



IN DEPTH

TEACHERS IN SOUTH AFRICA



SUPPLY AND DEMAND 2013–2025

March 2015

The Centre for Development and Enterprise, South Africa's leading development think tank, focuses on vital national development issues and their relationship to economic growth and democratic consolidation. Through examining South African realities and international experience, CDE formulates practical policy proposals for addressing major social and economic challenges. It has a special interest in the role of business and markets in development.

Series editor: Ann Bernstein

This report is based on three background research papers written for CDE by Dr Charles Simkins, Dr Roger Deacon and Dr Peter Robinson. The report was written by Dr Jane Hofmeyr (CDE's Education Policy and Advocacy Director) and Dr Kim Draper (CDE's Education Research Manager).

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The full report, as well as the CDE Technical Report: Teacher supply and demand 2013-2025, are available on the website www.cde.org.za.

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5 Eton Road, Parktown, Johannesburg 2193, South Africa
P O Box 1936, Johannesburg 2000, South Africa
Tel +27 11 482 5140 • Fax +27 11 482 5089 • info@cde.org.za • www.cde.org.za

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ACRONYMS

ANAs	Annual National Assessments
ASS	Annual Schools Survey
B Ed	Bachelor of Education
CDE	Centre for Development and Enterprise
CESM	Classification of Educational Subject Matter
CHE	Council on Higher Education
CPTD	Continuing Professional Teacher Development
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
ECD	Early Childhood Development
FL	Funza Lushaka
FET	Further Education and Training (Grades 10-12)
FP	Foundation Phase (Grades R-3)
HEI	Higher Education Institution
HEQC	Higher Education Quality Committee
HoD	Head of Department
IP	Intermediate Phase (Grades 4-6)
ISASA	Independent Schools Association of Southern Africa
ISPFTEd	Integrated Strategic Planning Framework for Teacher Education and Development
ITE	Initial Teacher Education
KZN	KwaZulu-Natal
LER	Learner to Educator Ratio
LSEN	Learners with Special Education Needs
MRTEQ	Minimum Requirements for Teacher Education Qualifications
NGO	Non-Governmental Organisation
NSC	National Senior Certificate
NTG	New Teacher Graduate
NWU	North-West University
PED	Provincial Education Department
PERSAL	Personnel Salary System
PGCE	Postgraduate Certificate in Education
REQV	Relative Education Qualification Value
SACE	South African Council for Educators
SP	Senior Phase (Grades 7-9)
UKZN	University of KwaZulu-Natal
UNISA	University of South Africa

INTRODUCTION

One of the greatest challenges facing the South African education system is the production of sufficient competent teachers, who can provide quality teaching for all school subjects and phases.

Whether South Africa is able to meet this critical challenge is a question that has motivated the Centre for Development and Enterprise (CDE) to undertake research on teacher supply and demand. A 2011 CDE report¹ indicated that South Africa was producing only a third of the country's requirement of some 25,000 new teachers a year, and particularly too few in key subjects such as mathematics, science, commerce and technology.

The seriousness of these findings led CDE to revisit teacher supply and demand to determine if the situation had improved. Accordingly, it commissioned three experts to update the 2011 research with the latest information. Dr Roger Deacon and Dr Peter Robinson, respectively, investigated the public and private provision of initial teacher education (ITE)², and Dr Charles Simkins modelled teacher supply and demand from 2013 to 2025, using 2012 and 2013 data on public and independent ordinary schools. The model is presented in detail in the *CDE Technical Report: Teacher Supply and Demand 2013-2025*,³ which is available on the CDE website.

This report is based on their research findings and seeks to address the key question: "Will South Africa be able to produce enough qualified competent teachers for all school phases and subjects over the next ten years?"

To answer this question, this report covers the following areas:

- Government strategy for improving the quantity and quality of ITE provision;
- The demand for teachers in the schooling system;
- The supply of new qualified teachers;
- The size and profile of the current teaching corps;
- The movement of teachers in and out of the schooling system; and
- Matching teacher supply and demand.

The report concludes with a summary of the main findings and recommendations. How the model was constructed is presented in detail in the CDE Technical Report referred to above.

Although the research for this report was predominantly quantitative, it also revealed that the quality of ITE programmes and teachers is of prime importance. Researchers and government agree that the subject content knowledge and pedagogical knowledge of most South African teachers is poor and that this is a major cause of inadequate learner achievement.⁴ That teachers lack essential knowledge and skills points to inadequate pre-service teacher training, which is provided through ITE programmes at higher education institutions (HEIs) in South Africa.

The quality of ITE programmes and teachers is of prime importance

GOVERNMENT STRATEGY AND INITIATIVES

In the late 1990s, provision of ITE programmes plummeted owing to the misperception that there were too many teachers. This misperception was based on a superficial understanding of the findings of the 1995 *National Teacher Education Audit*⁵ and was compounded by the subsequent closure of the colleges of education, many of which were absorbed into universities. Decreased geographical accessibility to teacher education programmes, coupled with the perceived low status of teaching and improved career opportunities in other fields, resulted in a significant drop in teacher education enrolments by black Africans in particular.

The reduction in the number of institutions providing ITE was accompanied by a marked decline in bursary funding which traditionally had been administered by the provincial education departments (PEDs).

While the concentration of teacher education in the universities may in general have enhanced its quality, not all institutions, especially those which themselves were historically disadvantaged, could offer the same levels of training, engagement or support to either lecturers or students. This was particularly the case with universities that inherited a teacher education programme from a poor quality former college rather than developing the programme themselves. At the same time, the merging and/or restructuring of certain universities reduced the attention and resources available to assure programme quality.⁶

In 2009, in response to increasing concern about the poor supply of new teachers and the quality of ITE programmes, the Department of Basic Education (DBE) and the Department of Higher Education and Training (DHET) called a multi-stakeholder Teacher Development Summit to examine all the challenges relating to teacher development and propose strategies to address them. This resulted in a co-ordinated plan for the sector in 2011, the *Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011-2025*, also known as ISPFTED or the Plan.⁷

THE INTEGRATED STRATEGIC PLANNING FRAMEWORK FOR TEACHER EDUCATION AND DEVELOPMENT

The Plan is a high-level strategy that frames the quantitative and qualitative challenges for teacher education and development, and outlines a 15-year plan for improved and expanded teacher education and development opportunities with the primary outcome as “to improve the quality of teacher education and development in order to improve the quality of teachers and teaching”.⁸

The Plan covers schooling from Grades R to 12 and includes all the professionals involved in the teacher development system – from those in education departments at all levels, HEIs and statutory bodies, to classroom teachers – and addresses all phases of a teacher’s career through recruitment, ITE, induction and Continuing Professional Teacher Development (CPTD). The Plan is also a sectoral one which is aligned with the strategic plans of both the DBE and DHET. This is most important because teacher education and development is split across these two departments.⁹

Four strategic outputs are identified: addressing the individual and systemic needs of teacher development, attracting increasing numbers of high-achieving school-leavers

Researchers and government agree that the subject content knowledge and pedagogical content knowledge of most South African teachers is poor and that this is a major cause of inadequate learner achievement

into teaching, enhancing teacher support at the district level, and expanding and making more accessible the formal teacher education system. The Plan sets out activities to achieve short-term (2011-2014), medium-term (2011-2017) and long-term (2011-2025) goals, and details who will be responsible for undertaking the tasks.

CDE regards the Plan as highly significant. A strategic plan of this nature and scope was well overdue and it signalled government's determination to tackle teacher education and development issues. It was also the result of an inclusive process involving all key stakeholders, not least the teacher unions.

Despite these strengths, the Plan stops short of identifying measurable deliverables with specific annual targets for every level of the system (national, provincial, district) to achieve. This makes it difficult to measure progress. Government has recognised this and in 2014 launched *Operation Phakisa*, using the World Bank methodology of 'Big Fast Results Now' to develop a detailed implementation plan for every level of the teacher development system in order to speed up the achievement of specified deliverables. It is a whole sector initiative with participation from teacher unions, higher education, basic education, the private sector and key institutions such as the Council on Higher Education (CHE), the South African Council for Educators (SACE) and Umalusi. For achieving system improvement, the commitment of all stakeholders in education is critical.

A key weakness of the Plan is the model of expansion used in the light of the poor quality of ITE programmes. The Plan is based on increasing the provision of ITE programmes at all public HEIs for all phases of schooling through expanded enrolments in two existing ITE qualifications, the Bachelor of Education (B Ed) and the Postgraduate Certificate in Education (PGCE).

ITE institutional arrangements and approaches in a wide range of other countries were researched to inform the Plan. The research found that

*... multiple and innovative pathways to becoming a teacher have been established, including the involvement of school consortia in the development of teachers. In some countries, a nested, integrated, holistic network of delivery institutions have been established at different levels of the system – national, provincial, regional and district – to ensure accessibility and wider reach.*¹⁰

However, none of these were proposed for the country although 'more flexible and accessible modes of delivering high-quality teacher education'¹¹ is one of the Plan's strategic goals. This was a missed opportunity because internationally the trend is towards opening up multiple pathways, especially school-based ones, and using different modes of delivering ITE. These provide the flexibility that meets the needs of different pools of potential teachers. For example, second-career professionals and later entrants into the profession require routes into teaching which combine full-time, school-based training and a qualification through distance education with a monthly allowance or remuneration. South Africa should seek to introduce a wider range of ITE models instead of relying on "more of the same" - even if it is of better quality.

Research into private ITE provision was conducted for the ISPFTED and found that there it was limited, but the Plan did not investigate what role the private sector could play in future to meet the needs of the country.

The professional development needs of teacher educators at HEIs are another gap in the Plan, although it does examine CPTD for school teachers in great detail and identifies the many steps that must be taken to meet their needs and those of the country effectively. If the overriding goals of the ISPFTED are to expand and improve the quality of ITE, then

A strategic plan of this nature and scope was well overdue and it signalled government's determination to tackle teacher education and development issues.

many more teacher educators will be needed and their quality and ability to teach new ITE curricula effectively is another important consideration.

IMPLEMENTATION OF THE PLAN

In line with the ISPFTED the two national education departments have made impressive progress in achieving its short and medium-term quantitative goals, and have begun to address the qualitative ones.

Expansion of ITE

Since 2007 government has successfully launched a number of initiatives to increase the supply of new teacher graduates: establishing the Funza Lushaka (FL) Bursary Scheme for teaching students in 2007, expanding university capacity to deliver ITE programmes, allocating additional funding to ITE provision, improving enrolment planning at provincial and institutional levels, and increasing the number of universities offering Foundation Phase (FP) programmes.

Between 2008 and 2010, additional funding of R570 million was provided to HEIs to improve their infrastructure and efficiency, and thus strengthen their teacher education provision. The allocation to FL has increased dramatically: from R109 million in 2007 to just over R940 million in 2014. Between 2009 and 2012 more than 39,000 FL bursaries were awarded and approximately 9,600 bursars graduated during that time. In 2013, 14,500 bursaries were awarded and more than 3,000 bursary recipients graduated as teachers.

Since 2009, ITE provision has expanded significantly. This is partly as a result of the financial support of the European Union Sector Policy Support Programme launched in 2011. In 2014, 23 universities offered ITE programmes, including the two new universities, the Sol Plaatje University in the Northern Cape and the University of Mpumalanga. New teacher education college campuses are being established in provinces where they are needed. For instance, in 2013 the former Ndebele College of Education was re-opened and in 2014 incorporated into the University of Mpumalanga as the Siyabuswa Teacher Education Campus to offer ITE for the FP and Intermediate Phase (IP), as well as CPTD programmes.

A focus of government's efforts has been the expanding and strengthening of the provision of FP teacher education because of the dearth of FP graduates. Since 2009 the number of universities committed to offer FP teacher education has increased from 13 to 22 in 2014, 16 of which already have their FP programmes in place and another 3 are awaiting evaluation of their programmes. Government also allocated R141 million in a new earmarked grant to research, programme development and materials development activities focused on FP.

Quality Improvement

The poor quality of ITE programmes became startlingly evident in a review undertaken by the Higher Education Quality Committee (HEQC) between 2005 and 2007 of four ITE programmes – the Masters in Education, Advanced Certificate in Education, B Ed, and PGCE.¹² This review found that the majority of teacher education programmes were not worthy of full accreditation because they did not meet the minimum standards as set by

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the review process. Of the 22 PGCE and 15 B Ed programmes, only seven of the former and six of the latter were awarded full accreditation. A particular weakness was the practice teaching component of the programmes.

The 2010 HEQC review had a direct and immediate impact on government planning regarding the quality of teacher education. In part it influenced the development of the policy on *The Minimum Requirements for Teacher Education Qualifications* (MRTEQ)¹³ in 2011. DHET gave notice that by July 2014, all teacher education programmes had to be re-designed, so as to give particular emphasis to what is taught (subject or disciplinary content knowledge), and how it is taught (pedagogical content knowledge), as well as a strong practice teaching component. Only re-designed ITE programmes that conformed to the MRTEQ policy would be approved and recognised as sufficient for graduates' employment in education. By February 2015, 124 of the 169 submitted programmes had been approved (73 per cent) and others are in the pipeline. DHET expects that in 2016 all new student registrations will be for MRTEQ-aligned qualifications.

For a considerable time the national departments have been worried about teacher utilisation because there is evidence that in schools teachers are placed in posts that do not correspond with their teaching qualifications or subject specialisations.¹⁴ Consequently, improving teacher utilisation is one of the objectives of the ISPFTED and the DBE's latest Medium-Term Expenditure Framework.¹⁵ In order to understand the extent of the problem so that it can be addressed, the DBE has instructed the PEDs to enter into the Personnel Salary System (PERSAL) database a minimum of three subjects that the teachers are qualified to teach, and what they were actually teaching. By August 2014 only a minority of PEDs had completed this task and it was clear that some of the data was inaccurate and had not been checked.¹⁶

More recently, DHET has co-funded a multi-year study investigating the quality of the English and mathematics curricula offered to B Ed students specialising in the IP of schooling at five HEIs across South Africa. JET Education Services is conducting the research and has released the first report.¹⁷ This study found that the content of modules and hence of the B Ed programmes varied widely among institutions, with the greatest variation in the amount of time devoted to and the quality in teaching practice. Most programmes also seemed to lack a strong underlying logic and coherence.

The study also pointed to the fact that ITE programmes have low entrance requirements in comparison with most other disciplines and students are accepted without any reference to what motivates them to become teachers. The issue of low admission criteria is an important factor: in most universities the B Ed programme has lower entrance requirements than other undergraduate degree programmes, which means that weaker students are attracted to the B Ed programme. By contrast in a country like Finland, the best students are accepted for ITE qualifications.¹⁸

The report concluded that

*...while there are some excellent practices, it is clear that, as a whole, none of the five institutions studied is rising fully to the challenge posed by the country's low quality school system ...*¹⁹

DHET has also launched two research projects to investigate the establishment of Teaching Schools or 'teaching laboratories' where student teachers could engage in learning-from-practice on a regular basis, and a possible network of Professional Practice Schools where student teachers can be placed for extended periods of teaching practice.

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TEACHER SUPPLY AND DEMAND

Given the development of the Plan in 2011 and the education departments' initiatives in recent years, the key question is whether teacher supply and demand has changed since CDE's previous model which projected a severe shortage of teachers based on the low production of new graduates in 2009. It is this question that the new CDE model seeks to answer.

To construct this new CDE model, a number of datasets were used:

- The population statistics from the Spectrum database used by Statistics South Africa to project the growth in the learner population over the next 10 years;
- The supply of teachers to the system from audited figures in DHET internal reports, *Trends in Teacher Supply*, for four consecutive years, 2009 to 2012;
- The number of teachers in the system for five consecutive years, 2009 to 2013, obtained from the DBE's *Education Statistics and School Realities*;
- The movement of teachers in the system from two sources of teacher information: PERSAL based on a secondary analysis of two internal DBE reports²⁰, and two consecutive years (2012 and 2013) of the DBE's Annual Schools Survey (ASS) data. The ASS data contain information on educators by characteristics relevant to the analysis, notably gender, age, citizenship, qualification level, years of experience, identity of employer (whether government or a school governing board); and
- The General Household Survey (2013) to investigate Grade R enrolments.

In the course of CDE's research it was found that the various data sources were inaccurate, incomplete or inconsistent in what they include. In the case of the available data for PERSAL and the ASS database, the main sources used to construct the model, the analyses lead to substantially different conclusions. These are discussed in detail in the CDE Technical Report, which also explains how the model dealt with the data problems.

This means that although the CDE model presented in this report is the most up-to-date, comprehensive and publicly available one, it cannot resolve the differences between PERSAL and the ASS. In principle, these differences could be resolved in the future. Even so, a revised model is a projection rather than a prediction and there will always be some uncertainty about the information fed into it. For these reasons, even an improved model should not be regarded as an infallible guide to the future. Rather modelling should be seen as a way of bringing together the influences bearing on the system in a coherent and appropriately weighted way to inform decision-makers about patterns and trends in teacher supply and demand.

Because CDE had primary data from the ASS and it allowed us to analyse data by age, which the available PERSAL data did not, the findings reported here will come from the ASS analysis unless otherwise stated.

TEACHER DEMAND

The future demand for teachers is influenced by various factors: demographic trends, learner enrolment and learner progression rates. All of these were used to construct the model.

Modelling should be seen as a way of bringing together the influences bearing on the system in a coherent and appropriately weighted way to inform decision-makers about patterns and trends

Demography

Population changes influence the numbers of learners who will need to be taught in the next decade. The previous teacher demand and supply model published by CDE²¹ was based on the best information at that time about demographic trends, and projected a flattening and then decreasing of learner enrolments over the next decade.

However, the latest population data shows that despite a declining fertility rate,²² women of child-bearing age are living longer, the number of births is increasing²³ and consequently there will be more learners in the next decade than were projected in 2011.

Projected Learner Enrolments 2013-2025

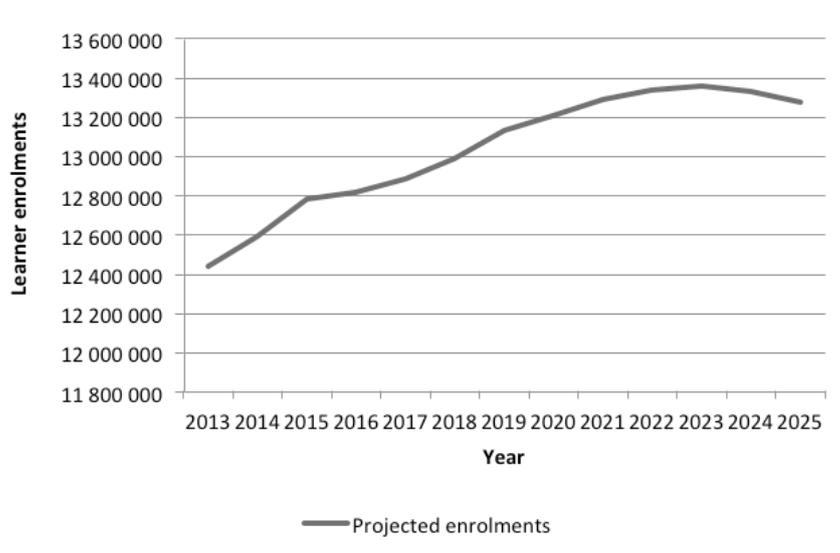
To project learner enrolments to 2025 the following were used:

- Registered birth rates seven years earlier to project new arrivals in Grade 1 where these were available and thereafter model estimates of births;
- Total learner enrolments in Grades 1 to 4 between 2008 and 2013;
- The 2011/12 learner promotion, repetition and dropout rates; and
- Grade R enrolments at 64 per cent of Grade 1 enrolments.²⁴

In the process of constructing the model, we found that both the number of registered births and total learner enrolments in Grades 1 to 4 from 2008 to 2010 revealed dips and spikes which will result in uneven learner enrolment as the various age cohorts move through the schooling system in the next decade. Similarly learner progression through school, as learners are promoted, drop out or repeat grades, is not smooth, with a significant bulge of learners in Grades 1 and 10.²⁵

Drawing on all the datasets outlined above, the CDE model projects that learner enrolments will increase from some 12.4 million in 2013 to in 13.4 million in 2023, after which they will decrease to 13.3 million in 2025. This projection is shown in Figure 1.

Figure 1: Projected learner enrolments (Grades R-12)



Source: CDE (2015)

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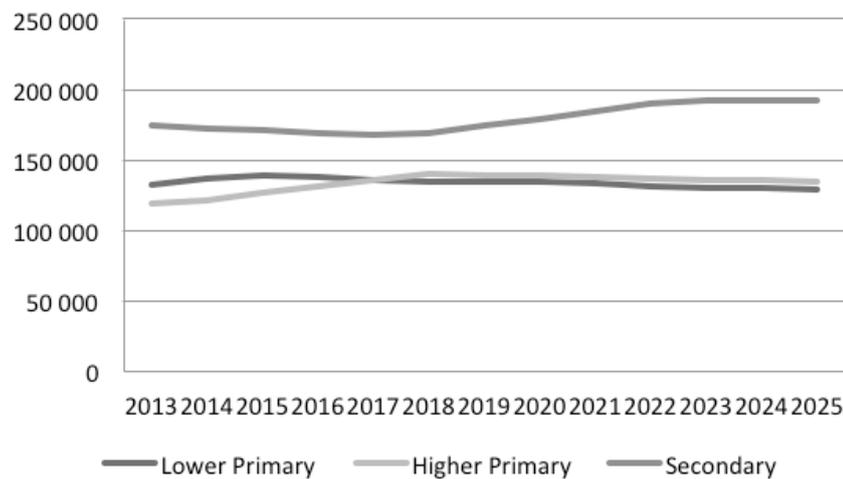
Future Demand for Teachers

The future demand for teachers will depend on the total number of learners in the system, and how many learners on average a teacher would teach in a class. This is calculated in terms of the learner to educator ratio (LER) in a schooling system. The model used an average LER of 31.2 for primary and 26.3 for secondary schools from 2009 to 2012 for the projection.

From the projected total learner enrolments and these LERs, the demand for teachers in the system will rise from around 426,000 in 2013 to a maximum of 456,000 in 2023. After that it will start to decline slowly to 2025. The projected increase of 7 per cent over the 12-year-period needed to produce the extra 30,000 teachers should be quite achievable in terms of the recent significant increase in new graduates as discussed in the next section.

The future need for teachers, however, is not evenly spread across the schooling system, as Figure 2 shows.

Figure 2: Projected teacher requirements (2013-2025)



Source: CDE (2015)

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If the 13 years of schooling are split into lower primary (Grades R to 3), higher primary (Grades 4 to 7) and secondary (Grades 8 to 12), by 2025 fewer teachers will be needed in the lower primary sector of schooling (some 3 per cent less) and more will be needed in the upper primary (13 per cent more) and secondary school sectors (10 per cent more).²⁶

It is important to note that the lack of adequate data on Grade R enrolments means that it is not possible to accurately project how many additional teachers might be needed as Grade R enrolments move through the schooling system and increase.²⁷ However, some scenarios were modelled. Suffice to say that if in the next decade Grade R enrolments in public and independent schools increase to 80 per cent of Grade 1 enrolments, then some 4,500 more teachers will be needed in 2025, approximately 8,122 additional teachers if enrolments increase to 90 per cent, and around 12,000 more teachers if the enrolments increase to 100 per cent.²⁸

TEACHER SUPPLY

Against the projected demand for teachers we look now at the supply of teachers which is made up of the number of new teachers graduating from ITE programmes and the number of teachers in the current teaching force.

Initial Teacher Education

In South Africa, ITE is provided by HEIs and is concerned with the academic and professional development of student teachers in order to prepare them for work in schools and as a basis for CPTD.

There are two basic models of ITE programmes: the consecutive model and the concurrent model. In the consecutive model, a teacher first obtains an undergraduate Bachelor's degree, and then studies for a further year to obtain a teaching qualification, a PGCE. In the concurrent model, a student simultaneously studies both the academic and professional requirements for the four-year B Ed degree.

As both of these are four-year qualifications, the current official requirement for a qualified teacher in South Africa is known as M+4, a matric (school-leaving) certificate plus four years of ITE. Until fairly recently, however, M+3 (matric plus three years of ITE) was the official requirement, and so most teachers in the country are qualified with M+3. Therefore a qualified teacher in South Africa is one who has acquired a formal accredited teaching qualification comprising at least three years of training.

'Qualified' and 'quality'

A qualified teacher is not the same as a good teacher. While a qualified teacher in South Africa is one who has at least three years of post-school ITE, not all qualified teachers are competent professionals able to provide quality teaching and learning. In fact, government's own investigation into the quality of ITE programmes and recent research make it clear that the quality of most of these programmes leaves a lot to be desired. The result is that most of the current teaching force has been inadequately educated and trained, whether during apartheid or in the recent past.

Public provision of ITE

The provision of newly qualified teachers to the system is dominated by public facilities, with only a small number of teachers graduating from private institutions.

Since 2009 three universities, the University of South Africa (UNISA), North-West University (NWU) and the University of KwaZulu-Natal (UKZN) have been the largest providers of ITE. In 2012, UNISA accounted for more than half of all ITE enrolments (52 per cent), followed by NWU (6 per cent), and UKZN (4 per cent). In 2012, these three universities together produced nearly half of all newly qualified teachers: 30 per cent by UNISA, followed by UKZN with 9 per cent and NWU with 8 per cent.

Enrolments

In line with the ISPFTED the national departments of education have expended considerable effort and resources to increase the provision of ITE programmes at HEIs. As a result the enrolments increased from 35 937 in 2009 to 94 237 in 2012, a 160 per cent increase.

The provision of newly qualified teachers to the system is dominated by public facilities, with only a small number of teachers graduating from private institutions

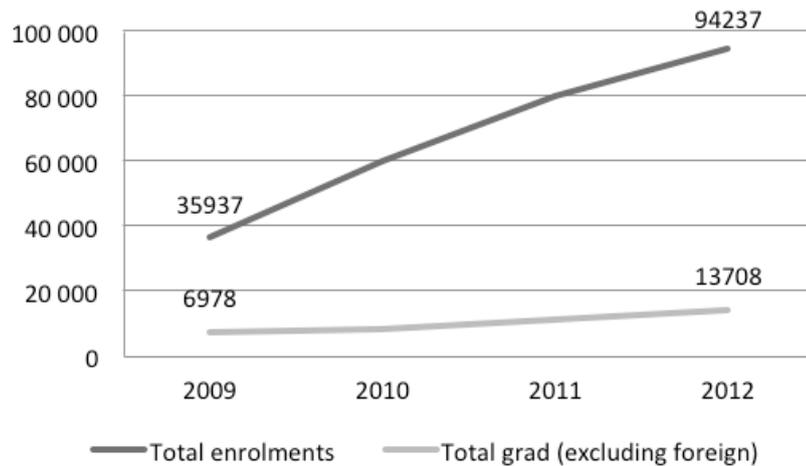
Any expansion of ITE provision requires additional resources. However, the main funding mechanism for public HEIs is not optimal for ITE. Currently education is in Classification of Educational Subject Matter (CESM) Level 1 (the lowest level) of government’s calculation of the teaching input and output components of the block grant each university receives, from which it decides how many ITE places to allocate. The B Ed and PGCE are also in the lowest category by level of higher education qualification and thus attract less funding. This has created a disincentive for the universities to allocate more money to ITE. By contrast government has used earmarked grants in recent years, to target specific improvements and the expansion of priority ITE programmes.

There is no doubt that FL bursaries have been a major contributing factor to the growth and the demand for them is outstripping the supply.²⁹ In January 2015, 78,593 applications for FL bursaries were received: 14,921 were re-applicants who had obtained FL bursaries for previous years of study, and 63,672 were new applicants.³⁰

Graduates

With the growth in the number of enrolments the number of graduates has also increased from 6,978 in 2009, nearly doubling to 13,708 in 2012. However, the number of graduates is very low compared to the number of enrolments, as Figure 3 shows.

Figure 3: ITE enrolments and graduations (excluding foreign students)



Source: CDE (2015)

Graduation rates

To analyse the throughput of teacher education programmes properly, a cohort study is needed. This will allow us to track the progress of one or more entering cohorts from the time of entry until all entrants have either graduated or dropped out. Such a cohort study has not been undertaken in South Africa so we do not have actual throughput rates.

The graduation rate refers to the number of students who graduate from a programme in a particular year, expressed as a percentage of the total number of students enrolled in that programme in the same year. The graduation rate is not an entirely satisfactory indicator, since the graduations in one year are actually a function of enrolments in earlier years, not the same year. The graduation rate is also sensitive to changes in the pattern of enrolment: for example, if the number of enrolees increases significantly in a particular year, the graduation rate will suddenly drop. It is also affected by whether or not the

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programme is offered through contact or distance education, and full-time or part-time study.

When ITE enrolment and graduation data between 2010 and 2012 was analysed, the graduation rate for the one-year PGCE programmes was found to be about half of what it could be. In the case of the four-year B Ed, the graduation rate was less than half of what it could be.³¹ For the B Ed distance education programmes offered by UNISA, where most students study on a part-time basis, the rate was even worse, dropping to around 10 per cent of what it could be.

The indicator is good enough to make the central point: that progress through both contact and distance ITE programmes is poor and the outputs are low, and particularly so in the case of distance programmes where many students study part-time. Hence distance education programmes are very inefficient and more costly.

Table 1 below compares the graduation rates for the B Ed at UNISA, which provides distance education, to the other campus-based institutions that provide contact education.

Table 1: B Ed graduation rates (2010-2012)

Year	UNISA (distance education)			Other universities (contact education)		
	Enrolments	Graduates	Graduation rate	Enrolments	Graduates	Graduation rate
2010	18,582	488	2.6%	33,481	4,429	13.2%
2011	30,086	611	2.0%	38,104	5,567	14.6%
2012	40,124	1,007	2.5%	41,781	6,996	16.7%

Source: CDE (2015)

The long turnaround time between enrolment and graduation also complicates government's ability to plan for the required number of new teacher graduates (NTGs).

Projected number of teacher graduates

To increase the number of NTGs the DHET produced an enrolment plan for the period 2014 to 2019 which was used as the basis for projecting graduation rates. The projection presented in Table 2 assumes the DHET plan to 2019. However, because the projected learner enrolments indicate that the demand for secondary school teachers will be greater than for primary school teachers in the next decade, the projection allows for a 6 per cent per annum increase in B Ed graduates from 2020 to 2025, and an 8 per cent per annum increase in PGCE graduates.

Progress through both contact and distance ITE programmes is poor and the outputs are low, and particularly so in the case of distance programmes where many students study part-time

Table 2: DHET enrolment plan extended to 2025

	B Ed			PGCE			Total graduates
	Enrolments	Graduates	Rate	Enrolments	Graduates	Rate	
2012	81,905	8,003	9.8%	12,332	5,705	46.3%	13,708
2013	92,759	8,732	9.4%	12,332	5,871	47.6%	14,604
2014	85,047	11,053	13.0%	14,050	6,492	49.4%	17,545
2015	91,050	11,374	12.5%	15,236	6,941	45.4%	18,315
2016	98,427	11,932	12.1%	16,608	7,471	45.0%	19,403
2017	105,010	12,531	11.9%	18,433	8,214	44.6%	20,745
2018	109,609	13,204	12.0%	19,989	8,827	44.2%	22,031
2019	113,890	13,909	12.2%	21,881	9,602	43.9%	23,511
2020	122,867	14,744	12.0%	23,568	10,370	44.0%	25,114
2021	130,233	15,628	12.0%	25,455	11,200	44.0%	26,828
2022	138,050	16,566	12.0%	27,491	12,096	44.0%	28,662
2023	146,333	17,560	12.0%	29,687	13,063	44.0%	30,623
2024	155,108	18,613	12.0%	32,064	14,108	44.0%	32,722
2025	166,417	19,730	12.0%	34,630	15,237	44.0%	34,967

Source: CDE (2015)

Table 2 shows that the total number of teachers expected to graduate from public HEIs will increase significantly from some 13,700 in 2012, to nearly 35,000 in 2025, almost a three-fold increase.

Private provision of ITE

The fact that the 2011 CDE model showed that public HEIs were producing far too few teachers for the country's future needs, prompted CDE to examine the private provision of ITE as a complementary source of teacher graduates, and how the private sector might contribute to increasing the supply of good teachers.

CDE's research revealed that the private provision of ITE in South Africa is very limited.³² Although there are approximately 115 private HEIs in South Africa, few of them offer ITE programmes.

There are a number of reasons for this, not least of all, financial. ITE does not bring in as much income as CPTD training does, so private HEIs have prioritised the provision of CPTD over ITE. This mirrors the situation in public universities where historically the government subsidy formulae for ITE have been unattractive. In addition, the lack of access to FL bursaries for students in private ITE institutions affects their affordability, so their fee levels have to be kept very competitive with public universities, without the advantage of a government subsidy. Setup costs are high and can extend over several years while the lengthy and very laborious process of obtaining full accreditation as a private ITE provider and accreditation of each programme through multiple statutory bodies unfolds.

Embury Institute for Teacher Education

During its research CDE identified the Embury Institute for Teacher Education in KwaZulu-Natal (KZN), the largest private provider of ITE in the country, as worthy of

The lack of access to Funza Lushaka bursaries for students in private ITE institutions affects their affordability, so their fee levels have to be kept very competitive with public universities, without the advantage of a government subsidy

further investigation in a case study. This Institute has been in existence for more than 10 years and has been steadily expanding. In 2013 it was bought by Curro, the fast-growing independent school chain.

Embury has some important features that have contributed to its success and could inform other private providers of ITE.

Embury Institute for Teacher Education

- Embury has full registration as an HEI and its certificate, diploma and B Ed (FP) degree programmes are accredited.
- It has a dedicated focus on ITE only and concentrates on a niche market by providing Early Childhood Development (ECD) and FP teacher education, two important areas of ITE to meet future teacher demand.
- It offers three of its own accredited qualifications and tuition for two UNISA degrees, as well as a range of short CPTD courses.
- By 2014 it had expanded to some 2,000 students, of which 590 were enrolled for Embury's B Ed programme, and another 60 in UNISA's B Ed.
- The success rates of students in its own programmes compare favourably with, or exceed, the various indicators of throughput at public universities. In 2013, for example, the success rate of the 100 students in their first year of the B Ed programme was 90 per cent, and of the 200 students in their fourth year, 70 per cent.
- The lecturers are highly motivated, professional and experienced and the classes are smaller than those of public universities, allowing for more interaction with students.
- It allocates considerably more time and attention to practical teaching than public HEIs. Their student teachers alternate between a week in schools and a week at Embury for their academic studies. Final year students spend an extended period of six to eight weeks in a school. During their degree they obtain experience in different types of schools – poorly resourced, well-resourced, and special needs schools.
- Over the years Embury has developed several important partnerships: with UNISA to provide accredited tuition for its B Ed and B Ed (Hons) degrees; with the KZN education department and a number of NGOs to train un- and underqualified pre-school teachers; with the DBE to develop new courses and materials for classroom teachers to teach physical education, and the education of the deaf; and with public and independent schools for the placement of students on teaching practice.³³
- Interviews with heads and teachers in public and independent schools indicated that generally its students and graduates are highly regarded.

Embury has developed a good, replicable model for private delivery of high-quality ITE for ECD and FP teachers, which offers some useful insights for the expansion of private provision

By all accounts, Embury has developed a good, replicable model for private delivery of high-quality ITE for ECD and FP teachers, which offers some useful insights for the expansion of private provision.

However, it is not without challenges. It has institutional challenges such as the high costs of physical infrastructure and the maintenance of high-quality IT equipment and services, the danger of overextending its capacity as it expands, and the challenge of finding suitable high-quality teacher educators with the right blend of academic qualifications and strong classroom experience. In addition, it has to cope with a number of external challenges, such as an unpredictable operating environment for teacher education institutions resulting from ongoing policy changes by the education departments, and the affordability of its fees in comparison with public HEIs where students are eligible for FL bursaries.

Nonetheless, Embury shows that a private provider that offers high quality ITE programmes, is entrepreneurial and forms important partnerships with government and

donors, can be successful in niche areas, especially where the public universities are weak, such as ECD, FP and teacher education for learners with special education needs (LSEN).

Private innovation

Although in 2013, when CDE conducted its research on private provision, there were only limited market-based solutions to the need for more high-quality ITE, in the non-profit private sector there have been some noteworthy developments. Two non-governmental organisations (NGO's) have developed alternative pathways to becoming a qualified teacher. One, established by the Independent Schools Association of Southern Africa (ISASA), is the ISASA Mathematics and English Programme, which involves a student teacher internship in independent schools and distance ITE for the duration of the B Ed or PGCE, with mentoring and strong academic and psycho-social support. The other, *Teach South Africa*, selects quality graduates and places them in poorly resourced public schools for two years after a short initial intensive course of teacher training, followed by ITE through distance education.

Government provides bursaries for some of the students in the ISASA internship programme on condition that the majority teach in public schools, and it pays the salaries of the *Teach South Africa* graduates in the public schools where they are placed. The DBE sees these programmes as potentially scalable models for the country and values what can be learnt from their strengths to improve public ITE provision. These include the access they provide to new pools of potential teachers whose needs are not being met by the traditional pathways, rigorous selection processes to ensure high-quality trainees, strong student support, mentoring in the schools, and students' intimate knowledge of the school curriculum and extensive classroom teaching experience.

Even if their scale cannot match the size of the enrolments in public ITE programmes, the DBE regards the internship graduates as constituting a corps of high-quality teachers who can be strategically used in the public school system as future heads of department (HoDs), teachers at resource centres or subject advisors.

These alternative ITE models illustrate the entrepreneurial and innovative nature of the private sector, which has the flexibility to introduce new approaches and experiment more easily and rapidly than large public institutions.

The Teaching Force

The size and nature of the teaching force in schools is the other key component of teacher supply in South Africa. The number of available teachers depends on the number of new teachers who enter the system ('joiners'), those who leave after some time ('leavers'), those who return to teaching at a later stage ('returners') and those who stay permanently until they retire ('stayers').

On the basis of the DBE's Education Statistics data for 2012³⁴ the model indicates that in 2013 there would be approximately 426,000 teachers in the schooling system. However, it is also important to take into account the profile of the teachers in the system in terms of qualifications, age, experience, whether they are in permanent or temporary posts, and how many are South African or foreign nationals, because all of these have implications for teacher supply and demand.

From the ASS, CDE used data on 400,756³⁵ teachers, who were South African citizens between the ages of 22 and 65, to produce the following profile of the South African teaching force in 2013:

In the non-profit private sector there have been some noteworthy developments. Two non-governmental organisations have developed alternative pathways to becoming a qualified teacher

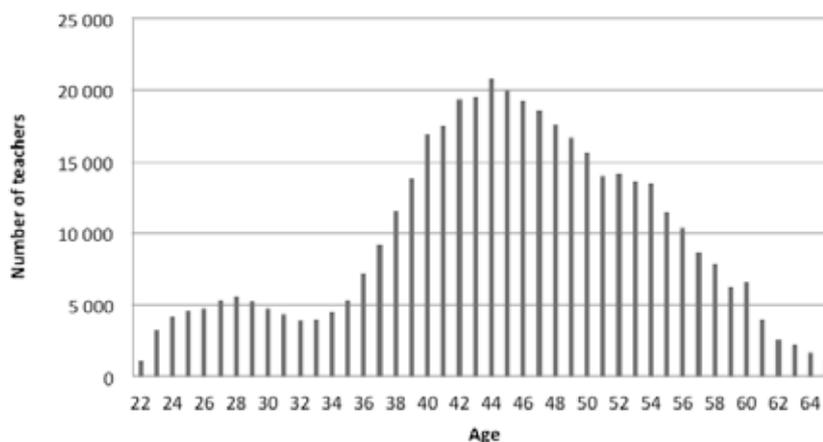
- Some 81 per cent of the teachers were fully qualified to teach.
- Of the qualified teachers, about 15 per cent (59,000) were qualified with a matric plus a four-year teacher education qualification (M+4); and 66 per cent (265,000) had a three-year teacher education qualification (M+3).³⁶
- Some 19 per cent (76,000) of teachers were unqualified:³⁷ 9 per cent (36,600) had the equivalent of M+3 but no professional teaching qualification, and 10 per cent (39,800) had M+2 or lower.
- Nearly 3 per cent (10,600) of teachers were foreign nationals, with two-thirds (6,700) of those from Zimbabwe.
- About 11 per cent (45,800) of the teaching force consisted of temporary appointees.
- 70 per cent of educators (282,223) were female.
- 22 per cent (86,700) of teachers were employed in KZN, 18 per cent (72,000) in Gauteng, and 17 per cent (67,300) in the Eastern Cape.
- About 31 per cent of all unqualified teachers (less than matric and three-year teaching qualification) were employed in KZN.
- The average teacher in service in 2013 had 17 years of experience, but the average experience reported by educators who had stayed in service until age 65 was 34 years.
- The age distribution was very uneven, with 45 per cent (169,000) of teachers in the age range of 40 to 49 years.

The most significant features of this profile are discussed below.

Age profile of teachers

In 2013 the age profile of teachers in the system was not a typical bell curve but bimodal, not unlike two humps of a camel. The number of teachers between 45 and 49 (97,700) was four times higher than the number between 30 and 34 (21,300) as shown in Figure 4 below. The number of employed teachers declined between 1999 and 2004 from 365,447 to 362,042. Stagnation in the number of teachers employed between 1999 and 2004 would have led to a decline in the number of young teachers entering the system. In addition, there was a substantial decline in ITE enrolments in contact colleges between 1994 and 2000, from 71,000 to 10,000. This decrease in enrolments would have resulted in a far smaller number of NTGs some four to five years later.³⁸

Figure 4: Teachers by age (2013)



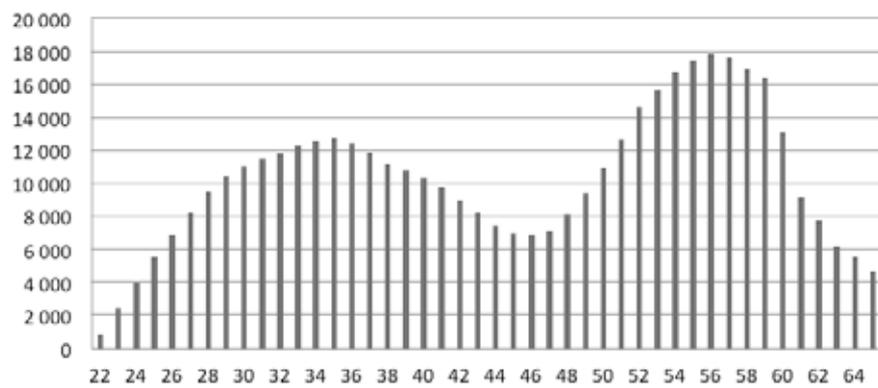
Source: CDE (2015)

In 2013, the number of teachers between 45 and 49 (97,700) was four times higher than the number between 30 and 34 (21,300)

The earliest age at which NTGs can enter the system after a four-year qualification is 22 years, but surprisingly, very few enter below the age of 24 years. The average age that most NTGs enter the system is 28 years and so, on average, there is a delay of some six years before the new graduates actually enter the system. The reason for this delay is not known but certainly worthy of investigation.

The age profile of the teaching force in 2025 was derived from projections of age-specific joiner, returner and leaver rates. This shows that by 2025 the significant dip in the current population of teachers of about 30 to 34 years will move through the system so that the smallest number of teachers will be 40 to 44 years old and the greatest number will be 50 to 59 years, with many opting for retirement after 55 when they can access their pensions. Figure 5 illustrates the 2025 age profile.

Figure 5: Teachers by age (2025)



Source: CDE (2015)

In 2013 by far the largest group of qualified teachers, 66 per cent, had an M+3 qualification – only 15 per cent had an M+4, the current official requirement for NTGs – and the remaining 19 per cent were unqualified

The uneven spread of ages in the system has major implications for school leadership in the future. In 2025 the smallest age group will be at the age at which teachers typically have sufficient experience to be eligible for senior management positions, such as principal, deputy-principal and HoD. The very small pool from which they can be drawn means that less experienced teachers may have to be promoted to those positions. This suggests that leadership training with a strong emphasis on instructional leadership should be timeously provided for teachers before they reach the age of 40. The stop-start hiring of teachers that has happened in the past must not be repeated if the challenges of the present bimodal age distribution are to be avoided.

Teacher qualifications

In 2013 by far the largest group of qualified teachers, 66 per cent, had an M+3 qualification – only 15 per cent had an M+4, the current official requirement for NTGs – and the remaining 19 per cent were unqualified. There are limits on how fast this situation can improve: the only way it can is by employing NTG with an M+4 or upgrading serving teachers’ qualifications. Consequently it will take a long time before the majority of teachers have an M+4 qualification.

When the qualifications profile of the teaching force is considered with the age profile, an atypical picture emerges. In a developing system younger teachers on average would be better qualified than older ones, but this is not the case in the 2013 teacher distribution up to age 50, or after age 30 in the 2025 projection.

More important than the qualifications of new joiners, are the qualifications added by teachers in employment. Between 2012 and 2013, the nearly 31 per cent of teachers who upgraded from unqualified to qualified while in employment exceeded the 22 per cent of newly qualified teachers who entered employment for the first time in 2013. This suggests that the majority of teachers build up their qualifications on the job, often over many years. Interestingly, the greatest number of qualified teachers entering the system comes from those who return to teaching (48 per cent), not the NTGs. This makes keeping teachers in the system, or encouraging teachers who leave the system to return, of critical importance.

Teacher attrition

The size of the teaching force at any time will be affected by the rate at which teachers leave the system. This is known as the attrition rate. However, in South Africa the high degree of churning in teaching force, with teachers joining, leaving and returning all the time, means that this is not a simple calculation.

To build the model, therefore, a gross attrition rate and a net attrition rate were calculated: the gross attrition rate is the number of leavers divided by the employed teachers, while the net attrition rate subtracts returning joiners from leavers.

However, the conclusions drawn from the secondary analysis of PERSAL data and the analysis of ASS data are substantially different in terms of gross and net attrition rates as shown in Table 3.

Table 3: Gross and net attrition rates of teachers

	Gross	Net
PERSAL	5.37%	2.73%
Annual Schools Survey	8.31%	3.37%

Source: CDE (2015)

In addition the two data sets indicate different net attrition rates in terms of qualified and unqualified teachers.³⁹

The analysis of both datasets suggests that the PERSAL attrition rates are biased downwards while the ASS rates are upwardly biased.⁴⁰ As a result, the estimates from both datasets were used to produce lower and higher projections of teacher supply and demand with different profiles of teacher qualifications.⁴¹

The main differences between the projections are outlined below:

PERSAL estimates

- The required number of B Ed and PGCE graduates is projected to rise from 7,500 in 2012 to some 12,000 in 2019 and will decline slowly after that. This implies that current teacher education capacity will suffice until 2017 and needs to be expanded by only 10 per cent thereafter.
- Until 2018 there may be a very small decline in the proportion of teachers who are qualified but the proportion should start to rise from 2019, provided that the share of unqualified teachers among joiners drops from 2013 to 2025.

Interestingly, the greatest number of qualified teachers entering the system comes from those who return to teaching (48 per cent), not the new teacher graduates

ASS estimates

- The ASS projection suggests that the number of enrolments will need to increase to produce the NTGs required: the B Ed intake in accordance with the DHET plan to 2019 and by 6 per cent each year from 2020; and the PGCE intake in accordance with the DHET plan to 2019 and by 8 per cent each year thereafter to produce approximately 35,000 NTG by 2025.
- This will result in the projected proportion of qualified teachers in the entire teaching force remaining at around 81 per cent, the same in 2025 as it was in 2013.

As is clear from the above, the gap between the PERSAL and ASS conclusions is uncomfortably wide.⁴² The PERSAL data suggest that it may be time to think of measures designed to curb the over-production of teachers down the line because in 2012 there were already 13,708 NTGs. By contrast the ASS data suggest an increase in intake will be necessary in the next ten years to produce 35,000 NTGs in 2025.

Notwithstanding these differences, the overall conclusion is positive: the required increases in first-time enrolments in ITE programmes are attainable in the next decade and South Africa is highly unlikely to have an overall shortage of teachers.

Teacher turnover

Another factor affecting the proportion of qualified and unqualified teachers in the teaching force is the very high rate of teacher turnover.

Of those teachers who leave the system, some return but many more do not. The loss of teachers is particularly significant for qualified teachers. Whereas 81 per cent of teachers were qualified in 2013, by 2025, based on the DHET's Enrolment Plan, the projected number of qualified teachers is only 7 per cent higher in 2025, even if gross attrition rates drop relative to 2013.⁴³ In fact the model's projections show the stock of unqualified teachers fluctuating between 2013 and 2025, peaking in 2023, and higher in 2025 than at present.

Why is this the case? Returning teachers, on average, are less well qualified than those who leave at the same ages. For example, 93 per cent of 40-year-old educators who left between 2012 and 2013 were qualified, whereas only 56 per cent of educators who returned at age 40 were qualified. For all age groups this picture is true – more qualified teachers leave than return to teaching.

This means that qualified teachers are more likely than unqualified teachers to leave the system permanently. In effect the teaching force is like a leaky bucket. Almost as fast as new qualified teachers enter the system, experienced qualified teachers are leaving it in net terms. Between 2012 and 2013, approximately 27,000 qualified teachers were added to the pool of qualified teachers through NTGs (24 per cent), returning qualified teachers (43 per cent) and teacher upgrades (33 per cent), and about 29,000 qualified teachers left. It is worth noting that the NTGs add the smallest proportion of qualified teachers to the pool.

A key finding of this research is that pumping more newly qualified educators into the system will not in itself improve the average level of qualification among employed teachers. Every effort needs to be made to retain qualified teachers as well.⁴⁴

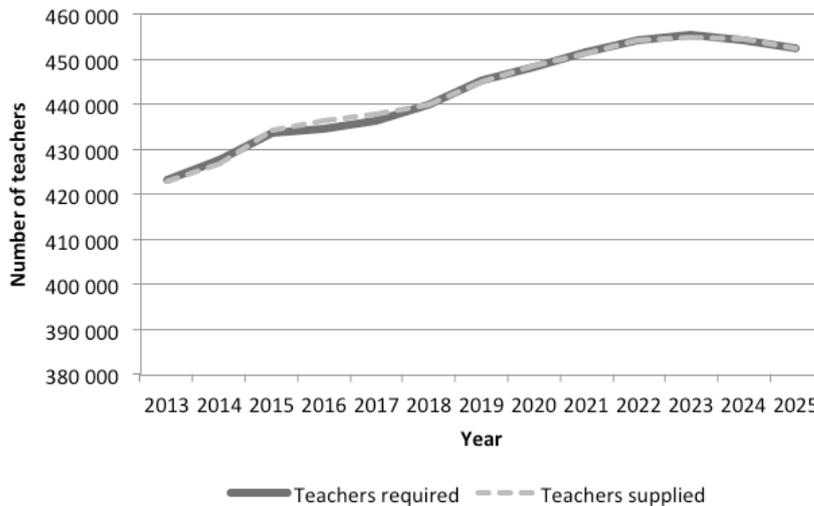
The leaky bucket also has cost implications: resources – time, skills and money – are wasted if qualified teachers never enter teaching or depart permanently after a period of employment.

93 per cent of 40-year-old educators who left between 2012 and 2013 were qualified, whereas only 56 per cent of educators who returned at age 40 were qualified. For all age groups this picture is true – more qualified teachers leave than return to teaching

MATCHING TEACHER SUPPLY AND DEMAND

The model used the calculations of the demand for teachers and the available supply that are outlined earlier in this report as the basis for projecting the match between supply and demand over the next 10 years. The result of that modelling is shown in Figure 6.

Figure 6: Teacher supply and demand (2013-2025)



Source: CDE (2015)

The two lines on the graph are closely aligned. This means that the demand for teachers in the system over the next 10 years will closely match the supply, and the current average LER of 29.2 learners to 1 teacher will remain almost constant across the system over the next 10 years. This is good news for the system!

MATCHING TEACHER SUPPLY AND DEMAND FOR SCHOOL PHASES AND SUBJECTS

Although the projected number of teachers required and supplied will closely match during the next decade, a far more important consideration is whether sufficient numbers are being trained for the needs of the different school phases and subjects. The devil, as they say, is in the detail.

The internal 2009 DHET report, *Trends in Teacher Education*, includes graduates by learning area for the Intermediate and Senior phases and graduates by subject in the Further Education and Training (FET) Phase. As no such information appears in the later *Trends in Teacher Education*, the 2009 trends data was used by CDE to analyse the match between the teacher supply and demand for school subjects, and school phases. This revealed that there will be shortages in the case of both phase and subject requirements.

The demand for teachers in the system over the next 10 years will closely match the supply, and the current average LER of 29.2 learners to 1 teacher will remain almost constant across the system over the next 10 years

Phase Requirements

For the period 2013 to 2017 too many secondary school teachers and far too few higher primary school teachers are being produced.⁴⁵ During this time, more than 60 per cent of teachers will graduate as secondary school teachers, while the system needs only some 15 per cent. By contrast some 36 per cent of teachers will graduate as primary school teachers, even though the system requires around 85 per cent of NTGs for the primary school phases. After 2017, the pattern of demand for new graduates shifts, and between 2018 to 2025 the required distribution across the higher primary and secondary school systems is likely to match the phase qualifications of NTGs.

There is, however, a significant misalignment in the case of the FP, the first four years of schooling. As a result of the dedicated focus of the national departments of education on strengthening FP teacher education, since 2008 there has been considerable growth in NTGs qualified to teach in that phase. However, in a 2014 journal article,⁴⁶ DHET officials report on research they conducted which found that the proportion of FP graduates from 2008 to 2012, relative to teachers qualifying to teach in other school phases, is declining and the number of FP graduates is too low for the needs of that phase. The average percentage share of FP teacher graduates over the five years (2008 to 2012) was about 18 per cent of all graduates, yet in 2012 FP enrolments constituted some 400,000 learners, 33 per cent of all enrolments in ordinary schools.

The 2012 *Trends in Teacher Supply* shows that across the universities which offer a range of different teacher education programmes that include FP, fewer than 4,200 graduates who can teach in that phase were produced. In fact, the DHET researchers' model projects that even by 2020, the demand for FP teachers will largely outstrip supply.

However, an important development with regard to private provision of ITE is pointed out by the researchers: the output of new FP teachers has been augmented since 2011 by a small number of private providers entering the ITE domain. The DHET officials' expectation that the contribution of the private providers will increase substantially in future years is supported by the number of private providers, whose MRTEQ-aligned programmes, many focused on the FP, have recently been approved by the DHET.⁴⁷

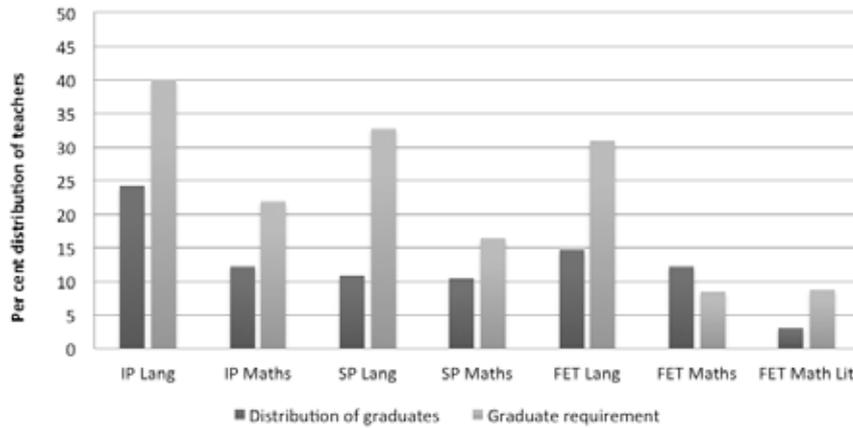
Subject Needs

Similarly there is a cause for concern when it comes to the supply of subject teachers. On the assumption that the proportion of subject teachers has remained fairly constant over the past few years, there is an oversupply of teachers in some subjects and a shortage in others. The worst shortages are in languages and mathematics, particularly in the IP Grades 4-7. While precise numbers of mathematics and language teachers were not available for this report, the ratio of demand to supply is around 2 to 1 for both mathematics and languages for these grades.

In the FET Phase, the greatest shortage of teachers is in languages, with the demand almost double the supply. An oversupply of mathematics teachers, but a significant shortage of mathematical literacy teachers, is projected, which will only worsen as the trend towards more learners choosing mathematical literacy as a subject continues.⁴⁸ Figure 7 illustrates the graduate requirement relative to the subject teacher demand.

There is an oversupply of teachers in some subjects and a shortage in others. The worst shortages are in languages and mathematics

Figure 7: Distribution of learning areas: Intermediate, Senior and FET Phase graduates



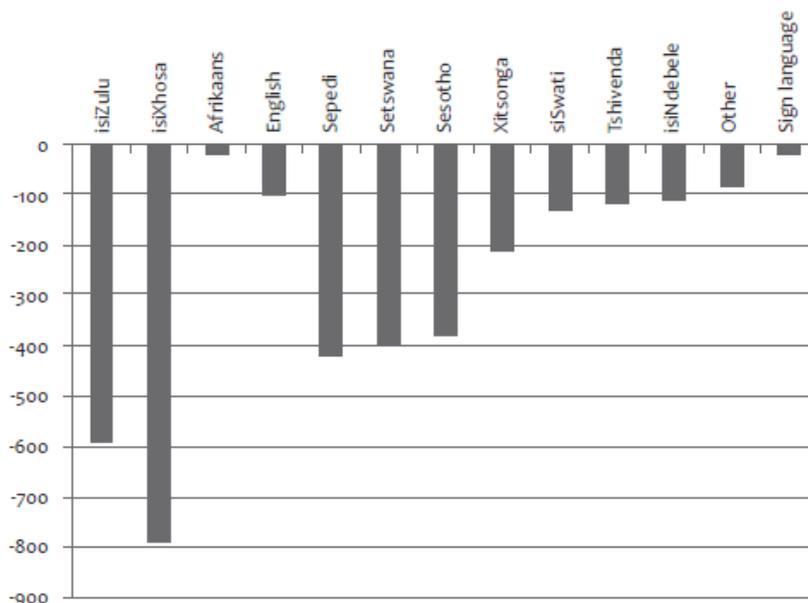
Source: CDE (2015)

The shortage of language teachers in the three school phases depicted above highlights the immediate need to increase enrolments of teaching students who want to specialise in languages.

However, even more disturbing is the dire shortage of NTGs in the FP whose mother tongue is an indigenous African language. In 2007, the DBE estimated the home language proportion of learners in the system as follows: 10 per cent Afrikaans, 7 per cent English, and the remaining 83 per cent an African language. By contrast, of the 1,275 NTGs expected to graduate in 2009 with an FP qualification, only 13 per cent had an African language as their mother tongue (with the overwhelming majority isiZulu speakers) and most were Afrikaans (44 per cent) and English speakers (43 per cent).

In 2012 there were not enough FP mother tongue teachers for any language group of learners, with isiXhosa the most under-represented language in terms of sheer numbers, as Figure 8 demonstrates.

Figure 8: Supply-demand gap in Foundation Phase teacher graduates per mother tongue (2012)⁴⁹



Source: Green, Adendorff and Mathebula (2014)

There is a dire shortage of NTGs whose mother tongue is an indigenous African language

The lack of sufficient qualified African teachers for the FP has severe implications for the effective development of numeracy and literacy by the mass of learners whose mother tongue is an indigenous African language.

Without a doubt one of the biggest challenges for the future will be the adequate production of new FP teachers able to use indigenous African languages as languages of instruction, and in particular those able to teach these languages as school subjects. This will become even more pressing if the proposed policy, *Incremental Introduction of African Languages*,⁵⁰ which would make the inclusion of at least one African Language compulsory for all learners in the system, is implemented.

SUMMARY OF MAIN FINDINGS

CDE's research and the modelling have covered extensive ground. We briefly summarise the key findings in the section that follows.

Positive Effect of the ISPFTED and Government Initiatives

The development of the ISPFTED was a significant development in tackling the quantity and quality of ITE provision. It provided a clear government strategy and plan that was accepted by all stakeholders and covered the full scope of teacher development.

Certain weaknesses in the Plan can be identified: the lack of measurable deliverables and specific annual targets; a model of expansion based on the existing models of ITE at public HEIs which excluded new and innovative approaches; neglect of professional development for teacher educators; a lack of attention to the role the private sector could play in the future; and most important of all, an inadequate emphasis on quality of ITE programmes as the most urgent national priority.

However, as a result of government's considerable efforts, achievement of the quantitative goals is well on track and important initial steps have been undertaken to understand and address the quality problems.

Adequate Supply of Teachers for the Next Decade

Despite a rise in learner enrolments to 2023 and the consequent increase in teacher demand, the DHET's enrolment plan until 2019 is well on track and the model's projections based on ASS show that South Africa will have sufficient teachers for the next decade to maintain the current LER of 29.2 learners to one teacher for the whole system.

Mismatch between Teacher Supply and Phase Requirements

The current mismatch between the qualifications and specialisations of NTGs and the demand for teachers able to teach in all phases is serious. Between 2013 and 2017 the system requires fewer secondary school NTGs and considerably more primary school teachers. In the case of the FP the shortage is particularly severe.

The lack of sufficient qualified African teachers for the Foundation Phase has severe implications for the effective development of numeracy and literacy by the mass of learners whose mother tongue is an indigenous African language

However, after 2017, the pattern of demand for new graduates shifts such that from 2018 to 2025, the required distribution across the higher primary and secondary school systems is likely to match the phase qualifications of NTGs.

Shortage of Teachers for Key Subjects

There is a mismatch between the qualifications and specialisations of NTGs and the system's demand for teachers able to teach effectively in all subjects, particularly languages in all phases, mathematics in the Intermediate and Senior phases, and mathematical literacy in the FET Phase.

The marked shortage of FP teachers able to use indigenous African languages as languages of instruction is deeply worrying.

Inefficient ITE System

While there has been a dramatic increase in the number of students enrolling in and graduating from ITE programmes, the ITE system is inefficient and both money and learning time are wasted.

In the absence of throughput rates to calculate properly how long it takes for the average cohort of teaching students to complete their qualifications, graduation rates are used as the next best indicator. These show that the percentage of graduates in a given year relative to the enrolments in ITE programmes in the same year is low, especially in the B Ed, and very much worse in the case of the distance ITE offered at UNISA. The fact that UNISA is the largest provider of NTGs only exacerbates the problem.

The inefficiency of the ITE system increases the costs of producing NTGs and the long turnaround time between enrolment and graduation complicates planning for the required number of NTGs. Moreover, as only degreed students can undertake a PGCE, these graduates are likely to be of better quality.

Limited Private Provision of ITE

While market-based solutions to the ITE challenges have been very limited in the past, the case of Embury shows that a private provider can be successful and grow very rapidly in niche areas, especially where the public universities are weak (such as teacher education for ECD, FP and LSEN). There are also indications that private provision is set to grow. The February 2015 list of MRTEQ-aligned ITE programmes approved by the DHET reveals that many of these are offered by private institutions and that FP programmes are a strong focus.

Private Innovation

Two NGOs within the private sector have developed innovative ITE models: the internship model of ISASA's Mathematics and English Programme, and the postgraduate model of *Teach South Africa*.

While there has been a dramatic increase in the number of students enrolling in and graduating from ITE programmes, the ITE system is inefficient and both money and learning time are wasted

Problematic Age Profile of Teacher Corps

The bimodal age distribution of the teaching force will create a significant problem by 2025. By then, the current bulge of teachers who are 40 to 49 years old will be 50 to 59 years old, with many in the process of retiring, and the smallest number of teachers will be aged 40 to 49 years, typically the age group from which senior managers and principals are drawn. This means that teachers with less experience will have to be promoted to fill leadership and management posts with potentially negative consequences for effective management, and especially instructional leadership, which is vital for quality teaching and learning.

High Turnover of Teachers

One of the most important findings of the modelling is the extent to which teachers move in and out of the system. NTGs typically do not enter the teaching force until they are about 28 years old. Many qualified teachers leave and fewer return, and many unqualified teachers stay and upgrade their qualifications or are new hires. Not only is there a high degree of churning in the teaching force, but it is in fact a leaky bucket with more qualified teachers leaving than returning.

As a result of the drain of qualified teachers from the system, the ASS-based projection indicates that the percentage of unqualified teachers, currently 19 per cent, is unlikely to reduce by 2025. If unqualified teachers are hired only when qualified teachers are unavailable, an improvement in the qualifications profile would be possible.

Primacy of Quality

As government's own quality assurance processes and recent research have revealed, there can be no doubt that in general the quality of ITE programmes has been poor and most NTGs have not been adequately educated or trained in the past. Unless teachers have the essential subject and pedagogical content knowledge required to provide quality teaching and learning, the very low level of learner achievement will not improve.

Government has begun to address the quality challenge in ITE with the MRTEQ policy, which has resulted in the redesign of most ITE programmes in line with the new requirements by allocating additional funding to public HEIs to strengthen their programmes, and funding research into the quality of programmes and in particular how the weakness of the teaching practice component can be improved.

Research has also indicated that the selection of teaching students is problematic both in terms of their academic quality and their motivation.

In order to understand and address the extent of misutilisation of teachers in schools, the PEDs now have to enter new data into the PERSAL database about what subjects teachers are qualified to teach as opposed to what they are actually teaching in the schools. However, the progress of the PEDs is slow and the accuracy of the data questionable.

Significant Data Challenges

As is abundantly clear from CDE's research and modelling, education researchers encounter enormous data problems. Typically education databases are unreliable because the data is not entered correctly or complete or it is out of date. None of the

Not only is there a high degree of churning in the teaching force, but it is in fact a leaky bucket with more qualified teachers leaving than returning

datasets used for the CDE research agree on key issues like Grade R enrolments, or even the number of teachers. In addition, in some years government reports include certain important data and then in other years this is omitted.

As the *CDE Technical Report* shows, in 2012 KZN returned no ASS data on educators to the DBE. As KZN is the province which has the most learners and employs the greatest number of teachers, this presented a significant challenge for the modelling. Consequently, CDE has had to spend considerable resources to try to unravel the inconsistencies and reconstruct missing information.

Access to databases is one of the most critical issues. At the time of the CDE research, access to the primary PERSAL database was not made available to the researcher on grounds of the confidentiality of teacher information. Access to this would have made all the difference to the reliability of the CDE model's projections, because it would have enabled a direct comparison with the ASS dataset.

The data constraints posed significant challenges for CDE's modelling and despite every effort made resulted in substantial differences between conclusions of the ASS-based and PERSAL-based projections. These differences mean that the modelling does not allow government to accurately determine the adequacy of ITE enrolments and graduates to meet future teacher demand and plan accordingly.

Poor data is a fact of life for education policy-makers and planners, and limits the early identification of problems, appropriate strategy development, effective planning and timely action to address them.

Despite the lack of accurate and comprehensive data, CDE's research and the model have identified the main patterns and trends in the teaching force and teacher supply and demand, as well as their implications for the future. These should be factored into government's strategy, planning, policy and interventions, and the initiatives of the private sector.

CDE RECOMMENDATIONS

From the findings and implications of its research and modelling CDE has developed the following recommendations to inform the strategies, policies and initiatives of decision-makers in the public and private sectors, and to stimulate public debate.

Collection of More and Better Information

What South Africa urgently needs is reliable data systems that are compatible across all levels of the education sector – national, provincial and district. Existing databases must be improved so that they contain accurate, comprehensive and up-to-date information. This will depend on diligent collection and recording of annual data by all government departments at every level, and careful monitoring and checking of the process. Government is fully aware of this imperative and has made 'Effective systems for planning, information management, assessment and district monitoring' one of the six priorities of *Operation Phakisa*.

For the future, monitoring of demographic developments is crucial to update the demand for teachers because year-to-year fluctuations in births can be substantial.

Poor data is a fact of life for education policy-makers and planners, and limits the early identification of problems, appropriate strategy development, effective planning and timely action to address them

Planners need to keep their eyes closely on birth registration statistics to determine the size of Grade R and Grade 1 enrolments in five or six years' time.

Access to the primary PERSAL database should be made available to reputable policy research organisations like the CDE. The confidentiality problem can be overcome through a variety of means, with a confidentiality agreement as the simplest. In the case of CDE's model presented in this report, it is not too late to refine it. Access to PERSAL data for the same month as the ASS is undertaken, for two successive years, would make it possible to combine the best features of both in order to construct a single and more reliable set of estimates.

In addition to more and better data, targeted quantitative and qualitative research is needed for a proper diagnosis of the problems impeding the effective recruiting, training and retaining of qualified, competent and committed teachers, and how best to address them.

There are key issues that CDE was not able to research in this project that need investigation:

- The throughput rates of ITE programmes. A proper cohort study is needed to track cohorts of student teachers through the years of their studies to accurately quantify the throughput rate, and understand how blockages could be removed and the efficiency of ITE programmes be improved. This would enable students to graduate more quickly and thus reduce the cost of their training.
- Why teachers enter the system late, leave and do not return. Qualitative research would throw light on why there is a delayed entry of NTGs and why older qualified teachers leave temporarily or permanently.
- How teachers are utilised in schools. Many teachers are not teaching the subjects or phases in which they specialised. Misutilisation of teachers undermines quality education, and if we know the extent to which this is happening, we will have a better understanding of the match between teacher supply and demand, especially in the subjects and phases most needed. Poor national data in this regard compound the problem of vacant posts and excess teachers.
- The medium- and long-term cost implications of increasing numbers of teachers with M+4 qualifications. Raising the qualification bar to M+4 for all NTGs has funding implications. It increases the cost of qualifying as a teacher, both in terms of student fees and the amount of FL bursaries, and as more of M+4 teachers enter the teaching force, so will the PEDs' already unsustainable salary budgets have to grow.⁵¹
- The value of introducing knowledge and practice standards for teachers and teacher educators to improve the quality of teachers. International research is needed to investigate the experience of other countries in introducing professional practice standards, the processes involved in developing them and their core elements to inform the development of similar professional standards in South Africa.
- Whether a wider range of formally recognised pathways to a B Ed or PGCE teaching qualification could improve the quality, flexibility and accessibility of public ITE programmes. Research is needed into international and local experience of different models, their strengths and weaknesses, and the extent to which they could be taken to scale.

Existing databases must be improved so that they contain accurate, comprehensive and up-to-date information. This will depend on diligent collection and recording of annual data by all government departments at every level, and careful monitoring and checking of the process

Teacher Supply Aligned to School Phase and Subject Needs

The focus in the DHET enrolment plan for the next decade should be on supplying teachers for the phases and subjects where the need is greatest: more language teachers are essential in every phase, and especially more African language-speakers for the FP; more mathematics teachers in most phases; and in the FET Phase, there is a projected more mathematical literacy teachers. Specific enrolment and graduation targets for phases and subjects should be established, and through the FL bursaries, the maximum financial support given to students wanting to qualify in the areas of greatest need.

Because it takes more years for a B Ed student to graduate compared to a PGCE student, for the next four or five years the output of NTGs from the B Ed is set. Thus in planning for the future, adjustments to the number of PGCE enrolments will be a better strategy to match the supply and demand of teachers in subjects and phases where the need will be greatest. Moreover, as only students with a degree can undertake a PGCE, these graduates are likely to be of better quality.

Given the dire shortage of FP teachers able to teach through the medium of African languages or teach them as subjects, direct interventions are needed to grow the number of these new FP teacher graduates. Specific interventions should include intentionally recruiting and providing FL bursary funding to more African home language students to become FP teachers, and ensuring that the language practices at universities move beyond recruitment to putting programmes in place that develop students' capacity to use African languages as languages of instruction and teach them as subjects.

Until the numbers of NTGs with these competencies increase, however, government is unlikely to be able to implement the proposed *Incremental Introduction of African Languages* policy on scale.⁵² The low graduation rates and small numbers of graduates qualifying to teach in these languages in the next five to six years suggest that in the next decade this is not achievable.

Similarly if government plans any changes to the subject requirements of the National Senior Certificate (NSC), it needs to consider the knock-on effects on teacher supply. Curriculum change always carries implications for teacher supply and demand.

Improved Funding of ITE Programmes

The low funding category and status of ITE qualifications does not provide any incentive for universities to adequately fund ITE programmes or expand them. Unless providing quality ITE is seen as a national priority and the qualifications are accorded higher status for university funding, it is difficult to see how this situation will improve.

The teaching practice component of ITE has been identified as one of the weakest areas of ITE. If it is to be extended and strengthened it should receive special attention to ensure it is not underfunded as it has been in the past.

Government should continue to use earmarked grants for achieving specific objectives in order to shape and improve ITE provision, because apart from engaging with universities, government cannot determine how they spend the money within their block grant allocation.

The low funding category and status of ITE qualifications does not provide any incentive for universities to adequately fund ITE programmes or expand them.

Increasing the Employment of Qualified Teachers

Based on the findings of research into why NTGs delay their entry into the teaching force and older qualified teachers leave and return, or leave permanently, government must develop strategies to encourage NTGs to join earlier, incentivise experienced competent qualified teachers to remain in teaching, and take steps to prevent the hiring of unqualified teachers when qualified ones are available, especially in KZN.

Leadership and Management Training

As a result of the bimodal age profile of the teaching corps by 2025, and even before that, senior management posts will have to be filled from the smallest group of teachers aged 40 to 49. Thus leadership and management training, with a strong emphasis on instructional leadership, needs to be provided to teachers who are potential managers before they reach 40 years of age.

Ensuring High-Quality ITE

The expansion of ITE programmes at HEIs and higher enrolments will not lead to improved learner achievement in schools unless the critical challenges of quality are urgently resolved.

This must be the most urgent priority, otherwise the expansion of provision will only reproduce more poor quality teachers with inadequate subject and pedagogical content knowledge and limited teaching experience, which leaves them ill-prepared for the challenges of classroom teaching.

In particular, improving the quality of distance ITE provision is critical because more HEIs will be offering it in the future. UNISA's graduation rates indicate that studying part-time through distance education is a long and difficult process for students and they need more support. NWU⁵³ has developed a blended learning model which does provide more student support and could be adopted by more HEIs.

The quality of the teaching students receive from teacher educators is key to improving the standards of ITE. To meet the future demand for new high quality teachers, both the number and quality of teacher educators needs to increase.

Current teacher educators should be assessed on their ability to convey their subject content and pedagogical content knowledge in ways that enable student teachers to develop their knowledge and skills. This will require the collection of quantitative and qualitative data on all education faculty staff – their qualifications, age, experience, subject knowledge and pedagogical skills, as well as their workloads, remuneration, status, and job mobility trends. From this information, appropriate CPTD programmes can be developed for teacher educators.

To give more substance to MRTEQ, the national education departments have identified professional standards for teachers and teacher educators as a priority. These provide more detail about the standards of proficiency in both subject knowledge and pedagogy that are required and are becoming the norm in other countries.

Student selection for teaching needs to be rethought. Given the high demand for places,⁵⁴ the points required for admission to ITE programmes can be increased, and selection processes and mechanisms should become more rigorous. The selection of high-quality applicants who are likely to succeed will improve the efficiency of programmes and

The expansion of ITE programmes at HEIs and higher enrolments will not lead to improved learner achievement in schools unless the critical challenges of quality are urgently resolved

reduce costs. Equally, applicants' motivation for choosing to study teaching should be probed if we want committed teachers in our schools.

Targeted Role for the Private Sector

CDE's research in 2013 for this report found that there were few market-based solutions to the need for more high-quality ITE. However, in the case of FP programmes especially, there are indications that private provision has begun to expand.

The projections of the CDE model indicate that for the next decade the public HEIs will be able to provide enough graduates overall for the system's needs, so the role of the private sector in future should be a strategic, targeted one.

Market-based private initiatives

The Embury model could be replicated by the private sector, especially to meet the demand in niche areas where the system's need is greatest: ECD, FP, languages, mathematics and mathematical literacy. Private providers also are able to develop new courses, materials and programme to respond to new, emerging demands for teacher education.

Public-private partnerships

One of greatest strengths of Embury is the excellent partnerships it has formed with the PED, DBE, foundations and schools. Among the other benefits accruing from these, they have enabled it to give its trainee teachers extended, meaningful practical work experience, and to develop new courses and materials with government funding.

Because private providers are able to respond quickly to areas of urgent need, government should incentivise private ITE institutions to initiate or expand programmes where the public HEIs will be hard pushed to produce enough NTGs in the near future and where new teacher education needs emerge. The provision of student bursaries would enable private providers to focus on recruiting students for these programmes. For their part, private providers should engage regularly with the national and provincial education departments around ITE priorities and needs.

Expertise

Government's *Operation Phakisa* will take place in the second half of the year. The objective is to bring all the key education stakeholders together to develop detailed implementation plans that tackle education priorities and effect 'big, fast results'. The private sector should contribute its expertise to the task teams that, amongst others, will focus on developing effective data and information systems, improving the quality and efficiency of ITE, and aligning teacher supply and demand.

Alternative models and approaches to ITE

Both for-profit companies and institutions and not-for-profit organisations should use the private sector's entrepreneurial nature and flexibility to be innovative. They can experiment with alternative pathways to becoming a qualified teacher, different structures for ITE provision and a range of modes of delivery.

For the next decade the public HEIs will be able to provide enough graduates overall for the system's needs, so the role of the private sector in future should be a strategic, targeted one

Corporate social investment

Private donors could fund strategic initiatives to strengthen ITE in public HEIs in areas where maximum impact on quality, efficiency and teacher shortages can be achieved. Ad hoc projects will not do the job.

The expansion of ITE programmes means that substantially more competent teacher educators are required. Because they are central to the quality of ITE programmes, any initiative to strengthen their teaching will have a multiplier effect in terms of the added benefit to all the students they teach.

On the basis of the evaluation of teacher educators' knowledge and skills, donors could fund professional development programmes for teacher educators to upgrade their competencies in areas where they are weak. An initiative could begin with UNISA, NWU and UKZN, the three public HEIs that produce most NTGs.

Priority areas would be professional development courses in language, mathematics and mathematical literacy. For instance, in FP programmes, it is critical that teacher educators know how to teach students to educate reading effectively, given the very low levels of learners' reading proficiency as the 2014 Annual National Assessments (ANAs) have revealed.

Funders could also assist in recruiting and incentivising new high-quality teacher educators to staff the many expanded ITE programmes.

Another strategic area would be for donors to fund the research outlined above to produce the evidence needed to effectively diagnose and address critical problems in ITE as well as investigate new potentially promising initiatives to improve ITE.

Typically donors have invested heavily in CPTD for teachers in service rather than ITE. CPTD is important as nearly a fifth of the teaching force is unqualified and most lack the necessary subject and pedagogical content knowledge to teach the school curriculum effectively. Unfortunately in the past, most CPTD initiatives have achieved few, if any, positive effects on learner achievement. Evidence is emerging of promising models that have been implemented in South Africa and these should inform future CPTD efforts.⁵⁵

However, CDE would argue that unless we get the quality and focus of ITE provision right so that all newly qualified teachers are able to teach effectively and have specialised in the subjects and phases of greatest need, the country will not have teachers for critical subjects and will be engaged continually in remedial in-service training. Strengthening ITE is one of the most urgent and strategic national interventions needed to improve South African schooling and requires the combined resources and expertise of the public and private sectors. However, this needs to be coupled with effective teacher performance management and capacity-building through targeted professional development for the teachers in service.

The expansion of ITE programmes means that substantially more competent teacher educators are required. Because they are central to the quality of ITE programmes, any initiative to strengthen their teaching will have a multiplier effect

CONCLUDING REMARKS

Government must be commended for turning around a severe shortage of teacher graduates in 2009, such that it is meeting its targets of new graduates; and that if this continues, the production of sufficient teachers for the schooling system during the next ten years is achievable. The education departments have also taken important initial steps to improve the quality of ITE. However, as CDE's study has revealed, much still needs to be done to address the many challenges inherent in the composition of the teaching force, the quality of ITE provision, and the teacher shortages in key phases and subjects.

Teachers are at the centre of any education system and their quality directly affects learner achievement. Unless ITE programmes prepare teachers with all the competencies to provide quality teaching and learning, then all the resources poured into ITE will not achieve what must be the absolutely fundamental goal of our schooling system: improved learner achievement.

However, high quality ITE is not a sufficient condition for improving learner achievement. Even if existing and new teachers possess all the necessary knowledge and skills, their professionalism and commitment to fulfilling their teaching responsibilities in the best interests of the learners is of paramount importance.

This challenge is aptly summed up in a recent report of the National Treasury:

*Above all, it is the commitment of teachers that will ensure the success of the education system: to arrive at school on time, every school day; to be prepared for each day's lessons; and to be in their classes, teaching. If the system can ensure this, better basic education and effective expenditure will be within reach.*⁵⁶

Where this commitment is found wanting and teachers are not fulfilling their responsibilities, they need to be held accountable.

In conclusion, a final word about the CDE model is appropriate. It was developed in close co-operation with the national departments and other researchers. CDE brought together experts in and outside government for the first time to engage with drafts of the model and help refine it. There are only a few researchers in the country with the necessary expertise for such a complex task, and as new and better data becomes available, the group should continue to meet to refine the model further. To ensure that the small pool of these skills is increased for the future, more researchers, especially young African researchers with an interest in modelling, should be brought on board to learn from the group's expertise.

It is clear that CDE's study is not the last word on South Africa's teacher supply and demand challenges, but it is the first word on key aspects of the teacher supply and demand processes and the future implications of the profile of the current teaching force. Additional research, integrating PERSAL with ASS data, would improve the reliability of the model's projections and facilitate effective planning. However no future model could provide the various agents in the system with a precise plan of what to do. Rather, modelling should be the basis for a dialogue to create greater consensus about the best strategies for the future to produce the quality teachers South Africa needs.

Even if existing and new teachers possess all the necessary knowledge and skills, their professionalism and commitment to fulfilling their teaching responsibilities in the best interests of the learners is of paramount importance

Endnotes

1. Centre for Development and Enterprise, *Value in the Classroom* (Johannesburg: CDE, 2011). This report modelled teacher supply and demand based on 2009 data.
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4. Centre for Development and Enterprise, *CDE Technical Report: Teacher supply and demand 2013-2025* (Johannesburg: CDE, 2015).
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7. CHE, 'Report on the National Review of Academic and Professional Programmes in Education,' *HE Monitor* 11, 2010.
8. Department of Basic Education, Department of Higher Education and Training, *Integrated Strategic Planning Framework for Teacher Education and Development in South Africa, 2011–2025* (Pretoria: DBE & DHET, 2011).
9. DBE, DHET, 1
10. For example, while DHET is responsible for initial teacher education, the management of the Funza Lushaka Bursary Scheme and the implementation of the ISPTED are located in the DBE. This structural divide makes concerted effective efforts to improve the teacher development system difficult to achieve.
11. DBE, DHET, 123
12. DBE, DHET
13. CHE
14. Department of Higher Education and Training, *The Minimum Requirements for Teacher Education Qualifications* (Pretoria: DHET, 2011).
15. CDE (2011)
16. DBE presentation: *Basic Education Sector Plans for Six Priorities in the Sector, presented at national education workshop in preparation for Operation Phakisa* (10 December 2014).
17. DBE presentation: *Educator Human Resource Management: A Broad Overview, Operation Phakisa* (10-11 December 2014).
18. JET Education Services, *The Initial Teacher Education Research Project: An examination of aspects of initial teacher education curricula at five higher education institutions*, Progress Report (Johannesburg: JET, 2014).
19. CHE, 92
20. JET Education Services, 19
21. The analysis of PERSAL data was based on two internal departmental reports by Martin Gustafsson, adviser to the Minister of Basic Education. At the time of this study the PERSAL database was not made available to Dr Simkins on the grounds of confidentiality. The reports are "Teacher supply patterns in the payroll data" (unpublished, 2009) and "Inflow of new teachers into the public system" (unpublished, 2014).
22. CDE (2011)
23. Total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

24. The number of births continues to rise because the population of mothers is rising faster than fertility falls.
25. There is no reliable, comprehensive data on the number of learners in Grade R, the reception year for primary schooling. As the majority of learners now start school in Grade R, these enrolments were included in the model. After an examination of all the available datasets and recent research, it was decided to use the ratio of 64 per cent of Grade R to Grade 1 enrolments in public and independent ordinary schools drawn from DBE statistics. This decision is explained in the *CDE Technical Report*.
26. Department of Basic Education, *School Realities 2013* (Pretoria: Ministry of Education, 2014).
27. The 13 years of schooling are divided into four phases: the Foundation Phase (Grades R -3), the Intermediate Phase (Grades 4-6), the Senior Phase (Grades 7-9) and the Further Education and Training Phase (Grades 10-12). For the purposes of the model these were simplified into three categories: lower primary (FP), higher primary (IP, IP/SP and SP) and secondary (SP/FET and FET).
28. The *CDE Technical Report* discusses the problem of calculating the teachers required for Grade R in detail.
29. This is very unlikely because there will always be independent/community-based pre-schools with Grade R that parents prefer for their children.
30. The Funza Lushaka Bursary Scheme can at most provide bursaries for only 25 per cent of student teachers.
31. Figures obtained from the DBE in February 2015.
32. The fact that the PGCE students already have a degree is a key factor in the better graduation rate of PGCE programmes.
33. Although CDE did not undertake specific research on the extent of private provision of ITE internationally and neither did the researchers for the ISPFTED Technical Report, a scan of the literature suggests that in many countries, public ITE provision dominates.
34. For example in 2013 the various partnerships included the training of unqualified and under-qualified pre-school teachers in collaboration with Engen, Highbury Preparatory School (Thuthukisa Initiative) and the KZN Department of Education as described in the *Embury Institute for Teacher Education Prospectus*. Embury Institute for Teacher Education, *Embury Institute for Teacher Education Prospectus* (Durban: Embury Institute for Teacher Education, 2013), 15.
35. Department of Basic Education, *Education Statistics in South Africa 2013* (Pretoria: DBE, 2014).
36. In the case of the ASS, which is based on data entered by schools, the modelling was confined to only those teachers who had South African citizenship and were between the ages of 22 and 65 because the use of South African ID numbers was central to the methodology. As a result the population of teachers used in the ASS modelling was 400,756 teachers.
37. In his analysis of PERSAL data, Gustafsson took a qualified educator to be one with REQV13 (Relative Education Qualification Value) and above and an unqualified educator with REQV12 and below. This resulted in qualified teachers comprising 87 per cent of the teaching force. However, teachers are individually assessed for assignment to REVQ levels, and this is not wholly dependent on their qualifications, and REVQ entries are not always complete. Consequently CDE used actual teacher qualifications, which indicated that in 81 per cent of teachers were qualified in 2013.
38. CDE has included professionally unqualified teachers in the unqualified category, because they do not have a teaching qualification. Government figures tend to categorise only those with M+2 and lower qualifications as unqualified. In that case the number would decrease to about 40,000 (10 per cent).
39. P. Vinjevd, *Initial and In-service Teacher Education: Skills training in relation to national needs and interests, quoting a Committee of College of Education Rectors of South Africa*, Report prepared for Joint Education Trust, January 2000 (Johannesburg: JET, 2001).

40. In the case of the PERSAL data available, it had to be assumed that the attrition rates of qualified and unqualified educators were the same. By contrast, the ASS indicates considerably worse net attrition of qualified educators over unqualified educators. This is explained in detail in the *CDE Technical Report*.
41. The PERSAL net attrition rate seems too low, since it implies very long average periods of completed service (36 years as opposed to 30 on the ASS estimates). However, the ASS attrition rates are likely to be too high, because of the methodology adopted and inaccuracies in the data (some teachers may be counted as joiners or leavers, whereas they were in fact stayers).
42. These are fully discussed in the *CDE Technical Report* with an Appendix on each.
43. The lower attrition rates from the PERSAL data would be a major cause of the differences. Gustaffson's higher percentage of qualified teachers would also be a factor. Only a comparison of the full PERSAL database with the ASS could throw more light on the discrepancies.
44. This is based on the DHET's *Enrolment Plan 2013-2019*.
45. We do not know why qualified teachers leave permanently. This can happen because teachers leave when they have worked off their bursaries, they come under severe financial pressure at certain stages of their career, or the shortage of high-level skills in the labour market means that qualified teachers as university graduates can find other jobs.
46. For the purposes of this analysis, teachers qualifying for lower primary are those students who specialise in FP and FP/IP, those qualifying for higher primary are those students who major in IP, IP/SP and SP, and those qualifying for secondary are those students who specialise in SP/FET and FET.
47. W. Green, M. Adendorff, B. Mathebula, "Minding the gap?" A national foundation phase teacher supply-demand analysis 2012-2020, *South African Journal of Childhood Education* 4(2), 2014, 1-23.
48. Information supplied to CDE by the DHET in February 2015.
49. CDE (2013)
50. Green, Adendorff and Mathebula
51. The draft policy was introduced in 2013, and set to be implemented in 2015. At the time of writing this report, the policy had not yet been formally adopted in the system.
52. L. Chisholm, 'The Textbook Saga and Corruption in Education,' *Southern African Review of Education* 19(1), 2013, 7-22.
53. The intention of this policy, which is being piloted, is to make at least one African Language compulsory in the FP and to extend this up to the FET Phase over time.
54. See www.nwu.ac.za/c-gov/teaching-and-learning
55. Applications to study teacher education have been increasing way beyond the capacity of institutions to accommodate them, with media reports suggesting that just six institutions received almost 13,000 applications in early 2011. Times Live, *Star pupils opting to become teachers* (19 February 2011), available online at www.uj.ac.za/EN/Newsroom/News/Pages/Starpupils opting to become teachers.aspx, accessed 20 March 2011.
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57. P. Hobden, S. Hobden, *Going to Scale: What is required for intervention projects to go to scale?* Johannesburg: Centre for Development and Enterprise, 2012).
58. National Treasury, *Provincial Budgets and Expenditure Review: 2010/11 – 2016/17* (Pretoria: National Treasury, 2014), 49.

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INTERNATIONAL ASSOCIATE

Peter L Berger

5 Eton Road, Parktown, Johannesburg, South Africa

P O Box 1936, Johannesburg 2000, South Africa

Tel 27 11 482 5140 • Fax 27 11 482 5089

info@cde.org.za • www.cde.org.za

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