
# Provincial Educator Demand Projections for South Africa

2021-2030

Bianca Böhmer & Martin Gustafsson (27 June 2023)

Teacher Demographic Dividend.

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# Executive Summary

Over the last decade the public education system in South Africa has been squeezed. On the one side there has been rising enrolment due to population growth, coupled with lower drop-out rates which improved education access, particularly at secondary level. On the other side weak economic performance with sustained above inflation wage increases for educators have decreased the real budget available for provinces to allocate to both personnel and non-personnel resources. Despite enrolment growth, the workforce size remained static to remain within budget, driving up the learner-educator ratio, which has led to larger classes and higher proportions of very large classes.

The proportion of educators that are 50 years or older has steadily risen between 2012 to 2021. This will result in a wave of educator retirements, as this group of older educators reaches the standard retirement age of between 60 and 65. The upcoming retirement wave will open up both teaching posts and school management and leadership positions (principals, deputy principals, heads of department (HODs)) and other office-based education specialists, as their incumbents leave. A sufficient number of qualified educators will be needed to fill these posts. The required number of new appointments will need to increase simply to ensure that total educator numbers (at a minimum) stay at current levels. Planning will be required to ensure that provinces are ready for the sustained increase in appointments. If these positions are not filled, this could result in a further deterioration in the learner-educator ratio and lead to further increases in class sizes beyond those seen to date.

However, due to the change in age distribution, the average age of teachers (and therefore the average experience level) will continue to drop. Older, more experienced educators earn higher wages than entry-level teachers. Therefore, with a high number of retirements, if retirees are replaced by newly hired educators, this has the potential to bring down the average cost of educators, freeing up some fiscal room to manoeuvre within the proposed budget.

## Historical school and demographic trends from 2012 to 2021

### Historical educator age distributions

The proportion of older educators has risen between 2012 and 2021. There is a concentration of educators over the age of 50, with a peak at age 53 (in 2021). As a result, the number of educators retiring (for the purposes of this analysis, this is defined as any educator aged 56 or older leaving the public education system, even though this includes educators that leave due to resignation, illness, death or other reasons) will increase in the coming years. This concentration of older educators is more pronounced in more rural provinces, particularly Limpopo and the Eastern Cape. Across provinces we also see that there is a higher concentration of older educators in primary schools. It is therefore expected that the impact of increasing retirements will be felt most in more rural provinces and in primary schools.

## Historical school trends

There has been significant school rationalisation in public schools countrywide. School rationalisation refers to closing small, often rural, schools as enrolment in these schools decreases, normally driven by urbanisation. The largest such school rationalisation took place in the Free State where more than a quarter of public schools in the province (27%) were closed between 2012 and 2021. However, the number of public schools decreased in all provinces except the Western Cape and Gauteng, where the number increased marginally (by 4 schools in the Western Cape and 22 schools in Gauteng). As a result, the average number of learners per school has increased by 14% in public schools. Such centralisation of learners within fewer schools may result in some management efficiencies. However, this is contingent on existing school infrastructure upgrades. Otherwise, this may lead to school overcrowding. It is also worth noting that these efficiencies depend on reallocating teachers away from small, shrinking schools (often in rural areas) towards schools whose enrolment is increasing (often in urban areas).

In contrast to public schools closing, independent school numbers have grown, at very high rates, in all provinces except KwaZulu-Natal. However, independent schools remain a small part of the South African schooling system, making up only 6.1% of ordinary schools in 2012 and 8.7% in 2021, with the proportion of enrolment increasing from 4.1% to 5.2%. Between 2012 and 2021, the number of independent schools in Gauteng, the Western Cape and the North West increased by more than 50% from a non-trivial base in Gauteng and the Western Cape. The Northern Cape doubled the number of independent schools in the province from 20 to 40. The growth in independent schools may partly be in response to larger class and school sizes, if parents perceive large class sizes as signalling poor quality. Wealthier families are more likely to be able to make the shift from a public to an independent school. Therefore, this trend may have longer-run equity implications for schooling in South Africa.

## Historical educator trends

The total number of publicly employed educators[1] remained relatively constant between 2012 and 2021. However, the number of educators in independent ordinary schools increased by 28%, whilst independent school educators as a proportion of all educators rose from 7.7% to 9.4%. Within the public sector, there has also been a decline in the proportion of principals. This is both an overall decline in number of principals – about 12% fewer principals – and a relative decline. There were almost 6 principals per 100 educators in 2012 but only about 5 per 100 in 2021. Principals here refer to anyone classified as a principal in PERSAL and therefore excludes acting principals. Some of these declines are linked to school rationalisation, as in the Free State, where the number of principals declined by 27%, and the number of schools also declined by 27%. However, principal numbers have decreased more than school numbers in other provinces. This is most likely because some principal positions are

[1] The term 'educator' refers to school-based level 1 teachers and educators on the school management team (HODs, deputy principals and principals). In addition, a small number of education specialists that may be school-based or office-based are also classified as educators (this 'Other' category of educators makes up only about 2 % of educators in 2021). 'Educators' is thus not entirely synonymous with 'teacher' although teachers do make up the majority of educators (79%).

currently filled by acting principals. The COVID-19 pandemic also disrupted regular school governing bodies (SGB) meetings in many schools, which may have slowed principal appointment processes.

In Limpopo, large decreases in the number of HODs (-38%) and deputy principals (-50%) between 2012 and 2021 are cause for concern and possibly a response to budgetary pressure. It is possible that these positions are being filled by other educators that are acting HODs and deputy principals and that these promotions are not being finalised due to budget constraints or that these positions are falling away.

### Historical learner and enrolment trends

The number of children in South Africa is still on the rise, which will, all else being equal, result in an increase in learner enrolment. It was estimated that the population of children of school-going age (7-18 years) increased by about 13% from 2012 to 2021. Enrolment in ordinary schools grew by 8% over this period, although one should note that factors such as retention, access and drop-out rates all affect enrolment numbers not only the size of the child population. There are clear differences by province, with enrolment in ordinary schools in Gauteng and the Western Cape growing by more than 20% between 2012 and 2021 as the school-aged population grew, partially due to in-migration. In contrast, enrolment in the Eastern Cape declined by about 5% between 2012 and 2021, largely driven by an estimated decline in the population of school-aged children of about 4% over the same period. Enrolment in ordinary schools in the remaining provinces grew by between 1% and 13% over the 9 years.

## Projected educator and enrolment trends from 2021 to 2030

### Projected retirements

A significant increase in educator retirement is expected leading up to and including the year 2029. Thereafter retirement numbers will decrease. The scale of retirees differs across provinces. In Limpopo the number of educators that are estimated to retire up to 2035 is about two-thirds of the number of educators that were employed in 2021. This proportion is 60% for the Eastern Cape and ranges between 45 and 60% for the remaining provinces. Put differently, the retirement wave will lead to a significant replacement of teachers, and in 2035 there will be more 'new teachers' (employed after 2021) in the system than 'old teachers' (employed in or before 2021). The retirement wave will peak in different years for different provinces. In the Western Cape the numbers are already declining, whilst in Gauteng and the Northern Cape, the peak is closer to 2031.

### Projected resignations

Younger educators below the age of 55, leave the public schooling system for many reasons. In this report, we refer to any educator that leaves the public schooling system when they are 55 years or younger as having resigned, including temporary staff whose contracts came to an end, educators that moved to another province, dismissals, or promotions to positions that are not classified as educators at the district, provincial or national level. The rates at which educators resign are significantly different by province. In the Eastern Cape and Limpopo, there are very low rates of teacher resignations (<3% from 2017 to 2019). There are fewer younger educators in these provinces

(below 50 years), so the total number expected to resign is relatively low. The opposite pattern is evident in Gauteng and the Western Cape. Although these two provinces will see lower rates of retirement (due to lower proportions of older educators), they will also experience higher rates of resignations. This is likely due to greater access to alternative employment in the more urban provinces. This results in an overall rate of retirements and resignations that is higher in the Western Cape, North West, the Northern Cape and Gauteng than total resignations and retirements in Limpopo and the Eastern Cape, primarily driven by higher rates of resignations among 21 to 55-year-old educators.

### Projected school-aged population and enrolment growth

The school-aged population is forecast to continue to grow between 2021 and 2030. Population growth is a good indicator of future enrolment growth in schools. Provinces like Gauteng and the Western Cape, which are receiving significant inward migration from more rural provinces, are forecast to remain as high growth provinces. Most of the other provinces are also growing, though at a more moderate rate. However, KwaZulu Natal and the Free State are expected to have school-aged populations that are in slight decline, with the Eastern Cape forecast to experience a population contraction of -15%.

## Provincial budget implications from educator retirements

More experienced and older educators in South Africa earn higher basic salaries. This came about because publicly employed educators received a 1% real pay increase through notch progression starting from 2008 (Gustafsson, 2019), which was raised to a 1.5% increase that was phased in starting in 2019. This was initially intended to be a teacher incentive pay-for-performance system but has become a de facto annual increase for all teachers regardless of performance (almost all educators receive it every year).

Therefore, as older educators retire and their positions are filled by younger educators, the average unit cost of an educator decreases. As a result, despite the 1.5% notch increases for educators in the system, the real unit cost of educators is expected to stay roughly constant between 2021 and 2030. This is mainly driven by declining unit cost of senior educators. The average cost of a level 1 teacher, is expected to increase very slightly (+0.1% to +0.4% per annum) over the nine years in all provinces except Limpopo, where there is a slight decrease (-0.2% per annum).

The 2023 Budget review outlines a real decrease in provincial expenditure on compensation of employees in basic education in all three years from 2022/23 to 2025/26. As a result, it is likely that there will be a drop in the educator headcount in some provinces as their budgets shrink. Despite the tight budget conditions, provinces will need to continue to see where it is feasible and affordable to hire more and replace leaving educators. Provinces will also need to determine on an ongoing basis what proportion of their Equitable Share allocation from National Treasury is allocated to Education. While an ageing workforce is also seen in other professions (particularly defence and policing), this is most pronounced in education. In 2021 National Treasury estimated that the percentage of public employees aged 50 or older in 2020/21 was 45% in Education, 30% in Defence, 28% in Health, and 23% in the Police (National Treasury, 2021, p. 63).

*Table 1: Summary of key provincial trends and forecasts*

| Province | EC | FS | GP | KN | LP | MP | NC | NW | WC |
|---|---|---|---|---|---|---|---|---|---|
| Mostly* Urban/ Rural | Somewhat rural | Somewhat urban | Urban | Somewhat rural | Rural | Somewhat rural | Somewhat rural | Somewhat urban | Urban |
| 2021 Educator age distribution (% All educ., 50+) | 51% | 43% | 41% | 39% | 58% | 50% | 43% | 47% | 42% |
| 2021 Senior educator age distribution (% HOD, Dep-Principals, Principals & Other, 50+) | 71% | 65% | 65% | 65% | 81% | 73% | 69% | 70% | 73% |
| 2021 Primary school educators age distribution (% educ, 50+) | 58% | 49% | 42% | 44% | 63% | 55% | 44% | 52% | 40% |
| Projected retirement % of 2021 workforce (2022 – 35) | ~60% | ~50% | ~45% | ~50% | ~65% | ~55% | ~50% | ~55% | ~50% |
| Historical resignation & attrition rates (≤50 years) | Low (~2%) | Medium (~5%) | High (~6%) | Medium (~4%) | Low (~2%) | Medium (~4%) | High (~7%) | Medium (~5%) | High (~7%) |
| Projected School-aged population growth (2021-30) | Large decrease (~ –15%) | Small Decrease (~ –5%) | Very high growth (~+25-30%) | Stable (~0%) | Medium growth (~+5-10%) | Medium growth (~+5-10%) | Stable (~0%) | Low growth (~+5%) | High growth (~+15%) |
| Projected changes in real unit cost of educators** (2022 – 2030) | 0% | 0% | 1% | 0% | -2% | 0% | 0% | -1% | -0% |
| Educator headcount growth (2012-21) | -17% | -13% | 21% | -5% | -8% | 3% | 6% | 2% | 12% |
| Principal headcount growth (2012-21) | -10% | -27% | -9% | -9% | -6% | -19% | -17% | -21% | -13% |
| Deputy-principal headcount growth (2012-21) | 8% | -10% | 11% | -11% | -50% | 1% | 24% | 15% | -3% |
| HOD headcount growth (2012-21) | 6% | -8% | 6% | -8% | -38% | 0% | 6% | 1% | -9% |
| Ordinary school growth 2012-2021 | -7% | -25% | 13% | -2% | -5% | -7% | 1% | -6% | 7% |
| (Public) [Independent] Ordinary school growth (2012-21) | (-8%) [18%] | (-27%) [19%] | (1%) [54%] | (-3%) [0%] | (-7%) [26%] | (-8%) [16%] | (-3%) [100%] | (-9%) [65%] | (0%) [61%] |
| Learner – public educator ratio (2012 → 2021) | 26.6 → 30.9 | 24.1 → 30.0 | 28.5 → 29.2 | 28.3→ 29.6 | 26.7 → 30.4 | 27.1 → 29.6 | 27.7 → 27.4 | 27.1 → 28.1 | 28.9 → 31.5 |

** Constructed from the urban proportion of children aged 0-17 in 2020 from the UCT Children's Institute. Classifications: Rural (0-25%/), Somewhat rural (25,1 - 50%), Somewhat Urban (50,1 - 90%) and Urban (90,1 - 100%). Available at http://childrencount.uct.ac.za/indicator.php?domain=3&indicator=13*

*** Assumes workforce growth of 20% in GP, 10% in the WC, -10% in the EC and adjusts the rank proportions in LP to 79% teachers by 2030*

## Summary of main provincial challenges

### Eastern Cape

- Population decline will result in lower enrolment. There will be an expected decrease in the school-aged population of ~15% between 2021 and 2030. This is a much larger decrease than the enrolment decline seen from 2012 to 2021 of about -6% in public ordinary schools (POS). The number of POS has already decreased by 8% from 2012 to 2021, with significant reconfiguration of Grades offered within schools (DBE, 2022a, p. 19). Average school sizes are likely to decrease further, so ongoing school rationalisation efforts will likely need to continue.
- Higher levels of retirements expected to about 2035 - More than half of educators were 50 years or older in 2021 with peak at age 53 in 2021.
- Upward pressure on class sizes due to LE ratio increase. Learner enrolment declined, but educator numbers declined even more with a -17% decline in educator numbers in PERSAL and a -9% decrease recorded in School Realities from 2012 to 2021. This resulted in a large LE ratio deterioration seen between 2012 and 2021 from about 26.5:1 to 31:1.

### Free State

- School rationalisation resulted in 27% fewer public schools in 2021 compared to 2012. This was roughly equivalent to decrease seen in principal numbers of 27%. It also contributed to the learner-educator ratio increase from about 24:1 to 30:1 over this period, as many of the schools that were closed were small schools.
- Slight decline in the number of school-aged children (aged 7-18) expected from 2021 to 2030 (~1% decline), which will likely translate into lower enrolments, which means that further school rationalisation may be required in the future.
- High rates of movement out of the province. Between 2012 and 2019 more than 5.5% of educators moved from the Free State to teach in a different province, however the one-year movement from 2018 to 2019 was relatively low at about 0.4%.

### Gauteng

- Historical high population and enrolment growth from 2012 to 2021 - enrolment in ordinary schools grew by 24% (20% in public and a massive 56% increase in private school enrolment), heavily influenced by in-migration. Limited growth in the number of public schools (about 1% more in 2021 than in 2012), resulted in larger public ordinary schools. Average school enrolment grew by about 200 children per school, from about 900 children per school to about 1 100 children per school.
- Projections for continued high growth in the population of school-aged children. Population projections estimate an increase in the number of school-aged children of about 27% from 2021 to 2030,

driven by in-migration. Gauteng will need to respond by increasing the number of educators, including educators in management and leadership positions, building new schools and increasing the capacity of existing schools.

- Overall educator turnover is high and will increase with the retirement wave. The retirement wave will be felt slightly less and later in GP than the more rural provinces as the share of older educators is smaller, 41% of educators were aged 50 and older in 2021. But, younger educators (50 years and below) are more likely to leave the schooling system than in most other provinces. About 5% resign per year which pushes up total staff turnover.

KwaZulu Natal

- KZN will be less affected by the retirement wave to 2035, although numerically the province still accounts for a high number of retirees. In 2021 39% of educators were over the age of 50 years and the age distribution is flatter with a concentration of educators at about 35 years of age. However, there will still be an increase in age-related retirements with about half of educators from 2021 retiring by 2035.
- Stable enrolment with a slight decrease in educator and school numbers. Enrolment is likely to remain roughly stable because the population of school-aged children (7-18 years) is forecast to grow by only 1% from 2021 to 2030. This is similar to roughly stable enrolment growth of about 1% in public ordinary schools between 2012 and 2021. Over the same period, there was a slight (3%) decrease in public ordinary school numbers, with about 5% fewer educators in PERSAL (whilst the school realities reports indicate an 2% increase in educator numbers).
- These provincial totals likely mask within province movements due to urbanisation, given the high rural population in the province. It is expected that educators and resources will need to be directed towards more urban areas in response to urbanisation. Further within-province analysis is needed.

Limpopo

- This province has the highest proportion of older educators meaning the province will be most affected by the incoming retirement wave. About two-thirds of 2021 educators in Limpopo are expected to retire by 2035. A high share of educators (58%) and an even higher share of senior educators (HODs, deputy principals, principals and other), 81%, were over 50 years of age in 2021.
- Enrolment has grown (+4%), whilst the number of educators has declined (-2%) leading to rising LE ratios and class sizes between 2012 to 2021. Although enrolment in public ordinary schools in Limpopo increased by 4% from 2012 to 2021, the number of educators declined (-2%) leading to a rise in the Learner-Educator Ratio from 26.5 to 30.5 learners per educator over this period. There were also 7% fewer public ordinary schools over this period. The population of school-aged children in Limpopo is projected to grow by 7% from 2021 to 2030.

- Limpopo will need to increase employment with increasing enrolment to ensure the learner-educator ratio stays at the current level or decreases to keep class sizes from increasing.
- Between 2012 and 2021 in Limpopo the number of schools declined (-7%) in similar proportion to the decline in principals (-6%), however there was a sharp decline in the number of Deputy Principals (-50%) and HODs (-38%). School management and leadership structure has become more bottom-heavy between 2012 and 2021, as middle management in schools has been eroded. The number of teachers decreased by 2% and principals by 6%, roughly in line with the decrease in school numbers. However, the number of deputy principals halved (-50%) and HOD numbers dropped by 38%. The teacher share of total educators has climbed from 78% to 84%. Such a shift is potentially driven by budget constraints which means more educators may be in acting positions. This has short-run accountability, operational efficiency and sustainability implications and raises concerns about succession planning in the medium term. There are also implications for teaching and learning if these positions (Deputy principal and HOD) are vacant or left as acting roles.

Mpumalanga

- High number of school management and leadership staff will be retiring by 2035. Although 50% of all educators were 50 or older, the percentage for school management post (Principal, Deputy Principal, HODs and other education specialists) was much higher with 73% being 50 or older in 2021. Good succession planning at both district and provincial level should help manage the transition.
- Decrease in number of principals by 19%. This would have been partially driven by a decrease in the number of public ordinary schools (-8%). However, teacher numbers increased (+7%), in line with enrolment growth, whilst HOD and deputy principal numbers remained roughly unchanged.
- Growing population will lead to higher enrolment, requiring a larger educator workforce. Between 2012 and 2021 enrolment in public ordinary schools increased by 7%. The population of school-aged children (7-18 years) is expected to continue to grow by about 6% from 2021 to 2030.

Northern Cape

- High levels of attrition and out migration. Between 2018 and 2019 about 6% of educators under the age of 50 resigned (left PERSAL) and more than 8% moved between pay points, which normally indicates that they moved schools. Movement out of the province is also high, with more than 1% of teachers moving to a different province from 2018 to 2019. This was the highest rate of all the provinces, with the North West second at 0.6%. This movement out of province was 5.6% over a 7-year period (2012 to 2019), the third highest rate in the country (North West was highest at 6.4%).
- Slightly less affected by the retirement wave. The Northern Cape is one of the provinces that is expected to be slightly less affected by the retirement wave, nevertheless 69% of senior educators that hold

leadership and management positions (principals, deputy principals, HODs and others) were aged 50 and above in 2021, so careful succession planning may be required.

- The decline in public ordinary schools, was offset by an increase in the number of independent schools, off of a low base. The number of public ordinary schools decreased by 3%, in stark contrast to the number of independent schools which doubled over this period (from 20 to 40 schools).
- Little change in enrolment is expected between 2021 and 2030 as the school-aged population (ages 7-18) is forecast to remain roughly stable (1% growth) between 2021 and 2030.

North West

- High levels of movement within- and out of the province. Between 2018 and 2019, more than 6% of educators under the age of 50 moved between pay points. This normally indicates that they moved to a different school, and includes within-province and inter-provincial movements. Movement out of the province is also high, with about 0.6% of teachers moving to a different province from 2018 to 2019, whilst over a 7-year period (2012 – 2019), almost 6.5% of educators moved to a different province.
- Half of teachers in the North West were 50 or older in 2021, with much higher percentages (70%) for school management and leadership and education specialists. North West has the fourth highest percentage of educators aged 50 or older, but 70% of senior educators that hold leadership and management positions (principals, deputy principals, HODs and others) were aged 50 and above in 2021. There is a clear need for school management team (SMT) succession planning.
- No clear pattern links the underlying drivers of enrolment and school numbers, with historical changes in educator numbers. There was a large decrease in the number of principals (-21%) between 2012 and 2021. The number of public ordinary schools decreased by half that amount (-9%), and in contrast, deputy principal numbers increased (+15%). Growth in the total number of teachers (+4%) also lagged behind growth in enrolment in public ordinary schools (+12%). These trends have led to an increase in the average size of public ordinary schools (+22%), however the learner-educator ratio only increased from about 27:1 to 28:1.

Western Cape

- Historical high population and enrolment growth and continued high growth projected in the population of school-aged children. Enrolment in ordinary schools grew by 22% between 2012 and 2021, driven primarily by the increase in public school enrolment (+21%) and the increase in private school enrolment (46%). Population projections estimate an increase in the number of school-aged children of about 15% from 2021 to 2030, driven somewhat by provincial in-migration. The Western Cape will need to respond by increasing the number of educators, management and leadership positions and the number of schools and classrooms

- Between 2012 and 2021 total school numbers stayed the same, average school size increased (+21%), total educators increased (+22%) but the number of principals declined (-13%) as well as the number of HODs (-9%). There was no significant change in the number of public ordinary schools between 2012 and 2021 (4 fewer schools), resulting in an increase in the size of public ordinary schools by about 21% (from a mean of just under 700 to about 825 children per school). This coincided with a decrease in the number of principals (-13%), deputy principals (-3%) and HODs (-9%), whilst teacher numbers increased (+22%) over the same period.
- The retirement wave started in the Western Cape first, and it is the only province that has already reached the peak of the retirement wave, but a high proportion of school leadership and management staff are still due to retire. The total number of educators in the Western Cape that were 50 years and above was only 42% in 2021 (compared to 44% in 2019). However, 73% of senior educators (principals, deputy principals, HODs and other specialists) were 50 years or older in 2021, indicating that new school managers and leaders will need to be identified and appointed.

# 1. Introduction

Good teachers are the backbone of a well-run education system. The creation and retention of such a workforce of qualified, skilled, professional, motivated and valued teachers was highlighted as a priority in the National Development Plan (NPC, 2012). Ensuring that such teachers with the right combination of subjects, skills and language abilities are trained and then appointed in sufficient numbers in the schools where they are needed, and then supported and retained, is critical to ensuring the delivery of quality schooling. The appointment of educators should take place in response to the demand for schooling. Inefficiencies result if too many (or too few) educators are appointed or there is a mismatch of skills. Up to date and accurate information are required, as well as pro-active planning if one is to identify trends and constraints in the system. In order to adapt to changes one requires good management of resources, and well-functioning and responsive human resource systems underpinned by a well-managed budget.

In South Africa the average age of educators has been increasing, with a concentration of teachers above the age of 50, which will lead to a retirement wave as educators reach the standard retirement ages of between 60 and 65 years (Gustafsson, 2022; Van der Berg et al., 2020). Such teacher retirement waves are not uncommon, and high average teacher ages across the OECD suggest that similarly high levels of teacher retirements can be expected in several OECD countries particularly in Eastern and Southern Europe[2] (OECD, 2019). Within Africa, teachers tend to be younger on average, however, Liberia is another outlier with about 55% of their educators aged 50 or older. Therefore, Liberia will face similarly high levels of retirement compared to South Africa in the coming years (Evans & Mendez Acosta, 2023).

This anticipated rise in the number of age-related retirees in South Africa forms a part of a larger picture of changes in demand for teachers. Recent work has focussed on estimating the trends in retirees (educators that are 56 years of age or older that leave the system) and looking at the number of educators that leave the system for other reasons at earlier ages. In addition, the school-aged population in South Africa is still rising, and rising rapidly in urban areas, and as such the total teacher workforce will need to grow if class sizes are to be kept in check or reduced.

There is a long history of educator supply and demand forecasting in South Africa, where the focus has traditionally been on estimating the number of graduates required to meet the demand for educators. Van Broekhuizen, (2015), summarises the outcomes of 15 such studies. The most recent supply estimates were produced by Van der Berg et al. (2020). Teacher supply, at this specific juncture, no longer appears to be the overarching constraint. Although ensuring an adequate supply of Initial Teacher Education (ITE) graduates remains important, there has already been a dramatic increase in the supply of ITE graduates. One initiative that

[2] Countries with particularly high average teacher ages include Georgia, Lithuania, Estonia, Bulgaria, Portugal, Italy and Latvia all had teachers with average ages between 48 and 51, whilst in Hungary, Russia, Iceland, Slovenia and Spain, the average teacher age was between about 45 and 48. The average age in South Africa was about 43 (slightly below the OECD-31 average).

has contributed to strengthening teacher supply is the Funza Lushaka bursary programme. Concerns around teacher supply in the 2000s prompted the introduction of the bursary programme in 2007 to motivate students to choose teaching and reduce the financial barriers of tertiary studies for recipients (DBE, 2017). In parallel, South African Higher Education institutions have effectively tripled the number of graduates over ten years, from 2010 to 2019, to about 28,000 ITE graduates per year (Böhmer & Pampallis, 2022). This shows both a capacity to identify and respond to potential demand for educators by DHET through forecasting, tracking of progress and direction of funding. Additionally, teaching degrees are a popular choice among South African students, partially due to their lower entrance requirements (Taylor & Pampallis, 2023). Whilst this is an advantage for those seeking to increase the number of ITE students, this raises questions about the potential quality of ITE graduates. Many students underperform on literacy and numeracy skills when they enter the University system as first year ITE students. About 70% achieve only a basic score, the lowest level, on the National Benchmarking Test (Roberts & Moloi, 2022). Universities have varying rates of success in raising the Numeracy level of their students over the four years of their degree. Roberts & Moloi (2022) show using a cross-sectional dataset of first- and fourth-year students that the fourth-year students significantly outperform the first-year students in 5 out of 6 Universities studied. However, the average level of numeracy remains low. In only two of the Universities is the average score above the 60% benchmark, which is considered the minimum proficiency standard.

Despite rising numbers of ITE graduates, the public schooling system has not been absorbing these graduates. Gustafsson (2022) showed that whilst the number of ITE graduates had risen from just over 15,000 to about 28,000 graduates, the number of young joiners, under the age of 30, to the public education system had been fairly flat from about 2016 to 2021 at under 15,000. This is not due to lack of demand as proxied by enrolment growth. Rather it is due to a tight fiscal environment. In large part, this has been driven by two factors: above inflation cost of living increases for public sector workers from at least 2007 and enrolment growth (Ewinyu et al., 2022; Spaull et al., 2020). The COVID-19 pandemic has resulted in an even weaker macroeconomic climate, further straining the capacity of the system.

Budget constraints have squeezed provincial departments, limiting the hiring of new staff and promotions within the existing system. In South Africa, although enrolment in public ordinary schools has increased by 7% between 2012 and 2021, the number of educators has remained roughly constant, resulting in a deterioration in the learner-educator (LE) ratio. LE ratios have already risen from about 27.4 in 2012 to about 29.8 in 2021, with about 2.5 more learners per educator in 2021 than in 2012 (DBE, 2022b). Wills (2023) shows that there is significant variation in the ratio of class sizes to LE ratios in the primary grades. The trends suggest that a worsening of the LE ratio by 1 would result in an average increase in class sizes of more than 1, which would be experienced very differently across schools. Whilst it is not clear that a decrease in class size necessarily improves learner performance (Köhler, 2022), larger class sizes and in particular, excessively large classes, create an environment which is less conducive to learning and negatively impacts teacher motivation.

In South Africa, teacher hiring and promotion decisions are made at the provincial level. The nine provinces all face highly differentiated situations with regard to the demographics of their educators and projected trends in demand for educators. The potential expenditure per learner is also different by province, in part because provinces are able to decide on what share of the National Treasury provincial allocation to allocate to Education through the Equitable Share Formula (Spaull et al., 2020).

This report takes as a starting point the national projected educator demand figures reported by Gustafsson (2022) and uses the associated Excel model to break down selected results at the provincial level to inform provincial policymakers about likely educator demand trends up to 2030.

# 2. Data and Model

## 2.1 Datasets

### a. PERSAL 10-year anonymised dataset

The underlying data that is used in the modelling comes from a matched, anonymised PERSAL dataset spanning 10 years from 2012 to 2021 and includes all publicly paid employees within the education sector in South Africa. It does not include teachers employed in private schools or those paid and appointed by School Governing Bodies within public schools (SGB teachers). In each of the years 2012 to 2021, the dataset is a snapshot of employment numbers (headcount) with demographic and personal characteristics and information about the expenditure on these employees. Each of these data downloads was completed in November, with the exception of 2014. In this year, the data was downloaded in October. Employees are identified across time using their PERSAL number, a unique identifier of each person in the dataset, which is consistent across time, even if a person leaves and re-joins the public service. The PERSAL numbers, pay point[3] numbers, and component numbers[4] in the dataset were anonymised, and very senior individuals that could potentially have been identified within this anonymised dataset were grouped and assigned the average salary of this group. A detailed overview of the dataset and explanation of the anonymisation process is provided by the Department of Basic Education (2022). In this report, we restrict the analysis to include educators only. Educators are employees of rank 60 000 to 69 999 within PERSAL, but with the following groups removed: ECD practitioners, examination revisers and in years prior to 2021, ABET teachers and TVET lecturers. ABET teachers and TVET lecturers are predominantly found as part

[3] The pay points educators are assigned to often correspond to the school where they teach. But pay points do not correspond to schools one-to-one. In some cases, there are multiple schools to one pay point, or a more complex allocation could be adopted. Districts and provinces also have separate pay points that are not related to a school.

[4] Components are the department or school or institutional type that the employee is appointed to. This includes classification by school type eg. Primary school, combined school or School for the Deaf; the components could also be in a province or district eg. sub-directorate, district office, area office, or circuit team; or to an institution linked to a school eg. Teacher training or Hostel

of the educator ranks in 2012 – 2014. After this period, they are no longer part of the dataset. To summarise the above, the educator headcounts in Table 2 below are comparable over time. Table 2 shows a breakdown of the total number of educators by year and by province.

*Table 2: Headcount of educators in PERSAL by province for 2012 to 2021*

| | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Province** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** |
| EC | 64 428 | 61 648 | 59 008 | 55 620 | 54 976 | 54 400 | 54 896 | 55 743 | 54 610 | 53 786 |
| FS | 25 861 | 25 567 | 24 823 | 22 751 | 22 494 | 22 094 | 22 314 | 22 249 | 22 242 | 22 438 |
| GP | 63 475 | 64 642 | 65 665 | 66 324 | 68 394 | 71 428 | 71 174 | 71 732 | 76 433 | 76 772 |
| KN | 94 511 | 94 486 | 94 372 | 91 234 | 92 685 | 92 319 | 90 790 | 91 634 | 92 373 | 89 900 |
| LP | 57 383 | 56 916 | 56 461 | 54 373 | 52 548 | 52 786 | 52 877 | 53 036 | 53 066 | 52 975 |
| MP | 34 179 | 33 931 | 33 744 | 33 827 | 33 711 | 34 121 | 34 442 | 34 868 | 34 965 | 35 123 |
| NC | 9 665 | 10 380 | 10 358 | 10 313 | 10 427 | 10 696 | 10 789 | 10 774 | 10 883 | 10 272 |
| NW | 27 926 | 28 293 | 28 046 | 25 987 | 26 473 | 26 940 | 26 444 | 27 451 | 27 892 | 28 400 |
| WC | 31 813 | 31 862 | 31 651 | 32 335 | 32 290 | 32 643 | 33 258 | 33 721 | 34 054 | 35 765 |
| **Total** | **409 241** | **407 725** | **404 128** | **392 764** | **393 998** | **397 427** | **396 984** | **401 208** | **406 518** | **405 431** |

*Source: Anonymised 10-year PERSAL dataset. Only educators are considered. ECD practitioners and examination reviewers, ABET teachers and TVET lecturers were removed.*

### b. Thembisa V4.5 dataset

The Thembisa project is run by a team at the University of Cape Town (UCT). They produce a mathematical model with the primary purpose of tracking the HIV epidemic in South Africa to be used in a policy setting for HIV prevention and treatment. The model uses the 2011 census as the primary dataset from which to estimate projections (Johnson & Dorrington, 2022). The model was created in 2014 to consolidate four previous HIV-related demographic models: the Actuarial Society of South Africa AIDS and Demographic model, the STI-HIV Interaction model, the UCT Paediatric HIV model, and the National Strategic Plan ART Need model and is updated annually (*Thembisa Project*, nd). One outcome of the modelling process is a set of fairly granular demographic projections by province, age and gender. The dataset is available for download on the Thembisa website on https://thembisa.org/downloads.

### c. DBE School Realities 2012 - 2021

The Department of Basic Education (DBE) publishes an annual School Realities report which provides an overview of the number of schools; and enrolment and educator numbers in public ordinary schools broken down by province, grade and gender. These reports from 2009 – 2022 are available on the DBE statistical publications website at https://www.education.gov.za/Programmes/EMIS/StatisticalPublications.aspx.

### d. National Treasury Budget Review and Estimates of Provincial Revenue and Expenditure (EPRE) Tables

The South African National Treasury releases their national and provincial budget speeches as well as the Medium Term Budget Policy Statements (MTBPS) on their website at https://www.treasury.gov.za/documents/provincial%20budget/default.aspx. The national Budget Reviews are released in February of each year along with summaries and supporting documents and tables. At the provincial level they make available the Provincial Budget Speeches; Appropriation Bills; Estimates of Provincial Revenue and Expenditure (EPRE). National Treasury then consolidate the EPRE tables into one Excel file which contains the information from all nine provinces. The EPRE Excel tables report expenditure over the three previous financial years, contain a revised estimate for the current financial year and present the budget baseline estimates for the next three years.

## 2.2 Teacher Supply-and-Demand Model

The Teacher Supply-and-Demand (TSD) model that is used throughout this report to calculate trends in the number of leavers (referred to as retirements and resignations in this report) is an Excel model that was created for a UNICEF project in 2012 and updated by Gustafsson (2022) as a part of the Teacher Demographic Dividend project in 2022. The version released in December 2022 is used for these provincial estimates, however the model is still being refined as a part of ongoing work on the project.

### a. Forecasting headcounts by age and notch

The key input into the TSD model is an educator headcount by age and notch value, disaggregated across teachers and senior educators. The base year for the national and provincial models is 2021. A description of the job titles of educators in the senior educator category is provided in Table 3. Teachers, HODs, deputy principals and principals are always school-based staff, whilst educators in the "Other" category tend to be education specialists and could be school- or office-based.

*Table 3: Classification of educators by rank in the model*

| **All educators** | |
|---|---|
| *(Rank 60 000 – 69 999; with ECD practitioners, examination reviewers, ABET teachers & TVET lecturers removed)* | |
| **Teachers** | **Senior educators** |
| • Teachers | • HODs<br>• Deputy principals<br>• Principals<br>• Other<br>  ○ Education Specialist (Office Based): Additional, Senior, Deputy-Chief, Chief<br>  ○ Education Therapist, Chief Education Therapist (School Based)<br>  ○ Education Psychometrist (School-Based and Office-Based)<br>  ○ Education Psychologist (School-Based and Office-Based)<br>  ○ Senior Education Psychologist (Office-Based) |

The model also takes in detailed inputs by age and notch values.

By age: One-year joiner and attrition rates and benefits as a percentage of basic salary.

By notch value: Probability of being promoted and the percentage bonus resulting from the promotion.

The model forecasts by repeatedly implementing a four-step process every year, explained in detail in Figure 1 of *Projections of Educators by Age and Average Cost to 2070* (Gustafsson, 2022).

1. Attrition – estimate the number of educators that will be retiring and resigning
2. Promotion – calculate the probability of being promoted from a teacher to a senior educator or being promoted as a senior educator as well as the likely increase in notch value as a result of the promotion
3. Progression – Implement the automatic notch progression of 1.5%
4. Joining – Fill an open position with new entry-level teachers

The base year of both the national and provincial models is 2021. For each province, the headcounts of educators by teacher indicator[5], age and notch are entered into the model to create province-specific TSD models. In the standard cases, we assume no growth in educator numbers (constant educators). Similarly, the split of teachers versus senior educators remains at its 2021 level in the provincial models. Both of these assumptions are relaxed for selected provinces in Sections 3.5 and 3.6, where it is assumed that educator numbers increase in Gauteng and the Western Cape in response to projected enrolment growth; whilst educator numbers decrease in the Eastern Cape due to an expected population decline; and rank levels are adjusted for Limpopo.

[5] This indicator splits the sample into teachers and senior educators as defined in Table 3.

All of the detailed inputs by age and notch, with the exception of attrition rates, are set to the national levels for each province. The attrition rates used in the provincial models are province-specific. Further detail is provided in Section 2.2c.

### b. Forecasting unit costs

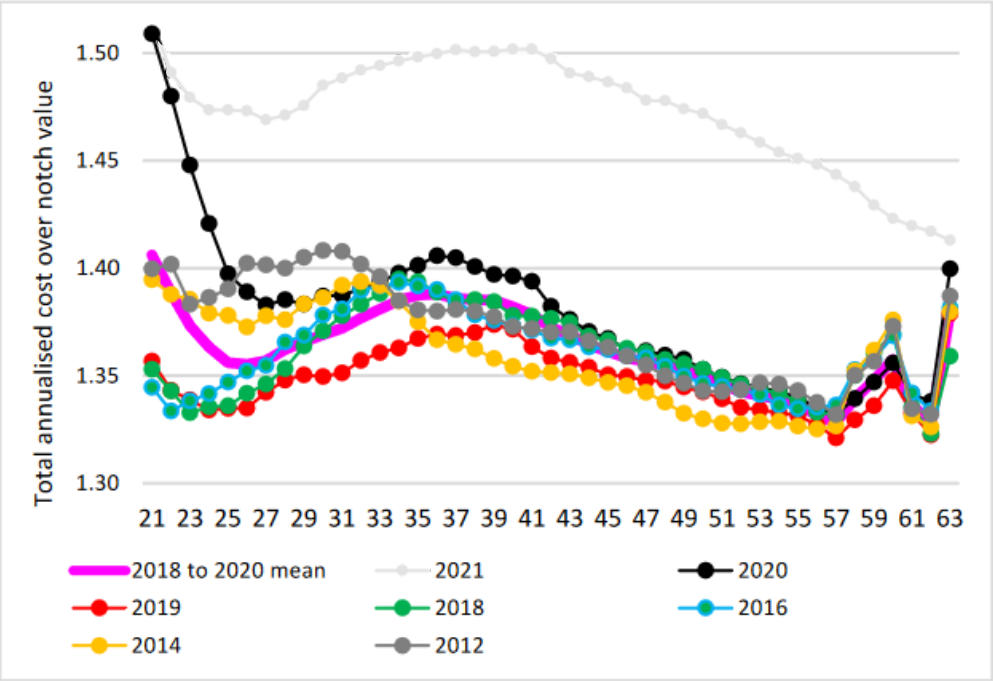
All of the estimations of unit costs use real 2021 rands. A strong assumption is made that the cost-of-living increases would be equal to, but not exceed consumer price inflation for the years 2022 – 2030. Educators in the model start at their 2021 notch values and these notch values are used to calculate their total compensation for the year. Educators are moved to a higher notch, with a value that is about 1.5% greater on an annual basis (notch progression). Educators may also move to a higher notch as the result of a promotion. The notch values are a reflection of basic salary only, so any benefits or additional payments received are not included in the notch values.

The "benefits" used in the model include any payments made to educators that are not their basic salary. This includes traditional benefits such as pension contributions, medical aid and housing allowances, but also any other payments for any reason including back-payment or additional work done for the Department. To calculate the final educator annualised cost, the notch values are scaled up using average ratio of notch value to the total annualised costs of educators by single age for the period 2018 – 2020. The pink line in Figure 1 is an average of this ratio over this period. The ratio of total expenditure to notch value by age remained relatively similar between 2018 and 2020 especially for older age groups, if the 2021 expenditure data is excluded

The values in 2021 could not be used, because in November of 2021, the month in which the PERSAL dataset was downloaded, a special backdated non-pensionable cash allowance was paid to educators to compensate them for the lack of cost-of-living adjustments in the previous year (PSCBC, 2021).

Figure 1 shows that there is an initial increase in the total cost over notch value with age. Some benefits, such as pension are available immediately, whilst access to housing and medical benefits grows more gradually with age (up to about 40 years of age). These benefits are not immediately available to all staff, particularly those on temporary contracts, and younger educators are more likely to be on temporary contracts. Then from about age 35, there is a slight decline in total annualised cost over notch value. This indicates that benefits make up a smaller proportion of total compensation as educators age. One reason for this decline is that some benefits increase proportionally to increases in salary, whilst others- for example medical aid and the housing allowance- do not increase at the same rate as salary increases. The figure also shows how the 2021 ratios are an outlier, due to the special backdated non-pensionable cash allowance paid in November 2021.

*Figure 1: Total cost and notch by single age*



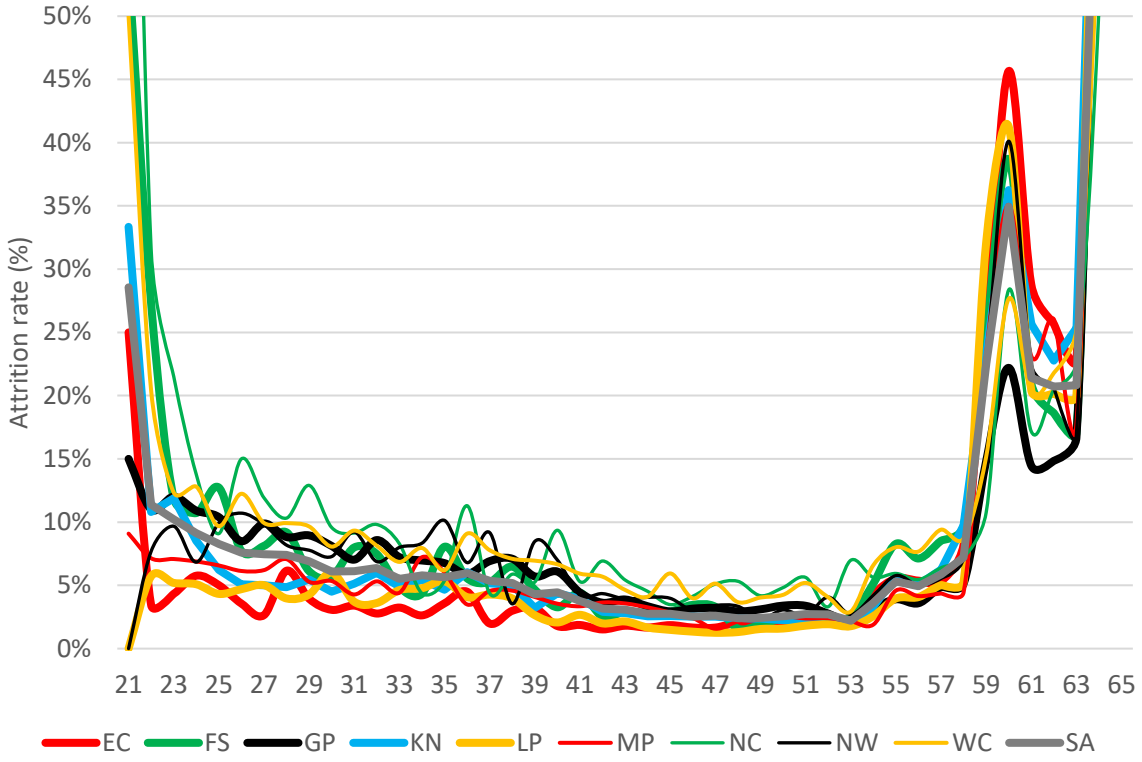

*Source: Figure 27 from the report Projections of Educators by Age and Average Cost to 2070 by Gustafsson (2022)*

### c. Provincial attrition rates by age

The attrition rates used in the national forecasts by Gustafsson in his 2022 report were the attrition rates by age between the years 2018 and 2019. The attrition rates by age are significantly different between provinces as shown in Figure 2. This variability in resignation and retirement (attrition) rates is particularly pronounced for younger educators, below the age of 40, and above the age of 55. For younger educators (particularly those below the age of 40), the Western Cape, the Northern Cape, Gauteng and the North West have the highest resignations rates. In contrast, very few younger educators resign in the Eastern Cape, Limpopo and Mpumalanga. This trend reverses around retirement, where educators in the more rural provinces (Limpopo and the Eastern Cape) retire earlier at higher rates, whilst retirement rates in Gauteng, the Western Cape and the Northern Cape are lower at around 60 years of age.

When looking at provincial resignation and retirement (attrition) rates, there is considerable year-specific variation in attrition rates, due to the smaller sample size when only a single province is considered (also Figure 35). Therefore, the mean of the age specific attrition in years 2017 to 2018 and 2018 to 2019 is used for the estimations in the provincial models A more detailed explanation of the approach is provided in Section 7.1 in the Appendix.

*Figure 2: Attrition rates by age and province from 2018 to 2019*




*Source: Anonymised PERSAL data from 2017-2019, only educators are considered. ECD practitioners, TVET lecturers and ABET teachers were removed.*

### d. Early and late retirements by province

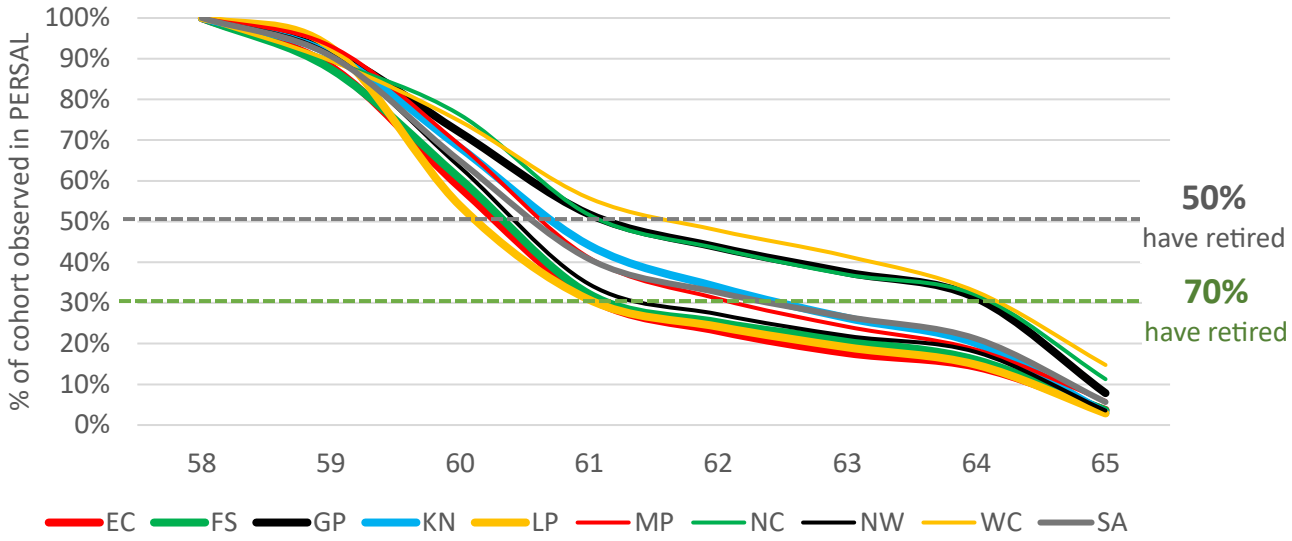
There are differences observed in the attrition rates by age for older educators that leave the profession. Specifically, at one of the standard retirement ages, sixty, there is a large difference in the proportion of educators that retire in the more rural provinces (Limpopo and the Eastern Cape) in comparison to Gauteng and the Western Cape, where it is usual for educators to retire a bit later.

A cohort of 58-year-olds for the years 2012, 2013 and 2014 were tracked through to retirement to investigate these trends. All educators that were 58 in either 2012, 2013 or 2014 in one of these years were identified and assigned to these cohorts. It was then observed at which age they no longer appeared in the dataset.

It is clear from Figure 3 that in Limpopo, the Eastern Cape, the Free State and North West about half of 58-year-old educators have retired by age 60, and about 70% are retired by age 61. There is a clear tendency toward retiring earlier in these provinces. On the other end of the spectrum are the Western Cape, Gauteng and the Northern Cape, where it is only by about 61 to 62 years of age that half of the group has retired. About 30% of educators in this group only retire at age 65 (the maximum age allowed). It is worth noting that these retirement figures include retirements that are not by choice but rather due to reasons such as ill health or death, so differences in average life

expectancy between provinces may influence these trends. The COVID-19 pandemic may have resulted in a slight increase in retirement at age 64 for the last cohort, but the impact is minimal.

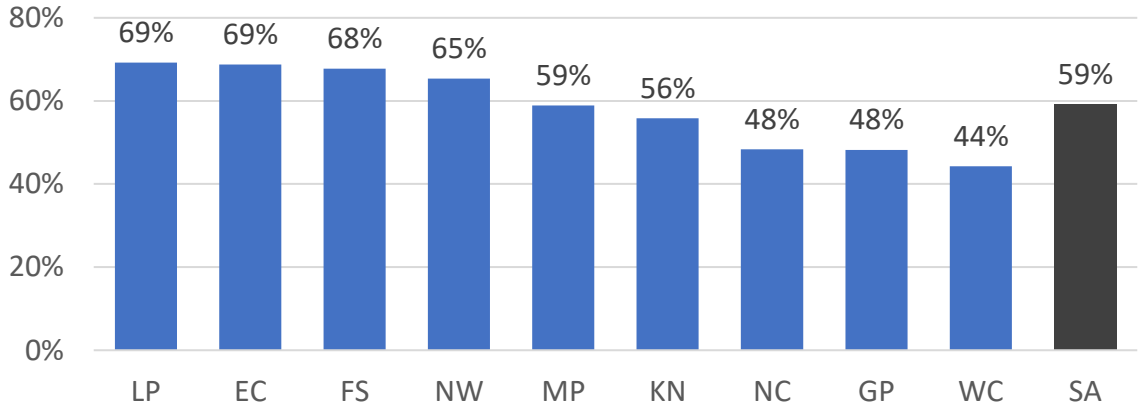
*Figure 3: Proportion of educators from the 2012 – 2014 58-year-old cohorts that are still in PERSAL*




*Source: Own calculations, using the anonymised 10-year PERSAL dataset, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers have been removed.*

*Note: Included all educators in the analysis that were in the dataset at age 58 in the years 2012 - 2014*

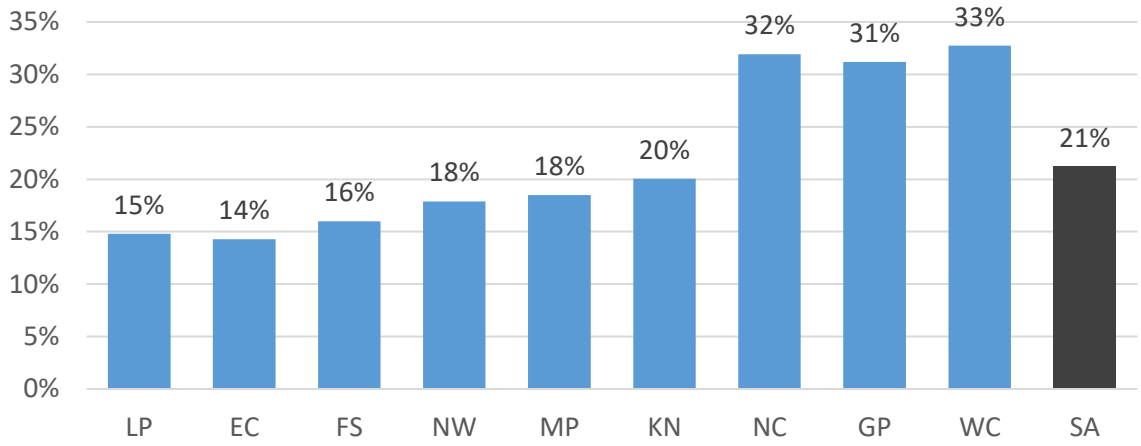
*Figure 4: Proportion of 58-year-old educators from 2012-2014 cohorts that retire by 60*




*Source: Own calculations, using the anonymised 10-year PERSAL dataset, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers have been removed.*

*Note: Included all educators in the analysis that were in the dataset at age 58 in the years 2012 – 2014. Educators were said to have "retired by 60" if they left PERSAL before the year in which they would be 61 years of age.*

*Figure 5: Proportion of 58-year-old educators from 2012-2014 cohorts that only retire at 65*

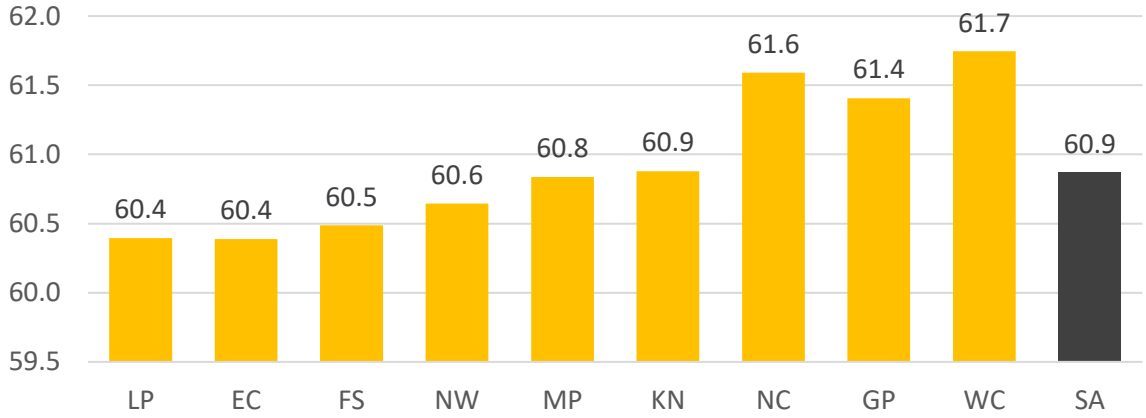



*Source: Own calculations, using the anonymised 10-year PERSAL dataset, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers have been removed.*

*Note: Included all educators in the analysis that were in the dataset at age 58 in the years 2012 - 2014Educators were said to "only retired at 65" if they were still in PERSAL in the year in which they were 64 years of age.*

The average ages at which educators from the three cohorts retire follow logically, with the highest average age of retirement in the Northern Cape, Gauteng and the Western Cape and the lowest average age of retirement in Limpopo, the Eastern Cape and the Free State, with the average educators in the more urbanised provinces (WC and GP) retiring about one and a quarter years later than those in the more rural provinces (LP and EC).

*Figure 6: Mean age at which educators from 2012-2014 cohorts leave due to age*




*Source: Own calculations, using the anonymised 10-year PERSAL dataset, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers have been removed.*

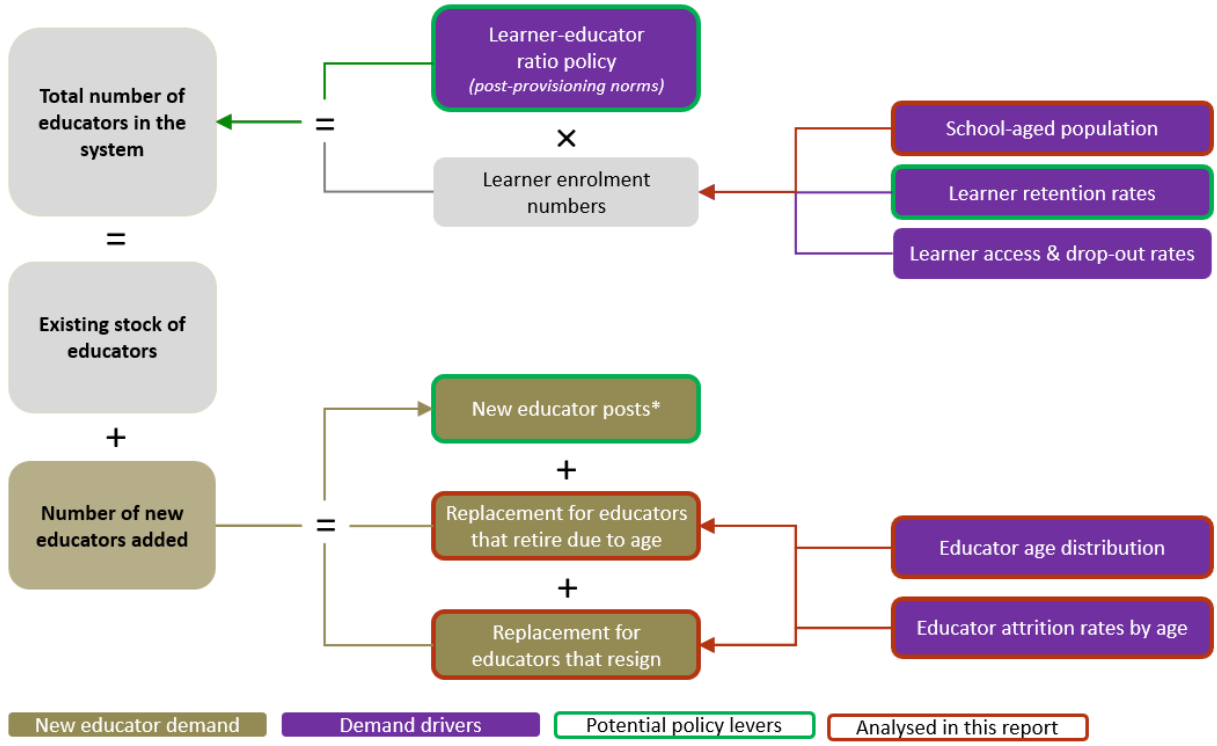
*Note: Included all educators in the analysis that were in the dataset at age 58 in the years 2012 - 2014. Age of retirement is set as the age of the educator in the last year in which they were observed in the PERSAL dataset.*

# 3. Educator demand

## 3.1 Educator demand framework

We adopt with slight modifications the framework proposed by Evans & Mendez Acosta (2023), who outline the drivers of overall teacher demand as they look at teacher demand in Africa. The adjusted framework is shown in Figure 7.

*Figure 7: Educator demand framework*




**The number of new posts can be negative if enrolment is declining*

In a system that is perfectly responsive to demand for schooling, the total number of educators that are needed is determined by the number of learners enrolled in the schooling system and the desired learner-educator ratio. This total number of educators needed in the system would be obtained by employing new teachers in addition to the existing stock of educators that are already employed to reach the desired total number of educators for the education system.

The number of new educators needed is equal to the number of educators that have left, either resigned or retired, that would need to be replaced and new posts due to growth that need to be filled. If enrolment is in decline, then the number of new posts could be negative.

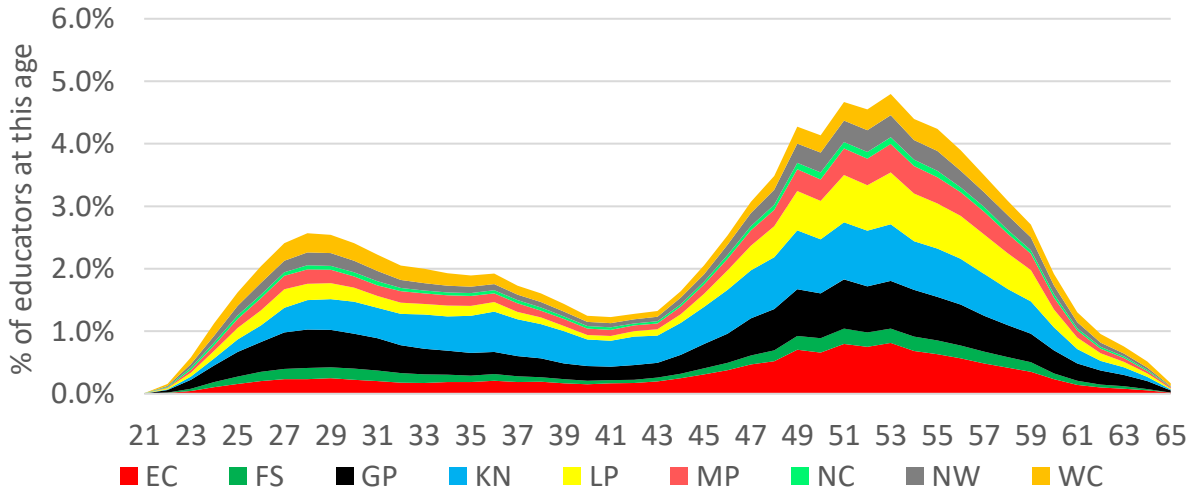
Section 0 looks only at the trends and drivers that are outlined in red. The focus is first on determining the projected number of educators that need to be replaced; this is in part determined by overall attrition rates by year as well as the age distribution of educators, as older educators are required to retire by age 65. The report also looks at the growth in school-aged population and its historical relationship to growth in enrolment. However, a number of demand drivers are not explored, in particular retention policy, access and drop-out rates which all affect enrolment numbers. Whilst lower access or higher dropout rates would reduce enrolment, higher levels of grade repetition increase total enrolment, as outlined by Van der Berg et al. (2019).

The framework describes a somewhat idealised scenario. Historically, the learner-educator ratio has been an outcome of learner enrolment and provincial level hiring decisions which determine total educator numbers in each province. Learner-educator ratios are used as inputs to the post-provisioning norms but mainly as a way to weight the allocation of teachers to grades or subjects. The availability of budget is the main driver that determines the overall number of posts. The achievement of a particular learner-educator ratio is not generally discussed as an explicit policy goal that is used to inform budget and hiring decisions.

## 3.2 Age distributions of educators

The age distributions of educators in 2021 had two clear modes as shown in Figure 8, a smaller mode for young educators with a peak in their late 20s and a large mode for older educators, with a peak for educators at age 53. Given this overall age distribution, with a high proportion of educators aged 50 and above (47%) and about 23% aged 55 and above, we can expect consistently higher rates of attrition at a national level than what we have experienced in the last two decades.

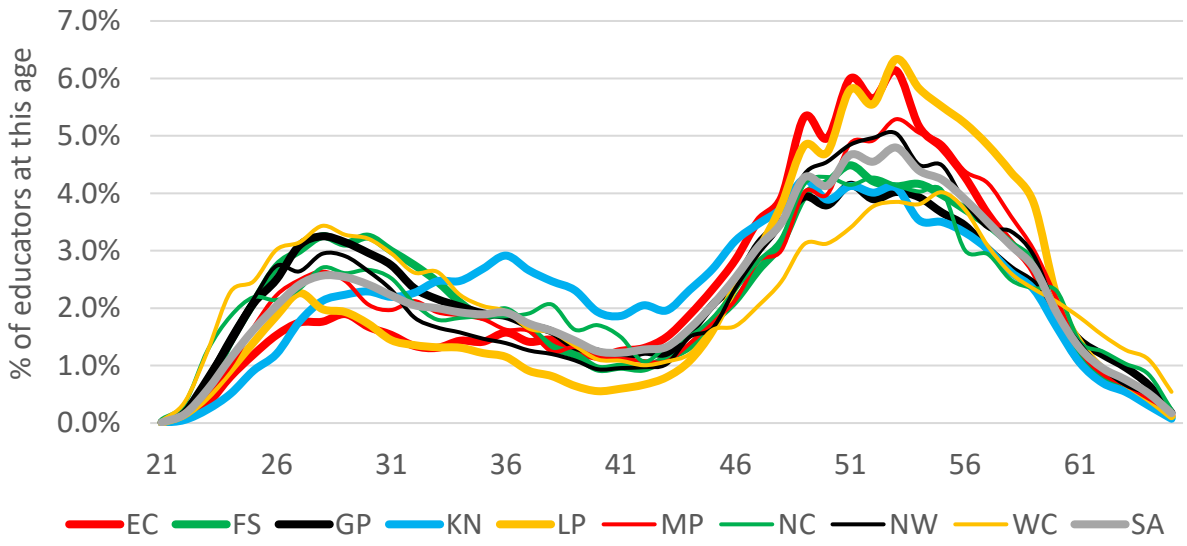
*Figure 8: Educator age distribution weighted by province in 2021*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination revisers were removed.*

There is some differentiation in the age distributions by province as shown in Figure 9. Both Limpopo and the Eastern Cape have a higher concentration of older educators relative to the rest of the country. The Western Cape has the lowest peak of older educators, but the higher concentration of younger educators, suggesting that the Western Cape had slightly high levels of older educators and they are already in the middle of their age-related retirement wave. Kwa-Zulu Natal also has a slightly lower peak of older educators; however, their distribution is flatter overall, and they have a peak at age 36 with a higher proportion of educators in the age range of about 34-38 than observed in other provinces. These differences suggest that the provinces that will likely be most affected by the upcoming age-related retirements are Limpopo and the Eastern Cape, followed by Mpumalanga and the North West.

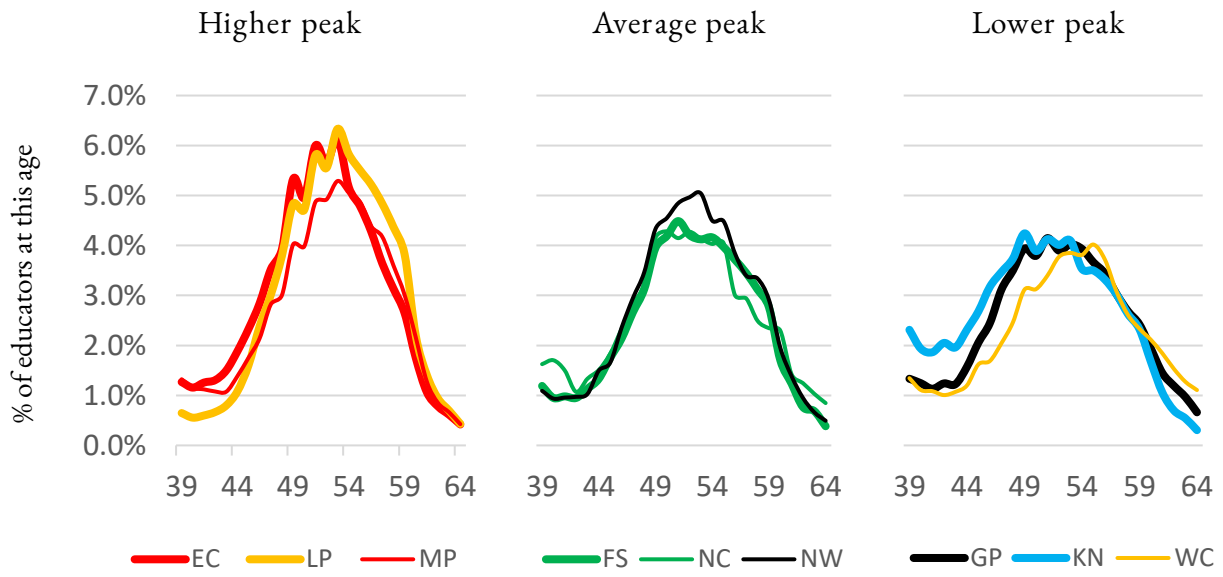
*Figure 9: Educator age distribution by province in 2021*




*Source: Anonymised PERSAL data from 2021 looking at only educators, ECD practitioners and examination reviewers ABET teachers and TVET lecturers removed.*

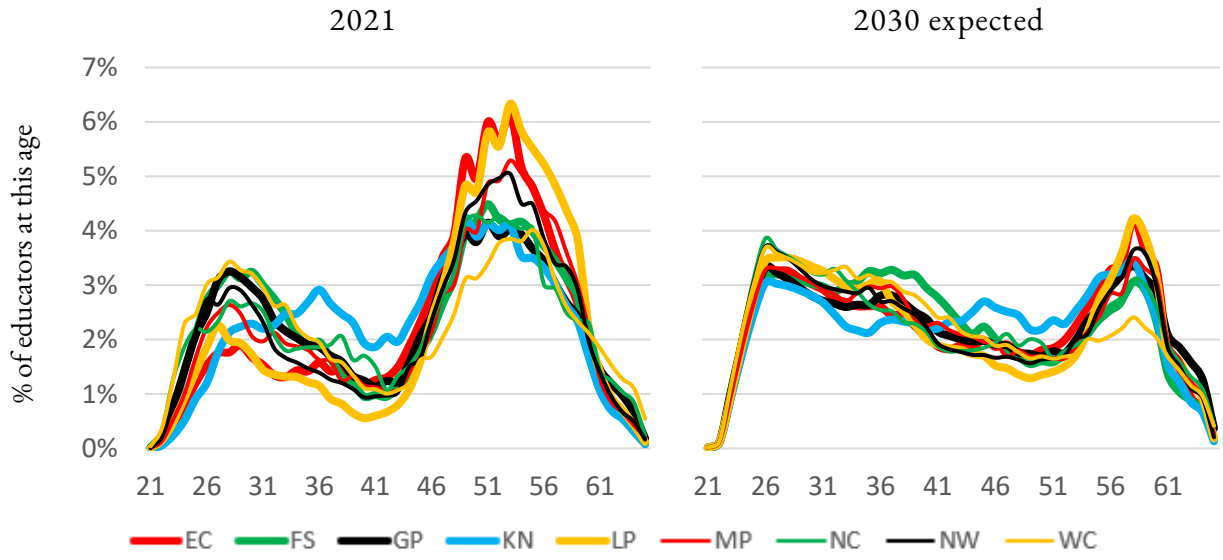
Under the assumption of constant educator numbers by province, the expected changes in the age distributions by province are shown in Figure 11. The age distribution for all provinces is expected to be far flatter in 2030, with almost no single age in any province making up more than a 4% share of the total educator population

*Figure 10: Educator age distribution from age 40 showing differences by province for older educators*




*Source: Anonymised PERSAL data from 2021 looking at only educators, ECD practitioners and examination reviewers ABET teachers and TVET lecturers removed.*

*Figure 11: Educator age distribution by province in 2021 and expected distribution in 2030*




*Source: Anonymised PERSAL data from 2021 looking at only educators, ECD practitioners and examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2035 derived from the National and provincial models – assumption of no growth in educator numbers.*

## 3.3 Historical and expected trends in resignations and retirements

The age distribution of educators in 2021 makes it clear that the number of educators leaving the system will increase as retirements due to age increase. In order to pick up the change in educator numbers, we compare the educators that are in the PERSAL dataset with those in the dataset in the following year.

Resignations and retirements: All educators that are in PERSAL in November of one year, but do not appear in the dataset in the following year in that province are classified either as a resignation or a retirement. An educator is classified as having resigned if they are 55-years-old or younger and are then no longer picked up in PERSAL a year later (i.e. they are no longer a publicly paid educator in that province). This includes anyone who officially resigned, was on a temporary contract and the contract was not renewed, if they moved to another province, is on unpaid leave, if the person was dismissed or any other reason. An educator on maternity leave, for example, would still be in PERSAL and would not be either a resignation or retirement. An educator is classified as having retired if they are 56-year-old or older and do not appear in the PERSAL dataset in the following year. This includes all retirees, anyone who needed to step down due to illness or death, educators who moved to another province or any standard resignations.

First, we look at the expected number of resignations and retirements between 2021 and 2030 and the likely band of uncertainty around these forecasts. To establish a likely range of the possible number of educators leaving PERSAL within each year, the nine historical attrition rates by age within each province between 2012 and 2021 are used. In some years, attrition rates are higher than others. When trying to decide which past attrition rates to use for future trends, we take a range of past attrition rates to predict a band of future attrition rates. The attrition rates at the 25$^{th}$ and 75$^{th}$ percentile, over the period, are then calculated and the value at the 25$^{th}$ percentile for each age is used to generate the lower bound scenario, whilst the 75$^{th}$ percentile values are used to generate the upper bound scenario (see Appendix for further detail).

### a. Expected trends in overall resignations and retirements (2022 – 2035)

Figure 12 shows the total number of expected retirements and resignations from 2022 to 2035 by province, assuming that the total number of educators remains constant at the 2021 numbers. A likely range of leavers in any given year is presented, with the grey band indicating this range by province. This range is calculated by looking at the 25$^{th}$ and 75$^{th}$ percentile of historical attritions rates by age between 2012 and 2021 (see Appendix Section 7.1b for more detail).

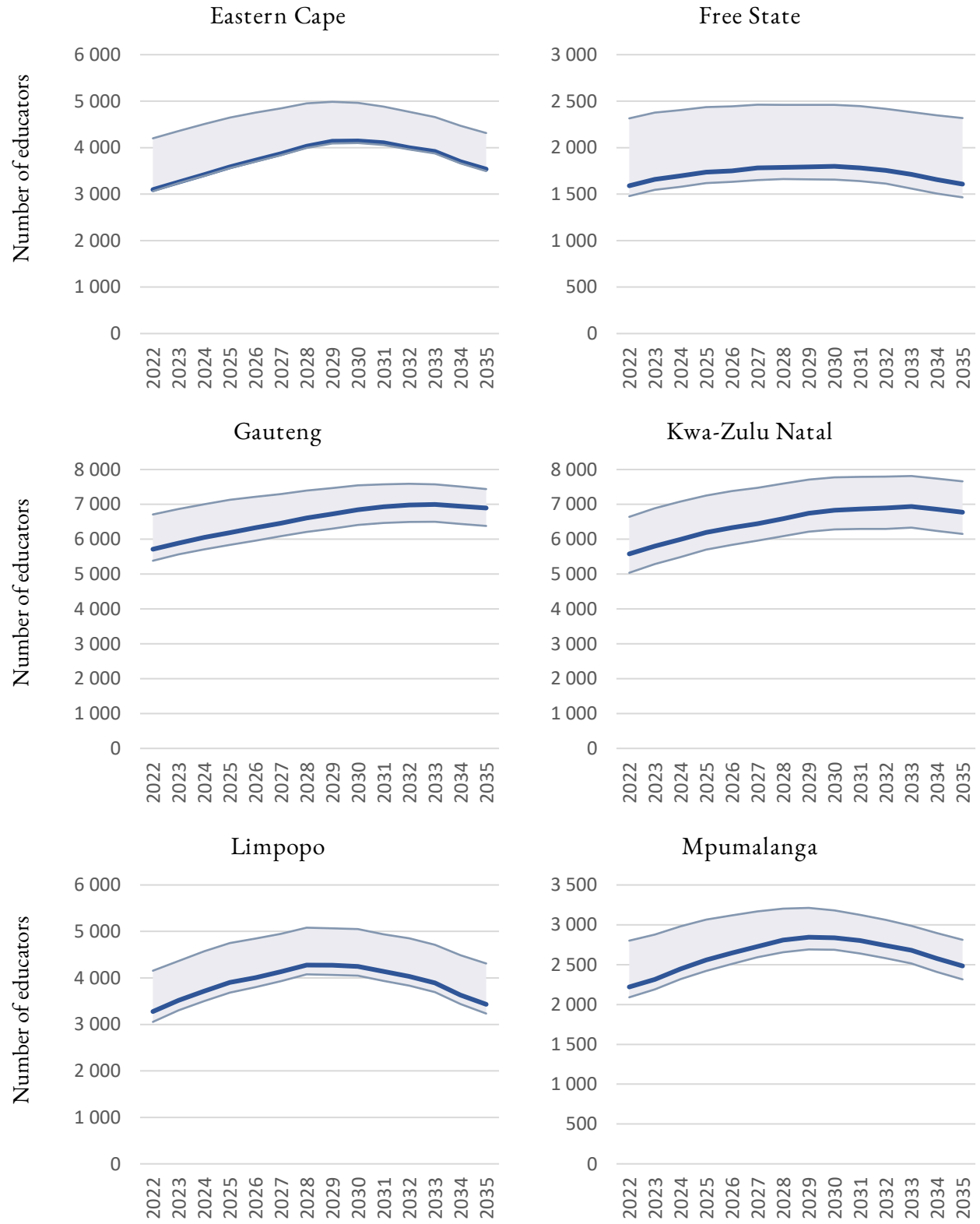
The dark blue line represents the average number of educators expected to exit PERSAL in any year. The blue line is generated using each province's attrition rates observed from 2017 to 2018 and 2018 to 2019. In most provinces, this attrition rate by age is low compared to historical levels; one possible reason may be that educators- particularly younger educators- historically have faced better economic prospects outside of the schooling sector and therefore were more easily able to switch to a different profession than is currently the case. Moreover, under COVID, the

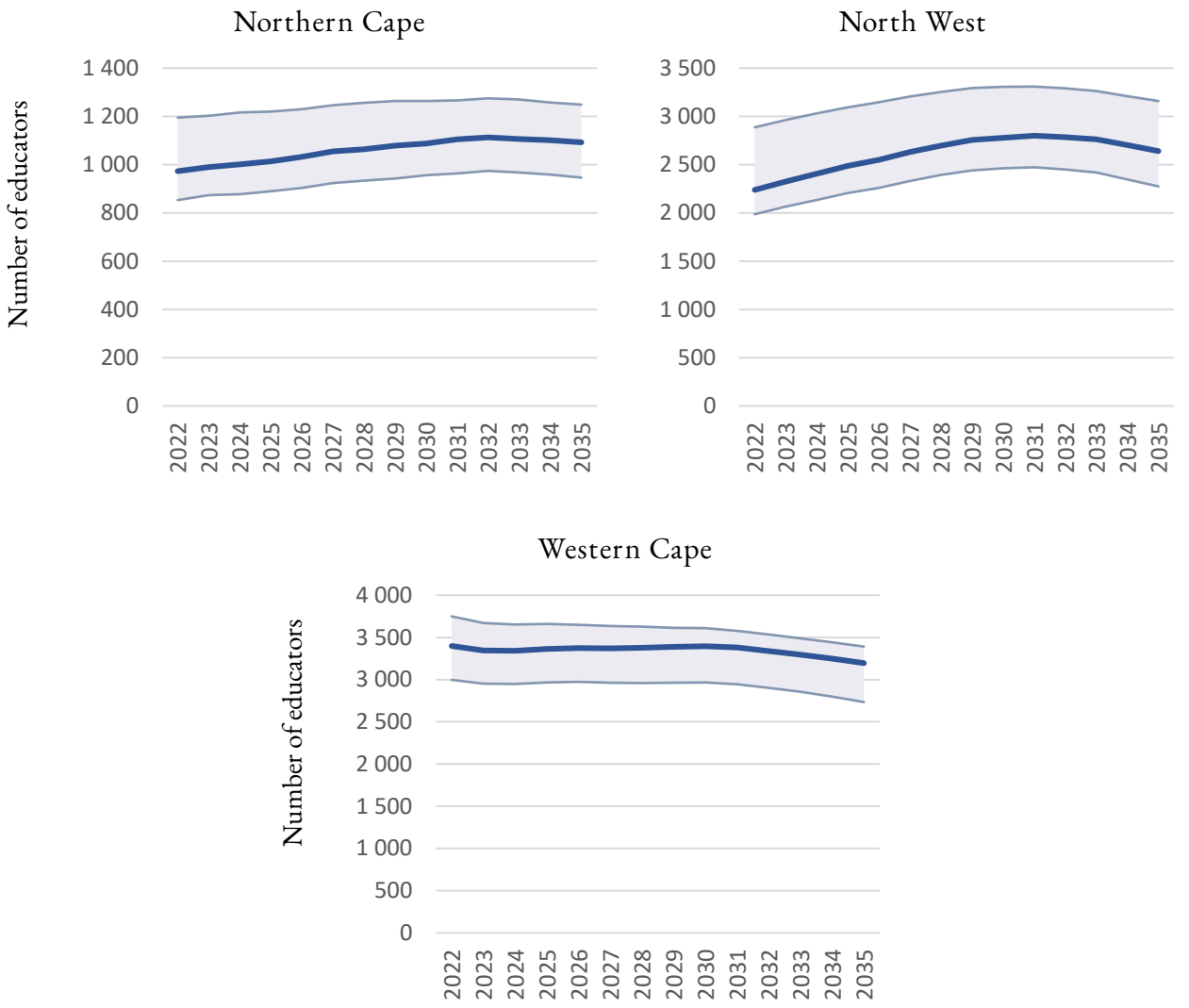
attrition rate for educators under 55 dropped, perhaps as people were less willing to take risks with regard to employment during such uncertain times.

All estimates in the remainder of the report will use the average (the dark blue line in the figure) which is the mean attrition rate from 2017 to 2018 and 2018 to 2019. However, it is necessary to remember that all numbers represent only the "most likely" estimate. If attrition rates were to revert to higher levels, such as in 2012 to 2014, the number of resignations and retirements would increase.

Figure 13 splits the expected number of resignations and retirements into three age groups: 21-30 year olds; 31-55 year olds; and 56 and above. It is evident, that the Western Cape and Northern Cape, two of the provinces that are slightly less affected by retirement, are likely to face the highest levels of resignations and retirements overall. The number of resignations in Gauteng and the North West may also increase mainly driven by younger educators (21-30 year olds) resigning as the proportion of younger educators increases. However, the rates at which younger leaver return to the public sector within a few years is also much higher, so not all of these educators are a permanent loss to the system, unlike with retirements.

*Figure 12: Expected number of retirements and resignations by province from 2022 - 2035*

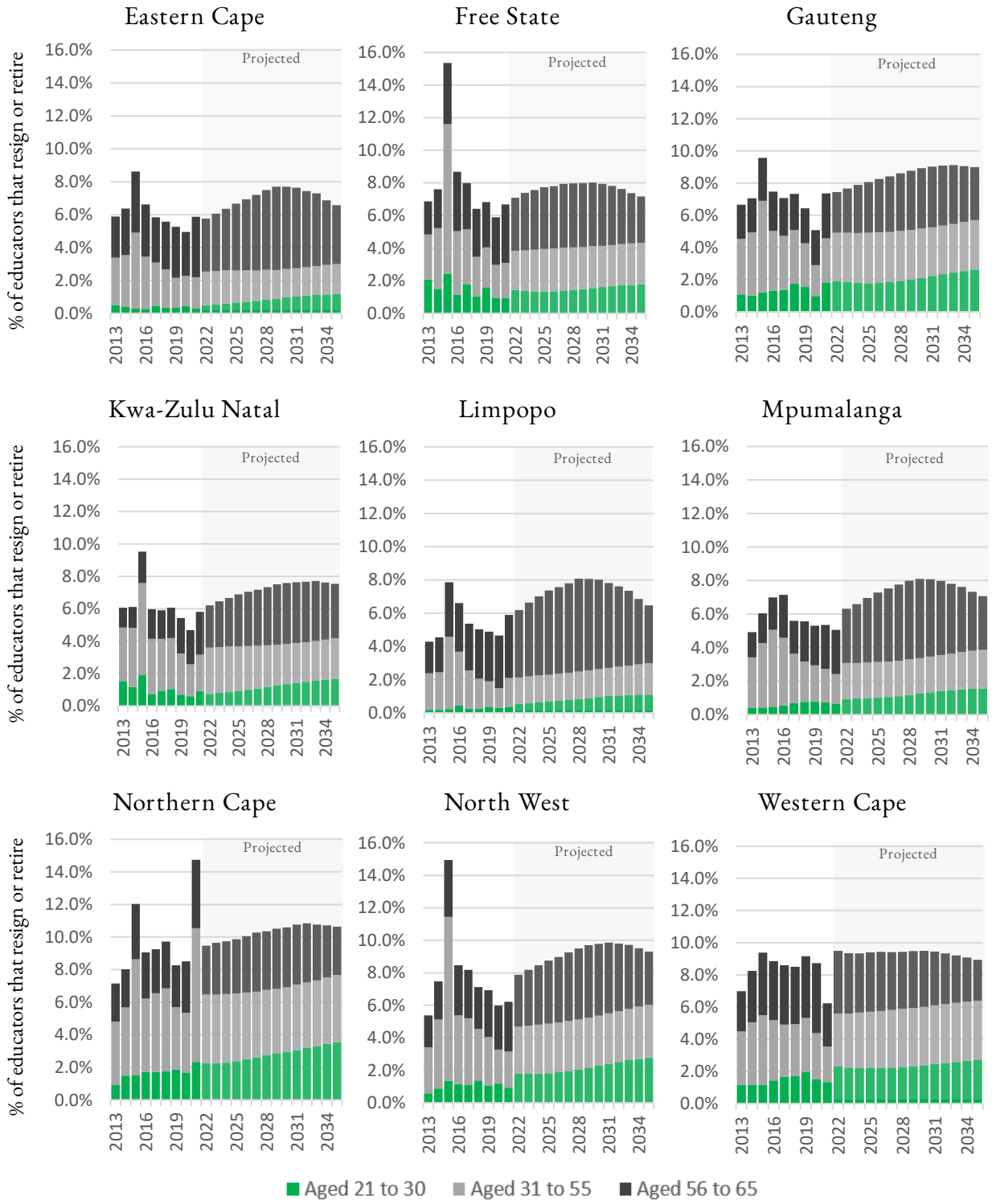





*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2035 derived from the national and provincial TSD models – assumption of no growth in educator numbers for all provinces. Average number of educators calculated using mean attritions rates of 2017 to 2018 and 2018 to 2019. Upper and lower limits are calculated using the 75$^{th}$ and 25$^{th}$ percentile one-year attrition rate by age from 2012 to 2021.*

*Note: Year for each point is the year in which the educator is no longer in the system. Age is the age in the previous year.*

*Figure 13: Proportion of estimated resignations and retirements by age group for each province*



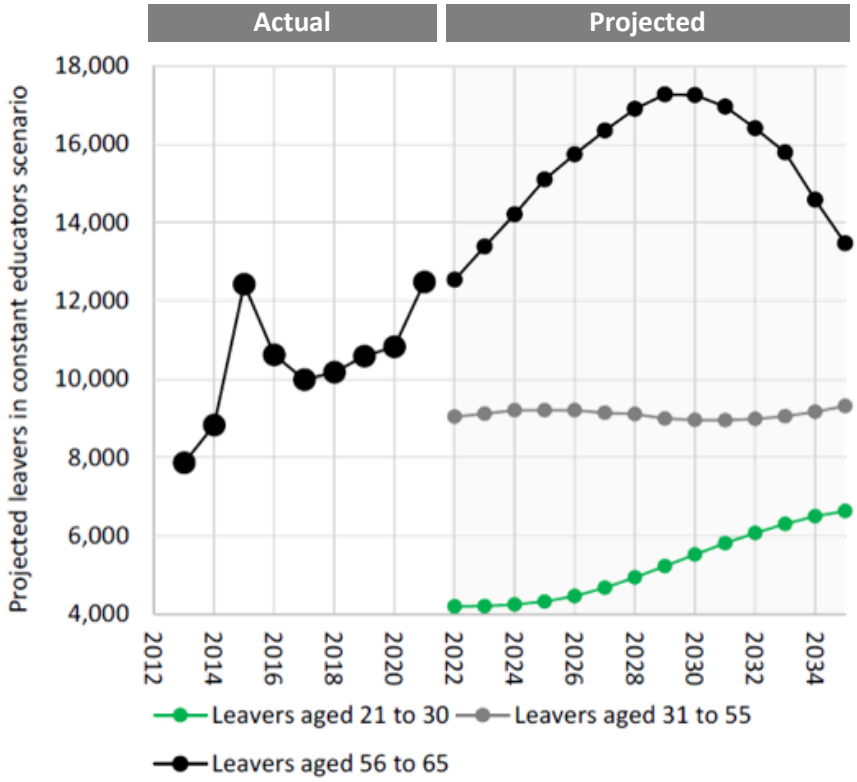

*Source: Anonymised PERSAL data from 2021, educators only with ECD practitioners and examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2035 derived from the national and provincial TSD models – assumption of no growth in educator numbers for all provinces.*

*Note: Year for each point is the year in which the educator is no longer in the system. Age is age in the previous year.*

### b. Trends in retirement for older educators (56- 65)

Educators in South Africa can retire from age 55 but are required to retire at 65 years of age. Thus, every educator that is 50 years or older at any given point will need to retire or resign (for any reason) within the next 15 years. Given the high average age of educators and the age distributions with a peak at 53 years of age in 2021, the number of retirements (leavers age 56 and above) is set to increase over the coming years. The expected increase in retirements and resignations at the national level is shown in Figure 14 below.

*Figure 14: Retirements and resignations by age category in 'Constant educators' scenario*




*Source: Figure 11 from Note from the report Projections of Educators by Age and Average Cost to 2070 by Gustafsson (2022)*

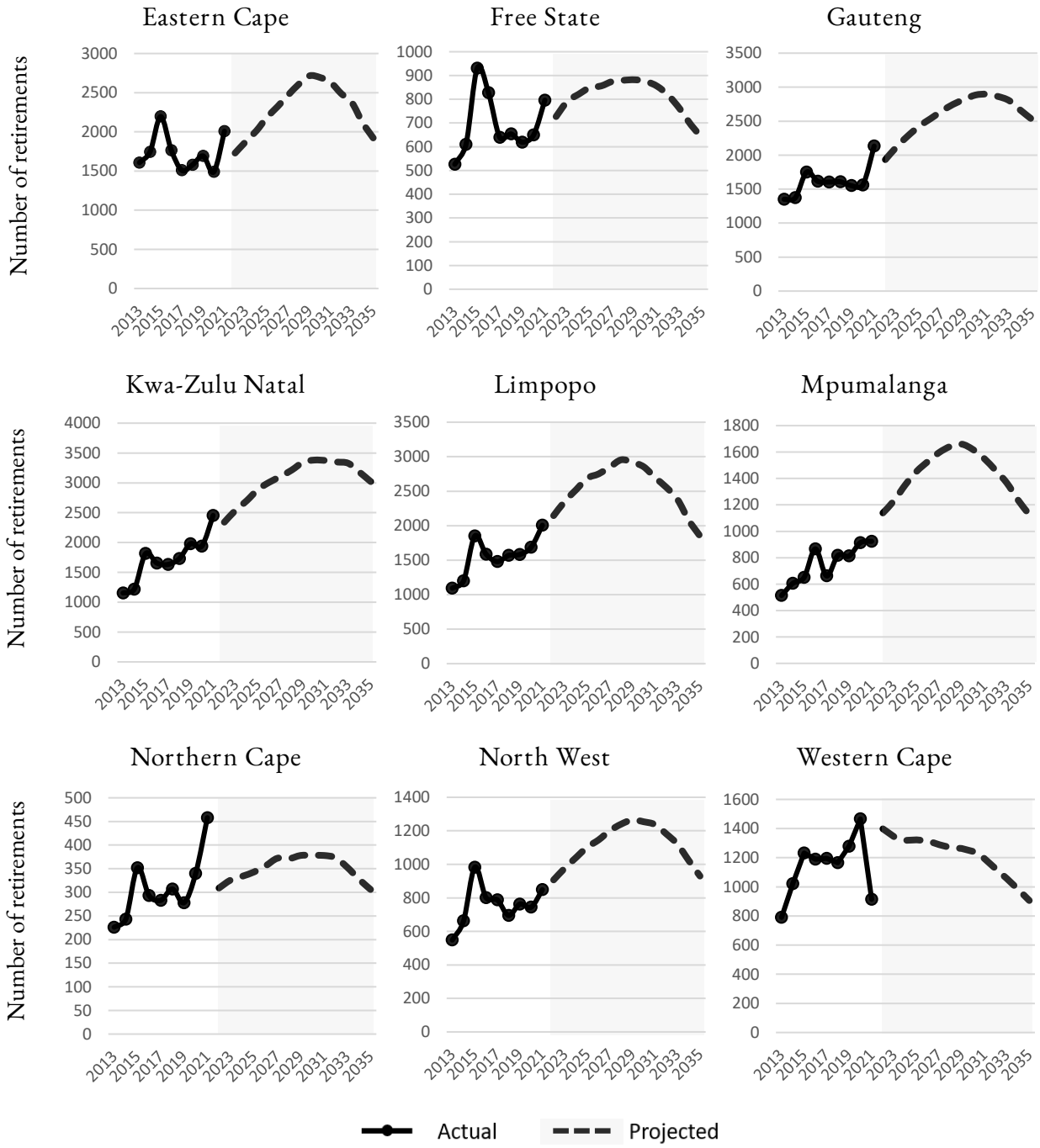
*Note: Year for each point is the year in which the educator is no longer in the system. Age is the age in the previous year.*

The estimated number of retiring educators rose steadily from 2012 to 2021 (actual historical data), and is then projected to keep increasing to an anticipated peak in about 2029 and decrease thereafter. The sharp increase in the number of educators leaving between 2014 and 2015 was due to rumours that a proposed pension reform would no longer allow the option of a lump sum pay-out (Masombuka, 2015). Moreover, between 2020 and 2021, there was a slight increase in the number of educators that chose to retire earlier, fell ill or died as a result of COVID-19 (Gustafsson, 2022).

Breaking this down by province in Figure 15, we find different trends in the various provinces, with the retirement numbers in the Western Cape already at their peak, most other provinces peaking at around 2028 – 2030, and

Kwa-Zulu Natal, Gauteng and the Northern Cape peaking slightly later in about 2030 – 2032. The overall national picture remains relatively similar across provinces, differing mainly in the size of the increase and the overall proportion of the affected workforce.

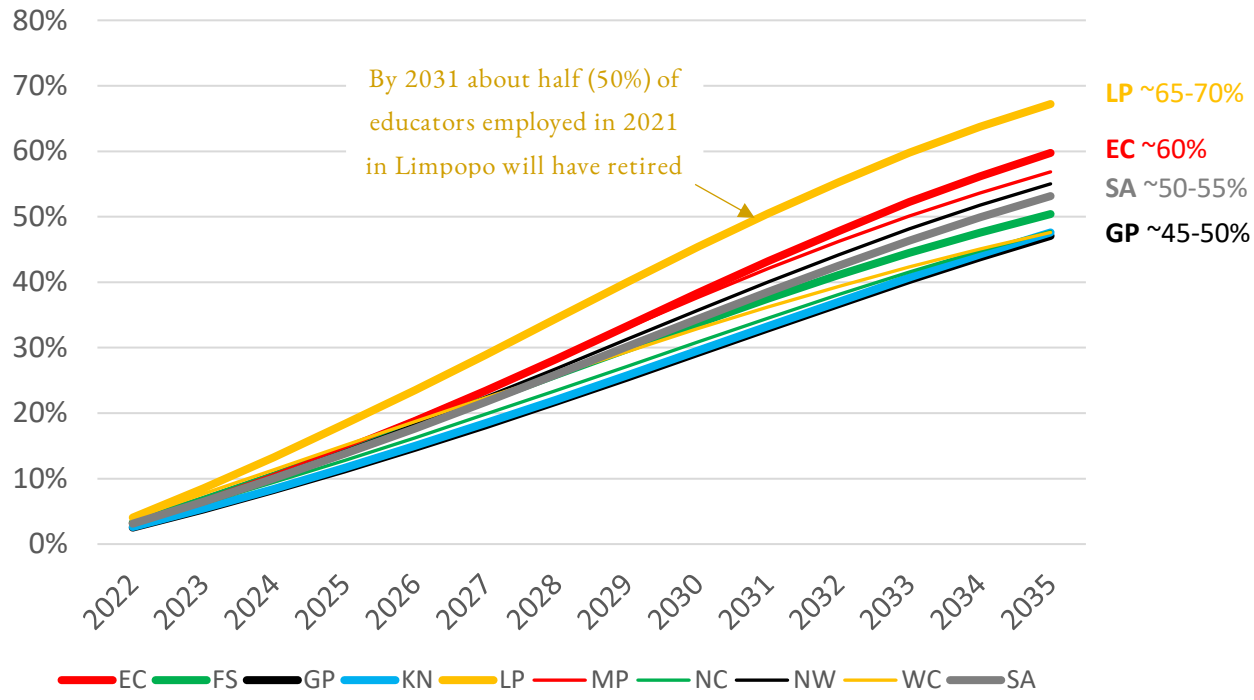
*Figure 15: Actual and projected retirements of educators by province for 2022 - 2035*




*Source: Ten-year anonymised PERSAL data looking at educators only, ECD practitioners and examination reviewers, TVET lecturers and ABET teachers removed. Estimates to 2035 derived from the national and provincial TSD models – assumption of no growth in educator numbers for all provinces.*
*Note: Year for each point is the year in which the educator is no longer in the system. Age is the age in the previous year.*

In Figure 16 we see the cumulative proportion of retirees relative to the total educator workforce in 2021 by province. Over the period 2021 to 2035, we expect about 53% of the workforce employed in 2021 to retire. In Limpopo, where the concentration of older educators is also highest, about two-thirds of educators, that were employed in 2021 are expected to retire by 2035, followed by the Eastern Cape, where about 60% of the 2021 workforce is expected to retire.

*Figure 16: Cumulative proportion of estimated retirements (educators aged 56-65) in the period 2021 to 2035 as a proportion of total educators in 2022*

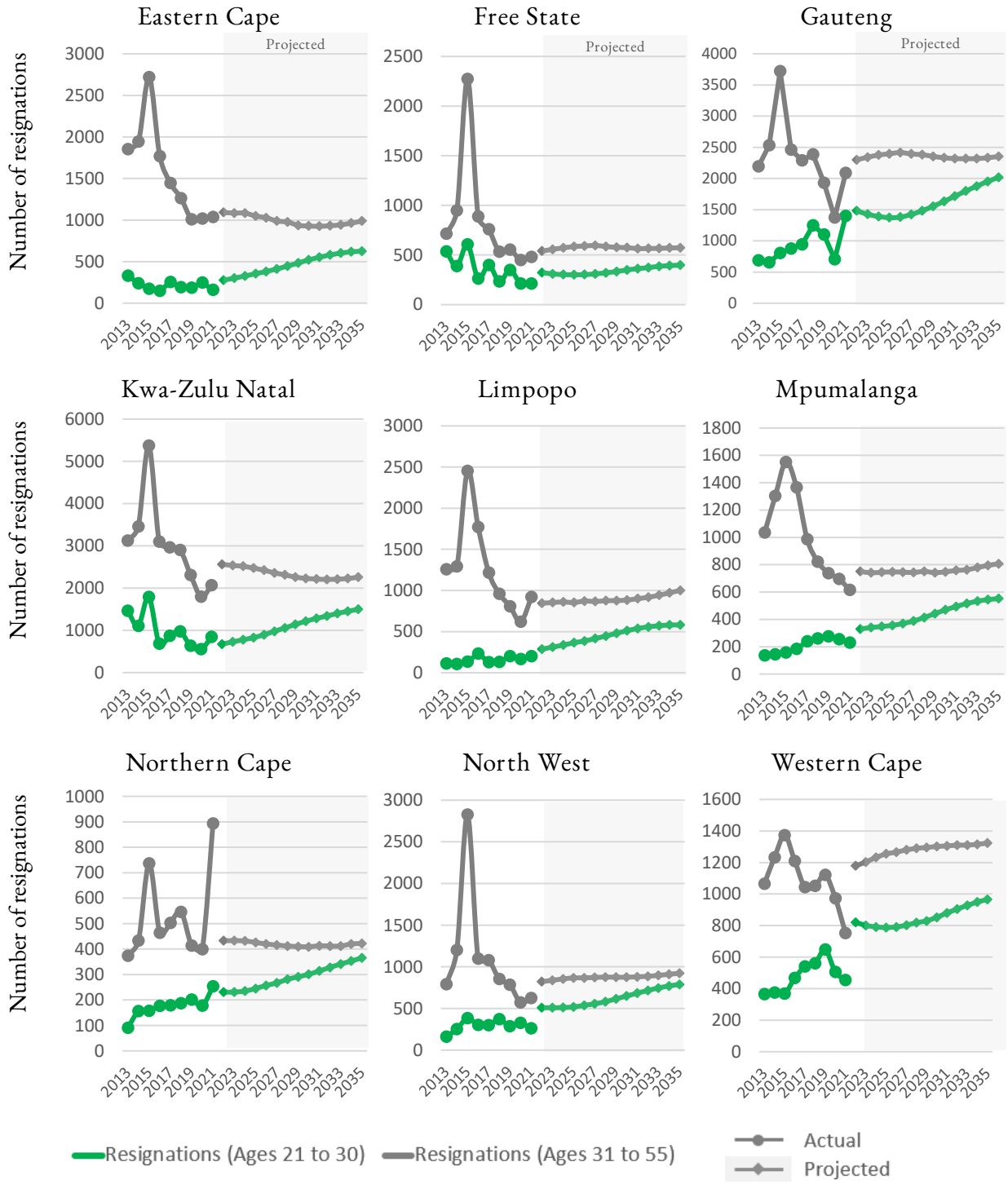



*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2035 derived from the national and provincial TSD models – assumption of no growth in educator numbers for all provinces.*

### c. Trends in resignations for younger educators (55 and below)

Attrition rates for younger educators, particularly those below the age of 40, are much lower in more rural areas and higher in the more urbanised provinces. This is likely due to the limited alternative employment options in rural areas as compared to more urban areas. The Northern Cape is an exception, with high resignation rates across all age groups. As older educators retire and are replaced with younger educators, the proportion of younger educators will rise and with it the number of resignations by educators below the age of 55.

*Figure 17: Projected resignations of educators by province for 2022 - 2035*




*Source: Own calculations, using the anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination reviewers removed. Estimates to 2035 derived from the national and provincial TSD models – assumption of no growth in educator numbers for all provinces.*

*Note: Year for each point is the year in which the educator is no longer in the system. Age is the age in the previous year.*

### d. Historical trends in teacher vs. senior educator numbers

School educators are divided into teachers and senior educators, where senior educators generally assume leadership and management roles. The three most relevant are heads of department (HODs), deputy principals and principals that would make up the school management team (SMT).

Table 4 compares growth rates of educator numbers, school numbers, enrolment and estimated population growth of school-aged (7-18 years) children. The change in number of educators is influenced both by changes in enrolment (more educators are needed) and by the growth or decline in school numbers (potentially fewer educators needed).

Table 5 outlines the change in the number of educators within each role comparing educator numbers in 2012 and 2021. A table showing just growth rates including the "Other" category is included in the appendix. The most dramatic change is seen in Limpopo, where there was a decline in educator numbers of about 8% (Table 4). However, this decrease is primarily driven by a large decrease in HODs and deputy principals. Relative to 2012, there were 38% fewer HODs and only half the number of deputy principals in Limpopo in 2021. This is evidence of significant hollowing out of middle management in Limpopo schools.

There is also a decrease in principal numbers, about 12% nationally, with large declines seen in the Free State, Mpumalanga and the North West. School rationalisation in the Free State is a likely reason for the reduction in principal numbers of 27% given a corresponding decrease of 27% in the number of public schools in the Free State between 2012 and 2021 (Table 10). A decrease in the number of public schools of 8% in Mpumalanga and 9% in the North West between 2012 and 2021 may partly explain the lower number of principals there. The North West also had an increase in the number of deputy principals.

Table 6 shows how the proportion of educators across the various ranks was distributed in 2012 and 2021. Overall, the proportion of teachers has grown, and the number and proportion of educators in more senior roles has declined. This is particularly evident in the Western Cape and Gauteng, where the number of teachers appears to be growing somewhat in line with enrolment growth (Table 4). Still, the absolute number of senior educators has declined. In the Western Cape, this decline is seen across all ranks, whilst the proportion of HODs, deputy principals and principals has decreased in both provinces. Table 7 shows that this corresponds to an increase in number of learners per school of 19% and 21% in the Western Cape and Gauteng. Growth in the average number of learners enrolled per school is evident across all provinces, with Free State schools increasing in size by almost 50% and the North West experiencing an increase in average learner numbers per school of 22%.

*Table 4: Comparing educator, school, enrolment and estimated population growth from 2012 to 2021*

| | % growth from 2012 - 2021 | | | | | |
|---|---|---|---|---|---|---|
| Province | Number of educators | Number of teachers | Number of public ordinary schools | Enrolment in public ordinary schools | Enrolment in all ordinary schools | Est. school-aged population |
| EC | -17% | -20% | -8% | -6% | -5% | -4% |
| FS | -13% | -13% | -27% | 9% | 10% | 14% |
| GP | 21% | 28% | 1% | 20% | 24% | 27% |
| KN | -5% | -3% | -3% | 1% | 1% | 8% |
| LP | -8% | -2% | -7% | 4% | 5% | 8% |
| MP | 3% | 7% | -8% | 7% | 8% | 13% |
| NC | 6% | 9% | -3% | 9% | 10% | 9% |
| NW | 2% | 4% | -9% | 12% | 13% | 20% |
| WC | 12% | 22% | 0% | 21% | 22% | 22% |
| **SA** | **-1%** | **2%** | **-6%** | **7%** | **8%** | **13%** |

*Source: First two columns use anonymised PERSAL data from 2012 and 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Ordinary school and enrolment numbers are from the Department of Basic Education School Realities-EMIS reports (2012 and 2021) and the school-aged population growth estimates are from Thembisa age specific data V4.5 looking at children aged 7 to 18.*

*Table 5: Changes in educator number by rank for each province in all schools from 2012 to 2021*

| | Teacher | | | | HOD | | | | Deputy-Principal | | | | Principal | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Province | 2012 | 2021 | Diff | % change | 2012 | 2021 | Diff | % change | 2012 | 2021 | Diff | % change | 2012 | 2021 | Diff | % change |
| EC | 50 295 | 40 115 | **-10 180** | *-20%* | 5 870 | 6 196 | **326** | *6%* | 1 342 | 1 453 | **111** | *8%* | 5 294 | 4 755 | **- 539** | *-10%* |
| FS | 20 148 | 17 561 | **-2 587** | *-13%* | 2 685 | 2 470 | **- 215** | *-8%* | 852 | 768 | **- 84** | *-10%* | 1 224 | 892 | **- 332** | *-27%* |
| GP | 47 233 | 60 677 | **13 444** | *28%* | 8 708 | 9 209 | **501** | *6%* | 2 565 | 2 850 | **285** | *11%* | 2 162 | 1 959 | **- 203** | *-9%* |
| KN | 73 050 | 71 000 | **-2 050** | *-3%* | 11 289 | 10 330 | **- 959** | *-8%* | 2 642 | 2 342 | **- 300** | *-11%* | 5 584 | 5 055 | **- 529** | *-9%* |
| LP | 44 998 | 44 317 | **- 681** | *-2%* | 6 090 | 3 762 | **-2 328** | *-38%* | 1 562 | 778 | **- 784** | *-50%* | 3 510 | 3 316 | **- 194** | *-6%* |
| MP | 26 127 | 27 857 | **1 730** | *7%* | 4 047 | 4 055 | **8** | *0%* | 1 108 | 1 114 | **6** | *1%* | 1 790 | 1 450 | **- 340** | *-19%* |
| NC | 7 257 | 7 929 | **672** | *9%* | 1 034 | 1 094 | **60** | *6%* | 294 | 365 | **71** | *24%* | 587 | 488 | **- 99** | *-17%* |
| NW | 21 305 | 22 261 | **956** | *4%* | 2 994 | 3 023 | **29** | *1%* | 902 | 1 041 | **139** | *15%* | 1 698 | 1 338 | **- 360** | *-21%* |
| WC | 23 579 | 28 665 | **5 086** | *22%* | 4 065 | 3 700 | **- 365** | *-9%* | 1 334 | 1 297 | **- 37** | *-3%* | 1 531 | 1 339 | **- 192** | *-13%* |
| SA | 313 992 | 320 382 | **6 390** | *2%* | 46 782 | 43 839 | **-2 943** | *-6%* | 12 601 | 12 008 | **- 593** | *-5%* | 23 380 | 20 592 | **-2 788** | *-12%* |

*Source: Anonymised PERSAL data from 2012 and 2021. Only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed.*

*Table 6: Proportional split of educators by educator rank in each province in 2012 compared to 2021*

| | All Educators | | Teacher | | HOD | | Dep.-Principal | | Principal | | Other | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2021 | 2012 | 2021 | 2012 | 2021 | 2012 | 2021 | 2012 | 2021 | 2012 | 2021 |
| EC | 100% | 100% | 78% | ↓ 75% | 9% | ↑ 12% | 2.1% | ↑ 2.7% | 8.2% | 8.8% | 2.5% | 2.4% |
| FS | 100% | 100% | 78% | 78% | 10% | 11% | 3.3% | 3.4% | 4.7% | 4.0% | 3.7% | 3.3% |
| GP | 100% | 100% | 74% | ↑ 79% | 14% | 12% | 4.0% | 3.7% | 3.4% | ↓ 2.6% | 4.4% | 2.7% |
| KN | 100% | 100% | 77% | 79% | 12% | 11% | 2.8% | 2.6% | 5.9% | 5.6% | 2.1% | 1.3% |
| LP | 100% | 100% | 78% | ↑ 84% | 11% | ↓ 7% | 2.7% | ↓ 1.5% | 6.1% | 6.3% | 2.1% | 1.5% |
| MP | 100% | 100% | 76% | ↑ 79% | 12% | 12% | 3.2% | 3.2% | 5.2% | ↓ 4.1% | 3.2% | 1.8% |
| NC | 100% | 100% | 75% | 77% | 11% | 11% | 3.0% | ↑ 3.6% | 6.1% | ↓ 4.8% | 5.1% | 3.9% |
| NW | 100% | 100% | 76% | 78% | 11% | 11% | 3.2% | 3.7% | 6.1% | ↓ 4.7% | 3.7% | 2.6% |
| WC | 100% | 100% | 74% | ↑ 80% | 13% | ↓ 10% | 4.2% | ↓ 3.6% | 4.8% | ↓ 3.7% | 4.1% | 2.1% |
| SA | 100% | 100% | 77% | 79% | 11% | 11% | 3.1% | 3.0% | 5.7% | 5.1% | 3.1% | 2.1% |

*Source: Anonymised PERSAL data from 2012 and 2021. Only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed. Arrow shown for teachers and HODs if difference is at least 3 percentage points, for deputy principals if the difference is at least 0.6 percentage points and for principals a difference of at least 0.8 percentage points.*

*Table 7: Trends in average learner enrolment per school from 2012 to 2021*

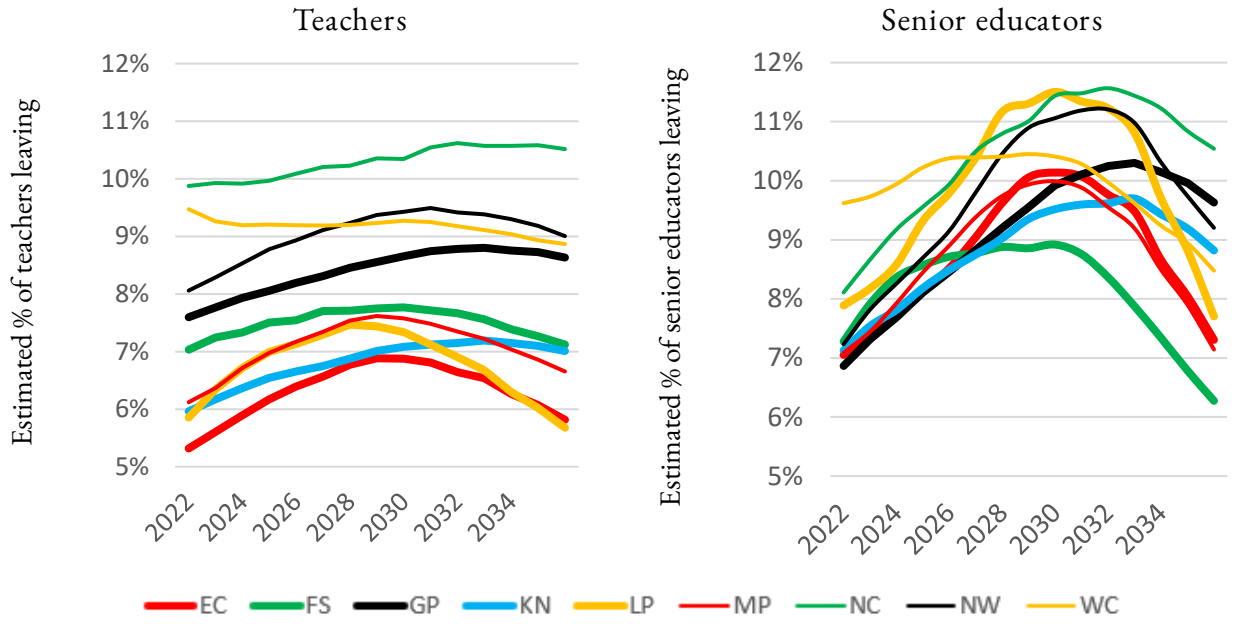
| Province | All Ordinary Schools | | | Public Schools | | | Independent Schools | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2021 | % Change | 2012 | 2021 | % Change | 2012 | 2021 | % Change |
| EC | 339 | 346 | *2%* | 340 | 347 | *2%* | 329 | 324 | *-2%* |
| FS | 467 | 679 | *45%* | 478 | 713 | *49%* | 234 | 252 | *8%* |
| GP | 795 | 872 | *10%* | 909 | 1 078 | *19%* | 383 | 386 | *1%* |
| KN | 466 | 481 | *3%* | 472 | 488 | *3%* | 295 | 283 | *-4%* |
| LP | 421 | 467 | *11%* | 423 | 469 | *11%* | 355 | 420 | *18%* |
| MP | 549 | 636 | *16%* | 569 | 666 | *17%* | 238 | 257 | *8%* |
| NC | 478 | 521 | *9%* | 490 | 547 | *12%* | 165 | 158 | *-4%* |
| NW | 471 | 567 | *20%* | 478 | 585 | *22%* | 275 | 275 | *0%* |
| WC | 632 | 721 | *14%* | 683 | 826 | *21%* | 244 | 222 | *-9%* |
| **SA** | **481** | **539** | ***12%*** | **492** | **559** | ***14%*** | **321** | **326** | ***2%*** |

*Source: Department of Basic Education School Realities-EMIS reports (2012 and 2021)*

### e. Trends in resignations and retirements for teacher vs. senior educators

HODs, deputy principals and principals tend to be older; therefore, we expect senior educators to be more affected by the retirement wave. Figure 18 shows this is the case, with a higher proportion of senior educators expected to retire and resign in most provinces from about 2026 onwards. The Western- and Northern Cape have the highest levels of retirements and resignations for teachers, at around 9%, with similarly high levels for senior educators. However, the rates here are less flat, with both an increase and a decrease over the period.

*Figure 18: Estimated proportion of teachers and senior educators that will be resigning and retiring*



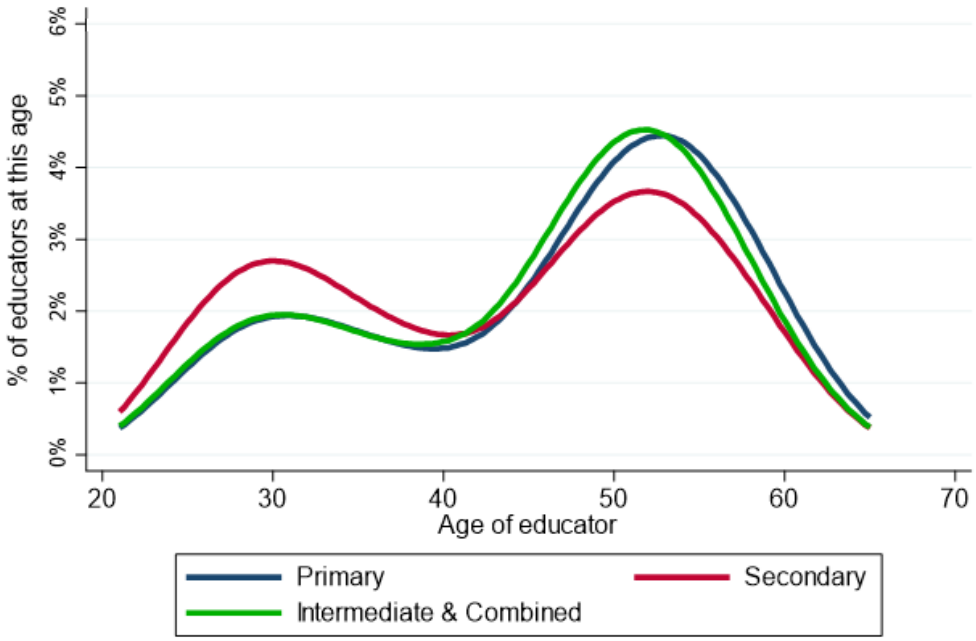

*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination reviewers were removed. Estimates to 2035 derived from the National and provincial models – assumption of no growth in educator numbers.*

### f. Historical trends in resignations and retirements for primary and secondary schools

The largest proportion of educators in South Africa are employed at either a primary (53%) or secondary school (34%) with an additional 6% of educators at intermediate and combined schools, calculated using the school classifications as they appear in PERSAL (see Table 21 in the Appendix for a breakdown). Figure 19 shows that primary-, intermediate- and combined schools all have a higher concentration of educators older than 50 years than secondary schools. These differences may be due to the later expansion of secondary schools relative to primary schools and further differentiated as a result of differences in attrition rates – given the different skill sets, preferences and alternative opportunities of primary and secondary educators. Therefore, the upcoming retirement wave will disproportionately affect primary-, intermediate, and combined ordinary schools.

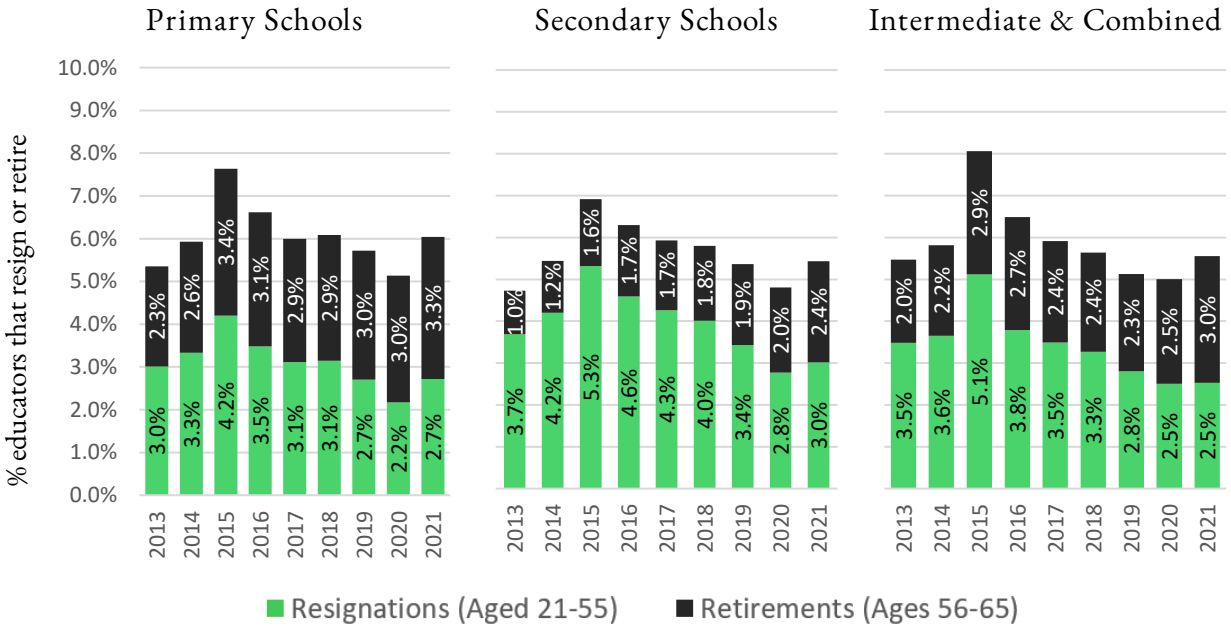
This trend is consistent with historical rates of resignations and retirements. Figure 20 shows that even between 2012 and 2021, the share of older educators retiring was much higher in primary schools and intermediate- and combined schools, which indicates that secondary schools tend to have younger educators. Figure 20 also shows that resignations make up a larger percentage of those leaving secondary schools, compared to primary schools, where retirement was the main reason for leaving between 2019 and 2021.

*Figure 19: Proportion of educators at various ages in Primary, Secondary, Intermediate and Combined schools in 2021*



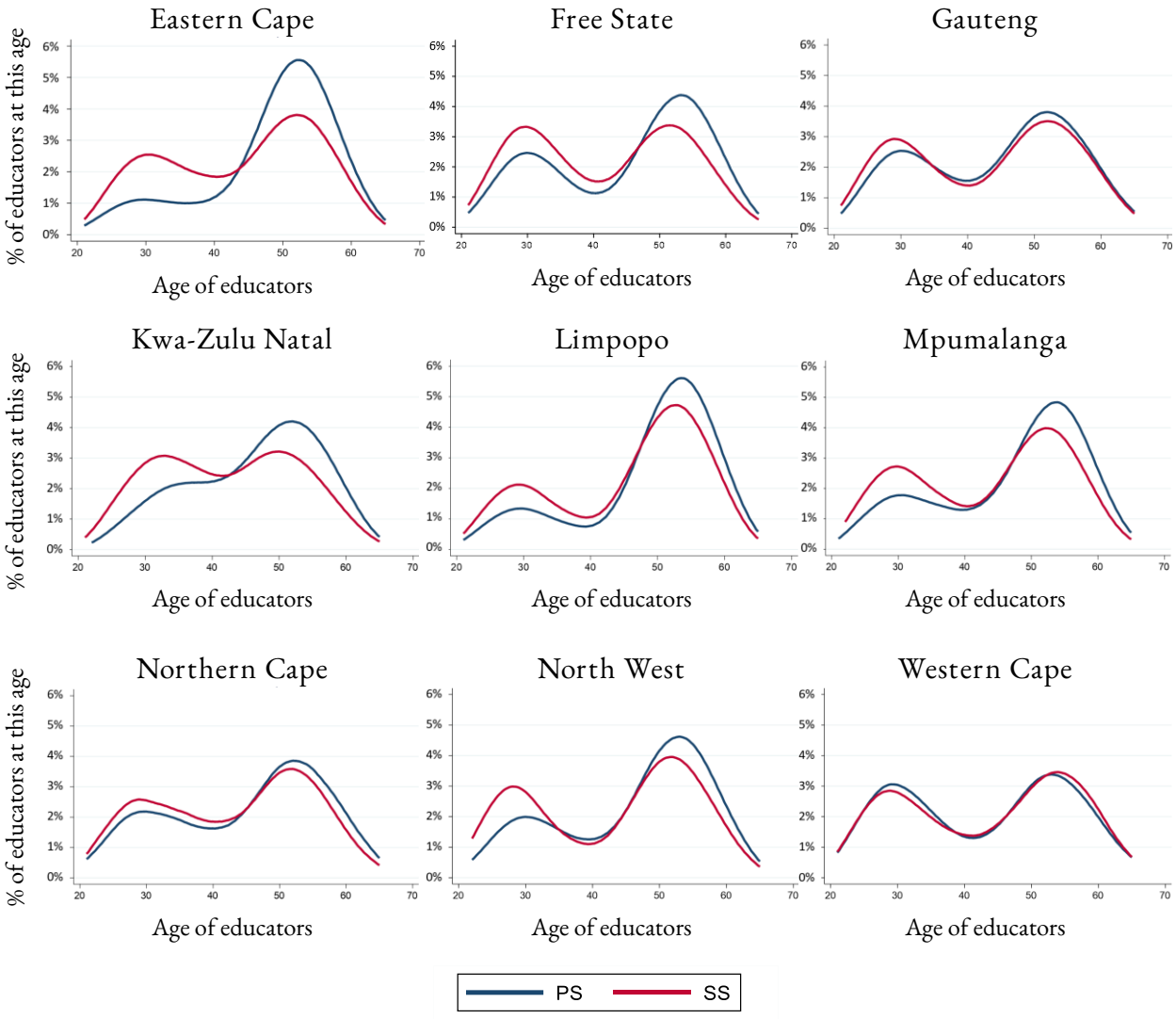

*Source: Anonymised 2021 PERSAL data, only educators included. ECD practitioners and examinations reviewers, ABET teachers and TVET lecturers removed. Used the component type classifications in PERSAL to identify school type.*

*Figure 20: Retirements and resignations as a proportion of total educators in Primary, Secondary, Intermediate and Combined Schools from 2021 to 2021*




*Source: Anonymised 2021 PERSAL data, only educators included. ECD practitioners and examinations reviewers, ABET teachers and TVET lecturers removed. Used the component type classifications in PERSAL to identify school type.*

*Figure 21: Age distributions for primary and secondary schools by province*




*Source: Anonymised 2021 PERSAL data, only educators included. ECD practitioners and examinations reviewers, ABET teachers and TVET lecturers removed. Used the component type classifications in PERSAL to identify school type.*

## 3.4 Growth in school-aged population and enrolment

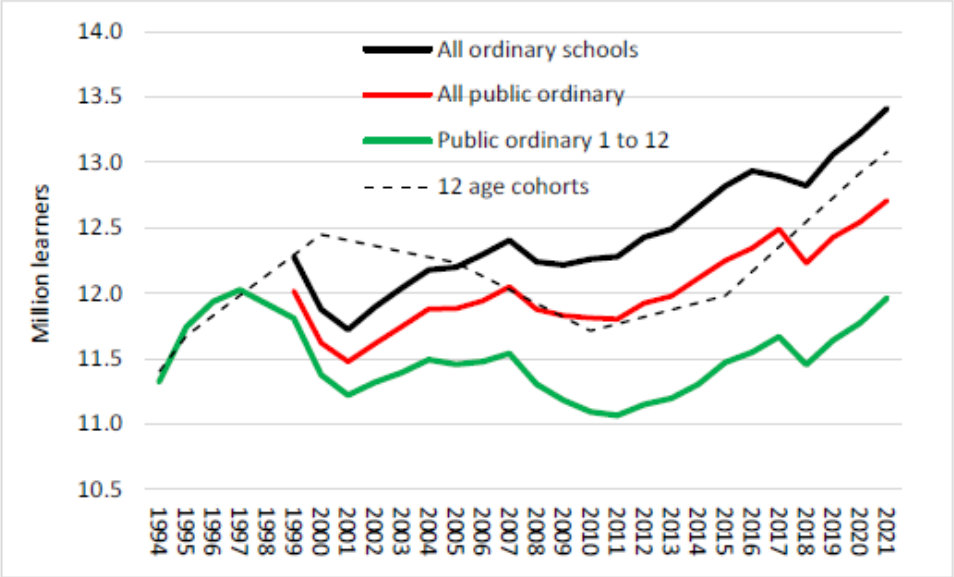
### a. Historical enrolment growth

Enrolment growth in ordinary schools, both public and private, since 2001 has largely been positive, with a slight dip between 2007 and 2009 and a sharp dip between 2017 and 2018, which occurred as a result of the introduction of the LURITS system which changed the way in which data on learner enrolment was collected. Figure 23 shows that growth in learner enrolment from 2016 to 2018 does not follow the trends observed in previous years, with sudden increases or decreases from year to year in most provinces. Particularly large decreases are observed in the Eastern Cape, Limpopo, Mpumalanga and the North West. The Western Cape has slightly

lower growth in enrolment recorded for 2016 to 2018, but then much higher levels in 2018 to 2020, the dip in 2018 is not evident in CEMIS data (van Wyk, 2021, p. 5).

Since about 2007, trends in ordinary schools' enrolments have reflected trends in the school-aged population (ages 7-18) relatively well. The dotted line indicates the school-aged population labelled '12 age cohorts' in Figure 22.

*Figure 22: Enrolment totals 1994 to 2021*

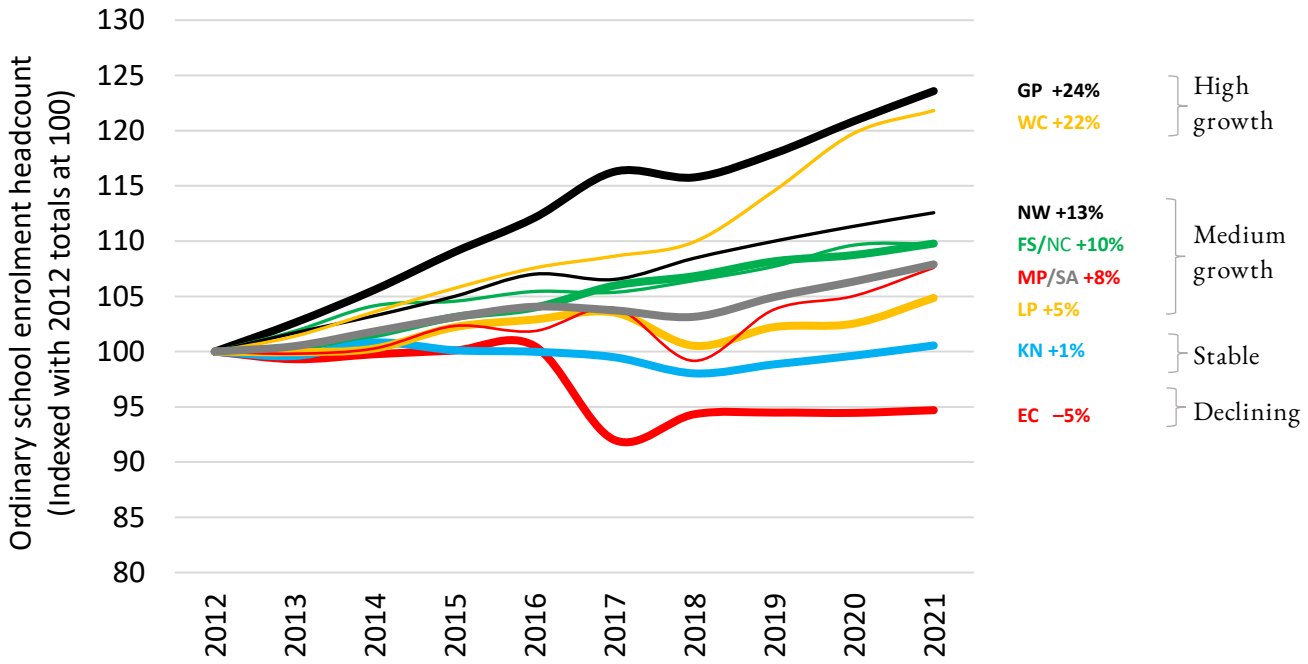



*Source: Taken from the report, Enrolment trends over 25 years (2022 06 30) produced by the Department of Basic Education. The note on data sources from the report: For '12 age cohorts' the source is the World Population Prospects 2019 of the United Nations, available through https://population.un.org. Figures for ages 7 to 18 were derived, using the UN data and Stats SA's Sprague tool to derive single age values and a simple linear trend to derive years between every fifth year of the UN data. Stats SA's Sprague tool was last released online together with the 2016 Mid-year Population Estimates files.*

### b. School-aged population growth and enrolment at the provincial level (2012 – 2021)

At the provincial level, Figure 23 shows that ordinary school enrolment in South Africa grew by 8% between 2012 and 2021. There was high growth in ordinary school enrolment in Gauteng, at 24%, and the Western Cape, 22%. KZN barely changed with an increase of 1%, whilst the Eastern Cape saw a decline in ordinary school enrolment of 5%.

*Figure 23: Ordinary school enrolment trends by province from 2012 to 2021*




*Source: Enrolment numbers taken from School Realities-EMIS (2012 – 2021) released by the DBE, using total numbers for ordinary public and independent schools*

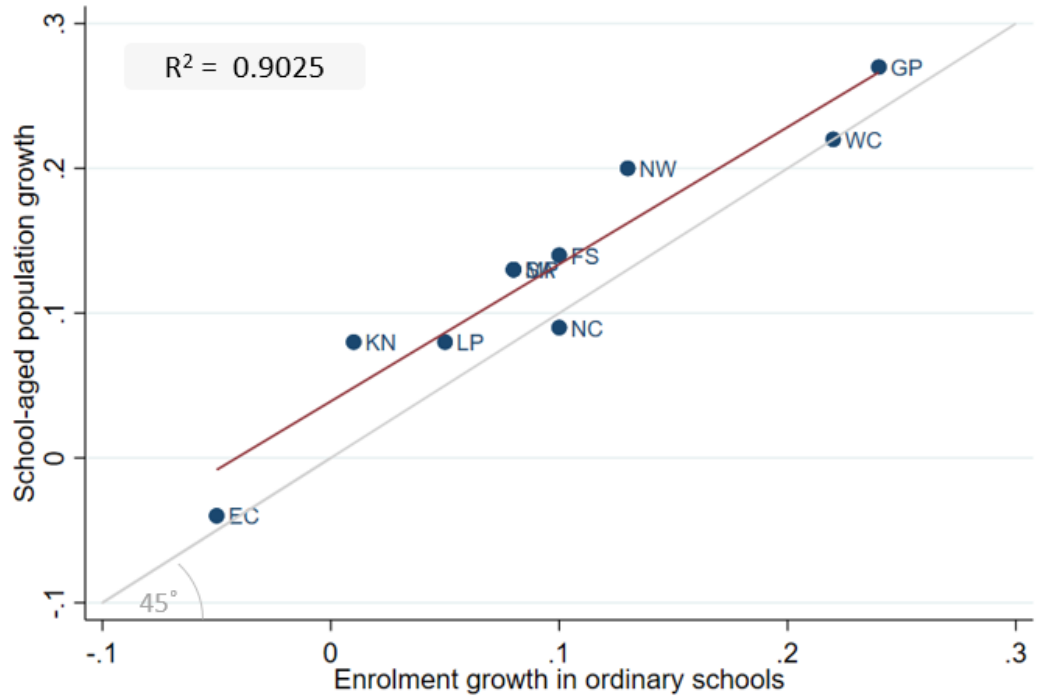
Figure 24 compares enrolment growth and the forecast growth in the school-aged population from 2012 to 2021. It is clear that there is a high level of correlation between the two at the provincial level, with an $R^2$ of 0.9025. This suggests that school-aged population growth is a main factor influencing overall school enrolment growth. Enrolment does not correspond to the school-aged population in all provinces in the same way due to differences in access and drop-out rates and retention policies which influence grade repetition, especially at the secondary school level. However, the expected growth or decline in the school-aged population at a provincial level, due to births and in- or out-migration, appears to be a good indicator of the expected increase or decrease in enrolment. Table 24 in the appendix compares the estimated growth in the school-aged population by province from 2012 to 2021 and 2021 to 2030.

### c. Forecast of growth for the school-aged population (2021 – 2030)

The provincial population growth rates estimates in the Thembisa V4.5 show that nationally the number of children in the age groups 7-18 was expected to grow by ~6% from 2012 to 2021. Figure 23 shows the vastly different enrolment growth trajectories across provinces from 2012 to 2021. Even larger differences in population growth estimates across provinces are expected for the years 2021 to 2030 as can be seen in Figure 25. The two most urbanised provinces, Gauteng and the Western Cape, are forecast to experience the highest population growth of school-aged children, around ~27% and ~15% respectively, whilst the number of school-aged children,

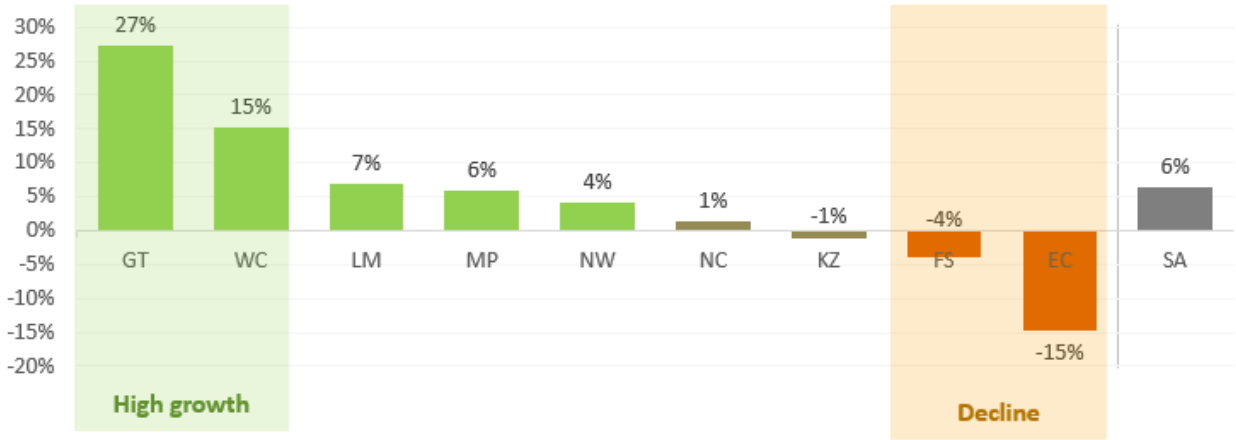
in the Eastern Cape is expected to decline substantially, at ~15% from 2021 to 2030. The remaining provinces have trajectories that fall somewhere in between these two extremes.

*Figure 24: Correlation of enrolment growth and growth in school-aged population from 2012 to 2021*




*Source: Thembisa age specific data V4.5 for school-aged population (Ages 7-18) estimates and enrolment taken from School Realities-EMIS (2012 and 2021) released by the DBE, for numbers on ordinary public and independent schools (Statistical Publications (education.gov.za)).*

*Figure 25: Projected growth of the school-aged population from 2021 to 2030 by province*




*Source: Thembisa age specific data V4.5 for school-aged population (ages 7-18) estimates*

Both growth and declines in enrolment have planning and policy implications with regard to resource allocations. For a province experiencing enrolment growth, the priorities are finding and retaining an adequate supply of quality educators and related staff as well as ensuring that new schools are built or expanded to meet growing demand. However, in a situation where enrolment is decreasing, decisions need to be made with regard to appointments and promotions that meet the current need but do not result in an oversupply of educators a number of years later and school rationalisation may need to be considered. As Gauteng, the Western Cape and the Eastern Cape specifically are vastly different from the "no-growth" scenario used in the report up to this point, growth scenarios will be considered for these provinces in Section 3.5.

### d. Growth in public vs independent schools

The DBE reports the headcount of learners and educators and school number of both public and independent schools. In Table 8 to Table 10 the public and private sector growth are compared across educator and enrolment numbers as well as the number of ordinary schools. It is immediately apparent that the growth rates of private schools across enrolment, educators and schools is vastly higher than the growth in public schools.

However, even in 2021 the independent sector remained small (5.2% of learners attend an independent school), so despite massive growth rates enrolment in the public sector still grew by almost four times as many children (about 780,000 additional children in the public sector compared to about 200,000 new enrolments in the independent sector). Educator growth was much more similar in absolute terms, with ~9,300 additional educators employed in the independent sector, but only about 12,700 additional educator posts in the public sector.

Nationally, independent ordinary school enrolment has grown by 39% from 2012 to 2021; this is closely aligned with the growth in the number of independent schools at 37%, with independent school educator numbers growing at a lower rate of 28%. In comparison, enrolment in public ordinary schools has grown by 7% whilst the number of public schools has decreased by 6%. Some of this is driven by programmes of school rationalisation in rural areas. Over this period, educator numbers increased by only 3% in public schools, thus leading to an increase in the learner-educator ratio and most likely class sizes.

The overall growth observed in the School Realities reports is different to the number of educators that are picked up in PERSAL. Whilst the 2021 totals are very similar, differing by 400 educators or 0.1%, the 2012 total differs by ~16,900 or 4,3% (see Figure 37 and Figure 38 in the Appendix for trends in these two educator totals). The sample of educators in the PERSAL dataset and School Realities are not exactly the same group. There are two main differences. The Schools Realities report only reports on ordinary schools, whilst the educator numbers from the anonymised PERSAL dataset, include all publicly paid educators. This includes educators at special schools or those that are not working in schools directly (i.e. office based staff or working for a related institution such as a school hostel). However, the School Realities includes SGB employed educators, whilst the PERSAL dataset does not. The largest differences in the 2012 public school educator numbers at a provincial level are observed in Gauteng, KwaZulu Natal, the Northern Cape and the North West.

*Table 8: Growth in educator numbers at ordinary schools from 2012 to 2021 (School Realities)*

| Province | All Ordinary Schools | | | Public Schools | | | Independent Schools | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ |
| EC | 67 936 | 62 698 | *-8%* | 64 809 | 58 824 | *-9%* | 3 127 | 3 874 | *24%* |
| FS | 24 828 | 23 867 | *-4%* | 23 854 | 22 686 | *-5%* | 974 | 1 181 | *21%* |
| GP | 73 960 | 91 958 | *24%* | 59 175 | 72 162 | *22%* | 14 785 | 19 796 | *34%* |
| KN | 94 932 | 96 659 | *2%* | 90 251 | 92 232 | *2%* | 4 681 | 4 427 | *-5%* |
| LP | 57 670 | 53 582 | *-7%* | 55 277 | 50 021 | *-10%* | 2 393 | 3 561 | *49%* |
| MP | 34 664 | 36 963 | *7%* | 33 059 | 34 837 | *5%* | 1 605 | 2 126 | *32%* |
| NC | 8 864 | 10 486 | *18%* | 8 632 | 9 984 | *16%* | 232 | 502 | *116%* |
| NW | 25 924 | 28 248 | *9%* | 24 881 | 26 796 | *8%* | 1 043 | 1 452 | *39%* |
| WC | 36 389 | 42 662 | *17%* | 32 439 | 37 508 | *16%* | 3 950 | 5 154 | *30%* |
| **SA** | **425 167** | **447 123** | ***5%*** | **392 377** | **405 050** | ***3%*** | **32 790** | **42 073** | ***28%*** |

*Source: Department of Basic Education School Realities-EMIS reports (2012 – 2021). Note: % Δ stands for "percentage change"*

*Table 9: Growth in enrolment numbers in ordinary schools from 2012 to 2021 (School Realities)*

| Province | All Ordinary Schools | | | Public Schools | | | Independent Schools | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ |
| EC | 1 951 523 | 1 848 053 | *-5%* | 1 886 982 | 1 772 877 | *-6%* | 64 541 | 75 176 | *16%* |
| FS | 661 974 | 726 713 | *10%* | 646 093 | 706 269 | *9%* | 15 881 | 20 444 | *29%* |
| GP | 2 075 387 | 2 564 812 | *24%* | 1 858 745 | 2 227 733 | *20%* | 216 642 | 337 079 | *56%* |
| KN | 2 877 969 | 2 893 958 | *1%* | 2 812 844 | 2 831 417 | *1%* | 65 125 | 62 541 | *-4%* |
| LP | 1 715 778 | 1 799 130 | *5%* | 1 665 013 | 1 723 583 | *4%* | 50 765 | 75 547 | *49%* |
| MP | 1 054 783 | 1 134 889 | *8%* | 1 027 851 | 1 101 224 | *7%* | 26 932 | 33 665 | *25%* |
| NC | 277 494 | 304 566 | *10%* | 274 189 | 298 253 | *9%* | 305 | 6 313 | *91%* |
| NW | 775 142 | 872 601 | *13%* | 760 272 | 848 086 | *12%* | 14 870 | 24 515 | *65%* |
| WC | 1 038 019 | 1 264 527 | *22%* | 991 685 | 1 196 715 | *21%* | 46 334 | 67 812 | *46%* |
| **SA** | **12 428 069** | **13 409 249** | ***8%*** | **11 923 674** | **12 706 157** | ***7%*** | **504 395** | **703 092** | ***39%*** |

*Source: Department of Basic Education School Realities-EMIS reports (2012 – 2021). Note: % Δ stands for "percentage change"*

*Table 10: Growth in school numbers of ordinary schools from 2012 to 2021 (School Realities)*

| Province | All Ordinary Schools | | | Public Schools | | | Independent Schools | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ | 2012 | 2021 | % Δ |
| EC | 5 754 | 5 341 | *-7%* | 5 558 | 5 109 | *-8%* | 196 | 232 | *18%* |
| FS | 1 419 | 1 071 | *-25%* | 1 351 | 990 | *-27%* | 68 | 81 | *19%* |
| GP | 2 611 | 2 941 | *13%* | 2 045 | 2 067 | *1%* | 566 | 874 | *54%* |
| KN | 6 176 | 6 022 | *-2%* | 5 955 | 5 801 | *-3%* | 221 | 221 | *0%* |
| LP | 4 078 | 3 855 | *-5%* | 3 935 | 3 675 | *-7%* | 143 | 180 | *26%* |
| MP | 1 920 | 1 785 | *-7%* | 1 807 | 1 654 | *-8%* | 113 | 131 | *16%* |
| NC | 580 | 585 | *1%* | 560 | 545 | *-3%* | 20 | 40 | *100%* |
| NW | 1 645 | 1 539 | *-6%* | 1 591 | 1 450 | *-9%* | 54 | 89 | *65%* |
| WC | 1 643 | 1 755 | *7%* | 1 453 | 1 449 | *0%* | 190 | 306 | *61%* |
| **SA** | **25 826** | **24 894** | ***-4%*** | **24 255** | **22 740** | ***-6%*** | **1 571** | **2 154** | ***37%*** |

*Source: Department of Basic Education School Realities-EMIS reports (2012 – 2021). Note: % Δ stands for "percentage change"*

## 3.5 Growth-adjusted results (GP, WC and EC)

All provinces are likely to be affected by changes to enrolment due to population growth. However, the two highest growth provinces, Gauteng and the Western Cape, and the province with the largest projected decrease, the Eastern Cape, will be disproportionately affected. Thus, projections were run under various growth scenarios for each of these three provinces. The scenarios for the three provinces are outlined in Table 11 below, with the growth referring to growth in the number of educators that we would expect to see in response to an enrolment increase or decrease. A middle scenario in each case (in bold) is, conservatively, judged to be the most likely based on trends seen from 2012 to 2021 and given forecast population growth rates for Gauteng and the Western Cape to 2030. For the Western Cape the school-aged population was estimated to grow by 22% from 2012 to 2021, over the same period the educator number increased by 12%, whilst in Gauteng the estimated population growth was 27%, whilst educator number grew by 21%. It appears that educator numbers growth lags somewhat behind the growth in school-aged population. Gauteng's schools aged population is forecast to increase by another 27% to 2030, so a 20% growth in educator numbers was selected, whilst the Western Cape's school-aged population is forecast to grow by 15%, so a 10% growth rate in educator numbers was chosen. For the Eastern Cape, the decision to choose -10% is less historically based. For 2012 to 2021 the Eastern Cape's school-aged population was estimated to have decreased by 4%, but the educator numbers decreased by 17%, partially due to school rationalisation (8% of public schools closed), however decreasing educator numbers at a higher rate than your population is decreasing is only feasible in the longer run if there are too many educators employed. In the medium run, it is expected that educator numbers will shift with enrolment decline, but with a lag. The Eastern Cape's population of school-aged children is forecast to decline by 15% from 2021 to 2030, therefore decline in educator numbers of about 10% was selected to account for this decrease. These scenarios in bold will be used in discussions and financial projections in the remainder of the report for these three provinces only.

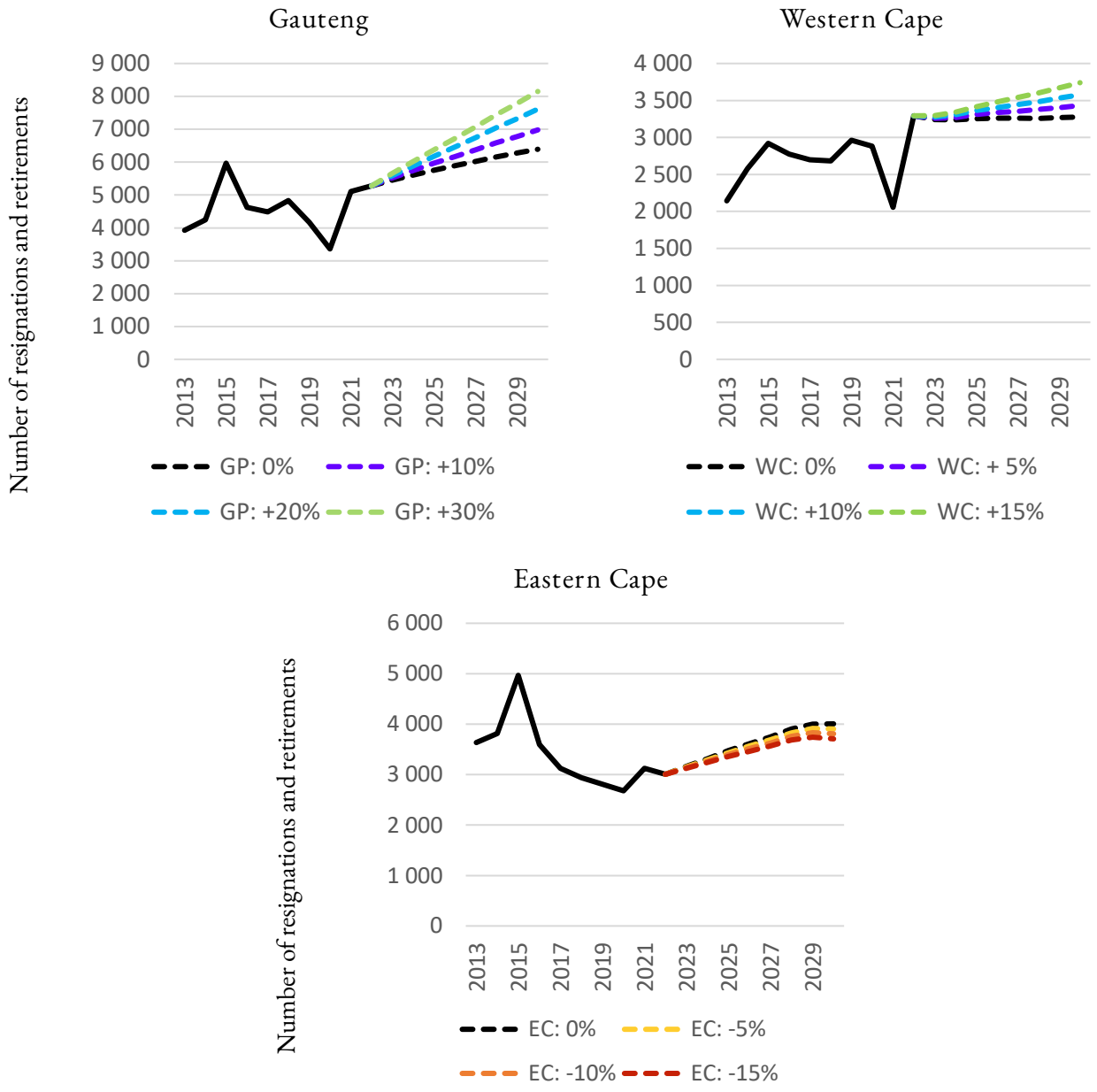
*Table 11: The educator growth scenarios used for Gauteng, the Western Cape and the Eastern Cape*

| Gauteng | | Western Cape | | Eastern Cape | |
|---|---|---|---|---|---|
| Growth | Educators in 2030 | Growth | Educators in 2030 | Growth | Educators in 2030 |
| 0% | 76 772 | 0% | 35 765 | 0% | 53 786 |
| 10% | 84 449 | 5% | 37 553 | -5% | 51 096 |
| 20% | 92 126 | 10% | 39 342 | -10% | 48 408 |
| 30% | 99 804 | 15% | 41 130 | -15% | 45 718 |

In Figure 26 the effect on the total number of retirements and resignations is shown if educators remain constant and for each of the three scenarios in Gauteng, the Western Cape and the Eastern Cape. For each of the growth (decline) scenarios the change in total number of educators means that the number of educators that join the workforce every year is larger (smaller). Additionally, those that join as new educators tend to be young. Younger educators below the age of 35 have higher resignation rates. This means that in a growth scenario, the workforce

is larger and on average educators are more likely to resign (as the proportion of young educators is higher) this results in a higher number of resignations overall. The opposite is true for a declining workforce, where the total number of resignations and retirements would be expected to be lower than if the workforce stayed constant.

*Figure 26: Total projected resignations and retirements in GP, WC and EC for the growth scenarios*




*Source: Ten-year anonymised PERSAL data, only educators are considered. ECD practitioners and examination reviewers, ABET teachers and TVET lecturers were removed. Estimates for each growth scenario to 2030 derived from the provincial TSD models.*

## 3.6 Rank adjusted results (LP only)

Limpopo has a much higher proportion of teachers relative to senior educators (HODs, deputy principals, principals and other specialists). In 2012, 22% of Limpopo's educators were senior educators, but by 2021 this proportion had dropped to 16%, implying that 84% are teachers, the highest proportion of teachers in the country. The province with the next highest proportion of teachers was the Western Cape at 80%. Given that the Western Cape is highly urbanised which allows for larger schools such a split between teachers and leadership and management positions is more likely to be feasible. The Eastern Cape which is more similar to Limpopo had only 75% of their educators as teachers. As such, the situation in Limpopo is likely to be unsustainable in the medium run. Therefore, in the scenario outlined in Table 12 the ratio of teachers to senior educators is presumed to return to the national average of 79% teachers to 21% senior educators in Limpopo by 2030. The overall number of educators is presumed to remain constant over this period. The proposed split of teachers and senior educators would then also return to a split similar to what was observed in Limpopo in 2012.

*Table 12: Scenario to return Limpopo Teacher vs. Senior educator ratio to national average by 2030*

| Year | 2021 | 2030 |
|---|---|---|
| Teachers | 44 317 | 41 850 |
| Senior educators | 8 658 | 11 125 |
| Total educators | 52 975 | 52 975 |
| *% teachers* | *84%* | *79%* |

## 3.7 Enrolment growth summary

A growth in enrolment exerts additional pressure on provinces and schools. The two provinces that are likely to experience continued high growth in the school-aged population are Gauteng and the Western Cape. Adequate provision will need to be made for the expansion of both schools, classroom space and educator numbers to accommodate this expansion of enrolment. Insufficient response to this increase in demand will lead to an increasing (deteriorating) learner-educator ratio in the provinces, an increase in class sizes, school overcrowding and likely a decline in learners' performance. It may also accelerate the movement to private schools by families that are able to afford it, which could lead to a worsening in inequality, but this would ease the pressure on public schools in the short run.

Projected growth in school-aged population is lower in all other provinces, however it remains positive for most, so the scenarios presented here, where educator numbers are kept constant are very conservative. The constant educator scenario will not be sufficient to maintain current learner-educator ratios, neither are the growth scenarios used for Gauteng and the Western Cape. Provinces should seek to increase the number of educators employed to at least match enrolment growth to avoid a further deterioration in learner-educator ratios, which will on average also lead to an increase in class size.

# 4. Financial impacts

The effects of the retirement wave over the next ten to fifteen years are not cost-neutral. Educators are beneficiaries of an annual notch progression if they meet minimum standards as a part of the annual Quality Management System (QMS), formerly Integrated Quality Management System (IQMS). In 2008 monetary incentives were first linked to high performance on the IQMS, although this was never implemented. In 2009 SADTU was able to negotiate an adaptation of the policy that retained the monetary incentive, in the form of a 1% annual bonus, but removed the performance requirements (Gustafsson, 2019). This annual notch progression was further increased from 1% to 1.5% in 2022. As a result, public sector educators with longer tenures receive a higher basic salary. Therefore, on average older educators earn a higher salary than younger ones because they have had more opportunity to gain experience.

This section first describes some of the factors that influenced the total cost of educators, outlines macroeconomic factors influencing the national budget and economic outlook, looks at historical trends in compensation of employees in education and then moves on to discuss the expected provincial trends in average costs of educators between 2022 and 2030.

## 4.1 Cost drivers of educator compensation

The cost of educators is determined by the number of educators employed, the notch distribution of these educators, the value assigned to each notch and the benefits packages that educators receive. The total number of educators should be largely informed by learner enrolment and class size norms as outlined in the educator demand framework in Figure 7, however hiring decisions would also be informed and constrained by the available budget.

The distribution of educators across notches is determined by experience – a higher level of experience would lead to higher salaries on average which would drive up the total cost of educators. The average tenure of educators is influenced by attrition rates, especially among younger educators, as well as workforce growth. If the educator workforce is growing, there is a new group of educators being added every year on an entry-level salary. This brings down the average experience and therefore compensation cost of the group. Similarly, if educator numbers remain constant, a province with high attrition will have a lower average level of experience than a province with low attrition. Many of the educators that leave will be replaced with entry level educators, which lowers the average level of experience of the group. This has been particularly relevant since 2018, as the rules were adjusted. Now most educators that leave and return, re-enter at the entry-level notch, regardless of their previous experience.

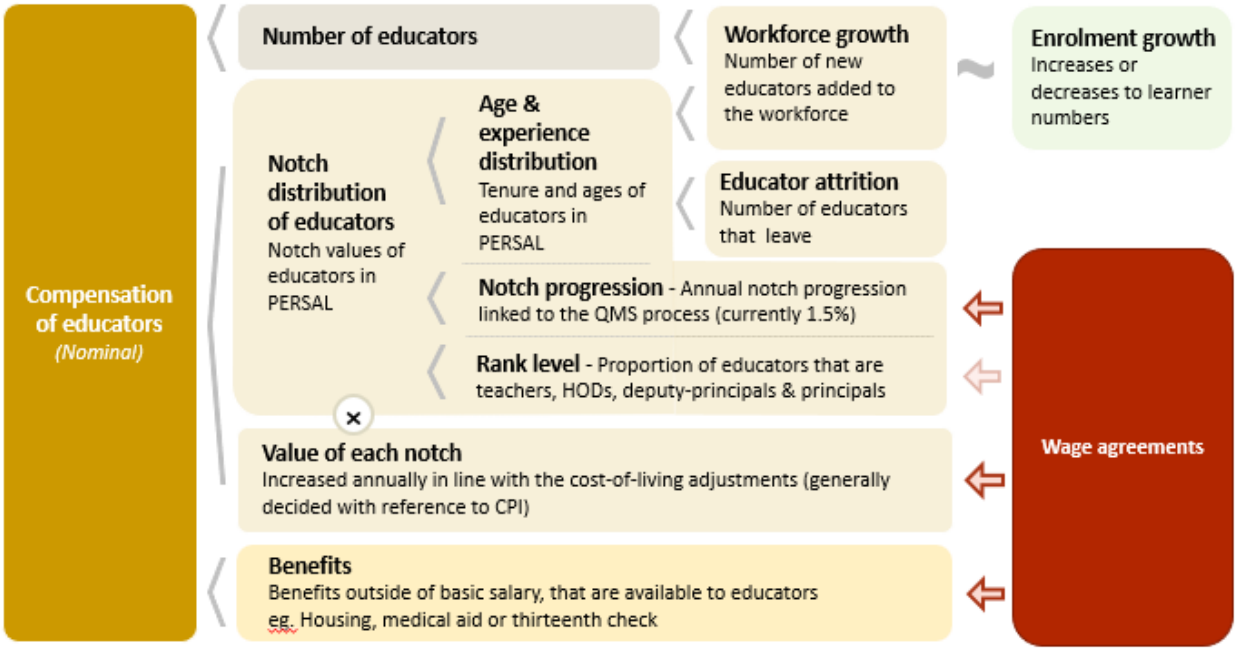
How experience is translated into notch level differences is determined by the notch progression percentage – currently 1.5%. A higher notch progression percentage will lead to higher compensation expenditure. The proportion of educators at each rank will also affect the notch distribution, as another way of moving to a higher notch value is through promotion. On average having a higher share of senior educators, roughly equivalent to

the School Management Team (SMT) positions, will result in higher educator costs as educators in these posts earn a higher basic salary. However, the rank within the SMT also matters. Generally, having a higher proportion of higher ranked educators relative to other positions will result in higher costs. For example, having a higher proportion of principals or even a higher share of senior principals (Say level 4 or 5) relative to Levels 1 and 2 will tend to increase costs.

The notch values are increased according to the cost-of-living adjustments that are the outcome of collective bargaining agreements. These are generally linked to consumer price inflation (CPI). If the cost-of-living adjustments are equal to CPI, this should mean that there is no change in the purchasing power of educators. However prior to 2020 the cost-of-living adjustments for employees that were not senior management tended to outpace CPI by about 1-2%, so their purchasing power increased slightly on an annual basis (National Treasury, 2022a).

Lastly, the benefit received by educators affects the compensation costs. More generous benefits including pension, medical aid, the annual bonus (13th check) and housing allowances among other would increase the total cost of compensation.

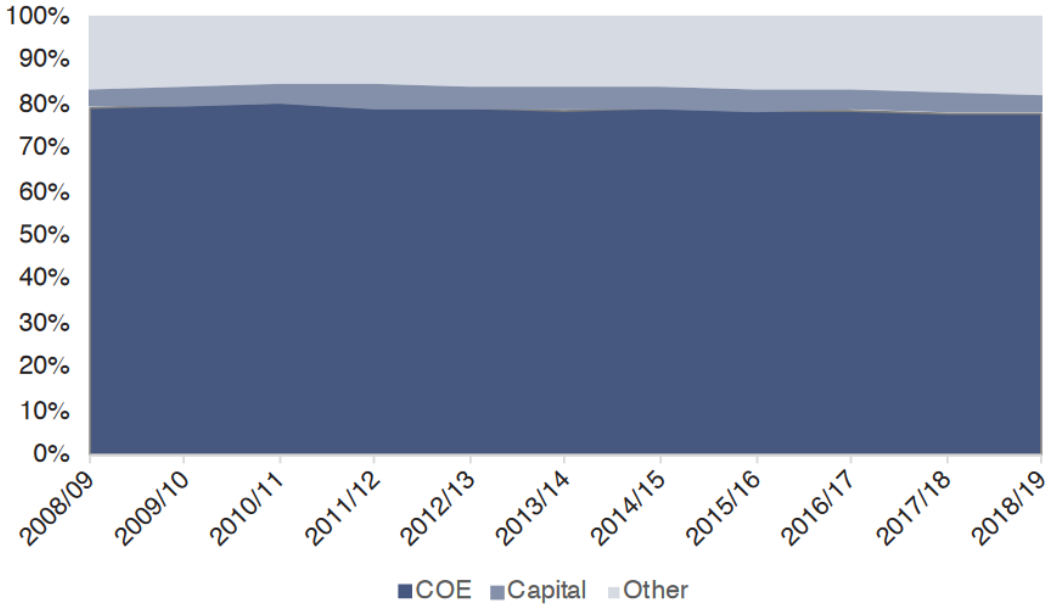
*Figure 27: Diagram showing the drivers of the total cost of educators*



## 4.2 Historical trends in the Education budget and compensation of employees

Expenditure on basic education can be split into three broad buckets, compensation of employees (COE), capital expenditure and other expenditure, with the largest share going to compensation of employees. Spaull et al. (2020) show that the split of expenditure at the national level has historically been fairly constant, with roughly 80% of the total budget being allocated to compensation of employees between 2008 and 2018 (see Figure 28). Similar proportions were obtained from the consolidated 2022 EPRE tables. With COE making up 79% of the 2019/20 provincial basic education budgets and 77% of the 2020/21 preliminary outcome (see Table 25 in the Appendix for a detailed view).

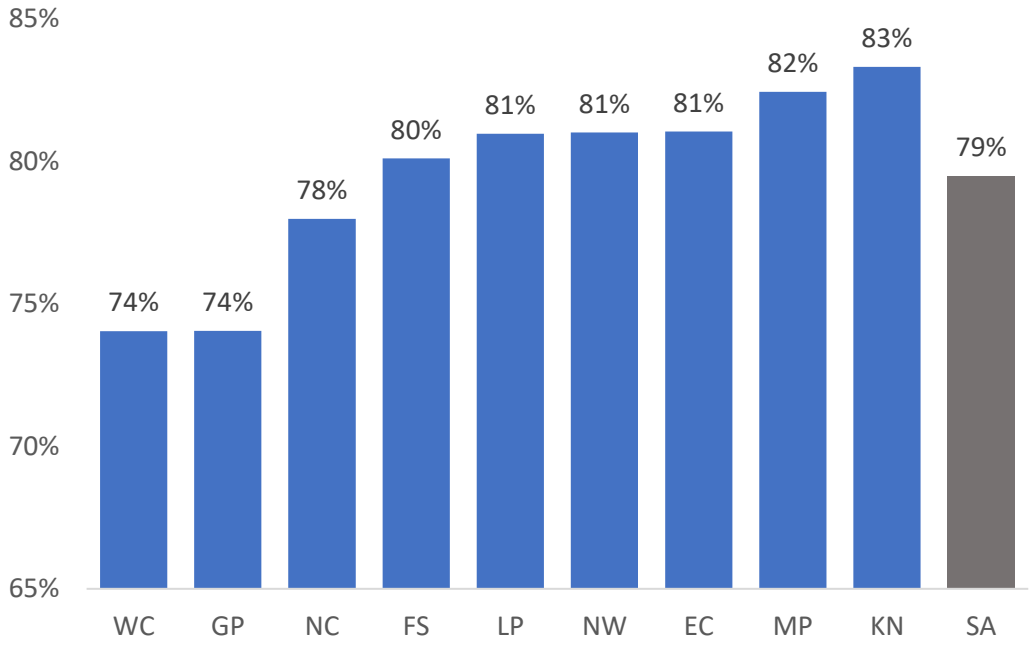
*Figure 28: Composition of total national expenditure on education, 2008 to 2018*




*Source: Figure 3 from* The Race between Teacher Wages and the Budget: the case of South Africa 2008 – 2018 *(Spaull et al., 2020). Note: 1. Figures derived from EPRE reports. 2. COE is Cost of Employment.*

There is some variation in the COE proportion by province with capital expenditure excluded. Capital expenditure is excluded from the analysis at the provincial level, because there are sometimes large changes in capital expenditure from year to year – depending on the status of capital projects. The more urbanised provinces, Gauteng and the Western Cape, as well as the Northern Cape have a lower COE share, below 80% if capital expenditure is excluded. The remaining provinces spend over 80% of their budget (excluding capital expenditure) on compensation of employees. This means that there is little room to increase expenditure on educators, by reallocating funds from other non-capital, non-compensation expenditure.

*Figure 29: Compensation of Employees % of total provincial budget excluding capital expenditure for the 2020/21 Preliminary Outcome budget*




*Source: Own calculation using National Treasury 2022 Provincial Budget EPRE tables. The capital allocation is excluded – due to high variability from year to year many of which relate to large infrastructure projects.*

Figure 29 shows the proportion of the provincial budgets in 2020/21 that went to compensation of employees. In all provinces this ranged between 73% and 83% of the budgets. Once the overall budget has been set, there is a trade-off between expenditure on human resources (COE) and other expenditure that needs to be taken at a provincial level.

Once the budget for compensation of employees has been set, the most basic trade-off that is faced is between hiring more educators or paying existing educators more. Paying existing educators more can take the form of an increase in the basic wage through a cost-of-living adjustment, increases in benefits, pay-for performance bonuses or promotions. Provinces are bound by the national wage agreements decided through collective bargaining. These national agreements apply to staff members that are already employed by the provinces (and also to any newly appointed employees). This means provinces have limited flexibility in how they spend their budget on employment. The main levers available to them are: choosing the number of new staff that they appoint and managing promotions.

## 4.3 2023/24 National and provincial budget outlook

The determinants of the overarching budget for basic education are numerous, however key macroeconomic and budget allocation variables that influence the basic education budget include: Gross domestic product (GDP), tax revenue as share of GDP, debt service costs and the share of the government expenditure that is allocated to basic education. Weak macroeconomic performance and above inflation wage increases of public servants have meant a stagnation in headcount growth in recent years – through hiring freezes and limiting the number of promotions by instead appointing staff in an "acting" role for HOD and deputy-principal positions.

Economic growth in South Africa has underperformed expectations for about a decade, limiting the growth of the tax revenue base. Additionally, the debt repayment burden in South Africa has increased by more than 50% in a decade - debt-service costs were about 11% as a share of main budget revenue in 2012/13, increasing to more than 18% in the 2022/23 budget estimate (National Treasury, 2022a), as higher debt repayments decrease the total budget available for functions and programmes.

*Table 13: Budget Review 2023 Estimates of Basic Education Compensation of Employees and CPI*

| | 2021/22 | 2022/23 | 2023/24 | 2024/25 | 2025/26 |
|---|---|---|---|---|---|
| Provincial Compensation of Employees (R mil) | 215 776 | 222 925 | 230 758 | 239 041 | 249 471 |
| *Growth in Compensation of Employees (%)* | | *3.3* | *3.5* | *3.6* | *4.4* |
| *CPI estimate (%)* | *5.1* | *7.1* | *4.9* | *4.8* | *4.7* |

*Source: National Budget Review 2023. Basic Education Provincial Compensation of employees from Table 5.6 (p. 61) and CPI from Figure 3.1 (p. 28). The 2021/22 COE figure is taken from Table 5.6 (pg. 59) in the 2022 Budget Review Growth in COE shows the increase over the previous year.*

The annual national budgeting process takes place between June and December of each year, with outcomes of the budget tabled in parliament in February of the following year (National Treasury, 2022b). Estimates of the sum of the nine provincial budgets for basic education including three-year medium-term estimates are outlined in the national budget review. Table 13 shows the estimated expenditure on provincial compensation of employees (COE) within Basic Education. The expected growth rates of provincial COE for Basic Education are about 1 percentage point below CPI estimate in all years, except from 2021/22 to 2022/23 where it is almost 4 percentage points below inflation, indicating that consistent decreases in real expenditure are expected in the medium term. The most recent (national) budget figures are reported here as opposed to the consolidated 2022 EPRE as changes in the expected CPI, and changes to the nominal spending figures, have somewhat shifted the real growth expectations over the next two fiscal years.

The longer run trends are less certain, but in the short run over the next 1to 3 years the baseline in the current budget forecasts that the basic education budget at the national and provincial levels, will decrease slightly in real terms. However, MTEF figures published in 2023 do not yet take into account all wage agreements signed in 2023.

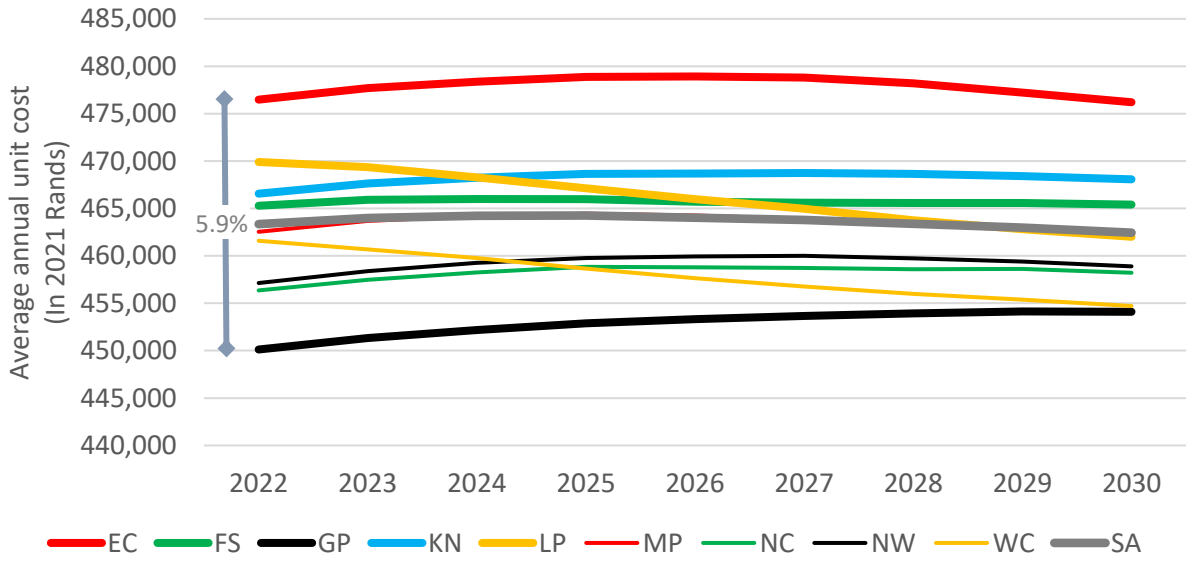
## 4.4 Expected unit cost trends

Due to the retirement wave and a resulting decrease in average educator age, the expected expenditure per educator will not follow historical trajectories. Figure 30 shows that the Unit costs of educators have relatively different starting points across provinces in 2022, with average salaries in the Eastern Cape about 6% higher than those in Gauteng. The Eastern Cape has a large share of older teachers as well the highest share of senior educators (principals, deputy principals and HODs). Both would result in higher unit costs per educator. Gauteng's educators are much younger and due to large schools, the number of senior educators in particular the proportion of principals is very low in Gauteng, which helps to drive down unit costs.

As can be seen, there is relatively little change anticipated in terms of real average cost per educator in most provinces, with a slight decline expected in Limpopo and the Western Cape and an increase in Gauteng. Figure 31 and Table 14 show just how small these changes are with a real increase of just over 1% expected in Gauteng over 8 years and the largest unit cost decrease expected in Limpopo of about 1.5%, with most provinces experiencing a change in the range of about 0% to 1% over the 8 years.

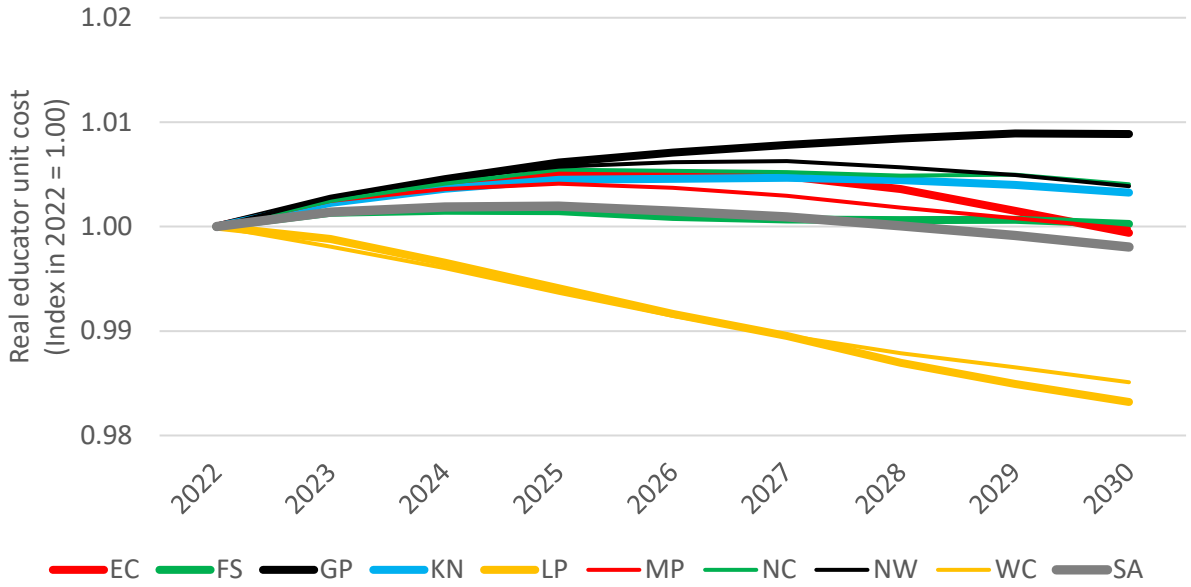
The changes to unit costs over the period 2022 – 2030 are driven mainly by falling unit costs for senior educators. The real unit cost of teachers is expected to increase very slightly from 2022 to 2030 in all provinces, with the exception of Limpopo, as can be seen in Figure 33. In Limpopo the real unit cost of teachers is expected to decrease by just over 1% from 2022 to 2030.

*Figure 30: Unit cost projections for all educators by province (2022 – 2030)*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2030 derived from the national and provincial TSD models. Assumption of no growth in educator numbers for FS, KN, LP, MP, NC, NW and SA. Assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

*Figure 31: Indexed real unit cost projections for all educators by province (2022 – 2030)*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2030 derived from the national and provincial TSD models. Assumption of no growth in educator numbers for FS, KN, LP, MP, NC, NW and SA. Assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

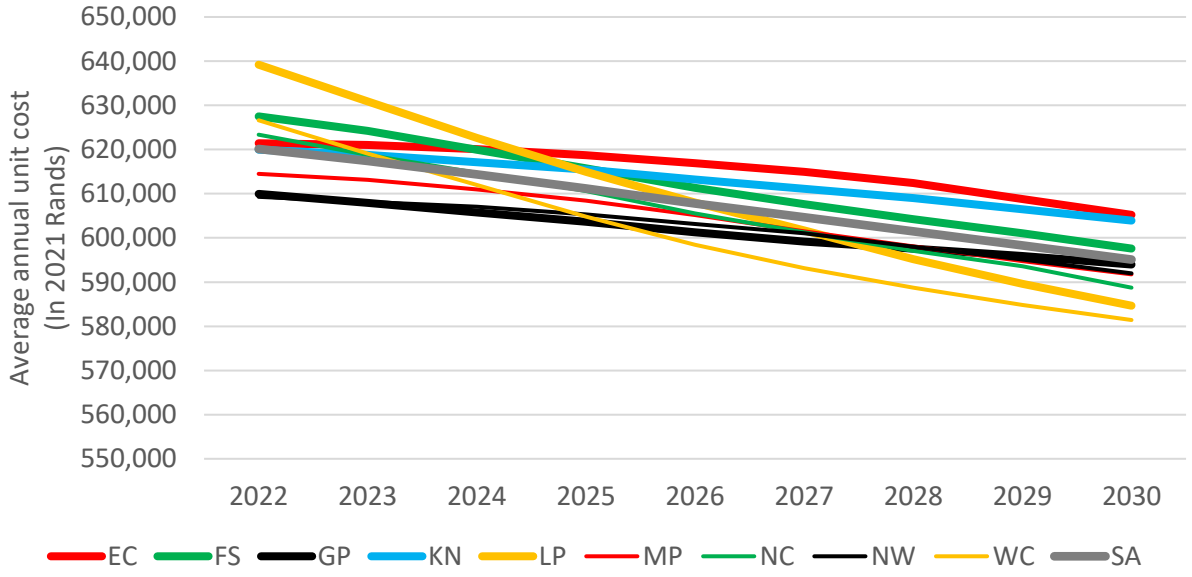
*Table 14: Projected annual growth rates of real unit costs for all educators, increase over the previous year*

| Province | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | Total 2022 - 2030 |
|---|---|---|---|---|---|---|---|---|---|
| EC | 0.2% | 0.1% | 0.1% | 0.0% | 0.0% | -0.1% | -0.2% | -0.2% | -0.1% |
| FS | 0.1% | 0.0% | 0.0% | -0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| GP | 0.3% | 0.2% | 0.2% | 0.1% | 0.1% | 0.1% | 0.0% | 0.0% | 0.9% |
| KN | 0.2% | 0.1% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% | 0.3% |
| LP | -0.1% | -0.2% | -0.2% | -0.2% | -0.2% | -0.3% | -0.2% | -0.2% | -1.7% |
| MP | 0.2% | 0.1% | 0.1% | 0.0% | -0.1% | -0.1% | -0.1% | -0.1% | 0.0% |
| NC | 0.2% | 0.2% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | -0.1% | 0.4% |
| NW | 0.3% | 0.2% | 0.1% | 0.0% | 0.0% | -0.1% | -0.1% | -0.1% | 0.4% |
| WC | -0.2% | -0.2% | -0.2% | -0.2% | -0.2% | -0.2% | -0.1% | -0.1% | -1.5% |
| SA | 0.1% | 0.0% | 0.0% | 0.0% | -0.1% | -0.1% | -0.1% | -0.1% | -0.2% |

*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2030 derived from the national and provincial TSD models. Assumption of no growth in educator numbers for FS, KN, LP, MP, NC, NW and SA. Assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

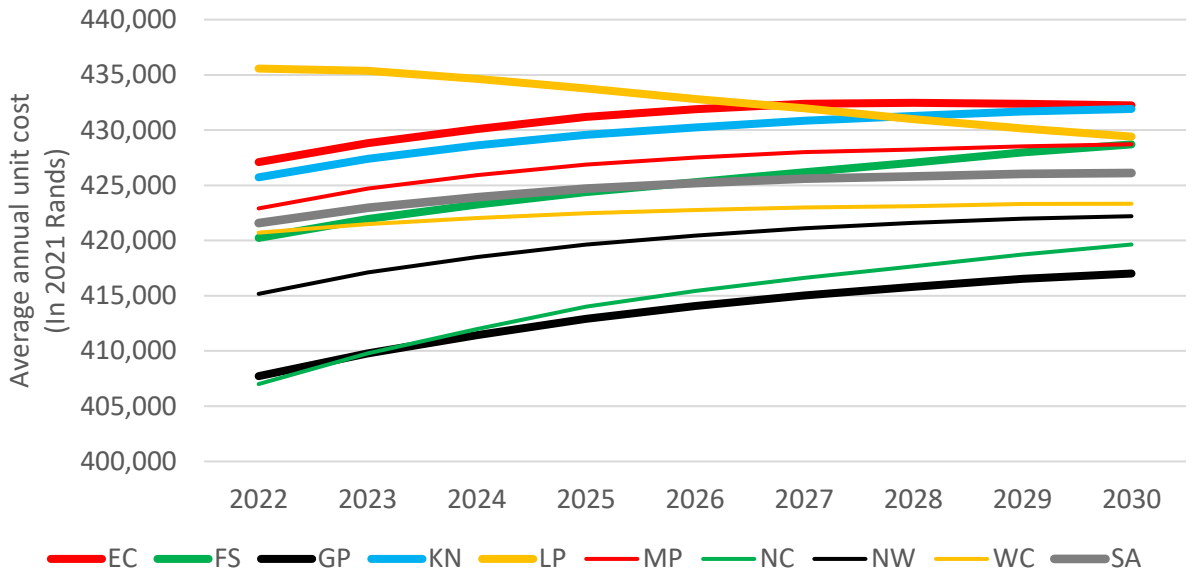
*Note: The growth rate is growth ending in the year indicated. So, growth listed under 2023 is growth from 2022 – 2023.*

*Figure 32: Unit cost projections for senior educators by province (2022 – 2030)*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2030 derived from the national and provincial TSD models. Assumption of no growth in educator numbers for FS, KN, LP, MP, NC, NW and SA. Assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

*Figure 33: Unit cost projections for teachers by province (2022 – 2030)*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed. Estimates to 2030 derived from the national and provincial TSD models. Assumption of no growth in educator numbers for FS, KN, LP, MP, NC, NW and SA. Assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

# 5. Educator movements

## 5.1 Educator movements between provinces

Table 15 and Table 16 track the movement of educators between provinces over a one year and seven-year timespan. Only educators that were present in PERSAL in both years are included in the matrix. In general educators stay within their province, over a one-year period fewer than one percent of teachers moved between provinces, with the exception of the Northern Cape, where just over 1% of teachers moved to another province.

The Northern Cape, North West, Mpumalanga and the Free State have a high level of movement out of the provinces generally. Interestingly, Table 17 shows that there is also a fair bit of movement into the NC and NW from other provinces. Gauteng is the most likely destination province – the number is absolutely large but also relatively large. Of all the educators that were in PERSAL in 2012 and 2019, Gauteng had the highest share (8%) of educators in 2019 who had been in a different province in 2012.

*Table 15: One-year transition matrix of educator movements between provinces from 2018 to 2019*

| | | Province in 2019 | | | | | | | | | | Movement out of province |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | EC | FS | GP | KN | LP | MP | NC | NW | WC | Total | |
| Province in 2018 | EC | 99.86 | 0.00 | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 | 0.00 | 0.06 | 100 | 0.15% |
| | FS | 0.03 | 99.58 | 0.11 | 0.05 | 0.00 | 0.03 | 0.05 | 0.10 | 0.04 | 100 | 0.41% |
| | GP | 0.04 | 0.05 | 99.42 | 0.12 | 0.15 | 0.06 | 0.01 | 0.12 | 0.04 | 100 | 0.59% |
| | KN | 0.04 | 0.02 | 0.08 | 99.81 | 0.00 | 0.03 | 0.00 | 0.01 | 0.01 | 100 | 0.19% |
| | LP | 0.01 | 0.01 | 0.08 | 0.01 | 99.77 | 0.09 | 0.00 | 0.03 | 0.00 | 100 | 0.23% |
| | MP | 0.03 | 0.02 | 0.10 | 0.11 | 0.13 | 99.55 | 0.00 | 0.04 | 0.01 | 100 | 0.44% |
| | NC | 0.12 | 0.18 | 0.03 | 0.04 | 0.05 | 0.00 | 98.86 | 0.35 | 0.37 | 100 | 1.14% |
| | NW | 0.01 | 0.11 | 0.23 | 0.01 | 0.12 | 0.04 | 0.08 | 99.38 | 0.01 | 100 | 0.61% |
| | WC | 0.15 | 0.01 | 0.03 | 0.01 | 0.00 | 0.00 | 0.07 | 0.00 | 99.74 | 100 | 0.27% |

*Source: Anonymised 10-year PERSAL data, only educators that are present in both 2018 and 2019 are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed.*

*Table 16: Seven-year transition matrix of educator movements between provinces from 2012 to 2019, relative movements in percentage*

| Province in 2012 | Province in 2019 | | | | | | | | | | Movement out of province |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | EC | FS | GP | KN | LP | MP | NC | NW | WC | Total | |
| EC | 97.79 | 0.10 | 0.86 | 0.22 | 0.01 | 0.04 | 0.11 | 0.19 | 0.70 | 100 | 2.23% |
| FS | 0.35 | 94.25 | 2.76 | 0.10 | 0.07 | 0.23 | 0.41 | 1.56 | 0.26 | 100 | 5.74% |
| GP | 0.15 | 0.26 | 96.86 | 0.27 | 0.81 | 0.42 | 0.05 | 0.93 | 0.24 | 100 | 3.13% |
| KN | 0.22 | 0.10 | 1.14 | 97.95 | 0.10 | 0.37 | 0.01 | 0.06 | 0.04 | 100 | 2.04% |
| LP | 0.02 | 0.02 | 1.72 | 0.02 | 96.80 | 0.80 | 0.05 | 0.56 | 0.02 | 100 | 3.21% |
| MP | 0.03 | 0.14 | 2.48 | 0.37 | 1.54 | 94.86 | 0.03 | 0.49 | 0.07 | 100 | 5.15% |
| NC | 0.47 | 0.50 | 0.47 | 0.06 | 0.59 | 0.03 | 94.35 | 2.37 | 1.15 | 100 | 5.64% |
| NW | 0.06 | 0.59 | 3.84 | 0.03 | 0.65 | 0.34 | 0.75 | 93.60 | 0.14 | 100 | 6.40% |
| WC | 0.72 | 0.03 | 0.17 | 0.05 | 0.00 | 0.02 | 0.35 | 0.03 | 98.61 | 100 | 1.37% |

*Source: Anonymised 10-year PERSAL data, only educators that are present in both 2012 and 2019 are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed.*

*Table 17: Seven-year transition matrix of educator movements into provinces from 2012 to 2019, in absolute numbers*

| Province in 2012 | Province in 2019 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | EC | FS | GP | KN | LP | MP | NC | NW | WC |
| EC | 42 645 | 42 | 373 | 95 | 5 | 16 | 46 | 82 | 304 |
| FS | 57 | 15 267 | 447 | 17 | 11 | 38 | 67 | 252 | 42 |
| GP | 67 | 117 | 42 770 | 121 | 356 | 187 | 20 | 409 | 108 |
| KN | 146 | 67 | 755 | 64 723 | 64 | 247 | 9 | 37 | 26 |
| LP | 10 | 10 | 709 | 7 | 39 899 | 328 | 20 | 230 | 7 |
| MP | 7 | 34 | 618 | 94 | 385 | 23 644 | 7 | 121 | 17 |
| NC | 31 | 33 | 31 | 4 | 39 | 2 | 6 214 | 156 | 76 |
| NW | 12 | 111 | 726 | 5 | 123 | 65 | 141 | 17 690 | 27 |
| WC | 152 | 7 | 37 | 11 | 0 | 5 | 75 | 6 | 20 858 |
| **Total 2019** | **43 127** | **15 688** | **46 466** | **65 077** | **40 882** | **24 532** | **6 599** | **18 983** | **21 465** |
| **Movement into province** | **482** | **421** | **3 696** | **354** | **983** | **888** | **385** | **1 293** | **607** |
| **% movement into province** | *1.1%* | *2.7%* | *8.0%* | *0.5%* | *2.4%* | *3.6%* | *5.8%* | *6.8%* | *2.8%* |

*Source: Anonymised 10-year PERSAL data, only educators that are present in both 2012 and 2019 are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed.*

## 5.2 Educator movements between pay points

Table 18 shows the movements of educators between pay points, which gives an indication of movement between schools (this could be within the province or across provinces). Educators that were present in 2018, but are not picked up in PERSAL in 2019 are presumed to have resigned or retired, this proportion is reported in the column titled "None-Left system". Only educators that were younger than 50 in 2018 are included in the analysis, to avoid picking up retirement differences across provinces. The analysis is also restricted to look at educators that were in ordinary schools in 2018, to ensure that it is movement between schools that is being observed, and not office-based positions.

Educators below the age of 50 nationally were more likely to move to a different pay-point than leave teaching during the year. The provinces with the highest attrition of educators under 50 are the Western Cape and the Northern Cape, followed by Gauteng. Movement between schools is particularly high in the Northern Cape, Limpopo and the North West – some of this "movement" could be as a result of temporary appointments, it could be an indicator that the province is flexible and responsive in the allocation of teacher where demand is high or could indicate teacher discontent with their schools, which is expressed through seeking alternative teaching posts at other schools.

*Table 18: One-year movement of educators in ordinary schools aged 50 and below between pay points from 2018 to 2019*

| | Pay point in 2019 | | | |
|---|---|---|---|---|
| | Same as in 2018 (%) | Different to 2018 (%) | None - left system (%) | **Total (%)** |
| **EC** | 93.25 | 4.61 | 2.14 | 100 |
| **FS** | 90.54 | 5.54 | 3.93 | 100 |
| **GP** | 91.08 | 3.95 | 4.97 | 100 |
| **KN** | 91.99 | 4.31 | 3.70 | 100 |
| **LP** | 91.04 | 6.95 | 2.00 | 100 |
| **MP** | 92.02 | 4.66 | 3.32 | 100 |
| **NC** | 85.44 | 8.39 | 6.18 | 100 |
| **NW** | 89.42 | 6.30 | 4.28 | 100 |
| **WC** | 87.27 | 6.09 | 6.64 | 100 |
| **Total** | **91.11** | **5.05** | **3.83** | **100** |

*Source: Anonymised PERSAL data with only educators are included with ECD practitioners, ABET teachers, TVET lecturers and examination reviewers removed. Only educators that are present in both 2018 and 2019 who are in pay points that are present in both years after cleaning, are included. Sample also restricted to include only educators that are in primary schools, secondary schools, intermediate schools and combined schools and are under 50 in 2018. Anything above 5% is highlighted.*

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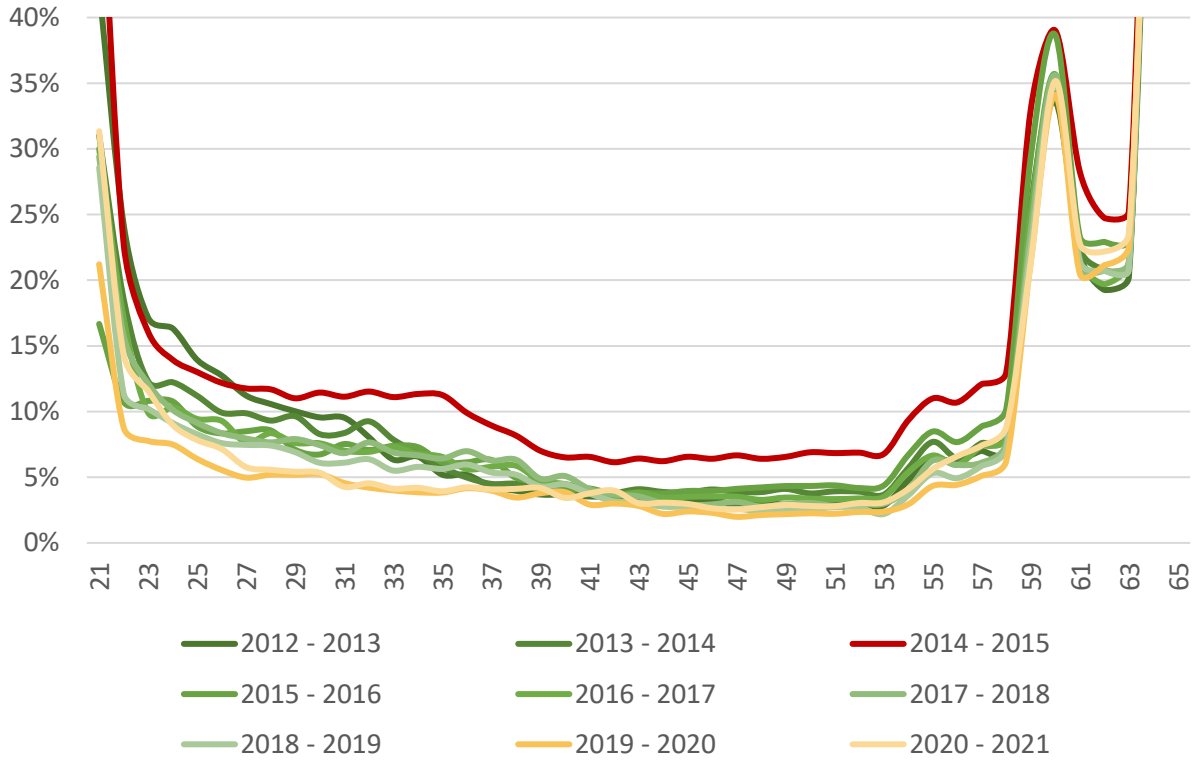
# 7. Appendix

## 7.1 Attrition rates by age over time and by province

The rate at which educators leave the public education system (which we called resign or retire) differs significantly by age at a national level. This age specific attrition is a key input into the Teacher supply and demand model. Raising attrition rates for older educators (56 and older) results in slightly earlier retirement, but does not change the total number of people that retire over a number of years by much as by 65 years of age everyone needs to retire. Within a single year the estimated resignation numbers change in proportion to changes in attrition rates. However, raising or lowering attritions rates also has an impact on the age distribution over time. Higher attrition rates result in a higher number of resignations and retirements. These leavers are then replaced by much younger educators. This effect is then compounded somewhat as the proportion of younger educators increases, as educators below the age of 35 have higher attrition rates than those above 35 years of age.

We look only at the national trend in attrition rates by age, although the province specific trends over time may be slightly different.

*Figure 34: Attrition rates by age for 2012 to 2021 (restricted to 22 – 63 year-olds)*




*Source: Ten-year anonymised PERSAL data looking at educators only, ECD practitioners and examination reviewers, TVET lecturers and ABET teachers removed.*

*Note: Age is age in the first year. Attrition rate of 21-, 22-, 64- and 65-year-olds are not shown, to keep the scale smaller.*

The overarching findings from Figure 34 are that:

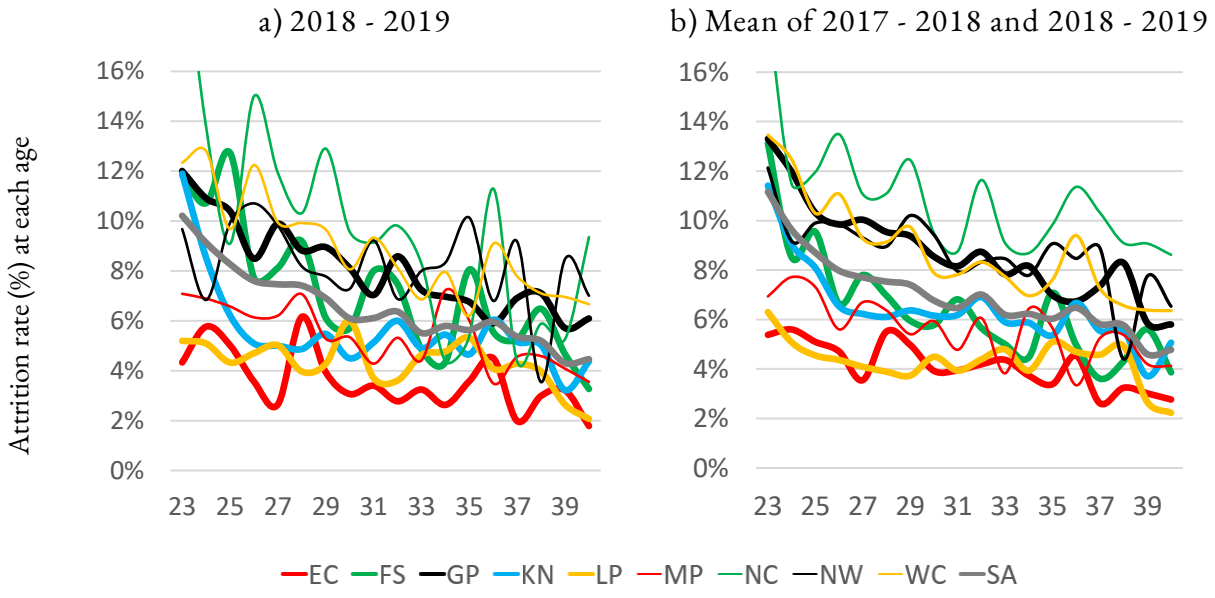
- Attrition rates have been decreasing over time. Attrition between 2012 -2014 was higher than attrition in 2017 - 2019 for most age groups (with the exception of 35–42-year-olds).
- National spike in attrition across all age groups in the period 2014 to 2015 due to rumours relating to the pension.
- COVID-19 affected attrition rates by age differently by age and province. Older educators (55+) were more likely to leave than in previous years, due to a higher number of deaths as a result of the pandemic as well as some educators opting to retire earlier. Younger educators, particularly those below the age of 35, were generally less likely to leave, possibly due to a weak and constrained labour market during this period.

### a. Province specific differences in attrition

However, there are also differences in these age specific attrition rates between provinces.

For an illustration of this variation, see Figure 35 below. Whilst variation between ages is still high when the mean of the two periods, 2017 – 2018 and 2018 -2019, is calculated, the trend is a bit smoother.

*Figure 35: Comparison of provincial attrition rates by age for 25 – 40-year-olds for 2018 – 2019 and the mean of 2017 – 2019*




*Source: Ten-year anonymised PERSAL data looking at educators only, ECD practitioners and examination reviewers, TVET lecturers and ABET teachers removed.*

A trade-off was made in choosing to use the mean of the years 2017 to 2018 and 2018 to 2019. As the group of educators of a particular age within each province is small, the variance in attrition between ages and across years

is higher than at the national level. So, we chose to use the mean of two years so that the between age variation is reduced as can be seen in Figure 35. However, because of the decreasing trend in attrition seen over the 10 years, we chose to use the average of only the two most recent non-COVID years to calculate the provincial attrition rates as inputs for the model.

### b. Provincial range – Selecting upper and lower bound attrition rates

Forecasting is an inexact science. Whilst, the forecasts are firmly rooted in trends and baseline information coming from the 2012 – 2021 period, there is inherent uncertainty around the estimates produced. To emphasise and somewhat quantify a reasonable range within which the estimate is likely to lie, upper and lower bound estimates of total expected resignations and retirements were included in Figure 12. These upper and lower bound estimates were calculated by altering the attrition rates in the provincial models based on historical attrition rates by age between 2012 and 2021. The upper bound was the 75$^{th}$ percentile and the lower bound the 25$^{th}$ percentile attrition rates for the years 2012 to 2021 for a particular age. The relationship of attrition rates between ages was not considered. An example of 25$^{th}$ and 75$^{th}$ percentile attrition rates at the national level, using the 21-year old educators is shown below in Figure 36.

*Figure 36: Example of the 25$^{th}$ and 75$^{th}$ percentile attrition rate for 21-year-old educators*

| | Attrition rate | Year |
|---|---|---|
| | 16.7% | 2015 - 2016 |
| 25$^{th}$ percentile: | 21.2% | 2019 - 2020 |
| **26.7%** | 28.6% | 2018 - 2019 |
| | 29.4% | 2017 - 2018 |
| | 30.0% | 2016 - 2017 |
| | 31.0% | 2013 - 2014 |
| 75$^{th}$ percentile: | 31.3% | 2020 - 2021 |
| **33.8%** | 42.3% | 2012 - 2013 |
| | 54.2% | 2014 - 2015 |

### c. Cohort analysis looking at average age of retirement by province

All educators that were 58 in either 2012, 2013 or 2014 in one of these years were identified and were assigned to these cohorts. The data download from PERSAL in 2014 was done in October, not November as for the other years, which results in some educators who are 58 in 2013 and 2014 – these were assigned to be in the 2013 cohort of 58-year-olds. Any educator that was assigned to be a part of a cohort still counts towards that cohort, even if they leave the schooling system and return. Table 19 shows the number of educators in each cohort by province, only the cohorts 2012 – 2014 are followed as they are the only ones that reach the final retirement age of 65 by 2021, as can be seen in Table 20.

*Table 19: Number of 58-year-old educators by province in each year*

| Province | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| EC | 1 460 | 1 402 | 1 359 | 1 407 | 1 609 | 1 484 | 1 484 | 1 376 | 1 592 | 1 687 |
| FS | 561 | 569 | 559 | 526 | 584 | 547 | 629 | 581 | 691 | 700 |
| GP | 1 299 | 1 399 | 1 451 | 1 495 | 1 597 | 1 658 | 1 696 | 1 736 | 2 005 | 2 062 |
| KN | 1 198 | 1 282 | 1 366 | 1 495 | 1 744 | 1 908 | 2 103 | 2 052 | 2 333 | 2 363 |
| LP | 1 271 | 1 201 | 1 42 2 | 1 398 | 1 597 | 1 621 | 1 895 | 1 806 | 2 189 | 2 315 |
| MP | 574 | 574 | 616 | 758 | 824 | 872 | 944 | 913 | 1 115 | 1 265 |
| NC | 220 | 200 | 219 | 228 | 265 | 269 | 279 | 299 | 274 | 256 |
| NW | 594 | 628 | 633 | 646 | 706 | 725 | 809 | 720 | 876 | 948 |
| WC | 847 | 858 | 884 | 950 | 1 001 | 956 | 975 | 857 | 860 | 933 |
| Total | 8 024 | 8 113 | 8 509 | 8 903 | 9 927 | 10 040 | 10 814 | 10 340 | 11 935 | 12 529 |

*Source: Ten-year anonymised PERSAL data from 2021, only educators are included with ECD practitioners and examination reviewers, ABET teachers and TVET lecturers removed.*

Table 20: Year in which each cohort is at a particular age

| | | Cohort Year (year in which educator is 58 year of age) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year # in the cohort | Age | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 0 | 58 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| 1 | 59 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| 2 | 60 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | |
| 3 | 61 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | | |
| 4 | 62 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | | | |
| 5 | 63 | 2017 | 2018 | 2019 | 2020 | 2021 | | | | |
| 6 | 64 | 2018 | 2019 | 2020 | 2021 | | | | | |
| 7 | 65 | 2019 | 2020 | 2021 | | | | | | |

## 7.2 School types

The table shows the breakdown of the types of schools at which educators were employed in 2021. Most educators, 93%, are in Ordinary schools (Primary, Secondary, Intermediate and Combined). A remaining 3% are in special schools. Here the classification of a Special school includes all of the educators that classified as being in a "Special School" as well as those that are at a school for specific special needs including schools for the physically disabled, the blind, the deaf, the mentally severe handicapped, those with early autism, the epileptic, the cerebral palsied, well as hospital schools and schools of skills. The category "Other" includes office positions (eg. District office or Sub-directorate), other types of schools (eg. Agricultural school or Technical High Schools) and training centres and related institutions such as school hostels.

*Table 21: Number educators assigned to different school types in 2021*

| School type | Number of educators in 2021 | % of total educators |
|---|---|---|
| Primary | 215 150 | 53.1% |
| Secondary | 138 122 | 34.1% |
| Combined | 17 431 | 4.3% |
| Intermediate | 8 029 | 2.0% |
| Special School | 11 977 | 3.0% |
| Other | 14 722 | 3.6% |
| **Total** | **405 431** | **100.0%** |

*Source: Anonymised 2021 PERSAL dataset, looking only at educators, with. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed.*

## 7.3 Trends in schools, enrolment and educator numbers from 2012 to 2021

*Table 22: Changes in educator number by rank for each province from 2012 to 2021*

| Province | *All ranks* | *Teachers* | *HODs* | *Dep. principal* | *Principals* | *Other* |
|---|---|---|---|---|---|---|
| **EC** | *-17%* | *-20%* | *6%* | *8%* | *-10%* | *-22%* |
| **FS** | *-13%* | *-13%* | *-8%* | *-10%* | *-27%* | *-22%* |
| **GP** | *21%* | *28%* | *6%* | *11%* | *-9%* | *-26%* |
| **KN** | *-5%* | *-3%* | *-8%* | *-11%* | *-9%* | *-40%* |
| **LP** | *-8%* | *-2%* | *-38%* | *-50%* | *-6%* | *-34%* |
| **MP** | *3%* | *7%* | *0%* | *1%* | *-19%* | *-42%* |
| **NC** | *6%* | *9%* | *6%* | *24%* | *-17%* | *-20%* |
| **NW** | *2%* | *4%* | *1%* | *15%* | *-21%* | *-28%* |
| **WC** | *12%* | *22%* | *-9%* | *-3%* | *-13%* | *-41%* |
| **SA** | *-1%* | *2%* | *-6%* | *-5%* | *-12%* | *-31%* |

*Source: Anonymised PERSAL data from 2012 and 2021. Only educators are considered. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers were removed.*

*Table 23: Enrolment growth in ordinary schools over the period 2012 – 2021 by province*

| | Enrolment in Ordinary Public & Independent Schools | | Growth |
|---|---|---|---|
| Province | 2012 | 2021 | '12-21 |
| EC | 1 951 523 | 1 848 053 | -5% |
| FS | 661 974 | 726 713 | 10% |
| GT | 2 075 387 | 2 564 812 | 24% |
| KZ | 2 877 969 | 2 893 958 | 1% |
| LM | 1 715 778 | 1 799 130 | 5% |
| MP | 1 054 783 | 1 134 889 | 8% |
| NC | 277 494 | 304 566 | 10% |
| NW | 775 142 | 872 601 | 13% |
| WC | 1 038 019 | 1 264 527 | 22% |
| Total | 12 428 069 | 13 409 249 | 8% |

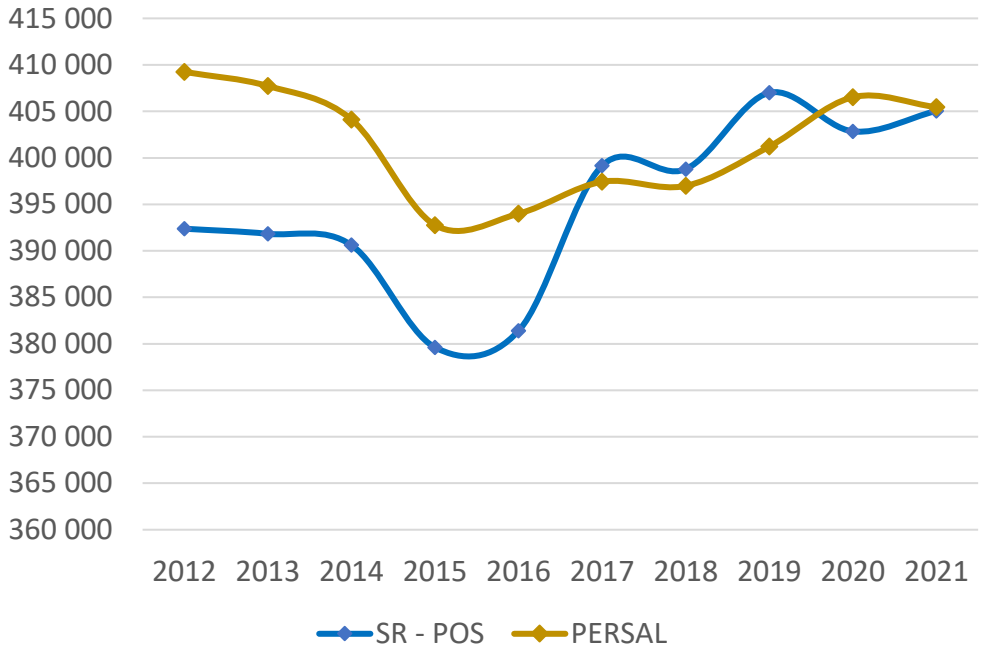
*Source: Department of Basic Education, School Realities-EMIS (2012 and2021)*

*Table 24: Projected growth in school-aged population of children aged 7-18 by province*

| | Number of children Aged 7-18 | | | Growth | Growth |
|---|---|---|---|---|---|
| Province | 2012 | 2021 | 2030 | '12-21 | '21-30 |
| EC | 1 657 202 | 1 598 475 | 1 361 637 | -4% | -15% |
| FS | 592 445 | 676 489 | 650 820 | 14% | -4% |
| GT | 1 962 793 | 2 498 533 | 3 180 884 | 27% | 27% |
| KZ | 2 485 822 | 2 690 378 | 2 657 716 | 8% | -1% |
| LM | 1 395 864 | 1 507 386 | 1 612 125 | 8% | 7% |
| MP | 977 749 | 1 100 594 | 1 165 728 | 13% | 6% |
| NC | 254 075 | 277 560 | 281 208 | 9% | 1% |
| NW | 742 943 | 893 530 | 930 323 | 20% | 4% |
| WC | 1 068 009 | 1 298 801 | 1 496 731 | 22% | 15% |
| Total | 11 136 902 | 12 541 746 | 13 337 172 | 13% | 6% |

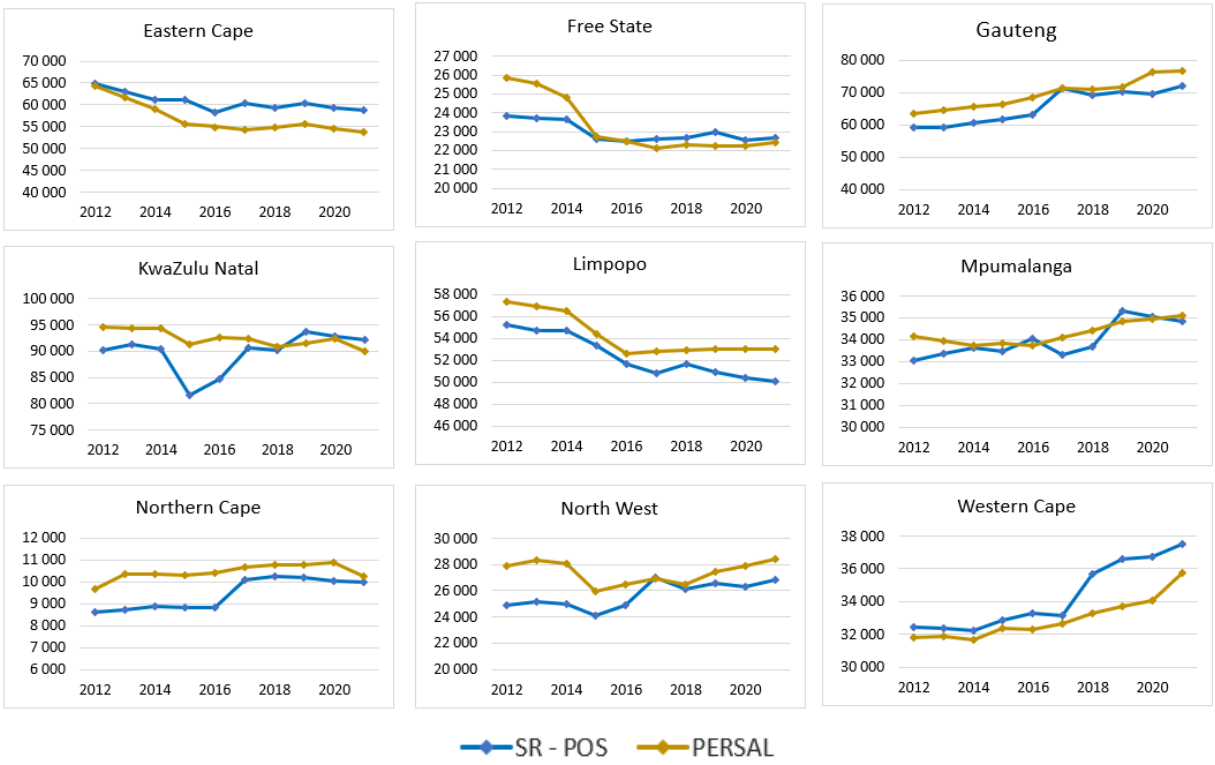
*Source: Thembisa age specific data V4.5 for school-aged population (Ages 7-18) estimates. All population estimates in the Thembisa dataset, from 2012 onwards, are projected figures.*

*Figure 37: Comparing educator numbers in South African public ordinary schools reported in School Realities and educator totals obtained from the 10-year anonymized PERSAL dataset*




*Source: Department of Basic Education, School Realities-EMIS (2012 – 2021) looking at educator totals in public ordinary schools. Ten-year anonymised PERSAL dataset, looking only at educators, with. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed.*

*Figure 38: Comparing educator numbers in South African public ordinary schools reported in School Realities and educator totals obtained from the 10-year anonymized PERSAL dataset by province*

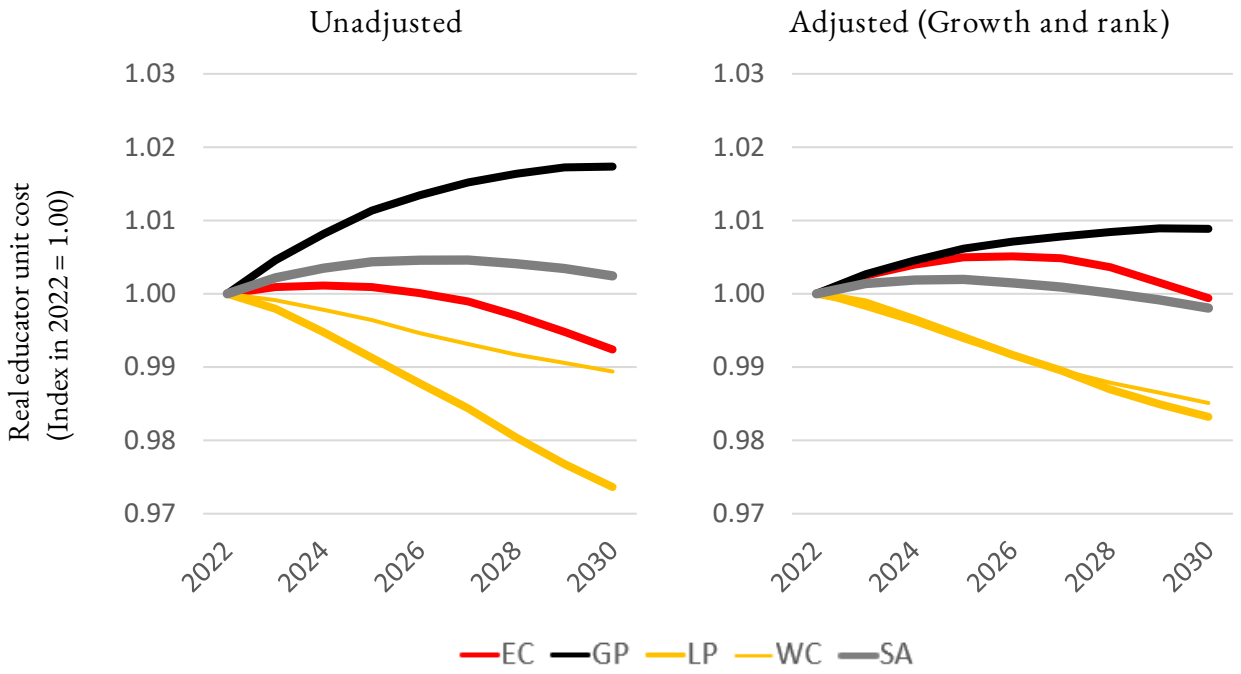



*Source: Department of Basic Education, School Realities-EMIS (2012 – 2021) looking at educator totals in public ordinary schools. Ten-year anonymised PERSAL dataset, looking only at educators, with. ECD practitioners, examination reviewers, ABET teachers and TVET lecturers removed.*

## 7.4 Adjusted and unadjusted unit cost projections

The figure below shows the unadjusted – constant educators and same rank proportion – projections on the left and the adjusted indexed unit cost projections on the right, where GP and the WC have growing educator headcounts. This result in a very slight decline in unit cost from unadjusted to the adjusted projections. Conversely, the EC has decreasing educator number by 10% to 2030, so the adjusted Unit costs decrease slightly less than in the unadjusted scenario. In LP for the adjusted scenario, the proportion of senior educators rises between 2022 and 2030. As teachers' salaries are lower than senior educators this results in less of a decline in unit cost in the adjusted scenario. However, the magnitude of these differences is very small - at most 1% over 8 years.

*Figure 39: Indexed Unit Cost Projections for all educators for the EC, GP, LP and WC*




*Source: Anonymised PERSAL data from 2021, only educators are considered. ECD practitioners and examination reviewers, ABET teachers and TVET lecturers are removed. Estimates to 2030 derived from the national and provincial TSD models. Unadjusted – assumed constant educators and rank proportions as in 2021. For the adjusted models, assume 20% educator growth for GP, 10% for WC and a decline in 10% of educators in the EC. In LP assume that the proportion of senior educators grows from 16% in 2021 to 21% in 2030.*

*Table 25: Consolidated provincial 2022 EPRE tables showing the total education budget and compensation of employees*

| Province | Description | 2018/19 Actual | 2019/20 Actual | 2020/21 Preliminary outcome | 2021/22 Main appropriation | 2021/22 Adjusted appropriation | 2021/22 Revised estimate | 2022/23 Baseline | 2023/24 Baseline | 2024/25 Baseline |
|---|---|---|---|---|---|---|---|---|---|---|
| **EC** | **Basic education** | **35 321 748** | **37 507 520** | **36 962 745** | **35 454 861** | **37 803 956** | **37 803 956** | **38 559 185** | **38 497 804** | **39 090 526** |
| | COE | 27 414 168 | 29 293 526 | 29 464 328 | 28 548 475 | 29 594 843 | 29 486 526 | 29 789 293 | 30 109 597 | 31 447 761 |
| | *COE % of Total* | *78%* | *78%* | *80%* | *81%* | *78%* | *78%* | *77%* | *78%* | *80%* |
| **FS** | **Basic education** | **13 619 286** | **14 714 095** | **15 190 688** | **15 474 944** | **16 279 687** | **16 956 763** | **17 293 137** | **16 813 996** | **16 621 748** |
| | COE | 10 973 949 | 11 712 863 | 11 740 422 | 11 936 698 | 12 133 447 | 12 634 128 | 12 811 675 | 12 844 906 | 13 100 300 |
| | *COE % of Total* | *81%* | *80%* | *77%* | *77%* | *75%* | *75%* | *74%* | *76%* | *79%* |
| **GP** | **Basic education** | **45 206 886** | **48 544 751** | **51 681 924** | **54 040 954** | **57 364 342** | **57 605 757** | **59 736 014** | **60 495 822** | **61 874 240** |
| | COE | 33 773 841 | 36 327 616 | 37 538 768 | 39 121 035 | 40 345 455 | 40 636 832 | 42 286 616 | 44 113 264 | 46 075 962 |
| | *COE % of Total* | *75%* | *75%* | *73%* | *72%* | *70%* | *71%* | *71%* | *73%* | *74%* |
| **KN** | **Basic education** | **50 776 516** | **54 835 076** | **57 390 772** | **53 184 040** | **57 433 185** | **58 803 503** | **57 480 788** | **57 794 640** | **58 502 212** |
| | COE | 42 293 314 | 45 441 188 | 46 020 028 | 44 145 871 | 47 977 398 | 49 478 653 | 47 066 626 | 46 945 553 | 47 588 954 |
| | *COE % of Total* | *83%* | *83%* | *80%* | *83%* | *84%* | *84%* | *82%* | *81%* | *81%* |
| **LP** | **Basic education** | **30 679 064** | **31 953 760** | **32 939 203** | **32 586 347** | **35 725 977** | **36 660 399** | **36 445 088** | **36 771 323** | **36 599 445** |
| | COE | 24 725 638 | 26 230 009 | 26 114 714 | 24 915 419 | 26 917 541 | 27 663 851 | 26 924 236 | 27 174 105 | 27 498 544 |
| | *COE % of Total* | *81%* | *82%* | *79%* | *76%* | *75%* | *75%* | *74%* | *74%* | *75%* |
| **MP** | **Basic education** | **20 976 616** | **22 635 488** | **22 354 865** | **22 628 331** | **23 769 532** | **23 769 532** | **24 273 229** | **23 959 757** | **24 528 280** |
| | COE | 16 459 396 | 17 587 542 | 17 744 875 | 18 588 758 | 18 339 710 | 18 339 319 | 18 719 486 | 18 293 740 | 19 113 992 |
| | *COE % of Total* | *78%* | *78%* | *79%* | *82%* | *77%* | *77%* | *77%* | *76%* | *78%* |
| **NW** | **Basic education** | **15 702 650** | **16 676 985** | **17 481 340** | **18 011 179** | **19 295 380** | **19 295 380** | **20 346 143** | **19 668 024** | **20 166 335** |
| | COE | 12 542 877 | 13 439 496 | 13 809 788 | 13 824 746 | 14 703 975 | 14 703 975 | 15 398 008 | 14 664 076 | 15 359 191 |
| | *COE % of Total* | *80%* | *81%* | *79%* | *77%* | *76%* | *76%* | *76%* | *75%* | *76%* |
| **NC** | **Basic education** | **6 455 682** | **6 910 216** | **7 180 417** | **7 136 914** | **7 476 151** | **7 543 195** | **7 671 519** | **7 694 560** | **7 691 442** |
| | COE | 4 947 963 | 5 281 624 | 5 347 856 | 5 354 035 | 5 548 891 | 5 644 281 | 5 551 232 | 5 615 579 | 5 705 585 |
| | *COE % of Total* | *77%* | *76%* | *74%* | *75%* | *74%* | *75%* | *72%* | *73%* | *74%* |
| **WC** | **Basic education** | **22 427 766** | **23 794 241** | **24 446 409** | **24 869 113** | **25 819 739** | **25 819 739** | **28 032 601** | **28 006 088** | **27 810 778** |
| | COE | 16 369 721 | 17 493 479 | 17 577 464 | 18 099 337 | 18 668 526 | 18 664 191 | 19 500 308 | 19 427 301 | 19 504 590 |
| | *COE % of Total* | *73%* | *74%* | *72%* | *73%* | *72%* | *72%* | *70%* | *69%* | *70%* |
| **SA** | **Basic education** | **241 166 214** | **257 572 132** | **265 628 363** | **263 386 682** | **280 967 949** | **284 258 224** | **289 837 704** | **289 702 014** | **292 885 006** |
| | COE | 189 500 867 | 202 807 343 | 205 358 243 | 204 534 374 | 214 229 786 | 217 251 756 | 218 047 480 | 219 188 121 | 225 394 879 |
| | *COE % of Total* | *79%* | *79%* | *77%* | *78%* | *76%* | *76%* | *75%* | *76%* | *77%* |

*Source: National Treasury 2022 Provincial Budget EPRE tables available at https://www.treasury.gov.za/documents/provincial%20budget/default.aspx*