% and 24% respectively if the distance institutions are excluded).

It is widely recognised that termination or suspension of studies can result from a range of factors, material and affective as well as academic. Financial problems are commonly reported as a significant factor. The DoE data available do not enable distinction to be made between exclusion and voluntary termination, and moreover, despite various institutional research efforts, there is little systematic knowledge about the underlying causes of dropout across the sector. Again, however, insofar as it results from or is affected by poor academic performance, the high first-year dropout rates that prevail alongside low participation rates are an indicator of systemic problems such as articulation failure.

In summary, the data analysis presented in this paper indicates that, notwithstanding the achievements of the past decade, the higher education sector is not meeting key output goals, and this has significant implications for development. Performance is unsatisfactory in terms of overall output and equity of outcomes. It has been argued (in section 4) that these two broad goals have become organically interlinked, in that improving equity of outcomes is essential for improving graduate output overall as well as for 'social cohesion'. It can be said that the development and equity agendas are converging: progress with equity will be a key measure of the sector's potential to meet future growth needs.

Given the persistence of inequalities in schooling and the limited pool of well-prepared candidates (see section 6.1.1), it is argued that highest priority should be attached to realising potential and facilitating successful performance in the existing student intake, particularly in the most under-represented groups and in the programme areas where growth in graduate output is most needed.

It is not clear, however, that policy and resources are sufficiently focused on addressing this priority. Since the performance patterns point to underlying systemic issues – such as the extent of continuity between major phases and the capacity of different sectors to adapt to changing conditions – the effectiveness of an improvement agenda depends on understanding the major factors affecting performance, and on agreeing where different responsibilities for development lie. The following section discusses this topic.

