

Education Scenarios for 2019

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Executive Summary

To realize South Africa's promise to all its inhabitants will require careful long-term strategic thinking about developing human capabilities. In this paper, we identify the salient features of South Africa's education sector and unpack some of its critical weaknesses. While we endorse the interventions associated with JIPSA, a long-term perspective points to the need for a long-term focus on primary school literacy and mathematics.

Features of the South African Education and Training System

Fact 1 Wide Access

Despite the impact of HIV and AIDS and poverty generally, the overwhelming majority of children are enrolled in primary schools, and relative to countries with similar levels of development, a high proportion of young people go onto secondary education.

Fact 2 High and Equalised Education Expenditure

At 5.4% of GDP, South African spending on education is high by comparable standard. Furthermore, in the past decade, the government has made significant progress in equalizing inter- and intra-provincial government spending.

Fact 3 Failing Primary School Language and Mathematics

Nationally, 72% of all Grade 6 learners failed a national literacy test in 2004. In mathematics, the figure is substantially higher, with 88% of all Grade 6 learners failing to achieve the curriculum standard. Given the centrality of reading, writing and arithmetic not only to all further learning, but also to most jobs in the information economy, the poor performance of South Africa's primary schools in providing basic education must constitute one of the countries most urgent problems.

Fact 4 Huge Achievement Gap

South Africa's levels of inequality are revealed by cross-country testing programmes to be the highest by a large margin among participating countries. The point is illustrated by results from tests administered in the Western Cape, which show that, while four out of five children in former white primary schools read at the right level, less than half of learners attending former Coloured primary schools can read at grade level and only four children in a hundred in former DET schools are reading at the prescribed level.

Fact 5 Comparative Perspective on Low Achievement

The mean score on the Trends in Mathematics and Science Study (TIMSS) place South African Grade 8 learners at the very bottom of 50 participating countries. Similar trends are evident in other cross-national studies of quality, where South Africa performs badly compared to a number of much poorer countries.

Fact 6 ***Low Output in Higher Grade Mathematics***

Of the total population of 18 year olds (about 980,000) less than 140,000 pass Grade 12 mathematics, and only some 20 000 to 25 000 (2.5%) pass the subject at higher grade.

Fact 7 ***Ineffectiveness of the educational bureaucracy***

The implementation of policy with respect to schools is heavily dependent on the effectiveness of provincial departments of education. While there is considerable variation across and within provinces, it is fair to say that most parts of the system exhibit low levels of functionality, while significant parts are essentially dysfunctional. For example, in her budget speech of 2007 the Minister of Education conceded that by no means the full Treasury allocation for QIDS UP had been used for this purpose in the provinces in the last year. Similarly, poor procurement and distribution of books and desks to schools leaves many schools heavily undersupplied with basic education resources.

Fact 8 ***Shortages of Technical Skills***

The the government/business Joint Initiative on Priority Skills for South Africa (JIPSA) estimates that, at the current rate of production, only some 40% of the required number of artisans in engineering and related fields will be available to cope with economic needs between 2007 and 2010. Similarly, the construction and engineering industries are experiencing shortages in the managerial, professional and technological fields, and JIPSA estimates that production of skills in these fields need to be increased by some 20% in order to meet the demands of the growing economy.

Fact 9 ***Poor Throughput in Higher Education***

Half of admitted students drop out of the system without receiving a tertiary qualification. The throughput rate in minimal time in engineering is around 35% at the best institutions and between 5-10% at the others. The comparable throughput rates in East African, Indian and US institutions are around 80-90%.

Fact 10 ***Education and Unemployment***

Around half of all learners that spend some time in secondary school or equivalent do not find work.

Reform Initiatives

The first decade of democracy can be characterized as a period in which equity considerations dominated government policy in the education sector. By the end of this period it had become apparent that, while the structures of apartheid had largely been dismantled, its legacy in terms of vast disparities in quality persisted. Furthermore, it has become clear that South Africa's performance is very low in any comparative terms, despite high levels of spending. A number of initiatives are emerging to address these problems.

Initiative 1 Professionalising the bureaucracy

The importance accorded by central government to the task of building systemic capacity is indicated by fact that cabinet has taken charge of directing the development of the education bureaucracy, as part of a larger process of strengthening the civil service. A cabinet legotla in June 2006 laid out a carefully structured activity plan for achieving these ends. Although the targets set by the cabinet process have proved too ambitious, there is no doubt that this process is on the right track, and already effects are being felt in some provinces. However, there is a very long way to go on this issue and a long-term commitment by central government to improving the capacity of departments of education is required if significant efficiency gains are to be achieved.

Initiative 2 Literacy programmes

The Department of Education has started to develop a number of policies in the area of literacy. These include a 'toolkit' for schools, which describes methods of teaching reading and writing and provides benchmarks for each school quarter and grade, a simple test for early reading which is intended for use by teachers in assessing learner progress, and the Drop All and Read campaign aimed at publicizing the need to set aside time for reading at school. However, these elements do not add up to anything like a coherent national literacy programme, and indeed the three provincial initiatives appear to be taking little direction from the national level.

Nevertheless the Western Cape, Gauteng and Kwa-Zulu/Natal are all in various stages of implementing province-wide literacy programmes. The Western Cape initiative, now entering its fourth year, is the best developed to date and has begun to register small but significant gains on provincial tests at Grade 3 and 6 levels.

Initiative 3 Pro-poor funding arrangements

QIDS-UP is based on the assumption that poverty is the major determinant of underachievement for the majority of schools in the country, and that they do not have the basic minimum resources required to make quality learning possible. Just over R2 billion has been allocated to the programme over the 2007 Medium Term Expenditure Framework (MTEF) period. The idea is to provide between R75 000 and R100 000 to each school specifically for books and other resources such as toys focusing on primary schools.

A second very significant area of pro-poor support to schools is the no-fee schools policy initiated in 2006. In that year 20% of the poorest schools were declared no-fee schools, and this will be increased to 40% in 2007. Here too the Minister noted implementation difficulties in her 2007 budget speech

Initiative 4 Secondary schools

Dinaledi is a programme of the Department of Education for increasing the number of HG maths and science matriculants in 400 high schools which exhibit at least moderate levels of functionality and which serve a majority of African learners. It is part of a wider

attempt to double the number of high quality Senior Certificate passers by 2009. Increases of 17% for HG maths and 23% for HG science were achieved in the first two years of the programme, and further increases can be expected as Dinaledi gets into full swing in 2007. Whether the department's target of an increase of at least 15 HG maths passes per school will be attained this year seems doubtful, but even half that quantity will increase overall production of these qualifications by 100% in Dinaledi schools and by 12% across the system.

Initiative 5 Vocational education

The reorganization of what was once known as the Technical College sector is arguably government's most successful educational initiative to date. The sector has been consolidated into 50 FET Colleges in which new curricula are focused on 11 programmes aligned to JIPSA priorities. The target of 25 000 learners was achieved in 2007, the first year of the initiative. Significant grants for the recapitalization of the colleges, student financial aid, and lecturer training have placed the sector in a position to provide significantly better vocational education to increasing numbers of students.

However, JIPSA has identified some obstacles to be overcome before these developments will translate into greater numbers of artisans. These obstacles include a messy policy terrain which arises at least partly from the fact that the FET Colleges are administered by the national and provincial departments of education, and the Sector Education and Training Authorities (SETAs) fall under the Department of Labour; while organized industry and labour also pursue their interests.

Initiative 7 Higher education

JIPSA has set a target of increasing the numbers of engineers and built environment technologists and technicians by 1000 pa, a 66% pa. It proposes to do this by increasing the throughput at universities and universities of technology; supporting the candidature process of guiding young graduates from graduation to registration with their respective professional councils; and removing current bottlenecks in the process of importing scarce and critical skills. If these initiatives are successful, they will not only provide the short-term skills required by the building boom set to peak by 2010, but are also likely to provide some of the lessons and efficiency gains required to propel the higher education system into a more effective instrument for national development.

Critical Challenges for 2019

The JIPSA and Dinaledi initiatives are based on the assumption that significant numbers of high- to intermediate-level technical skills can be obtained by providing incentives and improving the efficiency of the country's best universities and those high schools that exhibit at least moderate levels of functionality. Under conditions of the current acute skills crisis, these interventions represent the fastest means to providing some relief and,

even if they don't fully meet their ambitious targets, are likely to make a substantive difference.

However, this strategy has three long-term limitations. First, it will reach a ceiling if the literacy and mathematics skills of significant numbers of primary school graduates are not substantially improved. The current flow of the knowledge and skills required for technical study at further and higher levels is simply insufficient to sustain even a moderate expansion of these sub-sectors. The second limitation is that, being largely confined to a few relatively well functioning institutions, this approach will lead to greater differentiation of the education and training system, and hence will exacerbate South Africa's already dangerously high levels of inequality. Finally, JIPSA and related short-term interventions are focused on the production of technical skills, and will do little to enhance the cause of a generally more highly educated civil service or general population.

In pointing out these limitations, we do not wish to be seen to be undermining government's short-term plans for addressing the skills crisis: these not only represent the best options immediately available, but are also likely to begin building the momentum required for a larger strategy. However, our concern is that insufficient urgency is evident in putting in place a comprehensive long-term plan. The solution to all three limitations is the same: improve the quality of basic education provided by the country's primary schools. This will require a massive systemic effort and the best chances for success would seem to lie in the direction of focusing on a national literacy and numeracy strategy, such as the programme successfully adopted in the UK in 1998. Given the very weak state of South Africa's educational civil service, such a programme is likely only to begin producing significant effects over a ten to twenty year cycle. This requires a long view and sustained funding, but offers the most important plank in any strategy aimed at addressing South Africa's social and economic inequalities and placing the country on a sustainable growth path.

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Introduction

As part of the wider scenario planning for South Africa 2019, this paper analyses some of the key features of the contemporary South African education sector, explores government and private sector efforts to address the current challenges, and suggests areas of weakness and strength in current initiatives.

In an attempt to provide a succinct and evidence-based sector-wide analysis of education in South Africa, we begin with an analysis of nine key education indicators. These provide us with insights into the challenges in the sector and provide a verified quantum against which to work. While these indicators provide useful diagnostic tools, they also provide the basis for setting targets.

Analysing the long-term trends in education, a clear pattern is discernable. The period from 1994-2004 focused on policy development, improving fiscal equity (both inter-and intra-provincial) within budget constraints, and reducing the number of dysfunctional secondary schools. In 2004 there was a discernable shift towards concerns about how education and training must contribute to faster economic growth. ASGISA and related JIPSA frameworks began to shift the focus of education and training towards the contribution of skills to accelerated economic growth. As Akoogee (2005) shows, the main focus of the new sector strategy was at the post-basic level, primarily concerned with reducing poverty and skills creation, than with improving basic education. Various high profile and well funded initiatives were oriented towards developing skills and knowledge for learners leaving school, college and university and entering the work place. This post 2004 strategy focused on improving market relevance, whether by improved higher graduate numbers of mathematics and natural science in academic secondary schools, replacing the matriculation qualification with the new Further Education and Training Certificate, re-curricularisation and recapitalization of the further education and training institutions, improving the performance of the SETAs with regard to learnerships and artisan training, and the JIPSA project to increase engineering output in higher education institutions.

In the 2004-2014 period, basic education has not been without attention with the implementation of the no-fee school policy, early childhood initiatives, minimum instructional materials packages to schools and ad hoc interventions like the the ‘Drop-All and Read’ campaign. However at the basic education level, the objectives are focusing primarily on improved access e.g. no-fee schools and to a lesser extent on improving quality.

While we endorse the prioritization of the post-basic education and training system as it is clearly aligned to the dual demands of supporting faster economic growth and reducing poverty, in the longer term, without a high quality basic education sector, the growth and improvement in the post-basic education and training system will inevitably reach a limit. A consensus now exists that to transcend cycles of underdevelopment or in South Africa’s case unequal development, it is critical to widen and raise the human capital

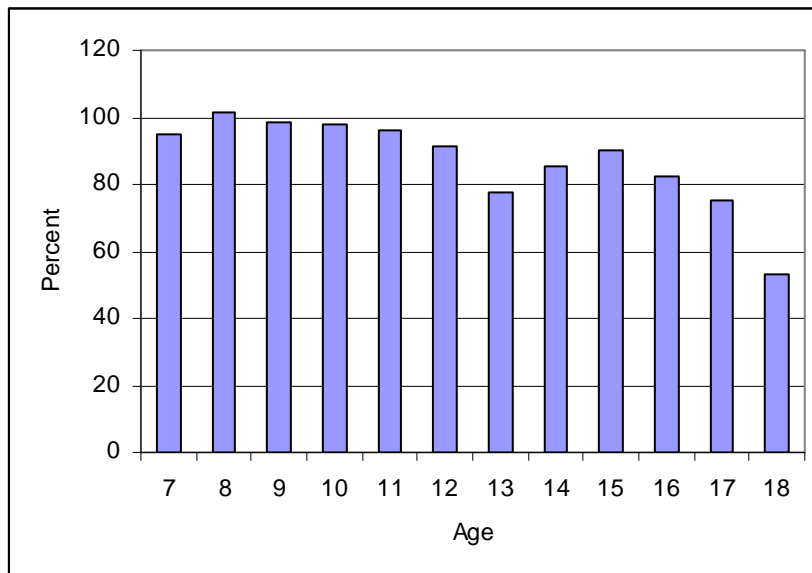
base. Without improving the human capital base, South Africa cannot expect to sustain high rates of economic growth over the longer-term. That is not to say that sustained long-term investment in human capital is a guarantee of sustained economic growth, but it is a necessary but not sufficient condition to moving towards a high standard of living for all (Pillay, 2006). Of even greater concern is that if good basic education is not accessible to a much wider range of children no inroads can be made into South Africa's yawning inequality gap.

Key Features of the Current System

Fact 1 **Wide Access**

The Constitution and the South African Schools Act has guaranteed access to nine years of basic education for all children, and placed a mandate on the state to make further education and training progressively available. Research undertaken in the past few years has shown that despite the impact of HIV and AIDS and poverty generally, the overwhelming majority of children are enrolled in primary schools, and relative to countries with similar levels of development, a high proportion of young people go onto secondary education (Shindler & Fleisch, 2007)

Figure 1 Participation rate in schools of each age cohort 7 to 18 years, 2001



Source: Shindler and Fleisch, 2007

Not only have high levels of access to schooling been achieved, unlike many other developing countries, access to schooling in South Africa has been achieved equally for

both male and female children. Table 1 shows that there is no difference in the rate in which males and females of official school going age participate in schooling.

Table 1 Participation rate in schools by gender, 2001

Age	Male	Female
7-13 years	94%	94%
14-18 years	78%	77%
7-18 years	87%	87%

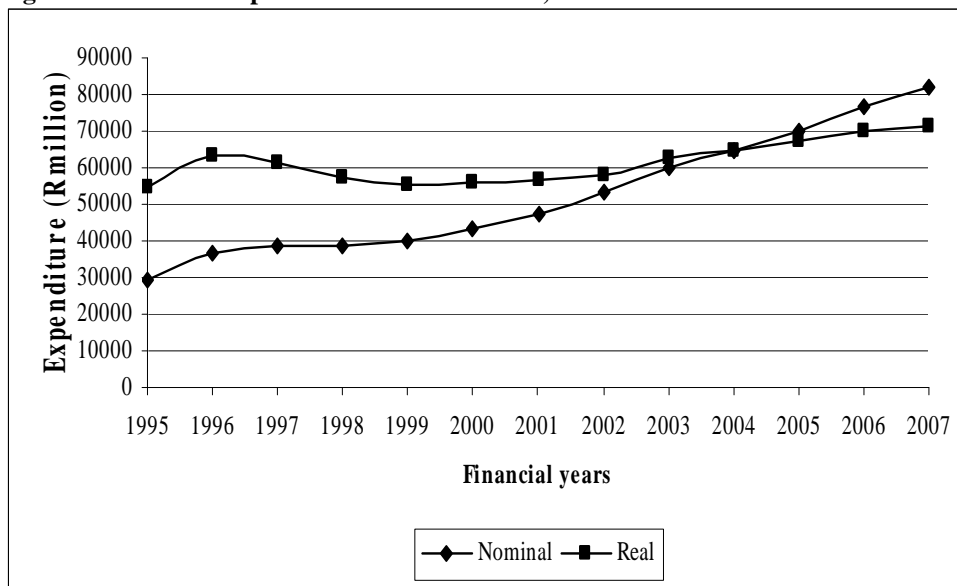
Source: Shindler and Fleisch, 2007

Fact 2 Equalised Education Expenditure

Does money matter is the crudest formulation of the question that links expenditure on education to schooling outcomes. In actual fact, no economist or reasonable person for that matter would question the centrality of funding to education. If funding was not available from state coffers, comprehensive systems of schooling would not exist. The real question is about the marginal benefits of increased levels of spending relative to improved achievement.

Russell Wildeman, as part of the wider IDASA budget monitoring project, has been systematically tracking educational expenditure in South Africa in the past ten years. He has recently shown that while educational expenditure had a brief sharp increase in the years immediately following the 1994 elections, real increases in educational expenditure only began in earnest in 2003. In other words, while the nominal amount of money in the budget had been going up, for much of the first decade of democracy the value of the funds allocated to education had actually declined or remained static.

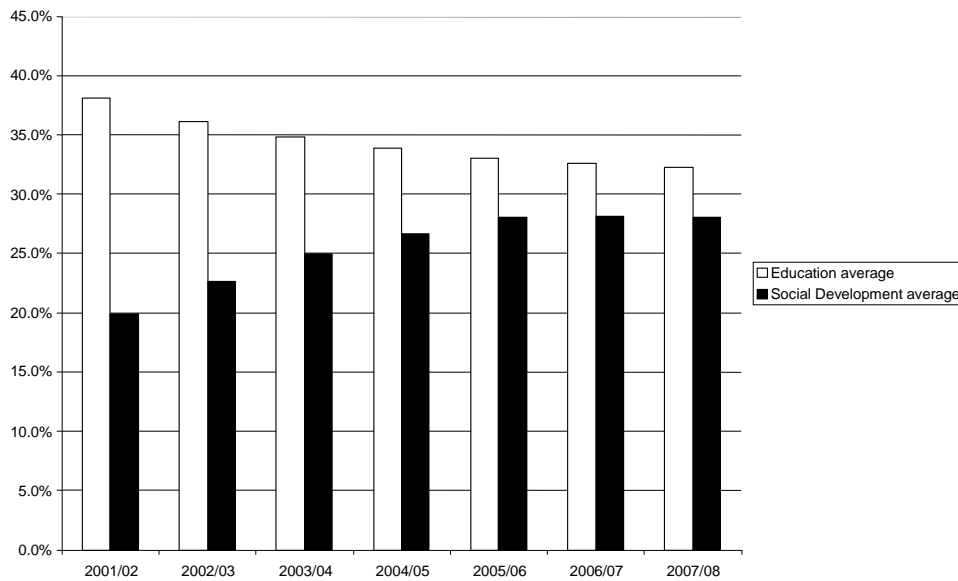
Figure 2 Education expenditure in South Africa, 1995-2007



Source: Wildeman, 2005. Note: 2005-2007 amounts are estimates

Another way of examining this is to analyse the proportion of the provincial budget allocated to education. From figure 3 it is clear that while the proportion of the provincial budgets allocated to social development have gone up dramatically from around 20 percent in 2001/02 to 28 percent in 2007/08, the share of provincial spending on education has declined significantly from 38 percent to just over 32 percent.¹ From a national picture during the past decade, education funding has remained relatively static, possibly even declined a little both in real terms and as a proportion of the overall funds available to provinces. In contrast, other programmes, particularly funding for social development has growth both in real terms and as a percentage of provincial spending.

Figure 3 Percentage of provincial budget on education and social development, 2001/2002-2007/08



Source: Department of Education, 2005

Note: 2006/07 and 2007/08 are based on MTEF projections.

While funding for education may not have increased overall, it is important to acknowledge that there has been a significant movement on the equalisation of educational expenditure. Immediately after the 1994 elections, there was huge inter-provincial discrepancy in per learner expenditure. By 2003/04, these discrepancies had largely been eliminated (see Table 2).

¹ In general, the education budget as a percentage of the overall budget is typically reported at national levels, with proportions ranging from 25 percent in 1993 to the current levels around 21 percent. But as the education budgets are primarily located in provinces, we have chosen to present the picture as an aggregate of provincial spending.

Table 2 Provincial education expenditure, 2003/2004

Province	R million	Learners (thous.)	Per capita (R)	Factor of total
Eastern Cape	10,308	2,116,426	4,870	0.97
Free State	4,087	696,155	5,871	1.17
Gauteng	9,539	1,661,817	5,740	1.15
KwaZulu Natal	12,022	2,783,051	4,320	0.86
Limpopo	8,264	1,816,852	4,549	0.91
Mpumalanga	4,529	914,739	4,951	0.99
Northern Cape	1,305	202,010	6,460	1.29
North West	4,896	891,036	5,495	1.10
Western Cape	5,305	956,836	5,544	1.11
Total	60,255	12,038,922	5,005	1.00

Source: Wildeman, 2005

While considerable progress in education finance equity has been made, the fundamental question remains, are we spending enough on education? While this is a complex question, and beyond the scope of this paper a scan of patterns of expenditure in comparable countries provides useful insights. Compared with Chile, Mauritius, Thailand and Turkey, South Africa is spending more on education as a proportion of Gross Domestic Product (Table 3).

Table 3 Comparative education expenditure as a percentage of Gross Domestic Product, 2004

Country	Total public expenditure on education as a % of GDP
Chile	4.1
Mauritius	4.7
South Africa	5.4
Thailand	4.2
Turkey	3.6

Source: United Nations Information Systems (Accessed 30 May 2007
http://www.uis.unesco.org/ev.php?ID=6827_201&ID2=DO_TOPIC)

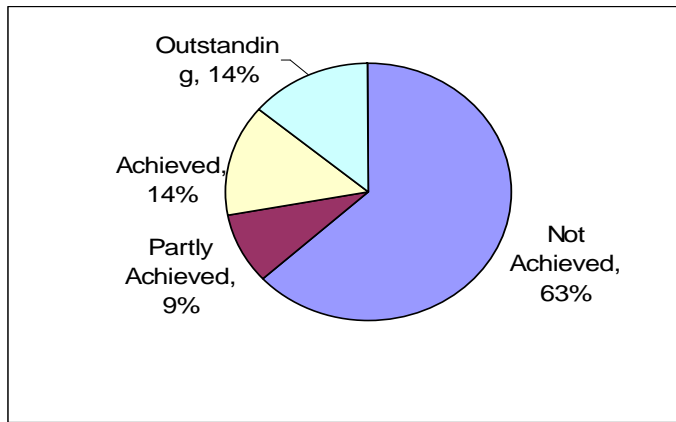
Fact 3 Failing Primary School Literacy and Mathematics

In 2005, the Department of Education released the results of the Grade Six Systemic Evaluation. Based on the results of an analysis of the academic performance of a sample of 34 015 learners tested in 2003 in three learning areas: language, mathematics and natural sciences, the results provide a powerful indicator of level of achievement of learners within the South African education system. The Department found that learners obtained mean scores of 35% for language, 27% for mathematics and 41 for natural sciences.

When the scores were reported for each learning area according to four achievement levels, i.e. outstanding, achieved, partly achieved and not achieved, the Department could determine the levels at which learner are functioning. In Language, only 28% of children were at the achieved level or above. Put another way, more than two-thirds of South

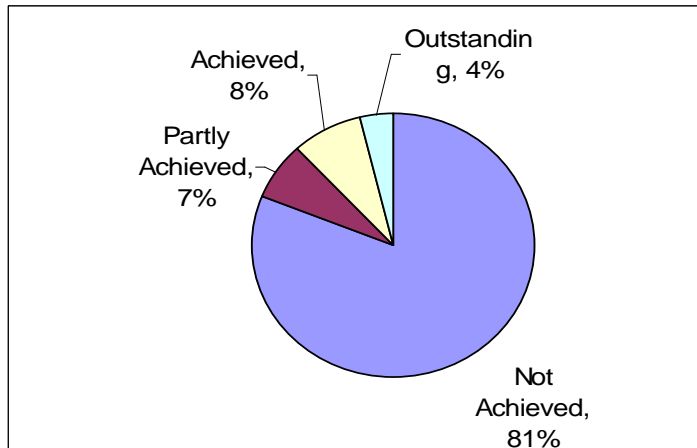
African Grade Six learners perform below the minimum level expected of them. In mathematics, the picture is even more severe. Only 12% of all learners sampled reached levels 3 (achieved) and 4 (outstanding), with 81% scoring at the 'not achieved' level. In other words, only one learner in ten was at the standard required by the National Curriculum Statement.

Figure 4 Percentage of learners at each achievement level in Language



Source: DoE (2005), Systemic Evaluation of Grade 6

Figure 5 Percentage of learners at each achievement level in Mathematics



Source: DoE (2005), Systemic Evaluation of Grade 6

In the most recent (2006) large-scale study of reading in South African primary schools, the Progress in International Reading Study (PIRLS), which involved over 30 000 learners in Grades 4 and 5, Howie (2007) found that the raw² mean scores for the Grade 4 learners to be 13.2% and the Grade 5 learners to be 18.2%. Unlike almost all previous studies, the 2006 PIRLS study offer learners the option of taking the test in any of the 11 official languages. The results suggest that, for learners for whom the language of instruction is not the same as their mother tongue, reading levels differ very little whether

² Still to be scaled and weighted.

they wrote the test in their mother tongue (mean 13.9% at Grade 4 and 18.7 at Grade 5) or in the language of instruction (12.0% at Grade 4 and 17.2% at Grade 5). The very small differences between reading in mother tongue and a second language, coupled with the very low absolute scores, indicate that children are not learning to read in any language.

Fact 4 Huge Achievement Gap

The full extent of the huge achievement gap between children in advantaged and disadvantaged schools became evident in the Western Cape Grade Six Learner Assessment Study. In this study, every primary school in the Western Cape with five or more Grade Six pupils were tested (34 596 children). One of the main purposes of this assessment exercise was to determine the proportion of learners who have attained official curriculum grade-level competence in literacy and numeracy.

The results of the study showed that only 12 104 children (35.0 percent) were performing at Grade Six level (Western Cape Education Department, 2004). While the national Grade Three Systemic Evaluation reported only a single mean score, with no reference to the proportion of learners who “made the grade”, the Western Cape not only reported on the achievement level based on curriculum requirements, but disaggregated the results by former department and by school poverty quintile.

Table 4 Western Cape literacy pass rates for Grade 6 by former department, 2003 and 2005

<i>Ex-Dept</i>	<i>Grade 6</i>		<i>% Distribution of Learners by Ex-Dept</i>	
	2003	2005	2003	2005
CED	82.9	86.9	20.1	21.2
DET	3.70	4.70	13.6	14.3
HOR	26.6	35.5	65.8	64.2
Total Province	35.0	42.1	100	100

Source: WCED Grade 6 Learner Assessment Study, 2003 and 2005

Note: Report acknowledges problems with the standard of the Grade Four test questions.

The results powerfully illustrate the scale of the achievement gap. While more than four out of five children in former white schools were at a Grade Six level, the figure, while improving, was less than half in former Coloured schools. In former DET schools, only four children in a hundred were reading at grade level. The 2005 report notes that the major challenge remains with the former DET schools.

On the numeracy test, the researchers found that, overall, only 15,6% of Grade 6 learners were performing at grade level in 2003. Forty percent of the children in the sample could only operate at Grade Three level. Less than one per cent of children (the talented few) in the poorest (former DET) schools were able to handle the Grade Six questions, compared to 62 percent in wealthiest schools. Between 2003 and 2005, the pass rates were little changed for the CED and DET schools, while former HOR schools showed a mean overall increase of 33%.

Table 5 Western Cape mathematics pass rates by Grade and former department for 2003 and 2005

<i>Ex-Dept</i>	<i>Grade Three</i>		<i>Grade Six</i>	
	2003	2005	2003	2005
CED	90.5	90.6	62.4	64.5
DET	12.0	12.9	0.1	0.2
HOR	30.5	34.0	3.8	5.3
Province	40.0	43.2	15.6	17.2

Source: WCED Grade 6 Learner Assessment Study, 2003 and 2005

The 2003 Report concluded:

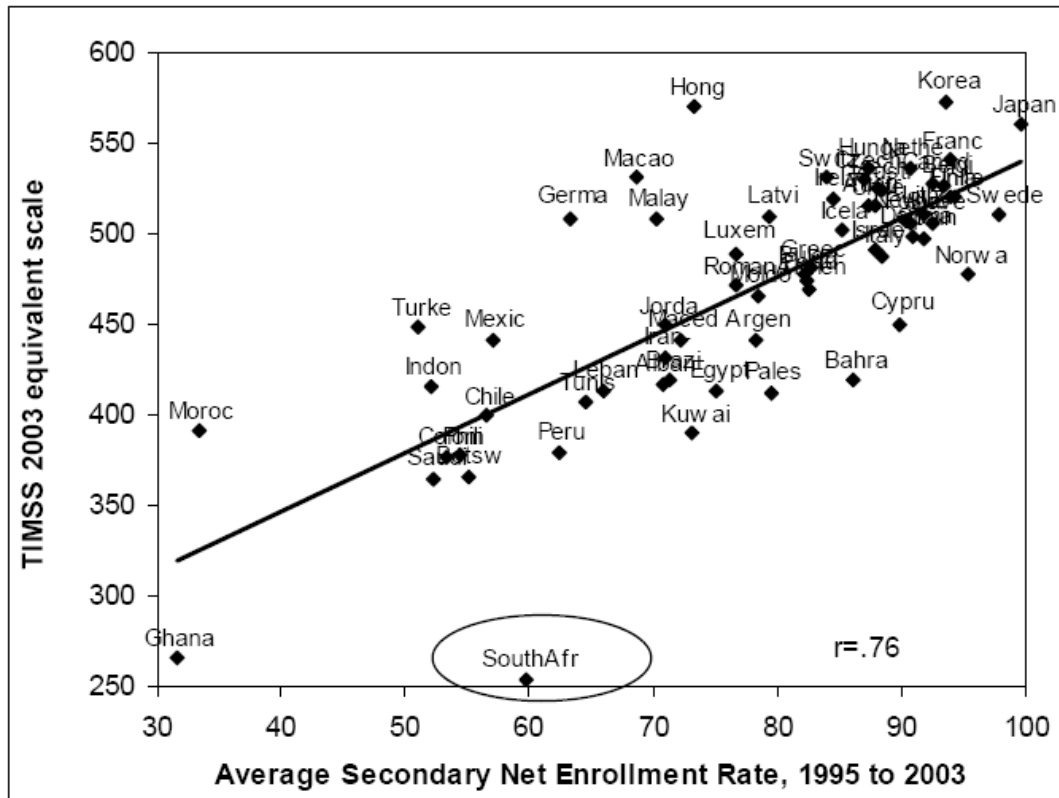
The schools continue to exhibit performance profiles that would have been expected during the apartheid era, their learners profiles are significantly different to raise questions about causes, issues and factors involved in the learner achievement in the province.

Fact 5 Comparative Perspective on Low Achievement

The first round of results from the Trends in Mathematics and Science Study (TIMSS) were cause for considerable national anxiety. In November 2002, the Human Sciences Research Council administered the TIMSS 2003 to 9000 Grade Eight pupils (15-year-olds). The results reflected little change from the 1999 assessment with East Asian countries scoring highest, and South Africa appearing at the bottom of the list with the lowest average score in both mathematics and science. According to Reddy (2005) the average South African score for mathematics was 264 (SE 5.5) compared to an international average of 467 and the science mean score was 244 (SE 6.7) compared to international average of 474. The low average scores conceal the huge spread in achievement within the 9000 pupils that took the test. South Africa has the widest distribution of scores in mathematics and science of all the participating countries. Children who attended former black schools had average mathematics scores of 227 compared to the average scores of pupils who attended former white schools whose mean score was 456, which is close to the international average.

Doubt has been cast on the comparability of test scores for countries with very different enrolment rates. In order to address this criticism, Crouch and Vinjevold (2006) compared TIMSS scores with enrolment rates and concluded that, whereas most countries manage to find a balance between enrolment and quality, South Africa is grossly underperforming in terms of the quality provided by its schooling system (Figure 6).

Figure 6 Comparative analysis of TIMSS 2003 Equivalent Results by Secondary Net Enrollment Rates



Source: Crouch & Vinjevold, 2006

Fact 6 Low Output in Higher Grade Mathematics

The failure of primary school children to develop mastery of key subjects, particularly literacy and mathematics has a direct effect on learner achievement in secondary school. The senior certificate examination (SCE) that takes place at the end of grade 12 provides the most reliable information on school quality at secondary school level. The SCE gives an indication of the contribution that schooling makes to human resource development as well as to ‘the stock of learners who are eligible to proceed to higher education and training opportunities’ (Perry and Arends, 2004, 317).

Between 1995 and 2006, both the number of candidates passing the SCE and the pass rate increased considerably, particularly since 2002 (see Figures 7 and 8). The number of candidates passing has increased from 283 742 in 1995 to 351 503 in 2006 while the pass rate has increased from 53% to 67% over the same period. An indication of the quality of the passes obtained in the SCE is the number of passes in 1995 with endorsement, the minimum qualification for entry into tertiary education. Despite a small increase in the number of candidates passing the SCE with endorsement between 1995 and 2006, the

number of passes with endorsement has never exceeded 90 000 and the endorsement pass rate has remained below 20%.

Figure 7 Number of senior certificate examination passes and passes with endorsement, 1995 to 2006

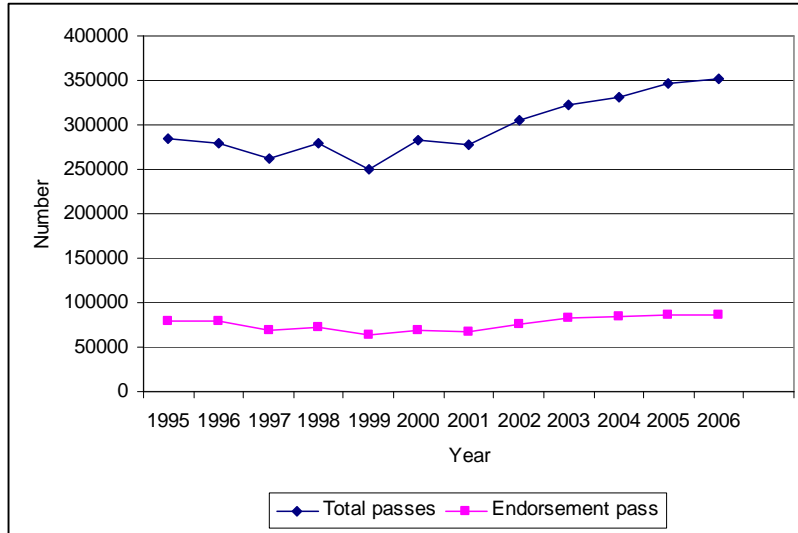
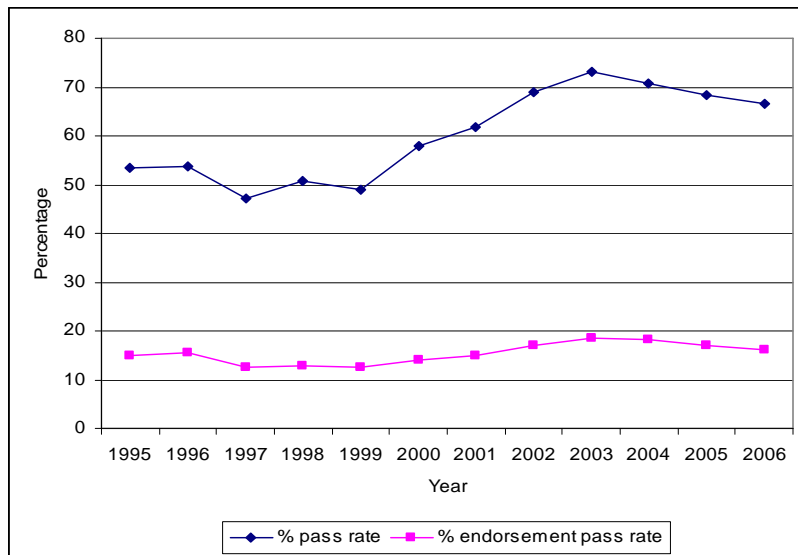


Figure 8 Senior certificate examination pass rate and pass rate with endorsement, 1995 to 2006



The subjects which learners take at school provide a foundation for the knowledge and skills required both in the labour market and in higher education. The level at which learners take these subjects is also important as higher grade SCE passes in certain key subjects, particularly mathematics and physical science, are often the minimum requirement for entry into certain study programmes in higher education. Figure 9 shows the number of candidates passing mathematics and science in total and at higher grade level, while Figure 10 shows the pass rate in higher grade mathematics and physical science. In the past decade, while the number of secondary school learners that pass

mathematics and physical science at the standard grade has grown, the number passing these subjects at higher grade level has remained more or less static (after a decline in 1996). Of the total population of 18 year olds (about 980,000) less than 140,000 passed mathematics, and only about 20,000 to 25 000, about 2.5%, passed the subject at higher grade. While inadequate mathematics and language teaching and sources at secondary schools undoubtedly contribute to the poor output, it is self-evident that a major contributor is the poor foundations that the vast majority of children receive at the primary levels. It thus follows that for any substantial long-term improvement in the number and proportion of learners that pass mathematics, and pass at a high level of achievement, much larger numbers of primary school learners need to be achieving in both mathematics and literacy.

Figure 9 Number of total and higher grade maths and science passes, 1995 to 2006

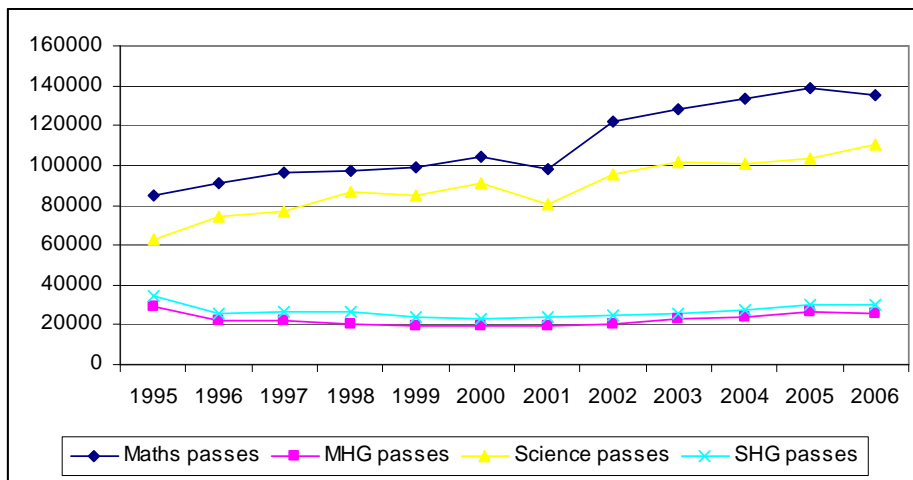
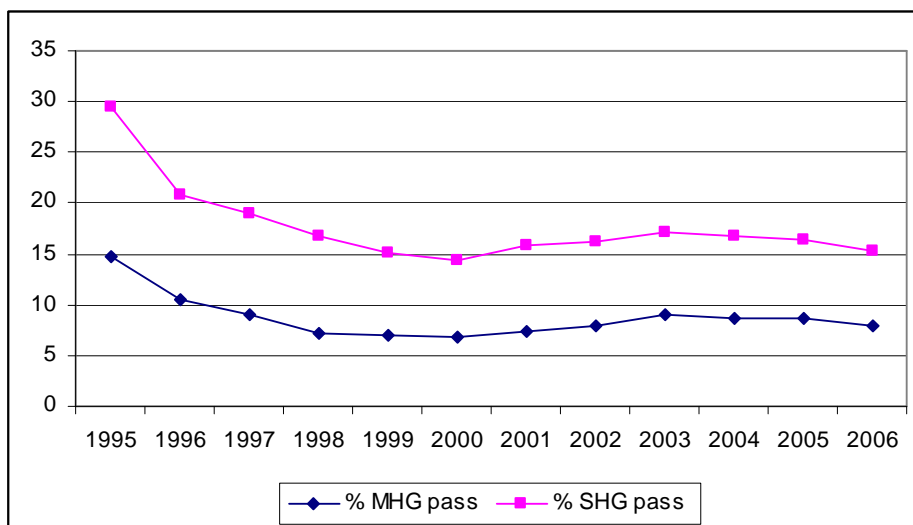


Figure 10 Higher grade mathematics and science pass rate, 1995 to 2006



Fact 7 *Inefficiency of the educational bureaucracy*

Serious capacity weaknesses in all departments of education affect both the quality of policy development and the ability of departments to implement policy. In many instances, national and provincial departments are understaffed and more importantly underskilled and inexperienced in key areas which adversely impact on system development and delivery. For example, in her budget speech of 2007 the Minister of Education conceded that by no means the full Treasury allocation for QIDS UP, a programme which allocates special funds for basic resources for poor schools, had been used for this purpose in the provinces in the last year. A second example is afforded by chronic problems experienced by a number of provincial departments in distributing textbooks to schools: a visit to 8 of the 60 Dinaledi schools in one province in 2006 revealed that only one had sufficient maths text books for its grade 12 cohort. If this is what happens in government's flagship programme, how much worse is the situation likely to be in the most remote rural schools? Indeed, a visit in April 2007 to 6 rural primary schools in the same province revealed that only one school had reading books of any kind with which to teach literacy in grades 1-3.

While these weaknesses persist in provincial head offices, they are often more acute at the district and school levels. One of the most important lessons learnt during the past decade of school improvement initiatives is the central role of district offices, which are often the only contact that schools have with outside agencies. Unfortunately there has been considerable instability at this level of the school system with various restructuring and redesign initiatives undermining the capacity of district officials to provide support and monitoring services to schools (Taylor, 2007). The critical factors which would contribute to strengthening the educational bureaucracy include: stabilising structures and personnel, filling established posts, combating patronage, standardising operating procedures, simplifying performance management systems, and providing sustained, relevant training.

A second important lesson concerning school improvement is that school management is a key factor in determining the quality of education (Taylor, 2007), and it is clear that a large majority of school principals are unable to ensure the most basic conditions conducive to teaching and learning. For example, Gustafsson (2005) notes that teacher late coming is a factor in 85% of South African schools, and estimates that if all schools were brought up to the level of the best schools in this regard then overall scores on the SACMEQ³ tests would improve by around 15% across the system, and around 20% in the poorest schools.

³ Southern and Eastern African Consortium for Monitoring Education Quality, a consortium of 14 countries which administer common literacy and numeracy tests. In the 2000 administration at Grade 6 level, South Africa was placed eighth in both subject, behind countries such as Uganda, Kenya, Tanzania, Swaziland and Mozambique.

Until these management problems are addressed at national, provincial, district and school levels, any programmes designed to channel increased funds to poor schools, or to improve the quality of education will be severely hampered by the gross inefficiency of the system.

Fact 8 Shortage of Artisans

A recently commissioned JIPSA report on the state of artisan training takes as its starting point:

It is widely accepted that the domestic economy is currently experiencing a severe shortage of well qualified, competent and experienced artisans. The reasons for this shortage range from sectoral growth patterns in the 1980s to issues such as policy signaling, the declining quality of institutions and the new regulatory regime in the mid-1990s.

JIPSA, 2007, 1

The report concludes that a minimum total of 50 000 artisans are required by 2010 to cope with the needs in 16 engineering related priority trades, while only 5000 new artisans a year are being produced. Reaching this number would therefore require the additional production of 12 500 artisans per annum, an increase of 150%.

Fact 9 Throughput in Higher Education

Higher education institutions make an essential contribution to human resource development by delivering highly-trained graduates with the skills and knowledge required by a growing economy. The development of high level knowledge and skills is essential to an economy that is expected to grow by 6% between 2010 and 2014. .

The shortage of skilled graduates in South Africa was acknowledged by the Department of Education in 1997 in the White Paper on higher education (Department of Education, 1997b) and again in 2001 in the National Plan for Higher Education (NPHE) (Ministry of Education, 2001). It was noted that there was an endemic shortage in South Africa of high level professional and managerial skills particularly in science, information technology, engineering, technological and technical occupations, economic and financial occupations and accountancy and related occupations.

The NPHE provided the implementation framework for transforming the higher education system in order to achieve the vision and goals of the White Paper. It established indicative targets for the size and shape of the higher education system, including overall growth and participation rates, institutional and programme mixes and equity and efficiency goals.

The NPHE set a target participation rate in higher education (the proportion of 20 to 24 year aged population enrolled in higher education) at 20% over a 10 to 15 year period. The original target participation rate of 30% by 2005 set by the National Council for Higher Education in 1996 had to be revised as it was clear such an ambitious target was unattainable. The ability of the higher education system to increase the participation rate is highly dependent on the quantity of suitable school-leavers who are eligible to enter higher education. The participation rate in public higher education decreased from 17% in 1996 to 15% in 2000 (Ministry of Education, 2001, 16). Since 2001 student enrolment in higher education institutions has increased substantially. Between 2001 and 2004 headcount enrolment in higher education increased by 28% so that by 2004 the participation rate had risen to 16.1%. The increase in enrolment between 2001 and 2004 followed an increase in the pass rate in the senior certificate examination (SCE) between 2000 and 2003 (see Figures 7 and 8). This resulted in a the number of learners passing the SCE increasing from 58% of candidates in 2000 to 73% in 2003 and those passing the SCE with an endorsement (the minimum requirement for entry into university) increasing from 14% of SCE candidates in 2000 to 18.6% in 2003.

Table 6 Headcount enrolment in higher education institutions, 2000 to 2005

Year	Number enrolled	% change over previous year
2000	578134	
2001	627277	8.5
2002	667182	6.4
2003	705255	5.7
2004	744479	5.6
2005	735073	-1.3

Source: Department of Education Hemis database supplied 3/4/2007

After this period of enormous growth in the higher education sector, the growth was reversed in 2005, with a drop in enrolment of just over 1% occurring between 2004 and 2005. This decline meant that the participation rate dropped slightly to 15.9% in 2005. The drop was a result of the Department of Education placing a cap on enrolments in higher education institutions for funding purposes at 723 000 in 2005, 730 000 in 2006 and 740 000 in 2007 (Department of Education 2005c, 23). This capping of enrolment was put into place for the following reasons (Department of Education 2005d): the higher education system's funding and infrastructure had not kept pace with the rapid growth in student enrolment; the system's output performance remained below the targets that had been set in the NPHE; and the drop-out rates were high indicating low levels of efficiency in the system. Clearly, while growth in student enrolment grew rapidly as the number of school leavers eligible to enter higher education grew from almost 64 000 in 1999 to just over 85 000 in 2004, this growth was not accompanied by an improvement in the quality of school leavers entering higher education resulting in students dropping out and performance targets not being met.⁴

⁴ Research conducted by Umalusi in 2004 revealed that the rapid growth in pass rates over the period 1999-2003 was accompanied by a decline in the standard of the SCE and by more lenient moderation procedures. Thus, the increased numbers of matriculants entering higher education

The capping of higher education enrolment creates a tension between the economy's need for a highly skilled and knowledgeable workforce and the capacity of the higher education sector to produce these skills. JIPSA has identified the need to increase the number of engineering graduate by 1000 a year and graduate technologist by 300 a year, as well as gearing up skills in areas such as tourism, education, management and business process outsourcing. These targets would require an increase in enrolment in higher education institutions, rather than a capping of enrolment. The Department of Education has decided that capping enrolment for funding purposes would occur in 2005 and 2006, but for the period 2007 to 2009 the funded head count and FTE student total for each university would be decided through 'bilateral discussions' between the Ministry of Education and each university (Department of Education, 2005d).

While the production of sufficient highly skilled graduates is dependent, in the first place, on the number of suitably qualified school-leavers who are able to enter higher education, it is also tempered by the high drop-out rate of those who do enter higher education. The Department of Education has found that half of admitted students drop out of the system without receiving a tertiary qualification (Department of Education 2005c). A report on increasing the supply of engineers and built environment professionals, technologists and professionals (EBEPTT) (JIPSA unpublished report, undated) found that the throughput of EBEPTTs at universities and universities of technology is around 65 percent at the 'top institutions' and about 20 percent at some others. Throughput rate is defined as the ratio of graduates to initial enrolments within 6 years of a four year programme. The report found that the throughput rate in minimal time was 'around 35 percent at the best institutions and between 5-10 percent at the others'. The report found that comparable throughput rates in East African, Indian and US institutions was around 80-90 percent. A high drop-out rate and poor throughput rate also points to the fact that many learners leave school and enter the higher education system without the cognitive skills necessary for the attainment of high level skills and knowledge.

One of the responses of the higher education sector to the need for high level technical skills were target ratios set by the NPHE for enrolment in the humanities, social sciences and education (HSSE), business, commerce and management (BCM) and science, engineering and technology (SET) of 40:30:30 (Ministry of Education, 2001, 26). In 2001 the HSSE:BCM:SET ratio was 49:26:25 (Ministry of Education, 2001, 26). The target ratios in favour of BCM and SET were based on what the Ministry felt could be achieved in the short-term 'as the school system is not at present able to produce large numbers of matriculants who have the required proficiency in mathematics' (Ministry of Education, 2001, 26). Furthermore, the Ministry felt that the desirability of adjusting the share of the humanities below the planned 40% was open to question as the humanities play an important role in career-oriented training in a range of fields such as education,

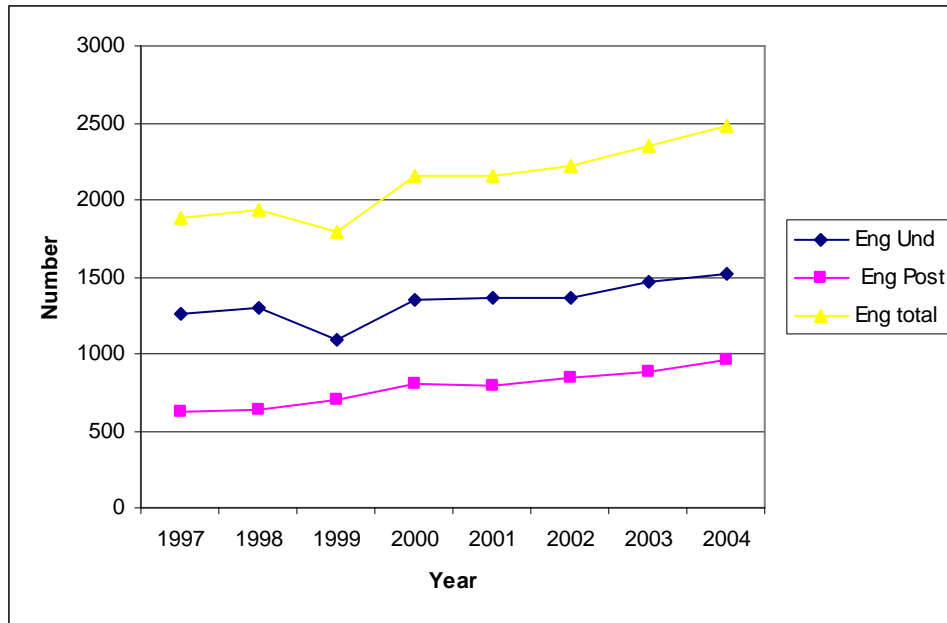
were insufficiently prepared, and consequently the throughput rates in tertiary institutions declined. Since 2005 Umalusi and the Department of Education have embarked on a concerted effort to raise the level of cognitive demand of the SCE, and this has been accompanied by a predictable decline in the pass rate.

law, private and public sector management, social development and the arts (Ministry of Education, 2001, 26).

Substantial progress has been made in shifting the balance of enrolment towards SET from 25 percent of total enrolment in 2001 to 29 percent in 2005. The share of enrolment held by the HSSE decreased from 47 percent in 2001 to 42 percent in 2005 while BCM increased its share to 29 percent (Information provided by Ms Jean Skene, Department of Education, 31/5/2007).

While there has been some redirection of enrolment towards SET, the production of advanced skills remains a problem. An example of this is engineering. Although there has been a steady increase in the number of engineers graduating from universities (excluding universities of technology) (see Figure 11), the average annual growth rate has amounted to only 3% between 1997 and 2004. JIPSA's requirement that the number of engineering graduates increase by 1 000 a year, was based on graduation statistics of 2004 when just over 1 500 engineers graduated from undergraduate professional degrees (Lawless et al , 2006). An increase of 1 000 engineering graduates a year means that universities will have to increase their output by 66%. In fact 1 000 additional engineering graduates a year might not be sufficient. Lawless et al (2006) state that 'given the planned 6% sustained growth, the worldwide shortage of engineering skills, the significant number of retirements expected over the next five to ten years and globalization', the 1 000 additional engineering graduates should be seen as a 'starting target' for increased engineering graduates and that the country should aim to graduate at least 3 000 to 4 000 in the medium term. In addition to the extra engineers required, 'an increase in architecture of some 30 percent to 35 percent is required and quantity surveyors needs to increase by at least 65 percent, to keep pace with the long term construction phase expected' (Lawless et al, 2006).

Figure 11 Engineering graduates at universities (excluding universities of technology), 1997 to 2004



Source: Department of Education HEMIS, supplied 16/5/2007

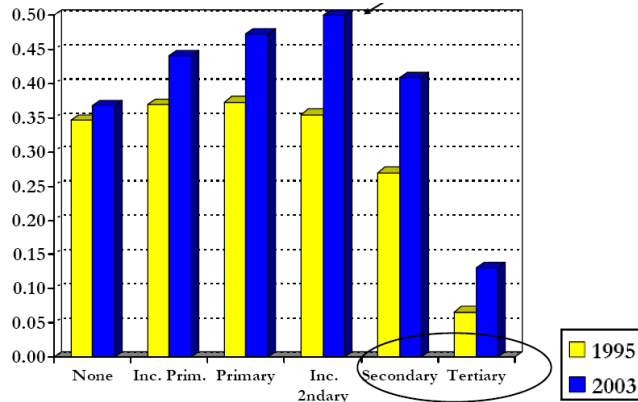
According to Steyn and Daniels (2003, 580) the numbers of learners enrolling in and graduating from engineering ‘correlate with the difficulties reported in attracting sufficient numbers of school-leavers with appropriate mathematics and science qualifications’. Two reasons are put forward for this. Firstly, engineering faculties at universities have found that the pool of school leavers who qualify to enter engineering (i.e have suitable matric mathematics and science passes) has decreased. The primary cause of this is believed to be ‘the dearth of well-qualified science and maths educators, particularly in schools servicing disadvantaged areas’ (Steyn and Daniels, 2003, 570). The second problem is the attractiveness of the engineering profession to suitably qualified individuals, which is affected by perceptions of expected remuneration and employability. Remuneration rates for engineers are often below those offered by the finance professions, and therefore, engineering recruitment suffers. To counteract this problem, engineering faculties are investing heavily in marketing.

Fact 10 Education and Unemployment

One of the key questions about the education sector is how well its graduates transition into the world of work. The work of Borat (2004) provides some important insights on this issue. The figure below shows the relationship between levels of schooling attained and the unemployment rates. As one would expect, higher levels of education are associated with higher levels of employment. However the picture has changed between 1995 and 2003. By 2003, around half of all learners that spent some time in secondary school or equivalent did not find work. This suggests that going to secondary schooling is no longer a guaranteed ticket for employment, despite the severe shortage of certain forms of skilled labour. Earning a senior certificate improves chances, but even here significant numbers remain unemployed. Borat also notes that the ‘graduate

unemployed’, higher education graduates who are unemployed, is growing. Given the relatively large number of these individuals, he suggests that the higher education system may not be working optimally, i.e. providing the qualifications needed by prospective employers.

Figure 12 Unemployment rates and education in South Africa



Source: Borat, 2004.

Conclusion

In sum, the education sector is defined by close to universal access to primary schooling, and extensive access to secondary school. While access issues have been addressed, the sector faces a serious challenge on the quality side. The evidence suggests that the vast majority of learners never acquire basic language and mathematics skills at primary school level, a problem that limits achievement at secondary level and restricts progression and success in higher education. An added problem relates to the slow down in the production of artisans, and the mismatch between particular skills developed in higher education institutions and the needs of employers.

What’s being done?

The Department of Education’s Strategic Plan for 2007-2011 (2007) has identified its overarching goals for ASGI to include strengthening the general education system for all and improving access to high skills and a cognitively demanding curricula in schools and colleges. More specifically, four of the five the ministerial goals for 2007/08 would impact on the quality of education. In this section, we describe some of the important government initiatives being planned or underway, designed to address the nine key problems we have identified above.

Initiative 1 Professionalising the bureaucracy

The importance accorded the task of improving the effectiveness of the system by central government is indicated by fact that cabinet has taken charge of directing the development of the education bureaucracy, as part of a larger process of strengthening the civil service. An investigation commissioned in 2004 by the Minister for the Public Service and Administration found that lower-skilled workers comprised half of public sector employment, while semi-skilled workers made up 40%. Managers and skilled personnel made up just 2% and 8%, respectively.

This analysis raised doubts as to whether the balance of skilled personnel was commensurate with the skills profile required by a developmental state. Skills shortages are manifested in difficulties in filling vacant posts and are found in certain occupational categories. Financial and computer skills were most needed, while literacy skills and skills for managing projects, human resources and communication are all required. Skills gaps include transversal skills ('hard' skills like project management skills or 'soft' skills like conflict management or communication skills) and specific skills associated with particular job profiles or occupational categories.

A cabinet legotla in June 2006 laid out a carefully structured activity plan for improving this situation. This includes standardizing job descriptions for officials at all levels of the system, instituting capacity building programmes, streamlining the quality management system and analyzing and, where necessary, revising salary structures. Although the targets set by the cabinet process have already proved too ambitious, there is no doubt that this process is on the right track, and already the effects are being felt in some provinces: for example, Limpopo appointed 800 district-level subject advisors in the second quarter of 2007.

However, there is a very long way to go on this issue and a long-term commitment by central government to improving the capacity of all ten departments of education is required if significant efficiency gains are to be achieved. In the meantime, until such gains begin to be felt throughout the system, all efforts aimed at improving the quality of schooling will experience less than optimal impact. This initiative, therefore, must be accorded the highest importance.

Initiative 2 Literacy programmes

A second critically important task is to improve the quality of reading, writing and mathematics offered by the country's 23 000 primary schools. The Department of Education has started to develop a number of policies in the area of literacy. In a recent interview (10 May 2007) the Minister reinforced this point, "My colleagues, the provincial MECS, and I have agreed we should strive to put reading at the centre of the education agenda for our country." At the national event to commemorate UNESCO'S World Book Day, the minister noted that the Department of Education has developed a national reading programme, with a number of strands. These include the Drop all and

Read campaign, designed to encourage principals to set aside a specific reading period in schools and a 'toolkit' for schools, which describes methods of teaching reading and writing and provides benchmarks for each school quarter and grade. In addition, in the past three years, over 10 000 primary schools received story books, written in all official language to establish classroom libraries. The Department is also currently piloting early-grade reading assessment instruments in Sepedi, Xitsonga, Tshivenda, isiXhosa, isiZulu and English to help teachers monitor reading progress in their classrooms. During 2007, the remaining languages will be completed (Pandor, 2007).

However, these elements do not add up to anything like a coherent national literacy programme, and indeed the three provincial initiatives described below appear to be taking little direction from the national level. Another factor hampering the effective delivery of quality improvement programmes is the inability of district personnel to participate. The reasons for this include: large numbers of vacant posts, a heavy workload consisting of large numbers of unconnected tasks, and low levels of capacity.

Western Cape

Over the past five years, the Western Cape has developed a strategy to address the poor achievement in literacy and mathematics in the province. The assumption that the provincial officials work with is that to make a contribution to ASGISA and JIPSA is critical for WCED to provide a solid general education and training foundation for all learners. At the centre of the strategies are what is referred to as three solutions:

1. Develop and support teachers
2. Work at systems level to attend to the problems surrounding the questions of mother-tongue and learning
3. Advocacy/community/family literacy.

Within schools the strategy concentrates on developing strong pre-school programmes, changing classroom practices, providing learning and teaching support materials, research, monitoring and support, with a strong coordination.

What makes this intervention unique is the emphasis on the fact that all schools are required to take part in provincial tests and all schools are given targets. The province uses the results of these tests for diagnostic purposes. The tests also allow the province to set realistic 'targets' for each and every school. The intervention is lead by a senior manager of the department with a large team of 100 provincial officials. As noted in above (see tables 4 and 5), progress has begun to be made in improving basic education in the province, and these gains are likely to accelerate as the initiative moves into full gear.

Gauteng

Gauteng's Accelerated Programme for Language, Literacy and Communication (2007) is a joint venture between the provincial Department of Education, READ Educational Trust and JET Education Services. The seven year programme, which is commencing with a pilot in 2007 aims to reach all primary and secondary schools in the province over a 7 year period. The initiative includes the following components:

- A professional development programme for teachers;
- Reading and writing programmes for learners;
- Reading and instructional materials for pupils and teachers; and
- A quality assurance framework to keep the programme on track and measure impact.

While the initiative for this intervention came from the Gauteng Department of Education, READ provides the teachers training, classroom resources and consultant services, JET is involved as the evaluator of the initiative. As with the Western Cape model, the initiative includes regular assessment of learners in all schools in the province, beginning with a comprehensive literacy profile of each school.

KwaZulu-Natal

While the formal status of this initiative needs to be confirmed, it appears that the KwaZulu-Natal Department of Education and Culture has a Whole School Information Literacy Programme which includes a Whole School Reading Programme, with timetabled reading strategies designed to instill a love of reading in learners of all ages. This is allied to the Provincial Reading Policy Guidelines, sometimes referred to as the Provincial Reading Policy. To advance this policy, the provincial department established a Reading Forum with membership from government departments, unions and universities. The mandates of the forum is to develop a reading policy and to monitor its implementation.

Initiative 3 Pro-poor funding arrangements

The Quality Improvement, Development, Support and Upliftment Programme (QIDS-UP) is based on the assumption that poverty is the major determinant of underachievement for the majority of schools in the country, and that they do not have the basic minimum resources required to make quality learning possible. QIDS-UP was launched in 2006, and just over R2 billion has been allocated to the programme over the 2007/08 period. The idea is to provide between R75 000 and R100 000 to each school specifically for books and other resources such as toys focusing on primary schools.

In her 2007 budget speech the Minister (Pandor, 2007) noted that “the programme was not given the attention we had anticipated in provincial budgets last year. As honourable colleagues are aware provinces determine their own allocations and while we may agree priority areas they are not always funded. However, this year the improvement strategy will be supported and acted upon in all provinces”. Whether provinces are able to keep to

these goals in the face of the management problems noted above remains to be seen. However, past experience does not provide a good prognosis.

A second very significant area of pro-poor support to schools is the no-fee schools policy initiated in 2006. In that year 20% of the poorest schools were declared no-fee schools, and this will be increased to 40% in 2007. Here too the Minister noted implementation difficulties in her 2007 budget speech.

Initiative 3 Secondary schools

In response to the low numbers of learners passing Higher Grade Mathematics and Science, the Department of Education launched the Dinaledi Programme in 2001. The aim of the initiative was to raise the participation and performance of historically disadvantaged learners in Senior Certificate mathematics and physical science. In the first few years, the initiative focused on 102 selected secondary schools. In 2002, 2003 and 2004, the project showed mixed results. About one-third of Dinaledi schools increased the number of learners that passed higher grade mathematics and science, but many schools showed little or no change, while significant declines were evident in others.

On the basis of insights gained from the project evaluation report and other research, the project was re-authorised for an additional three years, and plans were put in place to strengthen the intervention model. The second phase of the project had as its target increasing the number of students that pass higher grade mathematics and science from 24 000 in 2004 to 50 000 in 2008. The number of schools in the initiative was increased from 102 to 400 (7% of all high schools) in 2005. Most significantly, the criteria for selection into Dinaledi has changed, and only those schools which achieve at least 35 mathematics passes in the SCE among African children now qualify. Thus, in an important sense the Department of Education is acknowledging that, in the face of weak management in the provincial departments, it is powerless to act in the vast majority of schools which exhibit poor levels of functionality. Many private sector donors are following suit and changing their modalities of support to schools, from models which formerly selected the poorest schools irrespective of quality, to those which exhibit some level of functionality.

Increases of 17% for HG maths and 23% for HG science were achieved in the first two years of the programme, and further increases can be expected as Dinaledi gets into full swing in 2007. Whether the department's target of an increase of at least 15 HG maths passes per school will be attained this year seems doubtful, but even half that quantity will increase overall production of these qualifications by 100% in Dinaledi schools and by 12% across the system.

Initiative 5 Reshaping the Vocational Education landscape

Over the last 10 years government has made much progress in modernizing the FET (Vocational) sub-sector, through the following steps:

- Merged 150 small institutions into 50 Public FET Colleges
- Recapitalised the Colleges to the tune of R1.9 billion
- Identified 11 core programmes, in line with JIPSA priorities, and developed new curricula and trained staff to deliver these
- Allocated R600 million in financial aid to students in the Colleges for the 3 year period commencing 2007/08
- Enrolled 25 059 students on the new programmes, against a target of 25 000. These programmes offer a vocationally oriented alternative to the current 'academic' senior certificate (matric) course of study in the last 3 years of secondary schooling
- The Departments of Education and Labour are working on the establishment of a new trade test which will licence 'Twenty-first Century Artisans'.

These developments are part of a larger strategy of refashioning the shape of the entire education and training system, from its current 'hour-glass' shape (12 million school learners, 0.4 m vocational learners and 0.7 m higher education students), to achieve a 'pyramid' shape by 2019 (11.3 m, 1.2 m, 0.6 m).

While the Department of Education is confident that its 11 priority programmes are on the right track, the JIPSA secretariat identifies some obstacles to be overcome before these and other developments will translate into the 50 000 artisans required by 2010. These obstacles include a messy policy and governance terrain arising from the fact that the FET Colleges are administered by the national and provincial departments of education, while the Sector Education and Training Authorities (SETAs) fall under the Department of Labour. Within this context, JIPSA has identified a number of key elements which lie at the heart of unlocking the supply of artisans to the domestic labour market. These key elements are:

- To reach agreement on the list of 16 priority trades that would form the detail of the Artisan 50 000 plan. These 16 trades represent the priority scarce skills and range from boilermakers and automotive electricians to millwrights and welders
- To reach agreement on the various legitimate, but currently disparate training pathways to reaching artisan status. In particular, it is essential that employers, government, training bodies and all other relevant stakeholders accept that an artisan may be trained to the same quality and standard via different routes. The present confusion around legitimate alternative routes, or pathways, to training an artisan has created blockages in the supply of these individuals to the labour market.
- To support short-run employer-led initiatives.

It is further recommended that a number of possible revenue sources be mobilized for those programmes where funding is a particular constraint, including National Treasury discretionary funds, which could be channeled through the DoL or DoE; NSF funds which are currently being disbursed to provinces; SETA monies, which could be

reprioritized to meet short-run employer-led targets; and private sector contributions. Relatedly, it is essential that the tax differential between learnerships and apprenticeships is immediately closed – precisely to incentivise employers to support the Artisan 50 000 expansion plan. The incentive scheme should also take different delivery modalities into account.

Initiative 6 Higher Education Planning

The JIPSA proposal aimed at increasing the supply of engineers and built environment professionals, technologists and technicians indicates that many universities and universities of technology can boost throughput and increase their output of EBEPTTs by implementing the following interventions:

- Improving selection procedures by including processes that measure aptitude and motivation, as senior certificate results (including maths and science) alone have proved to be a poor indicator of success in engineering and the built environment.
- Providing academic support programmes in order to address identified gaps and shortcomings in secondary education.
- Offering pre-entry support in the form of specialized Saturday and holiday school training also in order to address the short-comings of secondary education by focusing, inter alia, on maths, science and language deficiencies.
- Provide academic development to improve teaching practices and course content so that they are more suitable to meet current and future demands.

Scenarios for 2019

Scenario 1 Business-as-usual: Relying on importing skills

Assuming that education policy, programmes and practices continue on the same trajectory of the past ten years, we are likely to see continued low achievement in primary schools, little if any increase in the number of secondary school learners passing high-level mathematics and science and by implication, low levels of entry and high drop-out in science and mathematics related fields in further and higher education institutions. Assuming minimal intervention in literacy and mathematics at primary level, the long-term consequence will be that South Africa will require increasing levels of skilled personnel from outside the country's borders for economic growth to be sustained. The importation of scarce skills, with all its difficulties and unintended consequences will inevitably become 'the' problem for both business and government. In the process, the human potential of millions of South African young people will go untapped, and most prospects for economic improvement for citizens will low.

Scenario 2 *Middle Road: Doing better with what we have*

This scenario assumes that significant and successful efforts are made to do better with what we have. Assuming that by improving the success rates of the small pool of potentially successful schools, improving the market signals such that larger number of potentially successful secondary school students actually choose to pursue studies in mathematics and sciences and that they choose to enter technically related fields such as engineering in further and high education institutions, it is likely that the pool of skills will increase substantially. This scenario is essentially the JIPSA strategy along with effective implementation of various initiatives (e.g. Dinaledi) currently on the table.

The JIPSA and Dinaledi initiatives are based on the assumption that significant numbers of high- to intermediate-level technical skills can be obtained by providing incentives and improving the efficiency of the country's best universities and those high schools that exhibit at least moderate levels of functionality. Under conditions of the current acute skills crisis, these interventions represent the fastest means to providing some relief and, even if they don't fully meet their ambitious targets, are likely to make a substantive difference and deserve every support.

However, this scenario has three long-term limitations. First, it will reach a ceiling if the literacy and mathematics skills of significant numbers of primary school graduates are not substantially improved. The current flow of learners with the knowledge and skills required for technical study at further and higher levels is simply insufficient to sustain even a moderate expansion of these sub-sectors. The second limitation on government's current short-term strategy for alleviating the skills crisis, is that, being largely confined to a few relatively well functioning institutions, it will lead to greater differentiation of the education and training system, and hence will exacerbate South Africa's already dangerously high levels of inequality. Finally, JIPSA and related short-term interventions are focused on the production of technical skills, and will do little to enhance the cause of a more highly educated general population needed to improve productivity of the public, private and SMME sectors.

In pointing out these limitations, we do not wish to be interpreted as undermining government's current plan for addressing the skills crisis: it is not only the best option available in the short term, but is also likely to begin building the momentum required for a larger strategy. However, our concern is that insufficient urgency is evident in putting in place the foundations of a comprehensive long-term plan. The solution to all three limitations is the same: improve the quality of basic education provided by the country's primary schools. Much of the remaining discussion below examines how this improvement might be obtained.

Scenario 3 *High Road: Improve the Quality of Basic Education*

To fully realize our economic, social and democratic goals for 2019, which would require coming to grips with the current and future skills shortages, we will need to pursue a new high road strategy in education. The single most important priority for the education and training system would be to improve the levels of literacy and mathematics of children graduating from our primary schools. This is as much about socializing young citizens into an orderly work environment and developing attitudes of responsibility and initiative as it is about providing them with the foundation knowledge and skills required for all subsequent learning, be it in the higher or further education sub-sectors, or on-the-job training in the workplace. Developing high levels of literacy and mathematics is essentially about inducting children into the comportment required for citizenship in a modern democracy, and a strong case can be made for the view that the failure of South Africa's primary schools in achieving this goal is a key factor underlying many of the country's weaknesses, including high levels of crime and corruption and an ineffective civil service. A constant refrain of this paper has been that improving the quality of primary schooling is essential to increasing the flow of SET skills into the economy, but, even more important, to strengthening the roots of South Africa's democracy and beginning to bridge the massive inequalities which characterize our society.

School improvement has become something of a growth industry among donors and NGOs over the last two decades, with government entering the field in the last five years. Although much of this work has been inadequately evaluated, a critical mass of research studies is beginning to identify the lessons provided by these initiatives. Chief among these lessons are:

- A differentiated approach is necessary, with very poorly functioning schools, which could constitute a majority of 75-80%, requiring much stronger medicine than those which exhibit moderate levels of functionality. This is the principle on which the Dinaledi project, together with a host of new private sector initiatives. Unfortunately, this has led to a neglect of the majority of schools, where no models have proved successful to date. Government's QIDS-UP programme aims to provide resources to the country's poorest primary schools, but much of this effort is bound to lead to less than optimal utilization if management systems are not first strengthened considerably.
- The role of strong, well resourced districts is key to ratcheting poorly functional schools to higher levels of efficiency.
- School management is central, first and foremost in improving the use of time, scores of days of which are wasted every year by the majority of schools.
- Building teacher capacity is central to improving the quality of teaching, but this is a long-term process. In this regard, the Department of Education's recently published National Framework for Teacher Education and Development is a step in the right direction, but is still too general to provide clear guidelines for providers.

These components of the overall strategy are in the process of being put in place. However, a key lever is missing, i.e. a national literacy and mathematics strategy. While current initiatives in the Department of Education such as the Toolkit for Literacy and instruments for the assessment of early reading are important components of such a strategy, on their own they do not add up to comprehensive programme.

What is needed is a national strategy which is:

- Narrowly focused on improving literacy and mathematics achievement in primary schools
- Built on proven teaching/instructional methods
- Rigorously piloted and evaluated prior to any national rollout
- Comprehensively planned in the implementation phase, with a limited set of tasks clearly defined for officials at national, provincial, district, circuit, school and classroom levels.
- Adequately resourced in terms of support to schools by expert mentors, books and stationery, and time.

Such a strategy will need to build on rigorous and comprehensive assessment of learners' achievement. Regarding national testing programmes, a common refrain from academic critics is that increasing the amount of measurement of learning will not improve achievement; repeated weighing of the pig, it is argued, is not going to make it fatter. While a plausible case could be made for this metaphor in the United States and England, it simply does not hold water in South Africa. Until very recently, we have had no national picture of levels of achievement in our primary schools, and even now, save for the Western Cape, evaluation of achievement has not impacted on provinces and schools at all. The good news in this regard is that the Department of Education is progressing well in its development of a Systemic Evaluation system, increasing the size of the sample with each successive administration. The system will have optimal benefit if applied to the entire population of schools, and the national Minister has stated her intention of moving in this direction. Such a programme will serve a variety of functions. First, it will send a powerful signal to schools about the importance attached to literacy and mathematics achievement. Second, once the evidence of specific school performance is known, it is likely to inform educators of the required level of achievement. Third, better and more systemic evaluation will allow for strategically targeting of interventions.

The implementation of this strategy is heavily dependent on the effectiveness of the national and provincial departments of education. While there is considerable variation across and within provinces, it is fair to say that most parts of the system exhibit low levels of functionality, and significant parts are essentially dysfunctional. Central government has recognized this problem and is in the process of overhauling the entire system. However, this process will take a long time to impact on service delivery, and we propose that the process be speeded up by implementing targeted programmes, which take their lead from initiatives that are successful.

If the overall primary school literacy and mathematics strategy, with all its levers and programmes, is to be effective it will take five years before it begins to show any results in even the best provinces, and a good 15 years before the results begin to feed into the further and higher education sub-sectors. If this task is commenced in 2008 it may just be beginning to show results in 2019. Every year delayed is another year in which the real take-off of the country is deferred.

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