

Public Disclosure Authorized

Republic of South Africa Systematic Country Diagnostic

An Incomplete Transition: Overcoming the Legacy of Exclusion in South Africa

Background note

Education in South Africa

Servaas van der Berg and Heleen Hofmeyr

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Introduction

The South Africa (SA) education system performs extremely poorly along a number of dimensions. A host of research, our own and that of others, has shown that this can be ascribed to a school system that is bimodal, i.e. where the distribution of test scores at every level exhibits sharp dualism between the smaller part of the school system, mainly schools that historically served whites and Indians, which perform similarly to schools in developed countries, and the bigger parts of the system, historically serving mainly black and coloured children, which performs extremely weakly, also in comparison to most much poorer African countries. A fundamental concern is thus that the learning that takes place in schools is highly unequal with respect to the socio-economic status of children and their race group.

Though these performance differentials are evident throughout the school system, an important feature is that these inequalities in performance manifest early, so that by Grade 4 it is already relatively clear which children have fallen so far behind that they would probably not be able to reach and pass matric with good enough marks to go on to university studies. Given the large returns on obtaining a university degree, this early failure of the education system has massive implications for labour market outcomes, and thus for social mobility. Low quality education is for many children a poverty trap.

From the perspective of the skills needs of the South African labour market, the major problems lies in the extremely weak and unequal school system. Early Childhood Development has expanded, but does not contribute much to improving school performance. On the other side of the spectrum, the university system functions moderately well, though unevenly, but still accommodates a relatively small segment of the population for an upper-middle income country. Moreover, flows through the university system are slow: even after six years of study, barely half the intake of undergraduate students would have completed a three or four year degree programme (HEMIS 2016). This slow throughput is probably not unrelated to the quality of the school education experienced by most students. The other large components of the post-school system are Technical and Vocational Colleges (TVET), a system that has expanded rapidly but that does not appear to offer skills that are appreciated in the labour market, and the Sector Education and Training Authorities (SETAs)², which have not been functioning well. Thus for the average young person, universities still appear to offer the best prospects for access to employment and good earnings in the labour market. While that is the case, the vocational education system and SETAs will continue to attract largely only those people who have no further academic route open to them.

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² SETA's are institutions set up within within each industry that provide learnerships, internships and other programmes aimed at providing skills training. For example, the BankSETA is tasked with finding workplaces that could be used for practical workplace experience, as well as setting up and registering learnership agreements. SETA's are funded through the national skills levy, a 1% earmarked tax on wages of all employers paying more than R500 000 in wages. The SETA's do not provide the training themselves but allocate these funds to employers or other service providers for training programmes. Unions have strong representation on the SETAs.

Broad-based improvement in this whole education system must be based on improving the quality of school education over a broad range, expanding the cognitive skills of most youths and providing the basis for workplace skills acquisition. This has to be the first priority, and therefore recent signs of improvement in the quality of education (described later) are important, albeit from a very low base. That does not mean that measures in other parts of the education and training system have to wait, but their effectiveness depend to a great degree on the cognitive development occurring in schools. The productivity improvements that can drive economic progress have to be built on this foundation.

Brief background on evolution of education policy since 1994

Education policy since apartheid

The post-apartheid government was faced with a school system that was highly fragmented, segregated by race, and with greatly discriminatory funding for teachers, learning materials and schools. This education system had little legitimacy, given its role under apartheid in perpetuating racial inequalities. Although the Bantu Education Act of 1953 was repealed in 1979, it was replaced by the Education and Training Act, which essentially created an 'independent' education system for each of the four apartheid racial groupings. This race-based education system was only fully dismantled in 1994, though some modest concessions were made towards the end of this period that allowed white schools to enrol some black children.

Dealing with this was one of the most urgent tasks the new government faced. Despite modest reforms at the end of the apartheid era, the major dismantling of the racially based edifice only occurred in 1994 with the political transition.

The rapid integration of the school system into a single system, administered by a national department and nine provincial departments, was one of the most fundamental and perhaps least acclaimed transformations in the first few years after the 1994 political transition. This implied that rules had to be set that specified the extent to which schools could determine their own policies regarding language, admission, setting school fees, supplementing state resources, and educational resource allocations. Schools were allowed some freedom to make choices, as long as race-based admission and other policies were eliminated.

The dramatic shift in the spending of public resource to the benefit of the black population has been documented elsewhere in fiscal incidence studies. The shift in resources in education was particularly rapid and incisive; there was a considerable reduction in the resources allocated to schools that formerly were for white children only, and a commensurate increase in that benefiting formerly black schools. This included the equalisation of salary scales and also teacher-pupil ratios, for those teachers funded by the state. More recently, relatively strong growth of teacher salaries from 2009/10 of 2.4% per year to reach R374 450 in 2016/17 has put upward pressure on the teacher wage bill, with one of the consequences stagnation of teacher numbers over this period at 404 000 (South Africa, National Treasury 2017: 62). Hiring of teachers takes place by the provinces, who have some discretion about this. Some provinces have been under considerable fiscal pressure and have accordingly not always filled positions in the last four or five years. In addition, there is sometime also a problem in getting teachers to accept positions in remote schools.

Important continuities and discontinuities

The most important discontinuity then relates to the unification of the fragmented school system. This also led to major changes in the composition of formerly white schools, with around half the enrolment in such schools now being learners other than whites. Another important new initiative was the introduction of Grade R, a reception year preceding Grade 1, and the rapid roll out of this system in the past decade.

Despite these changes, there were also some major continuities. The most important remain the massive differences in infrastructure in schools that served the different parts of the school system under apartheid. Despite government efforts to reduce these, there are still many schools with inadequate infrastructure. This may not be such an important factor in determining learning outcomes, but has a huge influence on perceptions of redress and can be seen as perhaps more of a human rights issue than simply an educational issue. Also, because wealthier schools are allowed to set school fees and use these to supplement public resources, actual pupil-teacher ratios were not equalised, if teachers paid by schools are included.

Another continuity is the very large performance differentials between the different parts of the school system. Consequently, analysts have identified strong bimodality in performance that largely follows historical divisions. Nevertheless, class rather than race has now become a stronger dividing line than in the past, considering that many of the beneficiaries of the well-functioning part of the system are not white.

A few issues regarding politics and education reform

Considering the important real and symbolic role of educational discrimination under apartheid, the transition brought very strong pressures for dramatic change. It was thus somewhat surprising that the Hunter Committee's recommendations that schools should be allowed to continue charging school fees was accepted. The committee had argued that failure to allow that would lead to an exodus of the middle class to private schools, with detrimental effects on the public system. They were proved right in that the private school enrolment of less than 4% of total school enrolment is much lower than in many upper-middle-income countries, particularly in Latin America. On the other hand, school fees were later abolished in the bottom three school quintiles. However, from the outset government set rules to avoid children being excluded from schools because their parents cannot afford school fees.

One of the major political issues regarding the working of the school system revolves around the role of teacher unions. The majority union, SADTU, is very strong and according to a recent Ministerial report (the Volmink report) this union effectively controls six of the nine provincial education departments. Clashes between government and the unions have had major impacts, despite the fact that SADTU is a member of Cosatu, an alliance partner of the ruling ANC. These clashes happened in 2008 with strikes about teacher pay, which led to the closing of many schools for an extended period. In 2015 SADTU and other unions' objections led to a refusal to implement the Annual National Assessment in schools nationally, one of the few potential accountability systems that government has tried to put in place.

Given the strong role played by teachers and schools in the opposition to apartheid, there is strong opposition to anything approaching an inspectorate, considering the role that this institution played under apartheid. Thus monitoring teacher behaviour in classrooms is not an accountability measure that is easy to implement.

Currently, ECD practitioners are not unionised and their compensation is determined by the financial viability of the centres they are attached to. It is likely that this will in future become something that will attract strong union objections.

Ironically, given weak education quality, dissatisfaction with the quality of education does not appear to be a major factor, at least not in the annual General Household Survey. At tertiary level, however, student movements have become strong, rallying around the issue of finance as well as broader political issues, e.g. the role of Afrikaans as a language of instruction at some universities that was perceived to exclude some students, and the Rhodes must fall campaign, aimed at re-interpreting South African history from an African lens. Financial demands of the Fees Must Fall movement have become somewhat unrealistic, however, and the relative amorphousness of parts of this campaign have made it difficult for university and national authorities to negotiate with the movement.

National Treasury has estimated the costs of achieving the enrolment targets set out in the White Paper on Post-School Education and Training as well as providing financial aid to cover the full cost of study to 30 per cent, 50 per cent and 75 per cent of undergraduate university students. In these scenarios university enrolments increase from about 980 000 in 2015 to 1.6 million by 2030 and TVET enrolments from 730 000 to 2.5 million. This would result in public expenditure on post-school education and training rising from 1.4% to 2.5% of GDP if universities' fees and other ('third-stream') income sources keep pace with the rise in enrolments. It is more probable that government would have to fund shortfalls from fees and third stream income, thus providing an increasing share of total post-school education and training costs. Providing additional subsidies to poor and middle-income students would further increase spending. If financial aid is to be provided to three-quarters of undergraduate university students, this would push post-school education spending up to 4.1 per cent of GDP by 2030/31 (South Africa, National Treasury 2017: 56).

Early childhood development

Why ECD is important in South Africa

The National Development Plan (NDP) drawn up by the National Planning Commission (NPC) describes early childhood development as "a top priority among the measures to improve the quality of education and long-term prospects of future generations" (NPC 2013:71). Based on this, the NDP proposed that an additional year of pre-school should be added to schools before the current reception year or Grade R.³

There is now strong agreement across disciplines that early development of children is both cost effective and inequality reducing. (For influential economics literature on this, see the work of Heckman and co-authors.) In South Africa there is agreement that inequality in education already manifests early in the school system. Reducing these inequalities is one of the main reasons why the NDP and the education authorities put such emphasis on the reception year (for children aged 5), but also on even earlier learning in ECD centres (ages 1 to 4). The issues with quality and inequality in the school system are not improved by the current weak, fragmented and poorly resourced ECD sector.

³ Different organisations adopt different definitions of ECD. While UNICEF includes all children up to the age of 8 in this category, the South African policy on ECD covers children from birth to the year before they enter formal school. It is unclear from the policy whether this is Grade R or Grade 1.

The nature of South African ECD

Two main planks of Early Childhood Development can be identified in South Africa. The first is the system of community based early childhood development for children 0 to 4 years old, which is subsidised by government. The second is Grade R, a preschool year largely based in public schools and preceding Grade 1 and aimed at children 5 to 6 years old. ECD subsidies take two major forms: Subsidies by the Department of Basic Education (DBE) of formal Grade R, mainly in public schools, and subsidies for community based ECD facilities by the Department of Social Development (DSD).

Grade R in public schools appears relatively well organised and many matters are well institutionalised, such as School Governing Bodies and financial reporting. Practitioners/teachers are relatively experienced and have a fair level of ECD qualifications. Since 2009 salaries were more than twice as high for practitioners in Grade R in public schools paid through Persal, the public sector electronic salary system, than for practitioners with similar qualifications directly paid by schools (School Governing Bodies). This raises the question whether public salary levels are inflated compared to market demand and supply and what teachers with similar characteristics need to be paid to attract them to ECD.

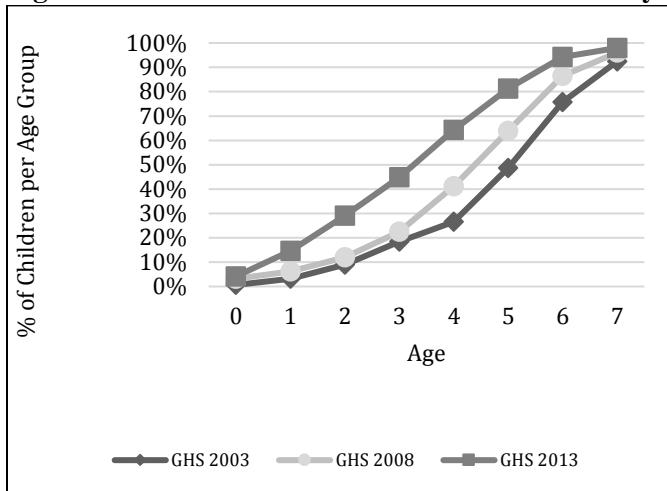
There is a lot of cross-subsidisation between ECD (Grade R) in schools versus the rest of these schools. For instance, financial outlays on fencing, playgrounds, toilet facilities, etc. are difficult to allocate. From National Treasury's Provincial Budgets and Expenditure Review 2010/11 – 2016/17 we know 2.1% of children enrolled in public schooling attend ECD, and ECD receives 2% of the overall education budget. Thus spending on ECD appears to be roughly proportional to the number of children in ECD. On the other hand, more detailed analysis that we did for DPME in 2013 concluded that "This average of R3 112 [spent per child in Grade R] compares to an average spending of about R10 500 per learner in public ordinary school (excluding Grade R) in 2011" (Van der Berg et al. 2013: 74)

The sector relies on a mixture of government grants and fees. Funding is fungible and there is no way to isolate and track the spending triggered by the government grants, i.e. to determine whether subsidies or fees funded teacher salaries or food expenditure. But clearly, grants considerably reduced the outlays poor parents had to make and thereby made ECD much more affordable. The average enrolment in registered community based ECD centres is about 50. Most of these facilities seem to be run as NGO type organisations in which there is not really a dominant owner.

ECD Access

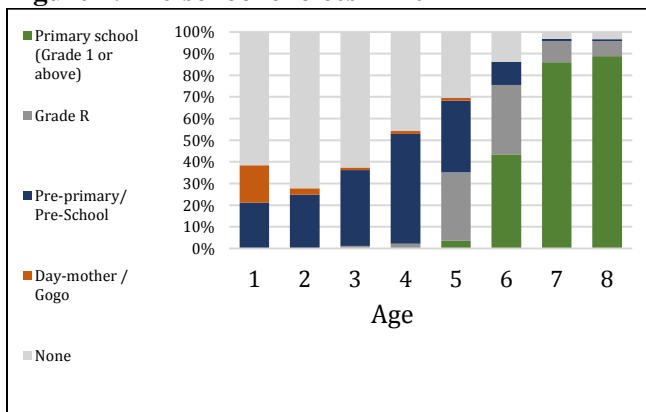
According to the Department of Basic Education, enrolment in Grade R more than doubled from about 300 000 in 2003 to 779 370 in 2013. Coverage and access have expanded greatly, particularly in poorer schools. Figure 1 shows enrolment in school and various forms of pre-school by age from the General Household Survey for 2003, 2008 and 2013, which clearly indicates the improved enrolment at all ages shown. Figure 2 shows the nature of pre-school attended according to the third wave of NIDS, again by age. From these data it is evident that about half of South Africa's four-year olds are not currently attending any form of early childhood development programme, particularly in rural areas. As Kotzé (2017: 68) points out, in preparing for universalising a pre-grade R year, it will be necessary to recognise that the current facilities will not have adequate space or resources to accommodate the additional influx of learners.

Figure 1: Overall enrolment rates of children in any education institution



Note: Categories considered were primary schools, Grade R, pre-schools, crèches and ECD centres.
 Source: 2003, 2008 and 2013 General Household Surveys, as shown in Kotzé 2017: 63.

Figure 2: Pre-school choices in 2012



Source: National Income Dynamic Study wave 3, as reported in Kotzé 2017: 64.

ECD Affordability

The ECD audit of 2013 captured information from more than 17 000 ECD centres, of which 45% were fully registered, 11% conditionally registered, and 44% unregistered. Median fee income per child amounted to around R70 per month in fully and partly registered facilities, and R113 in unregistered facilities, while median state subsidy amounts per month worked out at R124 in registered, R78 in conditionally registered and R0 in unregistered facilities. These modest income sources leave the centres very little money to offer nutritious food and to carry out a proper ECD function, yet the cost of such centres makes it difficult for many parents to afford such care. Median food expenditure per child was R67 in fully registered centres, R58 in conditionally registered centres and R47 in unregistered community centres. Food constituted 28% of average expenditure and salaries 52%. (EPRI: 261, 265, Tables 55, 62 & 63). One consequence of low income levels of these centres is that practitioner salaries are very low. Average salaries range between R1 400 and R2 000 (excluding other benefits). In 2013, a minimally qualified primary school teacher (matric plus two years of studies) received a starting salary more than 10 times as large if benefits are included (R21 000 per month), and somewhat less (R15 000 per month) if benefits are excluded.

Salaries are even lower in rural areas (Kotzé 2016: 19). Only 10% of ECD practitioners or assistant practitioners have any qualification above Grade 12 and 74% of practitioners and 88% of assistant practitioners have no qualification in ECD (Kotzé 2015: 17).

ECD impact and inequality

An analysis of the impact of exposure to Grade R on subsequent learning outcomes, based on data from the Annual National Assessment, has shown significant, though modest, effects of the introduction of Grade R on learning performance throughout the primary grades. Encouragingly, this effect does not appear to decline with time. Exposure to Grade R on average improved mathematics and home language test scores by 2.5% and 10.2% of a standard deviation respectively. Considering 40% of a standard deviation as roughly one grade level in school (see Filmer et al 2006), Grade R causes an average improvement equivalent to 6% or 25% of a year's learning across all grades, or for a school year of 200 days, it amounts to what the average learner should learn in 12 days or in 50 days of instruction for mathematics and home language respectively (Van der Berg et al. 2013).

However, the results indicated that there was no significant effect on test performance in lower quintile schools, while a positive and significant effect of 10% and 20% of a standard deviation was measured for Quintile 4 and Quintile 5 schools respectively. Thus Grade R increases learning in the wealthiest quintile by approximately half a year, while there is statistically no indication of benefits for the lower quintiles, thus widening rather than narrowing the performance gap, exactly the opposite effect than the intended one. The authors conclude: "Thus the gains follow a pattern that is all too familiar in the South African schools system: Positive interventions in schools to improve performance fall on fertile ground in some schools – mainly in stronger provinces and higher quintiles, where capacity may already be strong. The schools that have the largest deficits unfortunately do not gain as much and may even fall further behind. This may have much to do with the quality of interventions ..." (Van der Berg et al 2013: 61).

Thus far no rigorous analysis of the effects of ECD centres has been undertaken. The best available evidence is from analysis of SACMEQ III, where questions about exposure to preschool (ECD or Grade R) were included (Spaull 2011; DBE 2010). Further analysis of this dataset again concluded that there was suggestive evidence of a possible positive effect of such exposure, and that once again this is larger for children from wealthier backgrounds. This is not an uncommon finding: Social gradients in education occur throughout the world, in part because wealthier parents can offer their children more support, including support with school work. A similar finding applies to regression analysis based on the General Household survey, but no evidence of a possible effect could be found in analysis of the National Income Dynamics Study, NIDS (Van der Berg et al. 2013: 34 et seq.)

The literature agrees that the quality of cognitive and other development activities in ECD centres in South Africa generally leaves much to be desired, and that such centres often fulfil a more basic function for parents, namely looking after their children while they are working. More attention to quality is difficult given the small staff involved in monitoring ECD facilities, with the consequence that most attention falls on monitoring physical aspects of these centres, which in itself is a daunting task, as the data from Table 1 shows.

KwaZulu-Natal, the Eastern Cape and Limpopo are the three provinces with the largest percentage of ECD centres that lack adequate basic infrastructure. In Limpopo, 70% of ECD centres do not have adequate ablution facilities, while in KwaZulu-Natal, 60% of ECD centres are not connected to electricity. This

means that more than half (52%) of ECD centres in KwaZulu-Natal have to cook the children's meals on open fires. In these three provinces, roughly half of ECD centres stated that they require urgent maintenance and repair, roughly a quarter do not meet the minimum requirements for being an ECD centre and about 10% are reported as not safe for children. (Kotzé 2017: 70). More than half of ECD centres are overcrowded. Many also lack basic recreational equipment and resources such as tables, chairs and educational toys.

Table 1: Percentage of ECD centres that lack adequate infrastructure

	Inadequate Water	Inadequate Electricity	Inadequate Toilets	Overcrowded
Limpopo	42%	40%	60%	63%
KwaZulu-Natal	36%	60%	39%	64%
Eastern Cape	41%	48%	33%	51%
Northern Cape	15%	39%	20%	65%
Mpumalanga	15%	24%	41%	58%
North West	25%	22%	36%	66%
Free State	5%	18%	14%	55%
Gauteng	2%	9%	9%	55%
Western Cape	2%	4%	2%	40%
National	20%	25%	26%	57%

Notes: Adequate water is defined as any water from a tap inside the centre or on the site; adequate electricity is being connected to the electricity mains; adequate toilets are flush toilets connected to the sewerage system or a septic tank, chemical toilets and potties. A centre is deemed overcrowded if there is less than 1.5 m² indoor play space per child enrolled.

Source: 2013 ECD Audit, as summarised in Kotzé 2017: 70, Table 9.

Key issues for reform of ECD

The expansion of Grade R for a second year does not seem wise, considering the current quality issues and the additional demands such expansion would place on the school system, inter alia in terms of personnel, administration, and space/infrastructure.

Improving the quality of Grade R in poorer schools is a priority, to ensure that it contributes to reducing inequality in cognitive performance rather than increasing such inequality. Kotzé (2015: 21) proposes that this should take the form of extensive investment in infrastructure and learning and teaching support material, and training and capacity building of the existing ECD teaching force.

ECD practitioners are extremely poorly paid, with the result that personnel quality in ECD centres is generally poor. Training and selection issues are vital, but an increase in subsidy levels to attract more able practitioners can hardly be avoided.

Monitoring the quality of the cognitive, social and emotional development of children in ECD centres is an urgent priority. Currently these centres can often get away with offering poor quality education due to the lack of monitoring by the authorities. This would require more personnel in the provincial Departments of Social Development to undertake this function, after the necessary training. To ensure that provinces do actually implement such a policy, an earmarked grant from the national level may be necessary.

Basic education

Key trends, with a focus on inequality

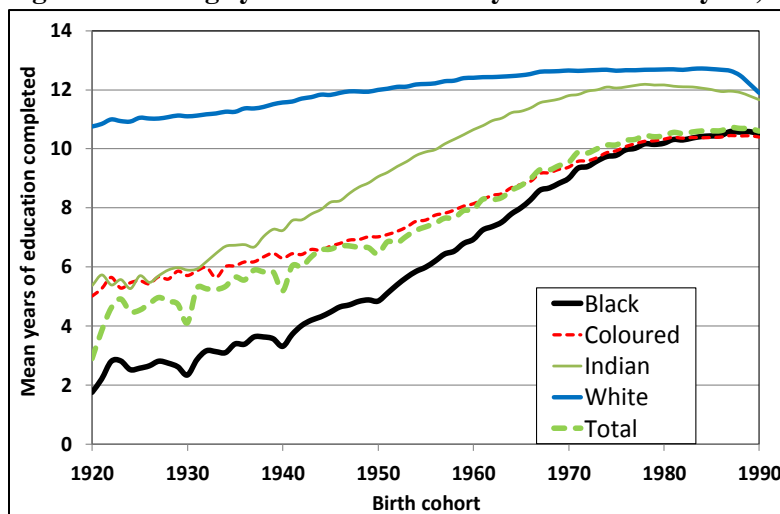
Stark racial inequalities in education are a major legacy of apartheid. This manifests in both flows through the school system (‘attainment’) and in actual learning as measured in cognitive tests.

Inequality in the quantity of education provided

Inequality in education quantity is influenced by both access to and progression in schools. This will be referred to as educational attainment, i.e. years of education completed. It is one of the ironies of the apartheid period that it saw a rapid expansion of education for all race groups, with the quantity of education received by the majority black population in particular expanding at unprecedented rates in the 1960s and 1970s. Simkins (2002: 2) finds that “Between 1960 and 1996, embedded human capital in South Africa, measured in completed school years, rose from 48 million to 230 million”, at a quite remarkable growth rate of 4.45% per year. Yet quality was extremely weak.

Figure 3 shows, based on census 2011 data, the average number of years of education attained by birth cohort. As survival is selective, data for older cohorts may slightly over-estimate educational attainment for the full cohort. Nevertheless, it provides a good reflection of progress. Particularly noticeable is how the gap between whites and other groups has narrowed. Whilst the gap in attainment for black and white people from President Mandela’s generation (birth cohort 1920) was nine years, this has been reduced to under two years for the most recent cohort, born in 1990.

Figure 3: Average years of education by race and birth year, 2010

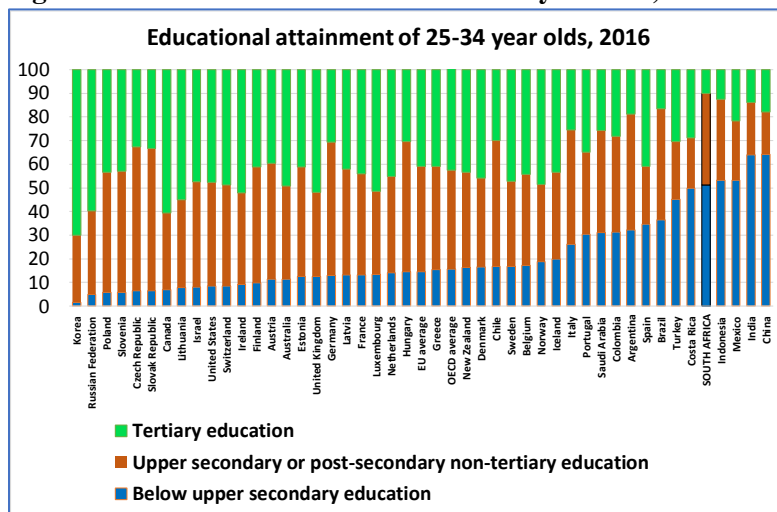


Source: Calculated from 2011 census

Though school attainment has risen rapidly, there are still some children not attending school. Using the 2007 Community Survey, Fleisch, Schindler & Perry (2010) conclude that there may have been 386 000 children, or 4.3% of the compulsory age group, not attending school. Around 58 000 (less than 1% of the compulsory age group) had never attended school, but many of those are aged 7 and may still enrol soon. Thus “almost all children have had and/or will have some exposure to schooling”. Non-attendance is greater than expected among coloured boys, children whose mothers have died, children born outside South Africa, children who have moved in the past five years, children with disabilities, and children living in specific rural communities.

Taylor and Mabogoane (2015) regard the growth in numbers enrolled at all levels of the system as the most significant development in South African education since democracy. They point out that the rapid expansion of Grade R and university education were particularly new phenomena. However, Figure 4 below shows that the proportion of young adults who have undergone tertiary education remains low by the standards of OECD and some other countries.

Figure 4: Educational attainment of 25-34 year olds, 2016



Source: OECD / ILO / UIS (2017). Education at a Glance Database, <http://stats.oecd.org/>.

Inequality in educational resources

There were great inequalities in resource allocation to schools under apartheid. The Needu Report (Department of Education 2009: 12) noted that “... the highly unequal character of schools persists despite comprehensive reforms since 1994 in pursuit of equal education for all” and “The resilience of these inequalities underlines the long shadow of history on all our schools.”

Public resources devoted to school education have been reallocated to the extent that the racial and rich-poor gaps in public spending per child have largely been eliminated (Gustafsson & Patel 2006; Van der Berg 2006; Van der Berg & Moses 2012; Inchauste et al. 2015; World Bank 2014), although wealthier urban schools still have more highly qualified and thus better remunerated teachers, and fee-paying schools can supplement public resources through their school fees. Resource shifts did not eliminate infrastructural backlogs in education, but it is also did not fundamentally change learning outcomes, because of the weak conversion of resources to learning outcomes in much of the school system. A consensus has emerged that “it is one thing for a school to have resources at its disposal but quite another for it to use the resources

effectively” (Jansen & Taylor 2003: 20; see also Taylor 2008: 4; Department of Education 2009 (Needu Report): 12; Timæus, Simelane & Letsoalo 2012: 271-2). This shortfall in effectiveness is found in low time-on-task (only about half of scheduled classes actually take place), poor pedagogy, little work in class or homework (see Van der Berg et al. 2016). More evidence of this is to be found in the fact that poor South African children perform far worse than for similarly poor children in other countries in SACMEQ, despite more classroom resources and more and better paid teachers than in most of these other countries.

Inequality in education quality

South African pupils perform weakly in both international and national tests. In TIMSS 2015, South Africa for the first time took part in the Grade 5 mathematics test and performed second weakest of all participating countries (though few developing countries participated). 61% of South African students performed below the low international benchmark, as against only 7% across all countries. In pre-PIRLS 2011, a reading test, 58% of South African Grade 5 children could not read for meaning, and half of those (29% of all children in Grade 5) performed so weakly that they could be regarded as reading illiterate. In the 2011 SACMEQ tests of Grade 6 children in Southern and Eastern Africa, South African children performed just below the average for all the participating countries (most of which are much poorer) in both reading and mathematics. South African Grade 6 school children are on average about a year’s learning behind Kenya, and two years behind Tanzania. This weak functioning led the Ministerial Committee to refer to a “...context of systemic collapse of schooling, at least in the bottom half of the education system.” (Department of Education 2009, Needu Report: 12.) Table 2 shows the weak performance in TIMSS Grade 9 in 2015 in both mathematics and science, again measured against the low international benchmark. Fee paying (richer) schools and independent schools perform much better than the poorer or no-fee schools that constitute two-thirds of the school.

Table 2: Percentage of Grade 9 learners in various school types that performed above the low international benchmark of 400 in TIMSS

	Public no-fee schools	Public fee-paying schools	Independent schools
Mathematics	19%	60%	81%
Science	16%	58%	81%

Source: Reddy et al. 2015: 8

Inequality in cognitive test performance is extremely large whether analysed by socio-economic status, language or population group. Typically, the richest 20% of the school system greatly outperforms other schools, amongst whom differences are quite small. In the 2006 PIRLS reading and literacy test, South African students were tested in Grade 5, English students in Grade 4. Even so, only 8% of English students could not reach the low international benchmark of 400, whilst this applied to 78% of South African students.

Evidence of reduced educational inequality from matric mathematics trends

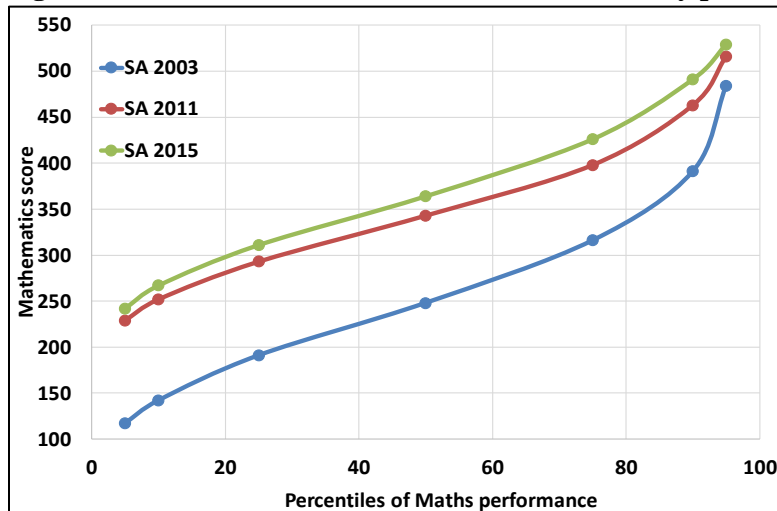
Gustafsson (2016) finds substantial equity gains in mathematics in Grade 12 examinations between 2008 and 2015.⁴ Similar analysis of matric performance for 2002, 2009 and 2016 reveal that the number of black African learners attaining levels of mathematics performance which would allow entry into, for instance,

⁴ Estimates derived using a threshold of the mathematics mark reached by 20% of white candidates across years.

engineering at university increased by 65% over the whole period (Van der Berg & Gustafsson 2017). These improvements occurred inter alia through expansion of good mathematics performance across more township and rural schools. Whilst in 2002 just over half of high-level mathematics performers in the public examination system were white, by 2016 over two-thirds were not white. The strongest increases occurred in quintile 3, though from a very low base.

Another source of information on system improvement is the TIMSS testing programme, which covers around fifty countries. South African Grade 9 mathematics and science results displayed a steady improvement across the years 2002, 2011 and 2015. In the mathematics tests, South Africa improved on average 0.07 South African standard deviations per year between 2002 and 2015, the average test scores being 285 in 2002, 352 in 2011 and 372 in 2015 (Mullis, Martin and Loveless 2016: Exhibit 1.6; Reddy et al. 2012: 3). South Africa's 0.07 standard deviation gain per year compares favourably with Brazil's PISA improvement of 0.06 standard deviations per year for over a decade, which has been regarded as the most impressive of any country (Bruns, Evans & Lugee 2012). South Africa performed well below Botswana in 2002 and even 2011, but by 2015 South Africa had almost caught up to Botswana. The South African TIMSS figures under-estimate gains, as drop-out before the end of Grade 9 has also been reduced. Thus educational outcomes have become less unequal and overall quality as measured by mathematics competencies showed marked improvement. At given levels of parental education there were substantial gains across the three tests, while Figure 5 shows that the gains at the lower levels of performance were particularly large. Similar conclusions about system improvement can also be found in revised preliminary results from the SACMEQ testing programme, which covers fifteen countries from Southern Africa and East Africa.

Figure 5: Performance in TIMSS Mathematics tests by performance percentile



Source: Derived from Mullis, Martin and Loveless 2016: Exhibit 1.6; Reddy et al. 2012: 3

Reasons for the persistence of the deep inequalities and poverty

Throughout the world, socio-economic status is correlated with cognitive outcomes, implying that it is difficult to overcome a poor background through educational interventions. However, the slope of the social gradient (the relationship between socio-economic status and test scores, for instance) is particularly steep in South Africa. Moreover, poor children in South Africa perform worse than equally poor children in countries such as Swaziland and Botswana. This points to systemic problems in the ability of South African

schools to improve educational outcomes for poor children. Many of these problems have their origin in the weak quality of education offered to black children during apartheid. The issue of how to escape from this legacy is one that South African educational policy is still grappling with.

Resep's research on Identifying Binding Constraints in Education identified four issues that act as binding constraints in education (Van der Berg et al, 2016). Failure to overcome these problems will mean that other interventions (such as the provision of more resources) would most probably only have limited success. These constraints to improvement preclude progress in other areas; as it is not possible for governments to tackle all things well, prioritisation is necessary.

The four binding constraints to improved educational outcomes that must be addressed are:

- 1) Weak institutional functionality reflected in provincial department weaknesses in fulfilling critical administrative functions.
- 2) Undue union influence on administrations' ability to act in children's best interests
- 3) Wasted learning time
- 4) Weak teacher content and pedagogical knowledge, including skills to teach reading.

After synthesising years' worth of collaborative research effort from contributors across economics, education and policy-making arenas, Resep identified four issues that act as binding constraints in education.

Binding Constraint #1: Weak institutional functionality reflected in provincial department weaknesses in fulfilling critical administrative functions

Weak institutional functionality acts as a binding constraint to improving education. This constraint takes the form of weak capacity in the national and provincial departments and education district and circuit offices. This weak capacity leads to a situation where these institutions do not provide adequate support to schools and teachers, but also do not hold them accountable.

Provincial departments

Provincial department weaknesses constrain the ability of schools to effectively convert resources into outcomes. Gustafsson & Taylor (2016) took advantage of the redrawing of provincial boundaries whereby 158 high schools were placed under new administrations to estimate the impact of institutional functionality on school performance. They found large improvements in schools transferred to Gauteng which they ascribe this to "more efficient use of non-personnel funds by authorities, with a special focus on educational materials; the brokering of pacts between stakeholders, including teacher unions, schools and communities; and better monitoring and support by the district office" (Gustafsson & Taylor 2016: 1).

Binding Constraint #2: Undue union influence

The role of unions

The majority of education sector workers are unionized. Roughly two thirds of all education sector workers (including non-teaching personnel) belong to a teacher union (Van der Berg et al. 2016: 35). The Labour Force Surveys from 2000 to 2007 indicate that this ratio may be as high as 76% among teachers (Armstrong 2014: 4).

The most damaging aspect of undue union influence is its distortion of the post-provisioning process. Evidence from the Volmink report (a report undertaken for the Minister of Basic Education) shows that nepotistic appointments linked to union membership are a serious and systematic problem throughout the school system. Communities interacting with schools participating in such practices are likely to lose trust in the education system. This compromises efforts to include parents in attempts to hold schools accountable.

SADTU has resisted a number of reforms aimed at increasing accountability in the education system. At the national level, SADTU is a critical player in determining which education policies are accepted and which are rejected. The union extended its scope beyond issues of teacher pay and worker benefits to all issues pertaining to teachers' work, including forms of control or monitoring of teachers' work.

This is situated in a historical context where control over black teachers during apartheid was intentionally bureaucratic and authoritarian to achieve social control (Van der Berg et al. 2016: 39). Teacher unions have thus strongly resisted attempts to monitor teachers in recent years. They have achieved this by blocking a number of accountability reforms. Although unions argue that it is unfair to hold them accountable when they are not given adequate resources, teachers working in comparable and worse conditions with fewer resources in other countries in Southern Africa produce much better learning results.

School leadership and management

The view that good school leadership and management (SLM) practices matter for school performance has gained traction in South Africa in recent years, with statements by the DBE and the NDP emphasizing its importance for improving learning and increasing accountability within the education system (Wills 2015: 1). The National Development Plan (NDP) explicitly identified improving school leadership as a national priority, proposing that this be achieved through improvements in the principal appointment process, managing their performance and providing them with greater powers over school management (Wills 2015: 1). Yet policies along these lines have not been introduced to date.

School Governing Boards

By law, parents are to exercise influence over schools and thus hold teachers accountable for learner performance by serving on School Governing Boards (SGBs). The South African Schools Act (SASA) of 1996 grants major decision-making power to parent governors, based on the belief that this will ensure teacher accountability, which in turn would lead to improved learner outcomes. One major area where parents are expected to exercise influence is the appointment of teachers and more senior positions: interview panels hiring educators in these roles are required to include members of SGBs. Entrusting this kind of decision-making power to parents implicitly assumes parents from all socio-economic classes would be willing and able to volunteer to serve as parent governors, in order to create the schools they want for their children.

This model of self-governance may not be appropriate for poorer communities. A growing body of literature reveals that this model of self-governance is not appropriate in communities where the majority of parents have themselves had very little experience of effective schooling. Taylor et al (1999: 30) highlight the tension inherent in relying on parents to hold schools accountable for learner performance in contexts where the majority of schools are in lower socio-economic communities, explaining that "In poorer communities, the prevalence of low levels of literacy and apathy among parents is a hurdle to their involvement in the life of the school in general and in governance in particular".

Graaff (2016: 8) finds scant evidence of SGBs meaningfully holding schools accountable in these schools, and rather finds evidence of “a pattern of abdication on the part of parent governors – abdication of decision making to the principal and school management team because of a lack of full knowledge about their rights and responsibilities”.

Standardised assessments

A potential lever for increased accountability throughout South Africa’s education system is standardized assessments. A major obstacle to bureaucrats, principals and parents holding teachers accountable for learner performance is asymmetric information: information about classroom practices is very difficult to come by, in part due to union resistance to any attempts to monitor teachers in recent years. Standardised assessments pose a possible solution to this problem, since they provide specific information on performance to parents, educators and bureaucrats. Van Wyk (2015:15) argues that performance data forms the basis of accountability. In 2011 the DBE introduced the Annual National Assessments (ANAs) to improve accountability throughout the system: both of schools to administration and of schools to parents (Taylor et al. 2013: 264-265). The ANAs were Literacy and Numeracy tests conducted in Grades 1-6 and Grade 9. These tests were especially valuable in providing information on primary school performance and could in principle also enable government to provide support to schools that need it most (Van Wyk 2015).

The ANAs have been the subject of much contention since their national roll-out in 2011 and were discontinued in 2015 due to union refusal to implement them in schools. Educationists have objected to ANA on the basis that testing itself leads to undesirable pedagogies such as ‘teaching to the test’. Further objections have focused on the fact that ANAs are conducted, marked, and even internally moderated by schools themselves, which, given the incentives schools face to perform well on the ANAs, many have argued make them an unreliable measure of school performance. (For an excellent critique of such views, see Hoadley and Muller 2016.) There now seems to be agreement that whatever replaces the ANAs should be implemented in a manner that it is not considered a form of high stakes accountability, as this leads to perverse outcomes in a situation where tests are not fully externally administered and graded, and where it is not clear how the background of children in a school would be considered in assessing the performance of schools on such tests.

The ANAs constitute a move in the right direction. Despite these criticisms, the ANAs have been successful in a number of ways. Those who failed Grade 1 performed significantly worse in ANA than those who passed, suggesting that the ANAs measure the same factors considered by teachers and schools when holding children back. This provides a case for building on the successes of ANA and further developing them as a measurement tool that provides information on the performance and learning trajectories of children (Van der Berg 2015).

Binding constraint #3: Weak teacher content knowledge and pedagogical skill

Teacher quality and low levels of teacher effort are often cited as drivers of South Africa’s weak educational performance (Armstrong 2014: 1).

Teacher subject knowledge and qualifications

Teachers lack sufficient content knowledge and pedagogical skill. SACMEQ 2007 assessed Grade 6 mathematics teachers as well as their students and showed that only 32% of Grade 6 Mathematics teachers had “desirable subject knowledge” in Mathematics, as derived from their score on a Mathematics test (Hungu et al. 2011: 52). There were considerable differences between provinces, with Mpumalanga (4%) and the Western Cape (64%) being the weakest and best respectively. More recent research by Venkat & Spaul (2014) showed that 79% of Grade 6 mathematics teachers tested in SACMEQ 2007 have a content knowledge level below Grade 6/7, i.e. below the level they are currently teaching. These teachers were highly concentrated in the poorest four quintiles of schools.

Poor content knowledge further manifests in teachers’ inability to accurately judge their learners’ performance. Taylor et al. (2013: 10) report that Foundation Phase teachers in the Western Cape were generally optimistic about whether their learners were at the right level: teachers interviewed indicated that around 80% of their learners could perform at the appropriate level at the end of the grade, in both home language and in numeracy. According to the authors, “these optimistic expectations are in sharp contrast to the weak performance of their learners on the annual provincial assessment tasks, with only 22% of learners in the schools observed actually meeting the provincial standard for adequate performance” (Taylor et al. 2013: 10). Clearly, teachers cannot improve the outcomes of learners if they are unable to accurately judge learners’ performance.

Most South African teachers are adequately qualified (in terms of certification). Most teachers possess a matric certificate (Grade 12) and a minimum of three years’ appropriate post-school training (Taylor et al. 2013: 8). This is reflective of large increases in the number of teacher qualifications in recent years: in 1990 only 53% were appropriately qualified and by 2008 this had increased to 94.4% (Taylor et al. 2013: 8). Yet this improved qualifications status have not resulted in improvement in learner performance. They argue that the massive growth in teacher qualifications has been fuelled by part-time Accelerated Certificates of Education (ACE) offered by universities, whose quality has been called into question by the Council on Higher Education (CHE).

The fact that most of South Africa’s teachers are qualified, but still lack the requisite content knowledge and pedagogical skill to teach effectively, suggests that pre-service training for teachers is not succeeding in adequately preparing students for the teaching profession.

Training for teachers

Teacher training initiatives have not undergone independent evaluation. Consequently, among the plethora of strategies undertaken by the DBE to support teachers and principals, there is little or no sense of what is actually working or why (Van der Berg, et al., 2016: 25). This is further complicated by the fact that different strategies are based on different models of support (Van der Berg, et al., 2016: 25). Without systematic assessment of which of these competing models work best, one cannot select the most effective interventions to implement throughout the system.

Deep conceptual understanding of their subject should be the focus of both pre- and in-service teacher training (Taylor et al. 2013: 232). Until South African teachers are better equipped with content knowledge, learning gains in students through other interventions will be marginal (Van der Berg et al, 2016: 44). Indeed, much of the on-the-job training undergone by teachers has produced disappointing results (Taylor

et al. 2013: 8). This may be attributable to the fact that deep conceptual understanding of their subject matter has hitherto not been the focus of on-the-job teacher training. Training offered by the Cape Teaching and Leadership Institute (CTLI), an intensive course focusing on subject content, has been the only in-service teaching training initiative that has been shown to be associated with significant increases in learner scores on reading and mathematics tests (Taylor et al. 2013: 8).

Incentives to become a teacher

Salary is a weak incentive to enter the teaching profession in South Africa. Armstrong (2014: 40-41) found that in 2014, an additional year of service in the teaching profession was associated with approximately 1% increase in remuneration. This slow rate of progression up the salary scale makes salaries a weak incentive for attracting high ability individuals that are likely to have high earnings potential outside the teaching profession. Comparing teachers with their non-teaching counterparts with similar education, Armstrong (2014: 2-3) finds that there is a wage differential in favour of non-teachers: non-teachers receive more remuneration for their observed productive characteristics than teachers do. In terms of returns to educational attainment, the teaching profession is least attractive to individuals with higher levels of education, and teachers earn less than their counterparts in all cases where teachers have at least a degree (Armstrong 2014: 16). Up until 25 years of experience, for all levels of educational attainment, teacher wages are higher than those of non-teachers in the SA labour market. However, after 25 years of experience, the wage of non-teachers becomes incrementally more attractive at higher levels of labour market experience. This provides evidence of the unattractiveness of the age-wage profile in terms of returns to experience for the teaching profession, while also highlighting the attractiveness of the teaching profession for younger labour market participants.

The teaching profession lacks requisite levels of prestige for professionalism to constitute an incentive for becoming a teacher. Armstrong (2014: 46) concludes that teaching in South Africa, as in many other countries, is ill-fitted to professionalization. She explains: “The nature of the knowledge required to enter the occupation and the absence of the rigorous entry procedures that exist for other professions make it difficult to justify a call for the professionalization of teaching in its current state” (Armstrong 2014: 46). She argues that the teaching profession would have to be ‘re-cast’ as one requiring rigorous preparation and one which holds a fair amount of prestige.

This lack of incentives to become a teacher in South Africa means that, barring a few exceptional cases, top-performing candidates are not attracted to the teaching profession. Teacher quality is invariably compromised as a result.

Incentives to perform

Lack of teacher effort is often considered a great hindrance to the development of learner skills in South Africa. This is evidenced by high rates of absenteeism from schools and classrooms, poor lesson preparation, little classwork and homework, and lack of interest in the progress of learners among many teachers. Some ascribe such low effort to weak incentive structures inside the education system, in addition to weak incentives to become a teacher (Armstrong 2014: 1). There are no rewards when a teacher puts in the requisite effort, and no punishment when she does not.

Peer evaluation is unlikely to act as an incentive to improve teacher performance. Peer evaluation has been proposed as a way of incentivizing teachers to perform better, but the Integrated Quality Management

System (IQMS) system whereby teacher performance is measured and recorded is unlikely to be successful (Armstrong 2014: 47). These peer evaluations seem intended to have a nurturing and developmental role, and were not designed to enable teachers to apply pressure or disciplinary actions against their peers. This, combined with the fact that peer evaluations are only a once-yearly exercise, makes it unlikely that teacher peer monitoring will improve teacher effort.

Incentives to move to difficult schools

There is an urgent need for incentives that motivate teachers to move to ‘difficult’ schools. When teachers do move, they tend to move to better performing schools (Gustafsson 2016: 71). Most often, given the strong association between school quintile⁵ and performance, this involves a move to schools in a higher quintile. It is not clear whether teachers are motivated by a perception that better performing learners make teaching easier, or whether they are attracted to the superior resourcing that better performing schools tend to enjoy (Gustafsson 2016: 71). There is a clear relationship between a school’s under-staffing problem and its degree of remoteness (Gustafsson 2016: 53). Since remote schools are often schools that struggle academically, this calls for additional incentives to teach in more remote areas. Gustafsson (2016: 74) also finds evidence of administrative barriers which discourage movement of teachers across provinces. As school performance varies considerably across provinces, barriers to moving across provinces add to the unattractiveness of moving to poor performing schools. All of these factors make teaching in difficult schools unattractive.

Binding constraint 4: Wasted Learning Time

A major constraint to effectively converting resources into outcomes in the South African education system is low time-on-task in schools. Van der Berg et al (2016: 47) cite evidence from a year-long study of 58 schools in the North West province that only about half of scheduled classes actually take place, and that very little schoolwork or homework gets done. This, surprisingly, was not due to teacher absenteeism, but rather a lack of teaching activity despite teacher presence. That is not to say that teacher absenteeism is not a major problem in South African schools. Spaul (2011), using SACMEQ 2007 data, finds that Grade 6 Mathematics teachers in Quintile 1 schools were absent for 23 days each year, on average. Although such rates of teacher absenteeism are not exceptional by developing country standards, teacher absenteeism is an important contributing factor to wasted learning time.

Wasted learning time results in insufficient opportunity to learn (OTL) (Van der Berg et al, 2016: 48). Van der Berg et al summarise the findings of a project which assessed approximately 15 000 students in Grades 4, 5 and 6 from eight out of the nine provinces in South Africa:

“Observing the students’ workbooks, the researchers could only find written exercises for 22 out of the 89 topics required to be taught in Grade 5. This implies that students covered less than one quarter of the prescribed mathematics topics for the year.”

Only 3% of Grade 5 learners wrote in their books every day (Dechaisemartin, 2013: 170)

The majority of exercises (78%) in Grade 4 books were half a page or less (Dechaisemartin, 2013: 170)

44% of Grade 4 learners had not written any paragraphs during the entire school year (Dechaisemartin, 2013: 172).

⁵ South African schools are classified into five “school quintiles” based on the wealth of the school community.

Further issues

In addition to the four binding constraints discussed above, there are a number of features of Basic Education in South Africa that warrant further consideration.

Teachers

South Africa faces a shortage of teachers. The rapid educational expansion during the late apartheid period and since the transition resulted in a growing need for teachers. Steady enrolment growth for a number of decades has meant that the demand for teachers also grew steadily, yet supply of new teachers has not matched this. One possible reason was the closing or amalgamation of the 120 largely rural teacher colleges into the 23 universities in 2003, which resulted in a dramatic drop in the number of teachers trained (Taylor et al. 2013: 8). Fortunately, the number of new teachers seems to have risen since the introduction of the Funza Lushaka state bursary scheme for studying teaching in 2009.

However, Van Broekhuizen (2015) calculates that the rate at which the higher education system is currently producing qualified teachers is still not sufficient to meet current and future needs of the schooling system. This teacher shortage is widespread: in almost all education districts throughout the country there are schools that are problematically under-staffed (Gustafsson 2016: 50). This is much more serious at secondary than at primary level, as secondary-level teaching posts are more difficult to fill because of specific requirements, such as subject requirements. Van Broekhuizen (2015: 1) reports that the country faces a particular shortage of teachers in key subject areas like mathematics and physical sciences. Gustafsson (2016: 51) found that in some districts upwards of 45% of secondary learners attend under-staffed schools. This has serious implications for meeting the country's skilled manpower needs.

The teacher workforce is ageing. The average age of teachers is increasing (Van der Berg & Burger 2010: 7). Fewer Initial Teacher Education (ITE) graduates are being produced than are required to meet the annual demand (Van Broekhuizen 2015: 2). Young teachers, especially those with high qualifications, have a significantly higher leaving rate from the teaching force. Considering that the under-supply of teachers already poses a major constraint to improving educational outcomes, this is likely to become worse as the teacher workforce shrinks over time due to retirement.

Access to good schools

The dual nature of South Africa's education system has been widely documented. The system consists of two sub-systems, each with very different historical backgrounds. These sub-systems continue to produce very different learner outcomes, the first and dominant sub-system producing abysmal results, even in comparison to other African countries with fewer educational resources, and the second producing results that are more-or-less on par with educational performance in developed countries (Taylor et al. 2013: 57). Tragically, the first system serves about 80% of South African learners.

Historically, access to schools in the second system was determined exclusively by race: schools in this system served white, Indian and some coloured learners during the apartheid era (Taylor et al. 2013: 58). This has changed since the dismantling of apartheid in 1994, with black children increasingly attending schools in this second system. Race is therefore no longer the major factor determining access to good

schools.⁶ This section evaluates the factors which have replaced race as determinants of access to high quality education in South Africa.

Socio-economic status (SES) largely determines who has access to good schools. Following democratization, there has been a “flight” of more affluent black learners out of historically black schools, with little, if any, movement in the opposite direction, thus leaving black schools with the poorest members in the community. A major factor in this regard was the ability granted by the South African Schools Act (SASA) of school governing boards (SGB’s) to charge fees (although more recently school fees have been eliminated for schools in the poorest three school quintiles). This creates an incentive to admit as large a proportion of fee-paying learners rather than non-fee-paying learners to maximize school resources per learner. Only a small number of ‘outlier’ schools in Quintile 1-3 produce good results.⁷ In this sense, SES remains the most important determinant of the quality of education. What is especially tragic about this is that poor learners require quality schooling to mitigate the negative effects of their disadvantaged backgrounds on learning.

Schools in urban and suburban areas clearly outperform rural and township schools. PIRLS 2011, a Grade 5 reading assessment, revealed that 80% of learners in urban or suburban schools had acquired basic reading skills in English or Afrikaans by Grade 5 (Van der Berg et al. 2016: 16). This proportion was only 26% for learners in remote rural areas and 28% for learners in township schools, respectively. This is in some respects the result of low SES in rural areas and the difficulty of attracting good teachers to such schools.

Role of home language

In a study of the impact of the language of assessment in South African schools, Spaull (2016) makes the important point that it is very difficult to isolate the effect of language on school performance, as home language as well as language of instruction is so strongly correlated with factors that influence school performance, such as SES, parents’ education, teacher quality, school resources, geographic location and school functionality. It is therefore important to explicitly try to disentangle these effects when assessing the impact of language on academic performance.

The majority of South African learners switch to a different language of teaching and learning in Grade 4. South Africa’s language in education policy supports children being taught in their home language for at least the first three grades of primary school and thereafter to switch to either English or Afrikaans. The majority of learners experience a switch in their language of learning and teaching (LOLT) in Grade 4 (Spaull 2016: 11). The logic behind this approach is that children find it easier to transition into literacy in a second language if they are first literate in their home language, a view which is supported by recent empirical evidence in South Africa (Taylor & Von Fintel, 2016).

Learners must switch to a second language before becoming literate in their home language. The practical difficulty with the language policy is that most children do not learn to read in African language (or any language) by the end of Grade 3. The prePIRLS assessment of 2011 tested a nationally representative sample of Grade 4 learners and found that 58% of the sample could not read for meaning in any language, while 29% were completely illiterate. The result is that these learners are switching to a second language

⁶ Some members of the small black middle class that emerged in the latter part of the apartheid era initially sent their children to private schools, where this was allowed (policy in this respect changed incrementally over time), and then later to the so-called model C schools, i.e. fee-paying schools formerly open only to whites or to Indians (again, as segregation policy became less strict).

⁷ Kotzé (2017) estimates that 5% of Quintile 1-3 schools fall in this category, serving 3% of the learner population.

before becoming literate in their home language. Consequently, by Grade 4, when learners should no longer be learning to read but rather reading to learn in English or Afrikaans, the majority of South African learners have not acquired even basic reading skills in either of these languages. The difficulties of providing enough teachers to teach African languages is particularly severe in South Africa's major metropolitan region around Johannesburg-Pretoria-Vereeniging, where many schools have multi-lingual situations.

There is a shortage of teachers qualified to teach African languages in the Foundation Phase, and African languages lack the benchmarks required to successfully teach reading in these languages. Van Broekhuizen (2015: 45) shows that universities are not producing anywhere near enough African-language teachers for the Foundation Phase, in which most South African children are taught in such languages. Moreover, he argues that it is highly unlikely that this will change in the near future.

While there are oral reading fluency norms for English, there are none for African languages and only nascent benchmarks for English First Additional Language (Van der Berg et al., 2016: 57). As Van der Berg et al. (2016: 57) explain, "it is not possible to translate English norms into African language norms since the language structure (morphology) is different, with English being an analytic language and African languages being agglutinating languages. Without these norms, it is not possible to reliably measure and benchmark's children's oral reading fluency or comprehension in African languages." In addition to benchmarks and standards for assessing the reading fluency of their learners, Foundation Phase African language teachers also lack sufficient teaching and learning materials for teaching children to read. Considering that many African language children come from print poor backgrounds, it is essential that they gain exposure to quality reading material in their home language in the Foundation Phase.

Illiteracy may explain the country's dismal education performance. The fact that the majority of students cannot read for meaning in English or Afrikaans by Grade 5 may go some way toward explaining the country's poor overall academic performance. Spaul (2016) finds that home language has a significant effect on Grade 3 learners' performance in both literacy and numeracy tests administered in the home language of learners. However, an even more important finding is the size of this home language compared to other factors: while the negative impact of a non-English home language is approximately 1-2 years' worth of learning for literacy and 1 year or numeracy, the composite effect of home background and school quality is roughly 4 years of learning for both literacy and numeracy. In other words, the size of the composite effect of home language and school quality is between 1.6 and 3.9 times larger than the impact of language for literacy and at least 3.8 times larger for numeracy (Spaul 2016: 35). This emphasizes that language is not the most important concern in a schooling system that is generally dysfunctional.

Income and school performance

Cognitive gaps between affluent and poor learners are cemented by the middle of primary school. The international literature shows that cognitive gaps between learners of different socio-economic backgrounds are established well before they enter school, and widen as they progress through the school system (Moses et al. 2017: 30). In other words, SES influences children's abilities and potential from the very beginning of life. The enduring impact of childhood circumstance, and its power in predicting future cognitive performance, is particularly evident in the South African context. Using the Annual National Assessments, Van der Berg (2015) finds that only one-third of learners starting Grade 1 in the poorest 40% of schools would be on track, that is, be of the appropriate age for their grade, by Grade 4, and be performing at levels commensurate with the low international benchmark in the TIMSS testing system. This finding of early learning deficits is mirrored by findings of Spaul & Kotzé (2015) that, by Grade 3, the effective learning

gap between learners in Quintile 5 (the richest 20% of schools) and other learners is almost 3 years, but that this gap widens to 3.5 years by Grade 9, with a projected gap of 4 years by Grade 12.

What to do about inequality in learning?

A unifying goal

In their report on Binding Constraints, the Resep group of researchers argues that the DBE should focus its attention, resources and energy on a single unifying goal, namely that every child should be able to read fluently and with comprehension by the end of Grade 3 (Van der Berg et al. 2016: 56). This implies that resources, including fiscal resources, support and efforts should as far as possible be redirected to primary schools. Currently, primary schools and especially the Foundation Phase receive less district support compared to secondary schools.

A subsidiary goal is that every child should also be able to read First Additional Language texts in English fluently and with comprehension by the end of Grade 3. Getting every child to read by Grade 3 is pedagogically sound, given that reading is the core academic skill upon which all other academic skills are built, is easy for parents and teachers to understand, and is easy to measure. The evidence presented thus points towards getting reading right as being the most effective policy measure for reducing the severe inequalities in learning that currently plague the South African schooling system.

Specific reforms

With this goal in mind, we propose the following key reforms for addressing the binding constraints in basic education:

The recommendations of the Volmink report should be implemented, inter alia: that school governing bodies should be excluded from interview panels hiring mid-career teachers and all other senior positions that prospective principals should take aptitude tests before such interviews that principals and office-based officials be banned from occupying leadership positions in unions and from being office bearers of political parties that the promotion of junior teachers to principal positions be stopped that the SA Council of Educators, the body that regulates teachers, be reconceptualised and freed from union domination. The appointment process for principals should be better managed by provincial departments.

The aborted Annual National Assessments should be replaced by alternative tests that focus less explicitly on accountability. This has been accepted in principle by the teacher unions. The focus should be on annual systemic testing of a sample of schools in various grades, to assess the performance of the system and improvements over time. In addition, given the absence of an external test in primary schools and therefore the absence of any measurements of how specific primary schools perform, there is a need for a regular assessment of two grades, perhaps grades 3 and 6, in all schools. This would require setting new tests on each occasion, as it is likely that the content of such tests will soon become known. This requires proper equating across years to ensure that tests are of similar difficulty.

The relatively recently instituted workbooks should be used as a tool to monitor the extent of the work covered in class. Accountability measures should be instituted to ensure that children are sufficiently exposed to reading, writing and mathematics in primary school. In particular, principals should be encouraged and/or incentivised to play a more direct role in instructional leadership and observing and

monitoring what happens in the classroom. Such measures are likely to run into union opposition, but can be implemented if sufficient information about their importance is provided to parents.

Further bursaries and other incentives are required to attract more students into teaching, considering the ageing teacher workforce. Special incentives for teaching in difficult schools should again be investigated to encourage teachers to take up positions in such schools.

The pedagogical skills of teachers for teaching reading in the Foundation Phase need much attention, particularly in African languages. This requires both better initial training at universities, and in-service training of current teachers. The evidence indicates that teachers are adequately qualified, but shows low levels of understanding of the material they are required to teach and lack of knowledge about the hurdles that must be cleared in order to progress to the next grade. This suggests that teacher training leaves much to be desired. In-service training is failing in the sense that none of the programmes introduced have undergone independent evaluation as to whether they are working and why. Given how little effect previous teacher training efforts appear to have had, rigorous evaluation of the effectiveness of such pedagogical training must be done regularly.

More attention should be paid to the creation of benchmarks for reading in African languages, as well as the provision of appropriate and sufficient reading materials in African languages.

Higher education

Apart from its potential contribution to productivity and thereby growth, higher education also improves employment prospects for new graduates, something that is particularly important considering that South Africa's youth unemployment rate in 2016 was among the highest in the world, at about 50% (Moses et al. 2017: 35). One suggested response to this troubling situation is expanding access to higher education so that more young adults can take advantage of the relatively high returns to tertiary education observed in South Africa.

Affordability of higher education

Approximately one third of matriculants who obtain Bachelor passes⁸ never go to university. This is a finding from a study of university access and success of the 2008 matric cohort by Van Broekhuizen et al (2016). Given South Africa's skills hungry economy, it is worrying that a third of students performing well enough in matric to succeed at university never access higher education. In light of the recent student protest around the affordability of higher education, specifically the narrative that that access to university is skewed in favour of wealthier matriculants, it is important to investigate how far affordability plays a role in determining access to university.

University enrolments vary greatly between candidates from schools in different quintiles. While only 12% of learners from quintile 1-3 schools (the poorer schools) enrolled in university at some point in the six years following matriculation, this proportion was 24% and 45% for learners from quintile 4 and 5 schools, respectively. This seems to support the notion that university access is skewed towards the wealthy. However, when taking into account the performance of learners in the matric exam, it becomes clear that university access is not skewed toward wealthier matriculants. Learners from quintile 1-3 schools

⁸ Bachelor's passes, formerly known as university exemption, are the level of pass for matric which usually gives entry to university studies for a degree.

constituted 35.2% of all Bachelor passes, and 34% of those who entered universities, suggesting learners from the poorest quintiles who perform well in matric do not have large deficits in university access (Van Broekhuizen et al. 2016: iii).

However, the latter form a very small proportion of the country's learners: only 3.9% of those who entered Grade 8 in quintile 1 schools would go on to achieve a Bachelor pass in Matric 2008 (Moses et al. 2017: 35). This proportion does not differ much in quintile 2 and 3 schools. Contrast this with the 42% of quintile 5 Grade 8's who would go on to achieve Bachelor passes in 2008, and it becomes clear that it is differentials in school quality that dictate the patterns of university access that characterise the higher education landscape in South Africa. This is supported by multivariate analysis, which shows a clear positive association between school performance and university access (Van Broekhuizen et al. 2016: 84), strong evidence that access to university among the poor is largely constrained by poor school results in poorer schools, rather than other barriers to access. The authors conclude that "The weak school system has a major influence on who reaches matric, and how they perform in matric. This, and the achievement of Bachelor passes, explains many of the differences in access to university by race, gender and province" (Van Broekhuizen et al. 2016: viii).

How do these learners afford university?

Some of the argument in the Fees Must Fall movement have been premised around the idea that university education is a public good. Tertiary education has externalities that give it some of the characteristics of a public good, but because it is excludable (people can be prevented from having it) and rival (there are limited places available), it is not a pure public good like a lighthouse. Others have described university education as a merit good, but a merit good usually is something which society deems must be consumed by everyone and should thus be compulsory, such as applies to primary education. Clearly compulsion at tertiary level is not realistic. Thus one is left with university education as mainly a private good, and therefore there is a strong case that the beneficiaries should repay some or all of the benefits. This leads to a discussion of a missing market.

Missing capital markets for funding university studies

Missing markets offer a strong case for state intervention to ensure students can obtain funding. It has long been accepted that imperfections in capital markets make it difficult to regard university education as something which could be adequately self-funded (Arrow 1993). The absence of collateral among many poor students is an obvious contributory factor in South Africa, but financial institutions are also hesitant to get too deeply involved in such funding because of the risks: only half of entering students complete degree studies, and there is uncertainty regarding collecting repayment of loans.

While NSFAS provides support to a segment of the student population, that support is inadequate in terms of the population reached and the magnitude of the support. Also, the NSFAS recovery rate is very low, thus it does not make it a viable long term way of financing most students. Development of financial markets for investing in people's own education should receive attention, but that would require some form of state guarantees and a way (e.g. the tax system) whereby relatively high repayment rates can be obtained. Even in a developed country such as the UK, only 55% of such funds are eventually repaid. With growing numbers of students qualifying for university, especially students from poorer homes, dealing with this missing market becomes more urgent.

Given large financial returns to obtaining a university degree, there would appear to be a strong case that such studies should be self-funded, but borrowing such money is not viable for most students. A student may require as much as R100 000 per year for student fees and living expenses (Fourie 2016). A household income of R600 000 has frequently been mentioned as the level below which parents would be unable to afford enrolling a child for degree studies from their current income without having to draw in savings or to borrow. Only about 5% of the age group 18-30 are in households with an income above R600 000; even amongst whites this figure is only 28%. But the university student population is disproportionately drawn from the more affluent parts of the population; 28% of students attending universities are from households earning above R600 000. (Calculations from Income and Expenditure Survey of 2010/11, with adjustment to 2016 Rand values).⁹ NSFAS helped many matriculants access university.

The National Student Financial Aid Scheme (NSFAS) plays a significant role in enabling poor learners to attend. Nearly half of learners from quintile 1 and 2 schools (48% and 46%, respectively) who enrolled in university received NSFAS awards during their first year of studies (Van Broekhuizen et al. 2016: 72). By comparison, only 11% of learners from quintile 5 schools received NSFAS awards.

In 2015, NSFAS supported students to the tune of R7.2 billion (NSFAS 2017), while the overall value of student fees of all universities was R20.5 billion (CHET 2017). The difference between these two values is R13.3 billion, which gives an indication of the shortfall in funding required if student fees were to be abolished. On the one hand it should also be considered that a part of the NSFAS support was not for funding student fees; if this was of the order of one-third, it would mean that NSFAS support for student fees contributed only R4.8 billion rather than R7.2 billion, increasing the funding gap to R15.7 billion. In addition, more students would probably attend university if there were no fees, thus the total costs would be higher. In addition, and perhaps more importantly in terms of overall costs, it is unlikely that the agitation for free university education would be halted by simply paying the student fees deficit; if student actual costs are of the order of R100 000 per year, then it would cost roughly almost R100 billion to fully fund all 985 000 students at universities (HEMIS 2016).). As the press leakages from the Hefer report to government on student fees indicate, it is impossible to provide free university education to all students, and other mechanisms would have to be considered, as is already happening.

Who attends university?

Analyses of fiscal incidence in South Africa show that tertiary education was by far the most unequally distributed of all social programmes (Van der Berg 2006 a & b 2009; Van der Berg & Moses 2012; World Bank 2014 & Inchauste et al 2015). However, these estimates could be biased, as they were “based on household surveys, but many students were no longer resident in their families of origin, so this may have led to inaccurate capturing of their home background in surveys.” (Van der Berg & Moses 2012: 136). The recent World Bank (2014: 48, footnote 44) incidence study also acknowledged this: “Note that students are captured in surveys at the places they find themselves when studying, which in some cases may not be the same as their households of origin. As a result, it may appear that some students from very poor households are not actually appearing in the survey as poor.”

However, an alternative analysis based on identifying children who probable would qualify for university based on performance in the SACMEQ tests, and then also considering who actually attend university

⁹ Moreover, from comparing e.g. teacher salaries of as reported in surveys to salary data it is known that there is generally underreporting of about 30% in surveys. So reported household income of R420 000 represents an approximation for actual income of R600 000. Instead of 28% of current students being drawn from households exceeding the threshold of R600 000, it may be realistic to think of 40% of current students being in households with a reported income above the threshold of R420 000. This does not reduce the magnitude of the problem.

amongst those who qualified to do so has confirms that the distribution based on surveys is a good reflection of the income distribution of the households from which university students are drawn (Van der Berg 2016b). Thus it appears as if the incidence of spending on university students is extremely skew.

Secondly, not all university subsidies benefit the students, as universities also have other roles in society that require that they be funded and that have benefits going to wider society. But this argument naturally relates to funding of tertiary education as a whole, not of the students.

A third qualification relates to the point made above regarding bias in household surveys. To get some estimate of the extent of such bias, SACMEQ III data (a survey of Grade 6 students undertaken in 2007) was used to estimate who the students were whose performance would make them most likely candidates to obtain university exemptions. In SACMEQ, a socio-economic status variable was created that reflects asset wealth, based on a possession of a series of assets in the homes of students. Then it was also necessary to determine, from the Community Survey, how many 12 year old (the median age) students fell into each population decile. Amongst these, the proportions likely to attain exemptions were then calculated to arrive at the figures for SACMEQ in Table 3. The incidence curves for 2006 estimates, the 2011 estimates and the SACMEQ-based estimates are shown in Figure 6. There is little difference in the findings across the three datasets and methodologies, confirming that universal university subsidies are indeed highly regressive. Thus, contrary to expectations, surveys do not appear to overestimate the concentration of university students among the rich.

Table 3: University subsidy share by decile based on different sources and methodologies

	2006	2011	SACMEQ
Decile 1	0.4%	2.5%	0.2%
Decile 2	1.1%	1.1%	0.6%
Decile 3	1.7%	1.7%	1.4%
Decile 4	2.1%	1.8%	3.1%
Decile 5	3.5%	3.4%	2.3%
Decile 6	5.7%	3.3%	4.0%
Decile 7	9.1%	7.2%	7.7%
Decile 8	13.7%	11.8%	13.0%
Decile 9	28.8%	19.2%	22.5%
Decile 10	33.9%	48.0%	45.2%
Total	100%	100%	100%

Sources: For 2006, Van der Berg 2009; for 2011, World Bank 2014 & Inchauste et al 2015; for SACMEQ, own calculations, using SACMEQ data to estimate likely university exemptions (Bachelor's passes) and 2007 Community Survey university attendance of matriculants who obtained exemptions. See Van der Berg (2016b) for full methodology.

Figure 6: Three alternative incidence curve for student funding at universities

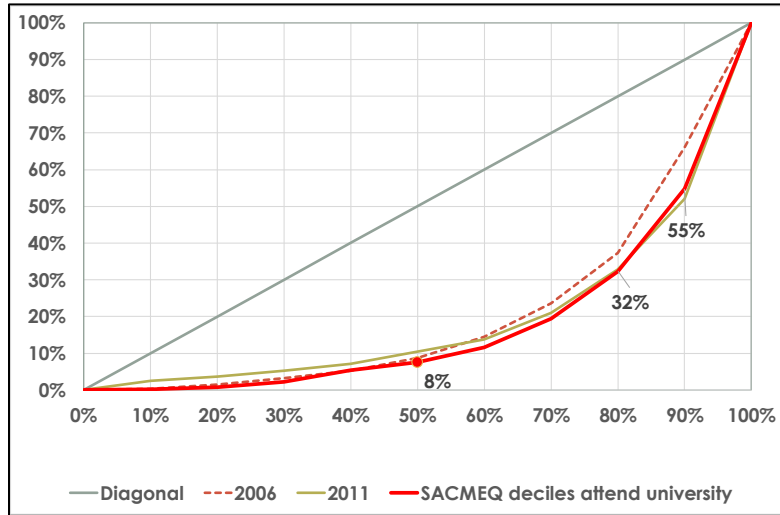
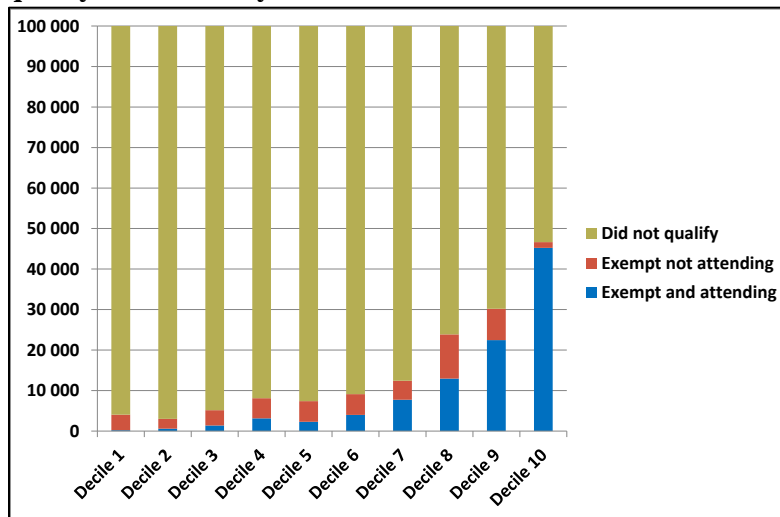


Figure 7 illustrates how selective a group those are who qualify for, and those who attend, universities.

This detracts from the argument that university education should be free, and rather strengthens the argument that alternative means should be found whereby university studies could be supported, but with beneficiaries having to carry a large share of the costs.

Figure 7: Approximate distribution of those who attend, qualified but do not attend, and did not qualify for university for a recent matric cohort



Quality of higher education

The labour market exhibits a strongly convex relationship between education and employment and, for those employed, between education and earnings. After conditioning on other variables, tertiary graduates have a 90% probability of employment, which is high even in international perspective, while those with matric face a 70% probability of employment, and those with Grade 11 only about 55%. Once employed, a degree also offers very high returns in terms of earnings. In 2010, graduates earned almost 2½ times (240%) as much as matriculants of similar age, gender and race. The extremely large wage premium for

university degrees can be ascribed to the large demand for highly qualified people, who are in short supply, while there is a surplus of relatively unskilled workers for whom there is a limited demand (Moses et al. 2016: 42).

There are large differences in the quality of the different universities. This can be expressed by various metrics. One dimension which is sometimes used is the reference to “research intensive” universities, DHET’s so-called “blue cluster”. These include the University of Cape Town, Stellenbosch University, University of Pretoria, University of the Witwatersrand, and Rhodes University. In addition to being research intensive, these universities (with the exception of University of the Witwatersrand) are also among the top performing in terms of undergraduate graduations: Van Broekhuizen et al. (2016: 21) show that for the 2008 NSC cohort who enrolled in university in 2009, the University of Cape Town, Stellenbosch University and University of Pretoria all had undergraduate completion rates exceeding 65% (where the highest completion rate was 75%, achieved by the University of Fort Hare). Rhodes University had an undergraduate completion rate of 58%. These five universities also had among the lowest dropout rates (Van Broekhuizen et al., 2016). These differences in quality across universities is also evident in unemployment differentials between graduates from different universities. Rogan & Reynolds (2016) find, for example, that in 2014 the unemployment rate among University of Fort Hare graduates was almost three times that of Rhodes University graduates, at 20% and 7% respectively.

Important for school education is the quality of instruction that students studying to become teachers receive. There is an opinion in some education circles that universities do not train teachers as well as the former teacher colleges did, but indications from tests of teachers indicate that younger teachers – mainly trained at universities – perform better. This could perhaps simply relate to the fact that entry into university courses may have caused greater selectivity. However, there is wide recognition that universities do not generally train teachers well in terms of pedagogy. This applies especially, so it seems, to teaching teachers to teach, particularly to teach reading and to do so especially in African languages. This requires special efforts to ensure that this neglected issue receives attention.

Key issues for reform for universities

It is essential that a balance be struck between the demands for free education, which cannot be met fully, and the fiscal resources to fund universities. This also requires that repayment systems should be developed to make it viable for financial institutions to also play a larger role in funding student loans. Also, the legitimate needs of poor students for scholarship funding to overcome their resource constraints need to be met. Getting the right mix and volume of funding is likely to be difficult, particularly given the tensions around the Fees Must Fall protests.

Universities should invest more resources into improving student throughput rates, so as to reduce the clogging up of the system by repeaters. Measures that could be considered are winter and summer schools for students to catch up modules they have to repeat. In addition, academic support programmes should continue to assist especially first-generation students with the adjustment to the academic demands made of them.

Education faculties at universities should be encouraged to put greater effort into teaching student teachers pedagogical skills, especially skills for teaching early reading in African languages.

TVET/SETAs

TVET

The TVET system (Technical and Vocational Education and Training) was introduced to offer an alternative to academic education that is better focused on the needs of the workplace. The Department of Higher Education and Training (DHET) placed much emphasis on the expansion of these colleges as offering an alternative, not only for children who drop out of high school early, but only as an alternative to the university system. The intention was that spending on TVET colleges would grow much more rapidly than the rest of the post-school education and training. However, in recent years it has become clear that this growth could not be sustained, and also that there are serious quality problems regarding TVET.

Annual growth in TVET programme expenditure is expected to grow only modestly at 0.9% per year over the MTEF period, which contrasts sharply with the 8.6% real expenditure growth per year during the 2006/07 to 2010/11 period. The programmes offered are not seen to be optimal for obtaining jobs, thus the demand to attend TVET colleges has not grown as much as that for entering universities, as the universities are perceived to offer better labour market prospects. It is at this stage also not clear how many students are obtaining TVET qualifications, as many students enter the examinations, but the data system is not yet capable of capturing the certification.

The White Paper for Post-School Education and Training (White Paper) set a target of 2.5 million TVET students by 2030, while the current enrolment target (2016/17) of 829 000 students is aligned to this White Paper target (DHET, 2016b). The projected increase in TVET student numbers over the MTEF period is 14.4% per annum, implying 1.24 million enrolments by 2019. From 2020 until 2030, the required growth to reach the White Paper target of 2.5 million would then be 6.6% per year. These figures are clearly unrealistic, and DHET has calculated that the fiscal shortfall relative to meeting the target is R13.4 billion in 2017/8.

The projected expenditure per full time equivalent TVET student of R16 467 in 2015/16 is far lower than the real spending per full time equivalent university student of almost R87 000, though the averages hide significant variation between different TVET colleges (DNA Economics, 2015). Throughput rates at TVET colleges are also very low, resulting in a disproportionately high ratio between FTE students and graduates (DNA Economics, 2016). It has been suggested that, given low throughput rates, expenditure and costs measures per graduate rather than per FTE student may be more useful (DNA Economics, 2016).

SETAs

The Sectoral Education and Training Authorities are funded by a skills levy on wages, amounting to R15.2 billion in 2015/16. This very large sum of money does not seem to lead to sufficient training in the workplace. The SETAs have strong union participation or even domination, and employers are often not particularly attracted to the type of training offered, in part because of the unnecessarily high administrative burden. The OECD (2017: 50) notes that due to the low take-up of the grants, employers often see the skills levy simply as an additional tax. They mention that the administrative burden that comes with the completion of reports acts as a disincentive from participating and benefiting from training provided with the SETA funds.

Key issues for reform of vocational training

The current system of TVET and SETAs as the training arms for TVET has thus far not been very successful in attracting students and convincing employers that they contribute to improved productivity. The greatest need remains to align the vocational education system to skill needs and workplace practices in the workplace. This may require a complete re-design of the whole vocational training system, which is currently wasteful and not very effective. Strong opposition can however be expected from unions if the position of SETAs is threatened.

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