Comments on the CDE's 2015 teacher supply and demand reports

8 June 2015

This report responds to a series of reports released by the Centre for Development and Enterprise (CDE) in early 2015 on teacher supply and demand in South Africa. In putting together the response, the three CDE reports were examined and some new data analysis was undertaken using data which are available within the Department of Basic Education (DBE).

The CDE's reports represent a significant step forward in understanding teacher supply and demand in South Africa. There has been too little rigorous analysis in this area. At the same time the CDE's reports have limitations, partly due to the limited access the researchers had to the relevant data (as is acknowledged in the reports). As is recognised in the CDE's reports, teacher supply and demand is a vast and complex area. Many issues will remain unresolved until there has been more analysis, by a sufficiently broad range of analysts. The current response should be seen as a contribution to the conversation, not a final word on the matter.

The emphasis within this report is largely on issues of direct concern to the DBE, in particular teacher attrition, joining rates, the profile of teacher qualifications and teacher utilisation. The report is organised under headings emphasising particular things to bear in mind, roughly from more to less strategically important.

The CDE package consists of three reports and one 'infographic'. Very often the same point is made across different documents. Though all four CDE products were examined, to simplify matters referencing to just two reports occurs here:

- Much of the referencing is to the 40-page report titled *Supply and demand 2013-2025.* This is the document covering the broadest range of issues, and it is aimed at a relatively non-technical audience. One presumes many readers would choose to read this document. This document is referred to as the 'full report' below.

- Where referring to the full report does not suffice, there is referencing to the 49-page *Technical report: Teacher supply and demand in South Africa: 2013 to 2025.* This report concentrates on explaining the details of the data analysis that occurred to arrive at certain teacher supply and demand conclusions. It is referred to as the 'technical report' below. This report is not easy to follow, partly because of the inherent complexity of the material. What would make following the modelling much easier is if CDE made widely available the software containing the model. If this is in Excel, and is sufficiently annotated, this would make it much easier for a number of key analysts working on teacher planning to understand the model and let it influence future modelling work.

1. There are good reasons to continue to be worried about the supply of new, young, qualified teachers.

A key conclusion made by CDE with respect to the overall supply of young graduate teachers is that the planned graduate numbers up to 2019 published by the Department of Higher Education and Training (DHET) are 'on track'[1]. However, there are a number of considerations which need to be kept in mind and which should guard us against complacency.

Firstly, it should be kept in mind that the CDE considers it necessary for the output of graduates to *continue* increasing beyond 2019, at about the same rate of increase as during the 2012 to 2019 period, up to 2025 (the CDE's analysis does not look at graduate production

[1] Full report: 24.

beyond 2025). In 2025, around 35,000 teachers should be produced, against around 23,500 planned for 2019[2].

But even if this expansion is accomplished, there are reasons to believe the schooling system will not have enough young qualified teachers. Of course faster expansion may not be possible, and what the CDE may be saying, implicitly, is that one has to make do with the number of qualified teachers one can reasonably produce[3]. But if this is so, it seems good to be explicit about certain matters. There are four considerations, discussed under four sub-headings below, which point to the risk of an under-supply of qualified teachers. The considerations are: (a) our tolerance of unqualified teachers; (b) expectations around grade attainment improvements amongst learners; (c) the poor uptake of new graduates into the public system currently; and (d) the fact that existing Grade R teachers are often excluded the available analyses.

1(a): We need to re-examine our tolerance and treatment of unqualified teacher joiners during the coming years.

There are a considerable number of unqualified teachers in the schooling system currently, though there seems to be some disagreement over what this number is. The CDE, using an analysis of the 2012 and 2013 Annual Survey of Schools (ASS) teacher questionnaire data, concludes that 19% of schools-based educators are unqualified, and that 10% have fewer than three years of post-school education[4]. The DBE has reported to UNESCO that by 2009 87% of primary school teachers were properly trained[5]. Overall in the public system, the percentage of teachers who were qualified in 2009 is 94%, and for 2012 97%, in an important DBE statistical report[6]. Figures would vary partly due to the qualifications cut-off used, and partly due to the teachers being considered (whether the employer is the state, whether the educator is permanently employed, in particular). Importantly, the CDE's analysis includes all independent school teachers (around 8% of all ordinary school teachers) and educators paid by the school-governing body in public schools (around 7% of all ordinary school teachers), whilst the DBE's figures generally focus only on publicly paid educators (the remaining 85%).

The CDE's use of the ASS teacher questionnaire data is relatively pioneering work. Very little analysis of these data has occurred, unfortunately. For this reason it is a pity that the CDE reports do not say more about how specific qualifications values were interpreted. A few pages down, an attempt is made to explore these data a bit more.

What is crucial for the matter of teacher supply and demand modelling is how many unqualified teachers enter the workforce each year. The CDE concludes, using the ASS data,

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[2] Full report: 14.

[3] In fact, it seems as if the CDE's model is unusual insofar as it does not, as standard teacher supply and demand models do, have the required number of graduates as an output of the main model. CDE seems instead to have taken the route of determining what a reasonable degree of expansion in graduate output is, and then kept other variables in line with this, including, rather critically, the variable of the number of unqualified teachers entering the system. UNESCO (2010) offers a rare example of a systematic explanation of what can be considered the standard (not necessarily optimal) teacher supply and demand model. (In the description of the model on p. 22 of the technical report, it seems the CDE *is* implementing a standard model with the demand for new qualified teachers as its final output, but elsewhere in the report, in particular on p.12, it appears that the future graduates are calculated without linking this directly to enrolment-linked demand. Part of the problem is that it is difficult to interpret the details of a model such as this one without accessing the software within which the calculations occurred.)

[4] Full report: 17.

[5] UNESCO, 2014: 376.

[6] Department of Basic Education, 2013: 62.

that in 2013 around 19,000 unqualified teachers entered the workforce, of which around 9,000 were 'returners', or people who had worked previously in the system. At the same time, it is found that as many as 9,000 unqualified teachers already in the system upgrade themselves each year. The two 9,000 figures here cancel each other out, in a sense. One can think of this being a matter of allowing people into the profession before they have finished their studies, and letting them finish their studies once inside[7].

It is assumed by the CDE that high levels of joining by unqualified educators would continue every year, up to 2025, though the level would decline, from around 19,000 in 2013 to around 12,000 in 2025[8]. The CDE analysis acknowledges that there is a lot of uncertainty around how many unqualified teachers enter the system each year, and moreover that the Persal payroll data suggest that the figure is much lower, at around 6,000 in 2012 (as opposed to the 19,000 seen using the ASS data)[9].

The CDE technical report and experiences in the DBE with the ASS teacher questionnaire and Persal data confirm that for tracking the movements of public employees into and out of the system, Persal is far superior to the ASS. Qualifications values, on the other hand, are problematic in both Persal and ASS. In Persal they are often missing, and there has been some questioning of the degree to which the Persal REQV[10] values correctly reflect qualifications, though it seems unlikely that the latter would represent a serious and extensive problem. The key thing is that for many issues, such as the movements of employees at different qualifications levels, Persal statistics can in general be considered highly trustworthy. The CDE had to rely on two years of ASS data because they did not have access to Persal records.

But even if one considers the number of unqualified joiners per year to be around 6,000 (the Persal statistic quoted by CDE), and not 19,000, then this is clearly an important feature of the system. Moreover, if the 2013 value is in reality much lower than 19,000, then the CDE model would under-state the requirement for qualified joiners. In any event, the degree to which one accepts the continued entry of unqualified joiners influences one's model outputs. In the absence of enough qualified joiners, the question is perhaps how one manages the entry of unqualified joiners as strategically as possible. One needs to know the characteristics of these unqualified joiners better, and for this the ASS data do provide some information that Persal would not provide, for instance in relation to their teaching responsibilities. To illustrate, if someone starts teaching when he has completed one or two years of a BEd on a part-time basis at UNISA, and plans to continue with his part-time studies until he obtains his BEd, then this may be an optimal stop-gap solution. On the other hand, employing Grade 12 matriculants simply on the basis that the community would like to create jobs for its members is a much less desirable situation. One needs to understand what is actually happening, largely through better use of the available data, and one should then adjust policies and strategies accordingly (policies governing unqualified educators are currently not very clear).

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[7] However, one should keep in mind that the around 9,000 who become unqualified are not necessarily young joiners, some could be older joiners who have remained unqualified in the system for many years.

[8] Technical report: 19, 37.

[9] See Technical report (23). A figure of around 5,000 is found if one examines Department of Basic Education (2015a), specifically if one compares Table 3 to Figure 1in that report. Moreover, if one re-analyses data used for Department of Basic Education (2015) one finds that the 6,000 is roughly confirmed. Specifically, if one counts educators with REQV below 13 and counts only *first-time* joiners one gets around 2,000 joiners in the recent years. This one can consider the minimum possible. On the other hand, if one makes reasonable assumptions around the qualifications of joiners with missing REQV values and one counts any joiner in a year (not just first-time joiners) one gets around 9,000 joiners a year. This we can consider the maximum possible. The range between this minimum and maximum clearly excludes the 19,000 value given by the ASS.

[10] Relative Education Qualification Value.

1(b): We need to be realistic about our expectations around grade attainment improvement amongst learners in future years.

The CDE's enrolment scenario envisages an 8% increase in Grade 12 enrolments between 2013 and 2025. The corresponding figure implied in the DBE's sector plan and in Presidency's Medium Term Strategic Framework (MTSF) document is around 55%[11], so the difference between the CDE's scenario and government's targets is large. This obviously means that the CDE has under-estimated the demand for teachers, relative to government's targets.

1(c): We need to understand why more young graduate teachers are not entering the public system.

Although the extent to which newly graduated teachers actually take up employment as teachers within the country is mentioned as an element of the CDE's model, it seems as if this was not taken into account when the data were analysed and recommendations were decided on[12]. This is a critical omission because it appears there is a serious gap between graduates and entry into employment in, at least, the *public* system.

This gap has become even more apparent in 2014, one year beyond the years covered by the ASS data used by the CDE. Specifically, the number of first-time young qualified joiners in the public system, where 'young' is defined as age 30 and below, divided by the number of teacher graduates in the previous year, has declined from 77% in 2009 to 53% in 2013 and to 41% in 2014. A level of 77% is probably reasonable, considering that student teachers without public bursaries find work outside the education sector, and that privately funded posts absorb new graduates, but levels around 40% are clearly worrying. It appears as if part of the problem is that budget pressures in Funza Lushaka bursary recipients. This is clearly a challenge as it may be very difficult to attract the qualified teachers at a later point in time, if they have already established themselves in jobs outside the education sector.

To conclude this point, what does not come through clearly enough in the CDE reports is that an increasing number of teacher graduates does not automatically translate into more new teachers in schools. The movement of graduates into the teaching profession, and factors which impede this movement, must explicitly be taken into account.

1(d): Grade R teachers need to be taken fully into consideration.

Unfortunately, the official *Education Statistics in South Africa* reports produced by the DBE do not specify that teacher totals for public and independent schools exclude what are referred to as 'Grade R practitioners', or teachers without full teaching qualifications who teach Grade R. Analysis of the Snap Survey data which are used for the DBE reports reveal that in 2013, the number of Grade R practitioners was around 18,000[13]. These 18,000 teachers would not

[11] Department of Basic Education (2015b) and Presidency (2014).

[12] See step 11 on p. 22 of the technical report. Table 13 on p. 18 of the technical report reflects a very large gap between teacher graduates in a year and the number of qualified joiners. It seems only around half of graduates actually become teachers. This is not discussed in the technical report. This might suggest that the CDE model is *over*-estimating the number of required graduates. An interesting possibility is that the graduates numbers in Table 13 reflect *both* people who join the system as newly qualified teachers *plus* people who obtain their teacher qualification *after* having entered the system as unqualified (so the column 'Joins and upgrades' in Table 13). In fact, it is important to consider how many qualifications obtained from the universities are obtained by people already employed as teachers who study on a part-time basis.

[13] Forthcoming work by Gustafsson within the Programme to Support Pro-poor Policy Development ('PSPPD II') of Presidency. The Snap data are now available at https://www.datafirst.uct.ac.za, but it

have been considered in the CDE model, yet all Grade R learners in schools were counted. This would have resulted in some under-estimation of the number of new teachers required each year, even with a constant level of Grade R enrolment in schools.

2. It seems we need more information before we can conclude we have a teacher attrition crisis.

A key conclusion put forward by the CDE's reports is that there is a 'leaky bucket' problem with regard to the retention of teachers. The teaching profession is said to lose more qualified teachers each year than it gains[14]. Given the CDE's overall conclusion that the supply of young, newly graduated teachers is more or less right, the 'leaky bucket' problem translates into a teacher retention problem. Qualified teachers need to be prevented from leaving to a greater degree.

Specifically, the technical report indicates that in 2013 whilst around 18,000 qualified teachers arrived in the system, 29,000 left the system[15]. This does seem very problematic. Even if one considers the fact that around 9,000 teachers already in the system become qualified in a year, this would still mean there is an overall loss of qualified teachers of a couple of thousands in each year.

As mentioned earlier, statistics derived from the ASS teacher questionnaire data, especially statistics involving comparison of the same people across different years, must be interpreted with a lot of caution. The 'leaky bucket' conclusion of the CDE report is mostly based on ASS data. The Persal data, which are far more reliable for this kind of analysis, confirm there is a problem, but of a smaller magnitude. Persal data from the years 2004 to 2014 were re-analysed and it was found that if one considers all years together, qualified joiners exceed qualified leavers, the average annual figures being around 20,000 and 18,000 respectively. For this analysis joiners and leavers are considered only in terms of their movements across two years at a time, so churning (multiple joining and leaving) is not factored in. If one does attempt to factor in churning and uses what has been described as a 'four-year approach'[16], one finds that for the years 2007 to 2011 joiners exceed leavers (the annual averages are around 15,000 and 12,000).

Yet the Persal data do point to a problem, and the possibility that we could be heading for a serious 'leaky bucket' situation. Whether one considers two-year joining and leaving patterns, or one tries to control for churning through a four-year approach, the ratio of qualified joiners to leavers has been dropping. For instance, the ratio was 1.28 for 2005 to 2007, but 0.80 for the years 2012 to 2014, using a two-year approach for determining joiners and leavers. Of course the implied CDE ratio of 0.62 for 2013 is even worse.

But if there are more leavers than joiners, does this point to a problem of too few joiners, or too many leavers? Part of the answer to that question must be found in the overall attrition rate. All schooling systems experience attrition at various ages and there are rough norms for what can be considered acceptable and what level of attrition would be too high. This matter is not dealt with in the CDE reports. The first difficulty here is determining what the overall attrition rate for qualified teachers is in a context of considerable in-and-out churning. Unless one takes the churning into account, the attrition rate becomes too high for meaningful comparisons across different countries. The DBE has arrived at an attrition rate of 3.0% for

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should be noted that the Grade R practitioner values are particularly difficult to interpret due to missing data problems.

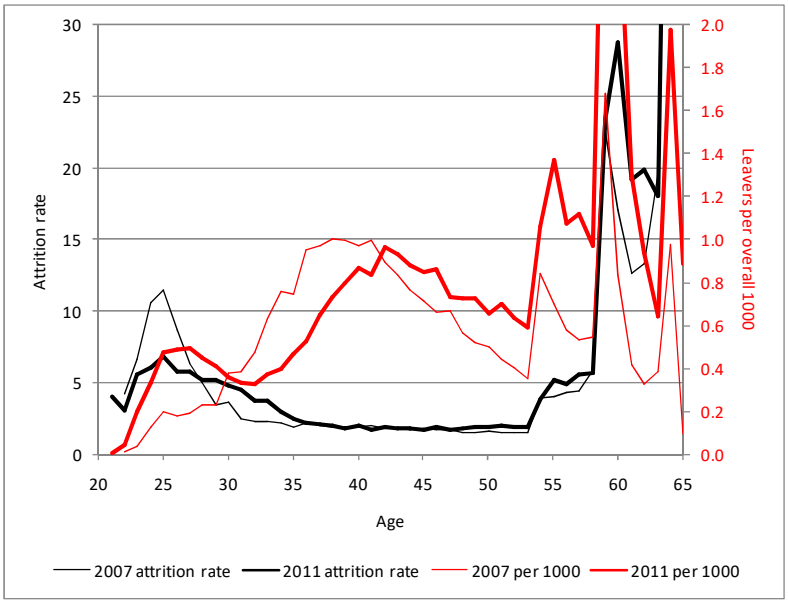
[14] Full report: 26.

[15] From technical report (18). The inflow would be 'Joins' plus 'Returns', whilst the outflow would be 'Over 65' plus 'Leaves'.

[16] Department of Basic Education (2014a).

around 2009, using an approach that factors out the effects of churning[17]. Attrition by age is important as averages can hide exceptionally high and problematic levels of attrition at specific ages. The following graph reflects attrition by age using Persal data and a 'four-year approach' for dealing with churning. Only qualified educators were considered for this graph. The overall attrition rates for these employees were 2.6% in 2007 against 3.6% in 2011, meaning attrition worsened. The worsening was not simply the result of a bulge of older employees at retirement age. The attrition rate for employees aged 22 to 49 was 2.0% in 2007 against 2.3% in 2011, so even for these ages it increased. The graph suggests that one factor which contributed to the overall worsening of the attrition rate was higher levels of attrition at around age 55 (probably early retirement) in 2011, compared to 2007.

Figure 1: Educator attrition in 2007 and 2011 for qualified teachers by age



Source: Analysis of Persal microdata.
Note: Red curves should be read against the right-hand vertical axis. These curves represent the trend for the age-specific number of leavers divided by all educators, multiplied by 1000.

Even at 3.6% per annum, teacher attrition in South Africa would not be high by international standards. For instance, UNESCO's Institute for Statistics considers a 5.0% rate as 'low' and 8.0% as 'high'[18]. Even if one did not adjust for churning, the attrition rate in South Africa, at around 5.4%, would not be remarkably high. Clearly even small increases in attrition should be cause for concern. However, one can expect efforts devoted to lowering an attrition rate that is still quite low not to yield easy returns. There should be programmes aimed at retaining teaches, but it seems there is not much leeway for reducing teacher attrition to a large degree in South Africa. The focus should perhaps be on ensuring that it does not worsen, and on trying as far as possible to keep the *best* teachers within the system.

On the matter of churning, there is an important error in the technical report (23), where it is said 'Gustafsson found that almost 20 per cent of qualified educators left and returned within four years, based on data from 2004.' In the original report by Gustafsson it is concluded that

[17] See Department of Basic Education (2009), also Department of Basic Education (2013: 65).
[18] UNESCO, 2006: 43.

20% of qualified *joiners* (not all educators) leave and then join again within a four year period[19]. If one's denominator is all educators, then the percentage drops to just 1.4%.

3. New evidence on the quality of young teachers in South Africa's schools should be taken into account.

The CDE focuses on the important matter of the quality of pre-service training for teachers, and concludes the quality challenges are considerable. However, it does this largely in terms of evaluations of the design of training programmes, which is a typical research approach in this area. The problem with this approach is that it easily misses trends in the actual quality of graduates. A well-designed training programme is of course not a guarantee of good teaching and learning, just as there are ways creative lecturers and student teachers can get around poorly designed programmes. An example of a rare view of what graduate teachers know and can do in South Africa is offered by Armstrong (2014, 2015). Armstrong uses learner and test scores from the 2000 and 2007 runs of the SACMEQ[20] programme to examine subject knowledge differences amongst teachers by age, as well as learner scores broken down by the age of the learners' teachers. She finds that younger teachers, who would be more likely to be the products of universities, as opposed to teacher training colleges, displayed better scores in their own subject tests, and, whilst controlling for other factors, produced better learner results[21]. This provides an indication that despite the problems in transferring teacher training from the old colleges to universities, this transfer appears to have brought about quality improvements. It is crucial that this analysis should be repeated when the 2011 SACMEQ data become available.

4. The question of the spread of teachers across the different qualifications levels, in particular three- against four-year post-school training, must be properly resolved.

The CDE presents a qualifications profile of teachers which is clearly at odds with what has been reported elsewhere. The CDE concludes, using the ASS teacher questionnaire data, that 15% of teachers have four years of post-school training, 66% have three years of post-school training, whilst the remaining 19% are unqualified[22]. A 2011 report by the Education Labour Relations Council (ELRC), using Persal data, found that two-thirds of publicly paid educators were at the REQV 14 level, which is generally taken to mean having four years of post-school education and training[23]. That report also points to the fact that the REQV 13 level is problematic insofar as it could mean three or fewer years of training, but makes no mention of the same problem applying to the REQV 14 classification. On the whole, qualifications distinctions amongst qualified educators do not have large practical implications, yet they are important to understand, partly for the purposes of planning in-service training. It would of course be interesting to clarify whether 15% or two-thirds of educators have four-year qualifications, for instance. And of course a proper understanding of unqualified teachers is important.

Below, an attempt is made to describe the data collected through the qualifications questions in the 2013 ASS teacher questionnaire. Clearly, twelve combinations of the 36 qualifications listed in the questionnaire are sufficient to describe half of all educators (the twelve qualifications in question are the column headings, the far right-hand column indicates the percentage of educators falling within each combination). The remaining 50% of educators are spread across as many as 9,839 combinations of the 36 qualifications. Using just the numbers in Table 1 and a general understanding of the meaning of the twelve qualifications

[19] Department of Basic Education, 2009: 2.
[20] Southern and Eastern Africa Consortium for Monitoring Educational Quality.
[21] See for instance Armstrong (2015: 129-130).
[22] Full report: 17.
[23] Education Labour Relations Council, 2011: 12.

one can reach the conclusion that 65% of the half of educators accounted for in the table have four or more years of post-school education. Of course, this may not be representative of the other half of educators not shown in the table. The aim here is not to provide a conclusive analysis of the ASS teacher questionnaire data, but rather to confirm that the data are usable and to propose ways of representing the relevant information.

Table 1: Combinations of teacher qualifications (2013)

Two-year Teachers' Certificate	Three-year Teachers' Diploma/National Professional Diploma in Education	Three-year Bachelor's degree	Honours degree (including an old one-year B Ed/BEd Honours)	Higher Diploma in Education (Post-Graduate)/Post-Graduate Certificate in Education	Further Diploma in Education	Four-year professional teaching degree	Four-year Higher Diploma in Education	Four-year Bachelor's degree	Advanced Certificate in Education	ABET Practitioner Certificate	Educ-ators	%
	●										57,461	15
	●								●		35,078	9
						●					21,551	5
							●				21,135	5
								●			14,929	4
		●									9,896	3
	●				●						9,339	2
●											7,243	2
	●		●						●		5,721	1
	●									●	5,637	1
	●	●									5,546	1
●	●										5,492	1
	Other combinations										193,003	49
	Total										392,031	100

5. Relatively good, but largely unused, data exist on teacher utilisation, data which should be used to a greater extent to inform teacher training

As pointed out by the CDE technical report[24], little is known about patterns of actual teacher utilisation in schools. Knowledge in this area would need to be based on data describing, in particular, how much time teachers devote to specific subjects and grades. CDE's full report refers to existing attempts to populate the Persal payroll system with both teacher qualifications data and data on teacher utilisation[25]. Whilst it seems feasible to use Persal as a definitive source for what teachers are qualified to teach, it is probably overly optimistic to expect Persal to accommodate data on teacher utilisation. Qualifications data per teacher are relatively straightforward and do not change often. Teacher utilisation data, on the other hand, are highly complex and dynamic. They would need to be updated annually to be useful. It seems unlikely that those in the system managing Persal would have the capacity to do this, or even a strong incentive to do so, given that Persal's main function is to ensure salaries are paid, whilst teacher utilisation data do not affect salaries directly.

There is in fact a rich source of data on teacher utilisation. The ASS teacher questionnaire data contains information not only on qualifications, but also on what grades and subjects each teacher teaches. It seems the CDE did not have access to this part of the ASS teacher questionnaire data. Whilst the data are not complete, there is information on a sufficient number of teachers to provide a vital picture of how teachers are actually utilised in schools. To illustrate, there were data for 2013 on around 263,000 teachers with respect to subjects and grades taught. This means data on around a third of teachers were missing. Statistics drawing from the available data would thus not be an exact representation of all teachers, but it should provide a reliable enough picture to guide policy. If data are used, this moreover encourages more complete collection in future years.

What follows is an illustration of the kinds of patterns the ASS teacher utilisation do reveal. From Table 2 below we see that teaching just one grade is relatively uncommon. For instance, of the 34,538 teachers appearing in the data who teach Grade 4, only 25% teach just Grade 4. The figure for Grade 9 is just 6%. Amongst the 34,538 Grade 4 teaches, close to a quarter teach two grades, a further quarter teach three grades and a final quarter teach four or more grades. Of more critical relevance to pre-service teacher training is the finding one obtains from Table 3 that only a third (32%) of the 95,279 teachers teaching in the senior phase (grades 7 to 9) teach *only* in the senior phase. Two-thirds also teach outside this phase, mostly grades above Grade 9. Clearly, if pre-service training assumes that there is a neat placement of each teacher within just one curriculum phase, then this could result in the teacher being unprepared for the actual situation prevailing in schools.

[24] Technical report (11).
[25] Full report (26).

Table 2: Teaching across grades (2013)

Grade	1 grade (%)	2 grades (%)	3 grades (%)	4 or more grades (%)	Teachers
1	81	8	8	4	21,206
2	72	15	9	4	19,240
3	74	11	9	5	19,046
4	25	22	27	26	34,538
5	17	25	32	26	35,728
6	17	27	31	26	36,562
7	23	24	29	24	43,289
8	7	24	36	34	46,086
9	6	25	35	34	47,604
10	12	22	45	21	83,180
11	5	26	45	23	75,808
12	8	23	46	23	72,976

Source: Own analysis of Annual of Survey of Schools 2013 microdata.
Note: The percentage values in each row add up to 100%. Both public and independent ordinary schools are reflected in this table (also applies to the following tables). The total number of teachers considered in this table is 253,459. The reason why the values in the right-hand column of the table would produce a larger total is that the same teacher can be counted in different rows, depending on the grades that teacher teaches.

Table 3: Teaching across phases (2013)

Phase	1 phase (%)	2 phases (%)	3 phases (%)	4 phases (%)	Teachers
Gr 1 to 3	95	3	1	0	52,057
Gr 4 to 6	58	41	1	0	62,085
Gr 7 to 9	32	67	1	0	95,279
Gr 10 to 12	64	36	0	0	111,810

Is it *wrong* if teachers end up teaching grades (and subjects) for which they were not formally trained? The CDE seems to suggest that this represents a 'misutilisation' of teachers, and many would share this view. However, one probably needs to proceed with a lot more caution in this area. Teachers are in fact not placed in front of specific classrooms by a central authority. The classes they end up teaching are a complex outcome of teacher choice (both in terms of choice of school and choice of class), mixed with school management. Moreover, the general availability of teachers with specific specialisations across the country influences patterns of utilisation. The problem, insofar as it is a problem, is to a fairly large degree a problem of undesirable teacher choices and undesirable school management decisions. However, there are probably many good reasons why 'misutilisation' arises. Schools have to deal with the complexity of making do with the teachers they have. Teachers may be happy to teach the 'wrong' subject if they can teach in a school they would like to teach in. Attempting to prohibit 'misutilisation' could have a detrimental effect on schools and could result in more teachers seeking employment elsewhere. It is also important to bear in mind that there are many factors, other than one's formal teaching specialisation, which determine whether one is a good teacher for a particular class. For instance, a senior phase English teacher who is passionate about natural sciences might make an excellent intermediate phase natural sciences teacher. It seems this type of flexibility should be accommodated, especially below the Grade 10 level. Of course the patterns of mismatches between qualifications and teaching should be known. Currently this is very difficult to calculate due to a lack of subject-specific qualifications data anywhere. But it seems less obvious that mismatches should all be corrected by a central authority, as is implied, very often, by the 'misutilisation' argument.

Turning to subject teaching, we can see from Table 4 below that just as teaching more than one phase is relatively common, so is teaching many subjects. Even amongst teachers

teaching grades 8 to 9, the typical situation is to teach more than one subject (and this is without breaking up languages into individual subjects, so 'any language' is treated as a single subject). For instance, only around a third of grades 8 to 9 mathematics teachers teach only mathematics.

Table 4: Teaching across subjects (2013)

Subject	1 subject (%)	2 subjects (%)	3 subjects (%)	4 subjects (%)	5 or more subjects (%)	Teachers
For all teachers teaching **grades 4 to 6** (subject teaching in other grades is counted)						
Arts and culture	5	23	28	19	24	5,835
Economic management sciences	1	24	31	19	25	5,790
Life orientation	13	33	25	18	11	26,192
Mathematics	18	34	22	16	9	27,696
Natural sciences	10	34	26	19	11	25,359
Social sciences	14	32	24	19	11	23,470
Technology	1	22	34	20	23	6,251
Any language subject	15	38	26	11	10	20,884
For all teachers teaching **Grade 7** (subject teaching in other grades is counted)						
Arts and culture	11	28	28	15	19	8,880
Economic management sciences	10	30	27	14	19	10,347
Life orientation	11	31	29	14	14	15,903
Mathematics	15	34	26	12	13	15,782
Natural sciences	7	32	31	15	15	14,549
Social sciences	12	32	27	14	15	14,030
Technology	7	28	30	15	19	10,234
Any language subject	11	33	31	15	10	13,236
For all teachers teaching **grades 8 to 9** (subject teaching in other grades is counted)						
Arts and culture	19	46	26	6	2	8,338
Economic management sciences	36	42	16	4	2	14,130
Life orientation	18	51	24	5	2	15,218
Mathematics	35	44	16	3	1	16,059
Natural sciences	25	49	20	4	2	15,268
Social sciences	31	45	18	4	2	13,278
Technology	16	49	27	6	2	9,585
Any language subject	31	46	18	4	1	15,280

Note: For this table, subject codes in the microdata were normalised so that they were all expressed in terms of the curriculum found in grades 7 to 9. Moreover, any language subject was collapsed into a single 'any language' category. For instance, the subject history was classified as 'social sciences'. This process was relatively straightforward. Perhaps the only debatable reclassification was considering geography a social science (as opposed to 'natural sciences').

The following table illustrates what the common subject combinations are for grades 4 to 6 teachers. Clearly life orientation draws teachers from a range of other subjects. Mathematics and natural sciences is a common combination (as one might expect), but mathematics and social sciences is also a common combination (this is perhaps less expected). Finally, Table 6 reports on combinations experienced by grades 8 to 9 teachers. Similar patterns to those seen in Table 5 appear, though in general teaching more than one subject is less common (as was seen in Table 4) and for grades 8 to 9 teachers combining mathematics with social sciences is not that common. At the very least, this type of information should be readily available to those engaged in training teachers, and probably the trainee teachers themselves.

Table 5: Subject combinations for grades 4 to 6 teachers (2013)

	ART	ECO	LIF	MAT	NAT	SOC	TEC
ART							
ECO	1,401						
LIF	3,252	2,800					
MAT	2,175	2,530	11,149				
NAT	2,272	2,477	10,494	13,125			
SOC	2,264	2,681	10,477	9,575	9,540		
TEC	1,376	1,524	2,541	2,892	4,061	2,243	
LAN	2,329	2,157	8,566	5,910	7,004	7,380	2,022

Note: The subject categories from the previous table are used, with abbreviations used here following the order of the subjects in the previous table. Importantly, the table considers only teachers teaching grades 4 to 6, but the subjects these teachers teach across any grade (1 to 12) are considered.

Table 6: Subject combinations for grades 8 to 9 teachers (2013)

	ART	ECO	LIF	MAT	NAT	SOC	TEC
ART							
ECO	1,614						
LIF	2,042	3,383					
MAT	977	1,790	2,005				
NAT	1,283	1,256	2,743	5,363			
SOC	1,564	1,705	3,165	1,090	1,553		
TEC	1,113	1,662	1,755	2,688	2,868	1,367	
LAN	2,156	1,888	3,615	1,006	1,901	3,190	1,122

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