

Teacher workforce: fiction vs fact

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Research Report 43

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Executive summary

Australia's education outcomes have deteriorated — despite increased spending on teachers and policy initiatives intended to increase the quantity and quality of the teacher workforce.

Education policy is dominated by inputs-based approaches, which see increasing inputs — such as the number of teachers (and, correspondingly smaller class sizes), salaries, and narrow indicators of 'quality' (such as level of credentials, years of experience, and teachers' test scores) — as the path to better education outcomes. But there is little evidence that increasing inputs improves outcomes.

There is a not an overall teacher workforce shortage

Claims of an imminent and significant overall teacher workforce shortage are largely unfounded. Concerns about the potential impact on the workforce from attrition, fewer commencing initial teacher education (ITE) students, an expected wave of teacher retirements, and growth in the number of school students all appear to be overstated or pose only relatively mild risks.

By international standards, Australia has among the most resourced school systems and records among the lowest on indicators of overall staff shortages. To the extent that a teacher shortage exists, it is geographically-specific and discipline-specific. The genuine shortage of mathematics teachers, in particular, should not be conflated with an overall shortage.

The Australian teacher workforce has consistently grown for the past two decades. The workforce is also growing (rather than slowing) at a faster pace in the past five years than the long-term rate.

Over the past 20 years, full-time-equivalent school students have increased by around 23%, while the

full-time-equivalent teachers increased by around 37%. Accompanying the growth of the teacher workforce is a more than doubling of the non-teaching workforce in schools.

Predictions of future shortages are typically made without proper consideration of the full range of potential supply and demand factors impacting on the workforce. Significant improvements to data collection and reporting are needed to better inform policy decisions and public communication of teacher workforce needs.

Addressing the subject-specific and geographic-specific teacher shortages will not be solved by commonly proposed approaches aimed at increasing attraction and reducing attrition — such as higher across-the-board salaries or reductions in class sizes.

Increasing and diversifying the supply of teachers that are most needed — especially maths teachers — requires a combination of targeted strategies. Some potential approaches include allowing market-based flexibility for salaries, reduced restrictions for those with industry experience to enter teaching, deregulating access for the international teaching workforce, and streamlined reskilling programmes to facilitate transitions to in-demand areas of need.

There doesn't appear to be a significant teacher attrition problem, the source of attrition is not clear, and not all attrition is undesirable

It's regularly reported that around one in three teachers leave the profession within five years. However, there is no nationally consistent and reliable evidence of that. Available data suggests it is more likely the attrition rate of early career teachers is around 10-14%.

By international standards, Australia's overall teacher attrition is relatively low — likely around 4.9%, which is around half the rate of English teachers. Australia's teacher workforce is also relatively young and with relatively few teachers approaching retirement, compared to OECD countries.

Moreover, it's often mistakenly argued by education unions that Australian teacher attrition is the result of low levels of pay and a perceived low status. However, Australian teachers are among the highest paid in the world, are nearly twice as likely than the OECD average to be satisfied with pay, and report relatively high perceptions of their status.

While it's true that filling vacancies due to attrition can be inconvenient, some degree of attrition is natural and there is no evidence that the level of attrition overall has any significant impact on education outcomes. However, policies aimed at preventing attrition — such as increases in across-the-board salaries and reductions in class sizes — are expensive and do not lift outcomes.

Focus on quality of teacher preparation programmes, rather than quality of university entrants alone

In recent years, policy interventions have focused on regulating entry to the teaching profession. However, policy efforts to predict and selectively recruit potentially effective teachers are somewhat blunt instruments.^{1 2} By and large, greater regulation of the teacher workforce is unlikely to improve outcomes, while posing potential risks of unintended consequences.

Moreover, there is not convincing evidence that Australia has a significant problem with *teacher* quality per se. Australian teachers are sourced from the same point in the academic distribution as in high performing countries, like Finland and Singapore. However, recent CIS research has identified significant deficiencies in the quality of *teaching* practices in Australian ITE programmes.

As a result, the greatest risk to the quality of the teaching profession is not the 'quality' of teachers who *come into* ITE courses, but the quality and preparedness of teachers *coming out of* ITE. Research suggests that teachers' success during ITE is a better predictor of their effectiveness in the classroom than their performance in school exit exams (and measured by the ATAR). The practices and performance of teachers when they are in training are a strong indicator of their likely effectiveness in future. Both federal and state governments have roles to play in further improvements to quality assurance of ITE.

Australian teachers commonly report a lack of quality practical training in classrooms during ITE. There is strong evidence that the quality — though not necessarily quantity — of time that trainee teachers spend in practicum is a significant predictor of teachers' effectiveness. Moreover, trainee teachers demonstrate significantly better outcomes when they are paired with

instructionally effective supervising teachers and placed in schools that are high performing. Trainee teachers who are placed in high-performing schools and with highly-effective supervising teachers are equally as effective as third year teachers by the time they enter the workforce.

Recognise and reward high performing teachers, not just credentials or years of tenure

Lifting the quality of teachers' training and practices in classrooms has significantly greater impact on student outcomes than commonly applied 'teacher quality' interventions, such as raising the credentials of teachers, having a teacher workforce with longer years of tenure, self-reported confidence of teachers, or the academic and other characteristics of incoming teachers. There is little to no relationship between these input-based 'teacher quality' factors and student achievement.

For instance, it is often assumed that teachers with longer tenure or more credentials are more effective than less credentialled or less experienced ones.

However, there is no evidence that teachers with a postgraduate degree are any more effective than those without. There is also little evidence that those who enter teaching through non-traditional pathways are any less effective — while some evidence shows they perform better than those who complete traditional ITE programmes.

OECD analysis confirms no relationship between teachers' years of experience and the achievement of students. Australian teachers with only a few years of experience are often equally as effective as those with more years in the classroom.

Many of the factors commonly claimed to significantly impact on student achievement — such as class sizes, teacher stress, teachers' pay, conditions, and perceptions of teaching — have virtually no effect on student outcomes.

What teachers and schools do is more important than who teachers are — such as their school academic achievement, psychological dispositions,³ and the like. How teachers use their working time (rather than the amount of working time), their practices in the classroom, school-based policies, and the quality (not necessarily quantity) of training are the significant factors that impact student achievement.

Performance management remains underdeveloped in Australian schools. This limits the ability of teachers to receive timely, independent, and meaningful feedback to improve their performance. Equally as important, it means that students do not consistently receive the highest possible quality of teaching. Improving the quality of teaching cannot be meaningfully achieved without commitment to greater performance management practices.

Introduction

Education has long been one of the most important areas of government policy, and spending on school education in particular has been increasing in real terms, year on year. By far the greatest component of school expenditure is teachers' salaries.

Real spending on teachers per student has increased significantly in recent years — 14% from 2010-11 to 2019-20 (Figure 1 and 2). But it is of considerable concern that there have not been any clear educational benefits from this additional influx of funding.^{4 5}

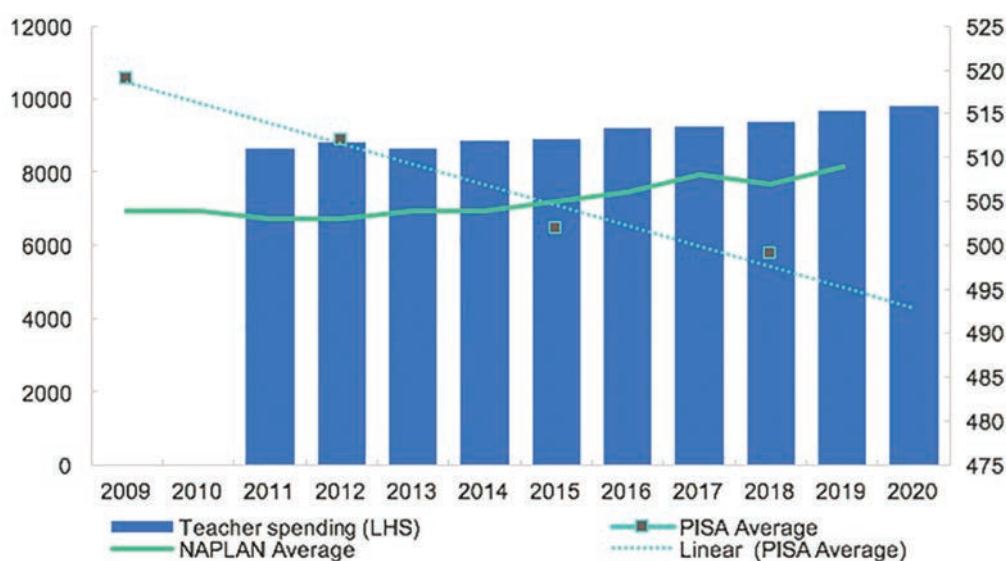
Australian student achievement over the past decade has been no better than mixed. Achievement trends in the OECD's Programme for International Student Assessment (PISA) have shown consistent declines. Across all assessed PISA domains, Australia's decline is more consistent and steep than any other OECD country except Finland.

One of the reasons for this lack of return is that education policy has focused too heavily on input-based approaches that believe more inputs — such as the number of teachers (and, correspondingly smaller class sizes), higher across-the-board teacher salaries, and narrow 'quality' indicators (such as level of credentials, years of experience, length of coursework preparation, and teachers' test scores) — will result in better education outcomes.

Such ideas persist, despite decades of empirical evidence finding virtually no statistical relationship between more inputs and better outcomes.⁶

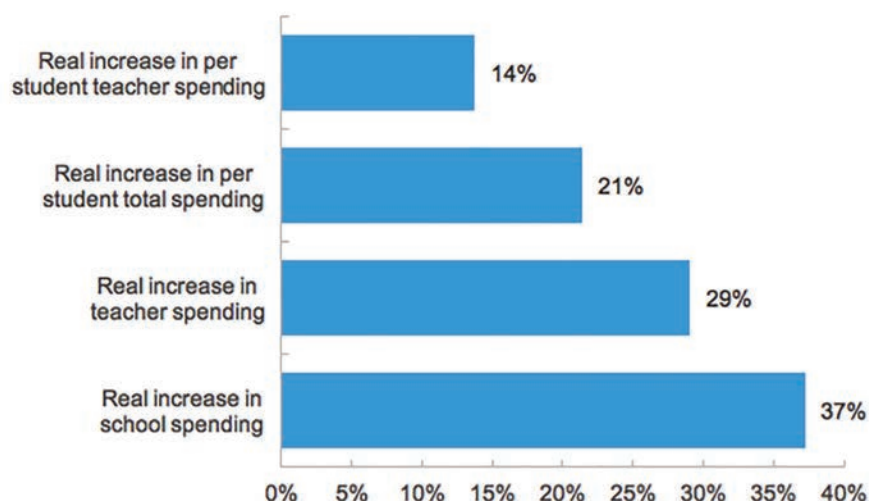
It is not just that policymakers have focused on input / quantity based measures: the quantity measures they have focused on (like general teacher shortages) are the wrong ones. Moreover, to the extent they have

Figure 1. Real teacher expenditure per student (LHS, government schools only; 2019-20 dollars), 2010-11 to 2019-20, and consolidated student achievement trend in NAPLAN and PISA (RHS).



Source: Productivity Commission Report on Government Services (2022), Programme for International Student Assessment (15 year olds average across all domains), and National Assessment Program – Literacy and Numeracy (average Year 3, 5, 7, and 9 and all domains).

Figure 2. Real change in total public spending on schooling and on teachers, 2010-11 to 2019-20.



Source: Productivity Commission Report on Government Services (2022).
NB that teacher spending data is reported only for government schools.

targeted the effectiveness or quality of the teaching workforce, too much focus has been on improving the quality of *teachers*, rather than the quality of *teaching*.

The most obvious area where this has played out is in Initial Teacher Education (ITE), which has undergone a series of significant reforms over the past decade — largely to improve the ‘quality’ of people who become *teachers*, while making fewer inroads in impacting on their *teaching* quality.

A major development has been the formation of the Teacher Education Ministerial Advisory Group (TEMAG) in 2014, which committed to improvement in five key areas:⁷

- stronger quality assurance of ITE programs;
- rigorous selection of entrants into initial teacher education;
- robust assessment of graduates;
- improved professional experience for pre-service teachers;
- and national research and workforce planning capabilities.

TEMAG has led to some incremental improvements in ITE — with slightly fewer low-ATAR course entrants, some consolidation of ITE programmes, and fewer underprepared (by self-report) teachers.⁸

In 2015, the federal government established the Literacy and Numeracy Test for Initial Teacher Education Students (LANTITE)⁹ as the tool to ensure all beginning teachers meet the standard of achievement equivalent to the top 30% of adults.

Despite these policies, it is clear that far more work remains to improve the sector. For example, in 2021, the federal government initiated a new Quality Initial Teaching Review (QITE) with a two-fold focus: better attracting, selecting, and keeping high quality candidates into teaching; and better preparation of graduates to be more effective teachers.

In the Australian Government’s response to the QITE final report, it announced the appointment of a further review — the new Initial Teacher Education Quality Assessment Expert Panel, with a view to develop new minimum and excellence threshold standards for ITE courses.

Within this context, this paper challenges several persistent assumptions about the quantity and quality of the teacher workforce and identifies areas of concern supported by data and evidence.

Quantity: how many teachers do we have and how many do we need?

Teacher workforce levels are determined by both demand and supply factors.

Demand is driven by any factor that requires more or fewer teachers for schools to function. It is largely determined by class sizes (and instructional supports), the number and range of course offerings, student population trends, and proportions of students requiring additional and intensive interventions (such as those with learning difficulties and special needs).

Supply includes any factor that impacts the numbers of teachers available to meet the demands of schooling. It is determined by the number of commencing teachers (including the entry and graduation rate from ITE courses), specialisations of teachers, geographical and school location preferences, the regulations placed on teachers to enter and serve in the workforce, employment preferences (including proportions of part-time and casual preferences, as well as ITE graduates and registered teachers who choose not to work as teachers), and the proportion of teachers exiting the workforce (based on retention vs attrition rates, including retirement).

Teacher supply is also impacted by labour market conditions more broadly — which goes some way to explaining changing preferences for high-ATAR school leavers entering teaching or choosing alternative professions.¹⁰ For instance, in a tight labour market (and where non-teaching salaries are relatively attractive), prospective teachers may have a wider range of employment opportunities. General economic conditions also impact on attrition decisions, including when teachers choose to retire. In recent years, large growth in comparable professions to teaching — like early childhood and other non-school education services — have drawn potential school teachers into other employment.

A teacher shortage exists when supply is unable to keep up with demand,* for any variety of factors. Shortages can be subject specific, geographically specific, or school type (relating to primary, secondary, or special education schools) or can be observed across the entire education system.

Unfortunately, most analysis relating to the teacher workforce is only one-dimensional. As a result, projections of teacher shortages are regularly made based on a change in just one of the factors listed above, without accounting for changes in the other dimensions. This means that decision-making often

does not benefit from proper matching of supply and demand factors impacting on the teacher workforce.

In part, ambiguity over the state of the teacher workforce has been the result of limited reliable and consistent reporting of relevant data. As far back as 2007, education ministers agreed in principle to “develop a process to achieve common [workforce] core data sets and definitions” and subsequently agreed to the development of a national teaching workforce dataset. Since 2011, the federal government has been working toward a National Teaching Workforce Dataset. Subsequently, all education ministers agreed to the Australian Teacher Workforce Data (AWTD) in 2016, under the management of the Australian Institute for Teaching and School Leadership (AITSL).

ASSUMPTION: Australia is facing a critical shortage of teachers

There are around 304,000 full-time-equivalent (FTE) teachers working in Australia,¹¹ with projections the workforce will make a nett gain of around 20,000 teachers from 2020 to 2025.¹² Yet, it is commonly reported there are significant and persistent shortages of teachers.^{13 14 15}

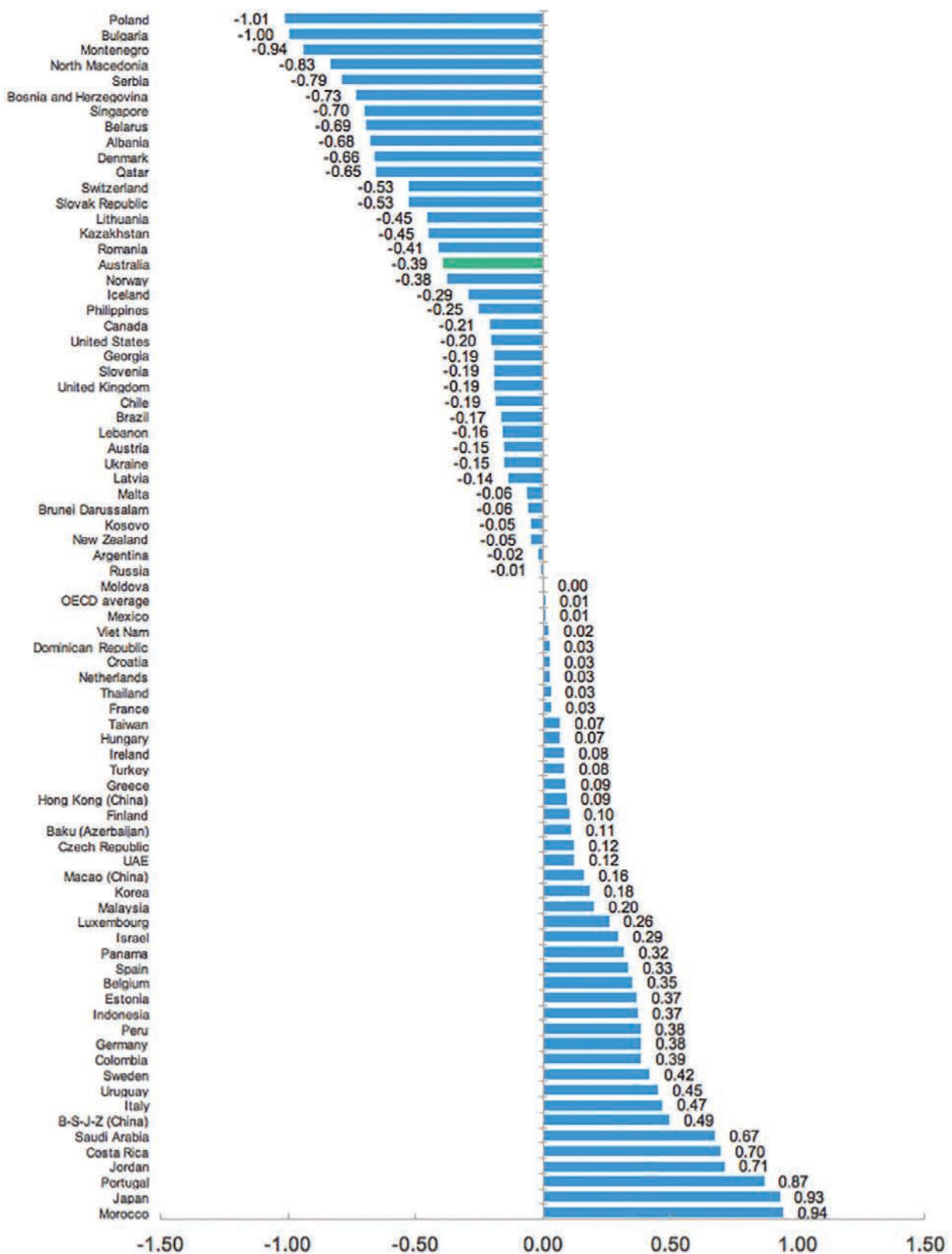
Several reasons are proposed for a claimed impending and worsening shortage of teachers. Among the most common are the growth in student enrolments (requiring more teachers in order to maintain student-teacher ratios) as well as projected attrition of teachers currently in the workforce (as is discussed later in this paper).

FACT: By international standards, Australia has relatively low teacher and resource shortages

The OECD’s Index of Shortage of Education Staff provides an international comparison of availability and quality of teaching and support staff. Of the 78 countries with comparable data, Australia is ranked around the bottom fifth — indicating that Australia experiences considerably lower levels of staff shortages compared to others (see Figure 3). And compared to OECD countries, Australian principals report relatively low levels of shortages of teachers and non-teaching support staff (see Figure 4).

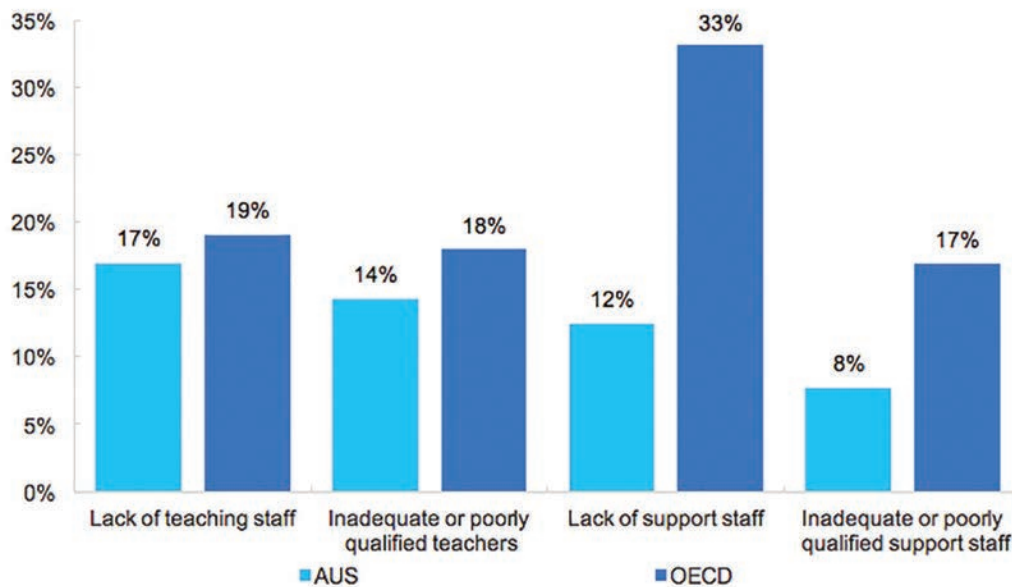
* Some school systems prefer to use a measure of vacancy rates (the proportion of permanent unfilled positions within the school system). While it’s true that vacancy rates reflect the experience of shortages, they do not necessarily fully reflect the potential of workforce supply to meet demand.

Figure 3. OECD Index of Shortage of Education Staff, countries ranked from lowest shortage (lower values) to highest shortage (higher values).



Source: OECD (2020). PISA 2018 Volume V, Figure V.4.2.

Figure 4. Proportion of students in schools whose principal reported that the school's capacity to provide instruction is hindered to some extent or a lot by the following factors, Australia and OECD average.



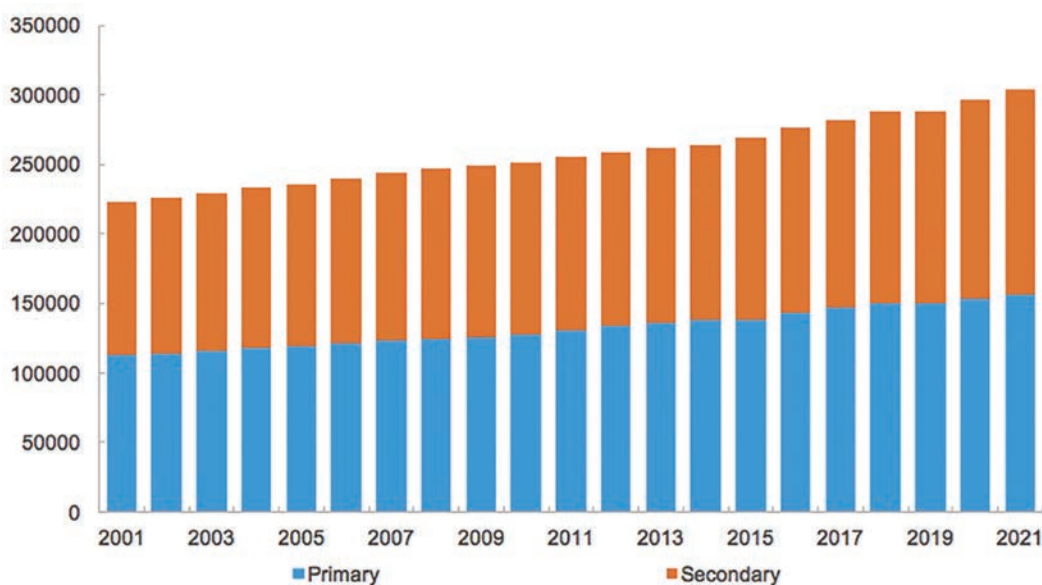
Source: OECD (2020). PISA 2018 Volume V, Figure V.4.3.

FACT: The teacher workforce has been consistently growing for two decades and is not slowing

Simply put, the teacher workforce increases when more teachers enter the workforce than leave it.

Over the past 20 years, the Australian full-time equivalent teacher workforce has increased by more than 37% (see Figure 5). The rate of growth of the workforce has also been increasing — in the past five years the workforce has grown by 2% each year on average, compared to 1.6% over the twenty-year period.

Figure 5. Full time equivalent teacher workforce (2001-2021), by school type.



Source: ABS (2022). Schools, 2020, Cat. No. 4221.0.

Available forecast data combining supply and demand largely do not validate concerns of significant across-workforce teacher shortages. For instance, Victorian projections suggest that its teacher supply will continue to exceed demand.¹⁶ By 2026, it is estimated there will be demand for 103,410 Victorian teachers, while there is projected to be 150,634 registered teachers at this time. The surplus of teachers — particularly at primary school level — is expected to significantly *increase* rather than decrease. Queensland data suggests that between 1997 and 2015, nearly twice as many teachers have entered the profession than have left.

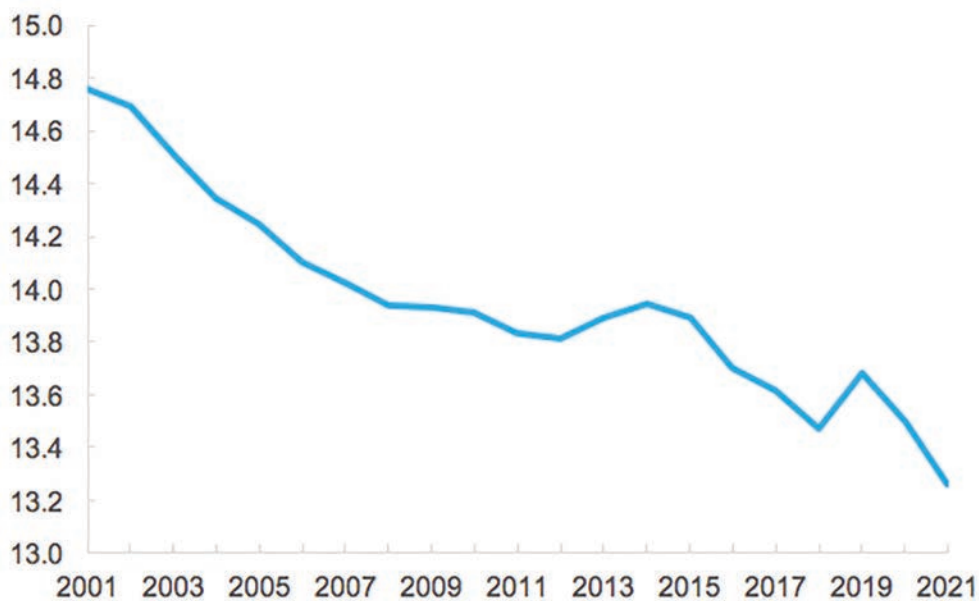
FACT: Projected teacher workforce shortages rely on assumed lower student-teacher ratios

The student-teacher ratio is a critical demand-side driver of teacher workforce needs. A lower student-teacher ratio means more teachers are needed to service the same number of students. Over the long run, student-teacher ratios have declined — meaning there are far fewer students per teacher in Australian

classrooms. In the late 1960s, there were around 25.6 students per teacher, but this had almost halved to 13.3 by 2021 (see Figure 6). The student-teacher ratio is markedly lower in some states and territories compared to others (Figure 8), and there have been clear trends in some states — particularly Victoria, Queensland, Tasmania, and South Australia — over the past decade to reduce the student-teacher ratio (Figure 7).

Declining student-teacher ratios are largely related (though not exactly equivalent) to smaller class sizes.^{**} The push for smaller class sizes has persisted despite decades of research finding no significant relationship between class size and student achievement.^{17 18} While some specific instruction can be more effective with smaller classes, research shows student performance in most classes is unaffected by variations in class size of between 15 and 40 students.¹⁹ OECD analysis of PISA data indicates that students in larger classes actually tend to achieve slightly better than those in smaller ones in reading and science, while in maths no relationship was observed.

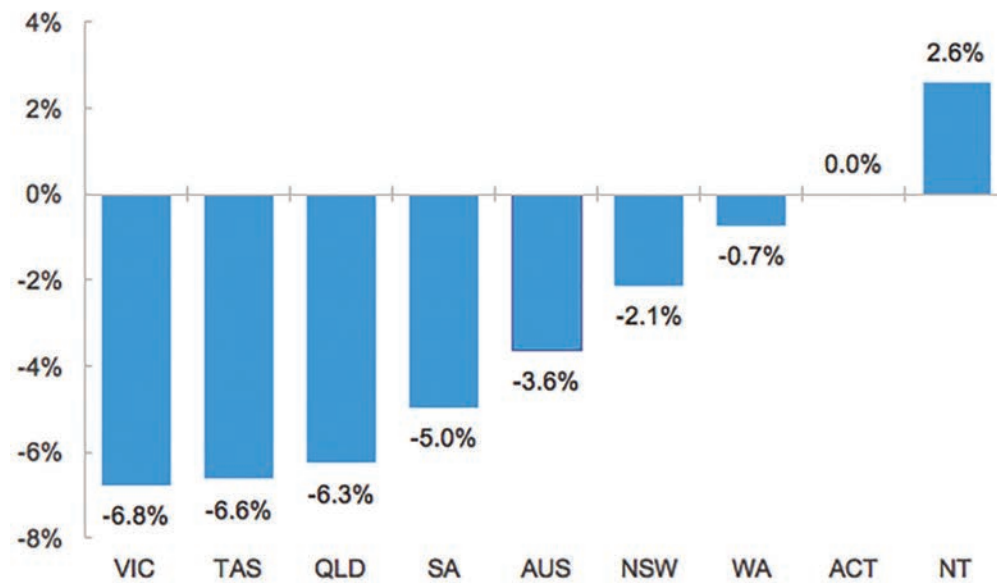
Figure 6. Full-time equivalent students per teacher ratio, Australia, 2006-2021.



Source: ABS (2022). Schools.

^{**} National data on overall class sizes is not systematically collected, so the student-teacher ratio is the best available proxy for class size.

Figure 7. Change in student-teacher ratio, 2011-2021, states and territories, all school levels combined.



Source: ABS (2022). Schools.

Figure 8. State and territory differences in student-teacher ratio, 2021 (student-teacher ratio labelled in 2011 in hollow dots)



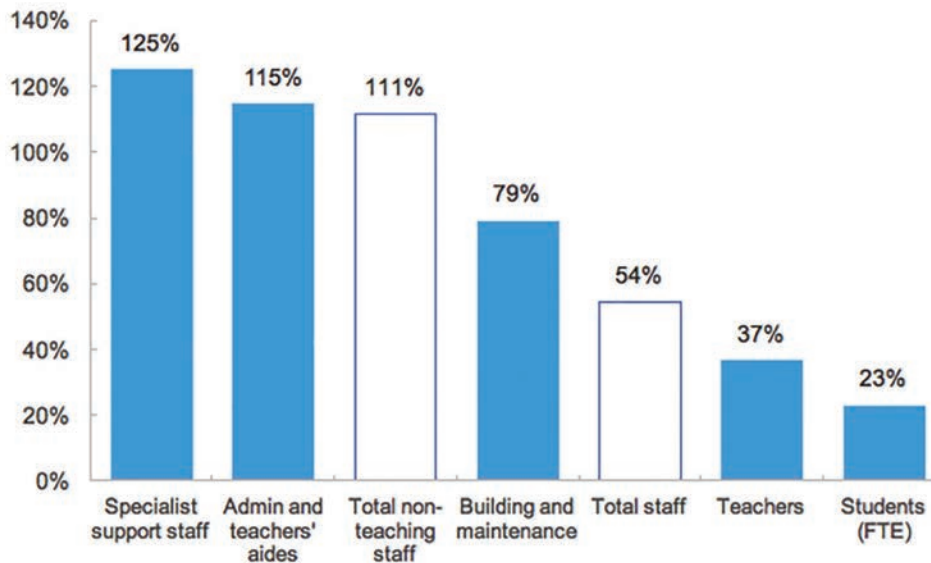
Source: ABS (2022). Schools.

Recent claims of a shortage of 11,095 NSW teachers by 2031 (in a NSW Teachers Federation-commissioned report) rely on assumptions of further reductions to the student-teacher ratio — namely, an assumption of at least a 5.2% reduction in the secondary student-teacher ratio and a 1.3% reduction in the primary student-teacher ratio.²⁰ That is despite the NSW

student-teacher ratio remaining constant for the past decade (Figure 8).

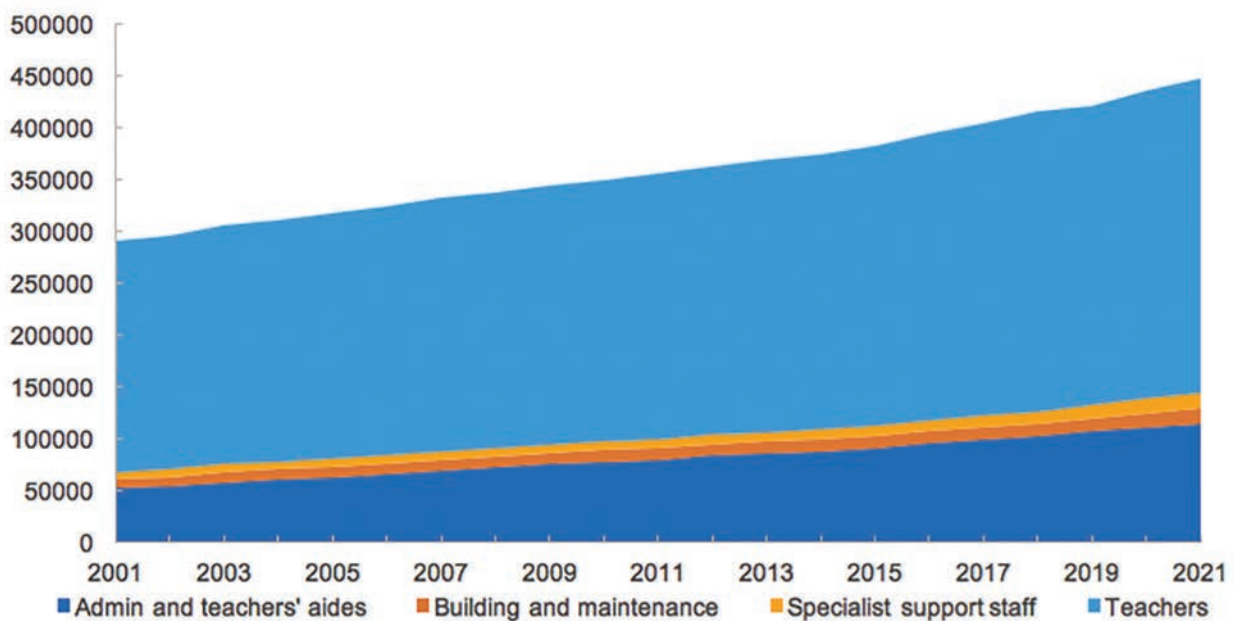
Maintaining the student-teacher ratio, or even modestly increasing it, could be accommodated without any negative impact on student outcomes.²¹ This would significantly alleviate pressure on potential teacher workforce resourcing needs.

Figure 9. Teaching and non-teaching staff growth, 2001-2021.



Source: ABS (2022). Schools.

Figure 10. Teaching and non-teaching staff numbers, 2001-2021.



Source: ABS (2022). Schools.

FACT: The growth in non-teaching staff is triple the growth in teaching staff

Not only has the growth in teaching staff significantly exceeded growth in students, there has also been an even faster growth in non-teaching staff (Figure 9). Namely, the number of administration and support staff has grown around five times the pace of growth

in students. This is despite evidence of no statistical relationship between the number of per student support staff and students' achievement.²² Moreover, this growth in administration and support staff appears to have coincided with a greater burden, rather than relief of it, in terms of teachers' time spent on administrative tasks.²³

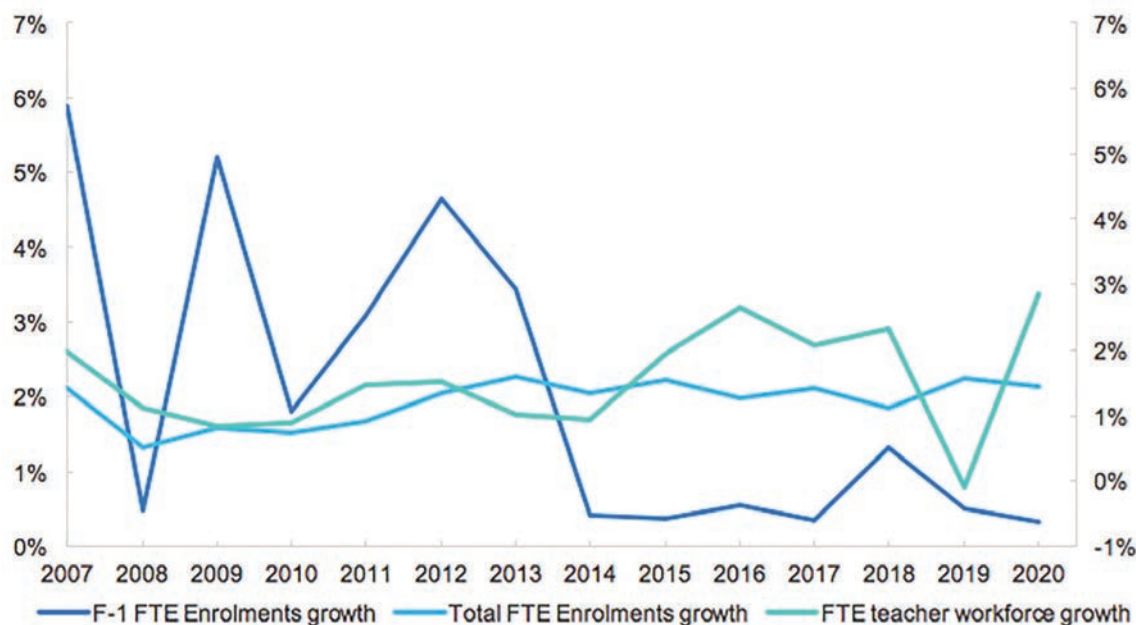
FACT: Student enrolments growth is slowing, not increasing

While it's true that overall student enrolments continue to increase (over the entire range of schooling), the rate of growth is not increasing steeply, and moreover, projected future enrolment growth is much slower than in the past (see Figure 11). Namely, the growth in enrolments in Foundation and Year 1 students has significantly slowed in recent years — which has a

lagged effect on overall student enrolments. In 2020, there was just a 0.3% increase in enrolments for Foundation and Year 1.

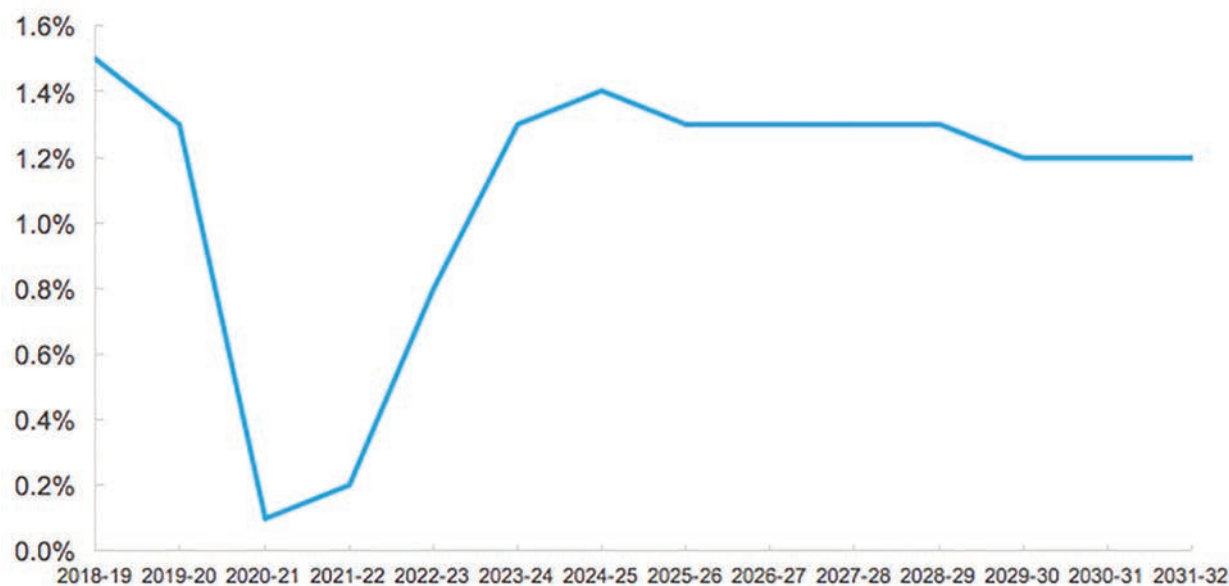
In any case, over the past 15 years, the growth in the teacher workforce has exceeded growth in students (see also Figure 9). Between 2006 and 2020, full-time-equivalent students increased by around 18%, while full-time-equivalent teachers increased by around 24%.

Figure 11. Annual school student enrolments and teacher workforce growth rate.



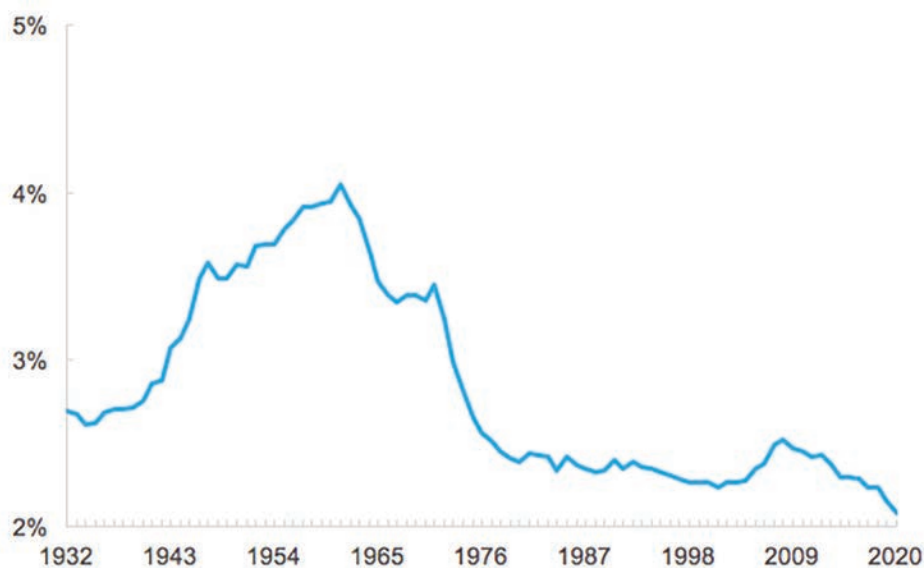
Source: ABS (2021). Schools.

Figure 12. Australian overall projected population growth, 2018–19 to 2031–32.



Source: ABS (2021). National state and territory population; Treasury (2021). 2021 Intergenerational Report.

Figure 13. Total fertility rate, 1932 to 2020.



Source: ABS (2021). Births, Australia.

There is also little reason to believe that future enrolments growth will significantly increase in the medium term. Sharp declines in Australia's population growth rate during the Covid-19 pandemic (see Figure 12) and historically low birth rates (see Figure 13) mean that enrolment growth throughout the 2020s can be expected to be markedly slower than in recent decades.²⁴ The two lowest annual recordings of fertility rates were in 2020 and 2019 — just 1.58 and 1.66 babies per woman respectively — which is likely to place downward pressure on future school enrolments growth into the second half of the 2020s.

FACT: The incoming teacher pipeline remains relatively strong by historical standards

A growing concern has been that the declining rate of completions of ITE degrees and a lower intake of incoming ITE students could significantly impact the new teacher pipeline.

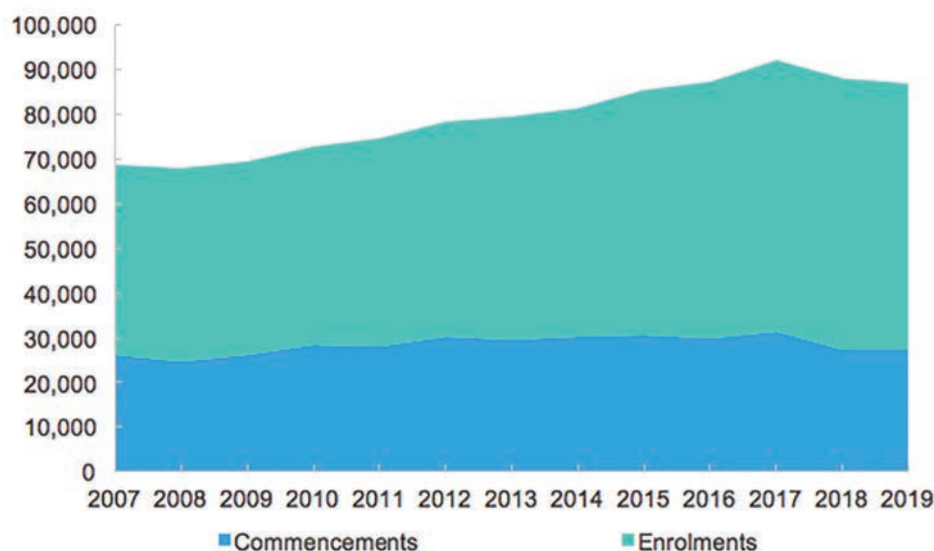
While ITE commencements and enrolments are not as high in 2018 and 2019 as they were in 2017, student numbers are not especially low by historical standards

(the average number of enrolments in 2018 and 2019 is the same as in 2016). The number of ITE enrolments in 2019 is still 27% higher than it was in 2007 and around 10% higher than the average number of enrolments between 2007 and 2019. On average, ITE enrolments have increased by around 2% annually (see Figure 14).

Fewer commencements in 2018 and 2019 (around 27,500, compared to an average of around 28,600 from 2007 to 2019) will of course lead to reduced enrolments in subsequent years, but this is likely to be moderated somewhat by changes to the incoming student profile of more recent years, who are expected to record relatively high completion rates (namely, because of measures to reduce no- and low-ATAR entrants to ITE degrees as a result of policy changes since TEMAG reforms).

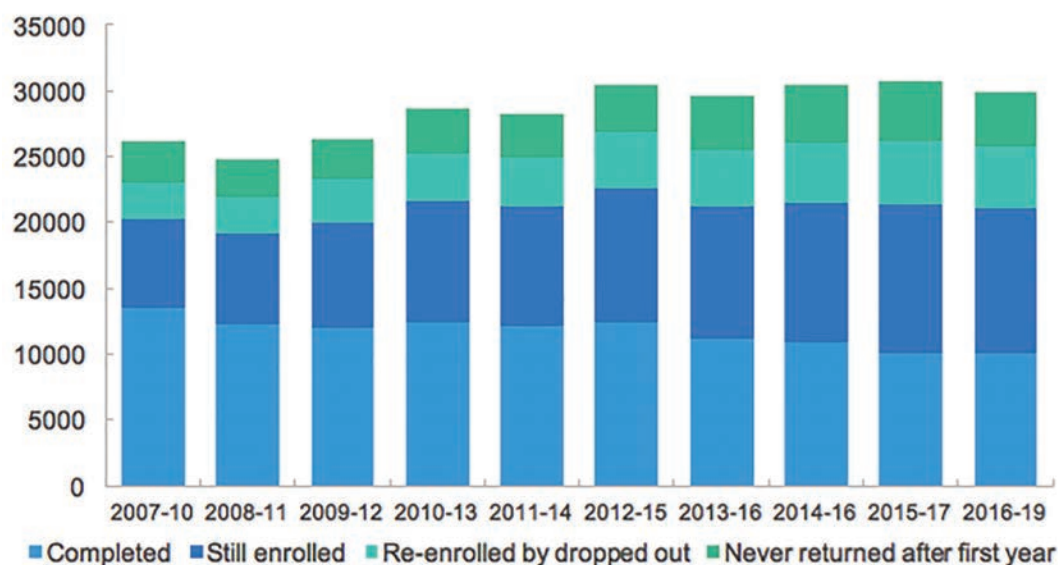
Moreover, the increased proportion of ITE degrees that are postgraduate relative to undergraduate will also see a greater proportion of ITE students completing in subsequent cohorts — since around 78% of postgraduate ITE students complete, compared to around 51% of undergraduate ITE students.

Figure 14. Total number of ITE commencements and enrolments[†], 2007 to 2019.



Source: Australian Department of Education Skills and Employment (2020). Higher Education Statistics, Section 8: Special Courses.^{††}

Figure 15. ITE student four-year outcomes, 2007 to 2019.



Source: Department of Education Skills and Employment: Completion rates of Higher Education students — Cohort analysis, 2005-2019.

In recent times, it's true that a smaller proportion of ITE students have completed their degrees within four years (see Figure 15) — around 34% of the 2016 entering cohort had completed their degree by 2019 (compared to 55% for the 2005 cohort). But looking at the completions rate and number of graduates alone can be misleading.

One reason for this is that the *combined number* of completers and those still enrolled in their degrees (that is, those likely to soon complete their degrees)

has remained at basically the same level through each cohort since 2010 (barring one jump in the number of ITE students in the 2012 cohort).

A reason for a decline in completion rates in recent years is likely to be because of a relative increase in the proportion of students participating in their ITE degree externally from campus — as these students record a much lower first-to-second year retention rate.

[†] Commencements counts all students enrolled for the first time. Enrolments includes both commencing and continuing students.

^{††} Statistics are based on the number of domestic and international students enrolled in courses providing initial teacher training at university and non-university higher education institutions.

FACT: Australia has some discipline and geographic shortages of teachers, not an overall workforce shortage

While it is difficult to validate a serious shortage of the overall teacher workforce, there are geographic and discipline-specific shortages. The most pronounced of these is a persistent shortage of qualified mathematics teachers, and to a lesser extent, science teachers.

A relatively small proportion of Australian mathematics teachers have a post-school mathematics background. In primary schools, only 16% of Australian teachers have a mathematics background, compared to 66% in Singapore (see Figure 16).²⁵

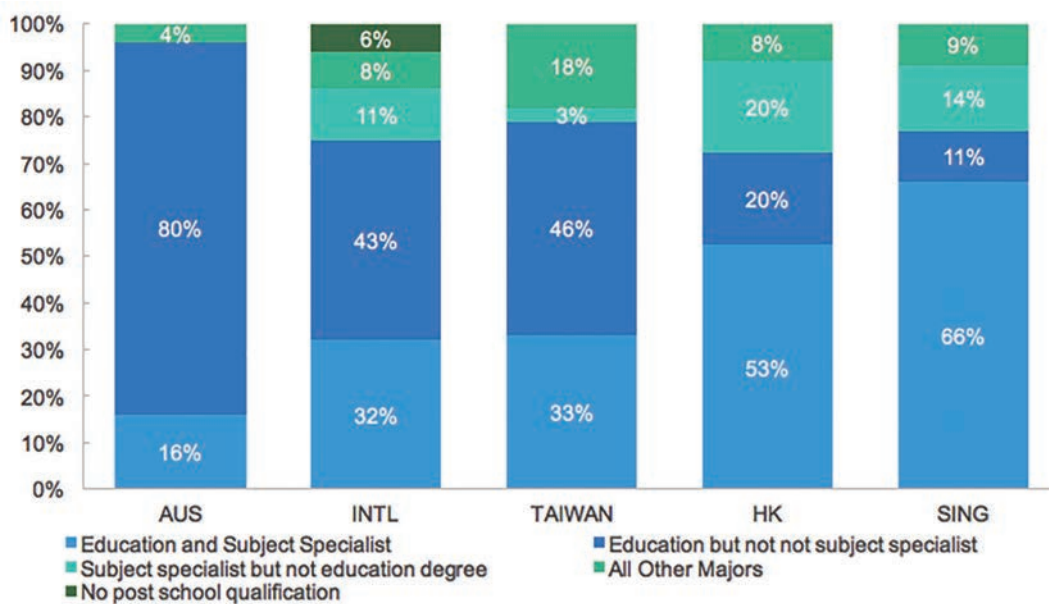
This has also resulted in persistent out-of-field teaching in the subject.^{26 27} Across Australia, mathematics is taught by out-of-field teachers 40% of the time.²⁸ This appears to be increasing, as past surveys have indicated around 30% of Australian mathematics

teachers were teaching out-of-field — including around 37% of early career teachers.

It has been estimated that to halve the proportion of students without a qualified mathematics teacher over five years would require an additional 6000 new teaching graduates, and 2200 current teachers to retrain.²⁹ Research shows that greater school autonomy is associated with lower levels of out-of-field teaching — implying that more autonomous schools are better able to compete for scarce teachers.³⁰

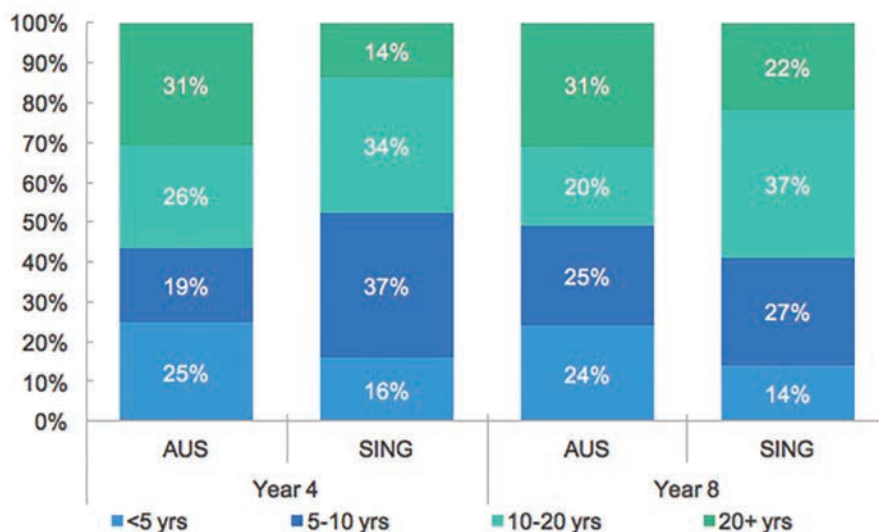
Comparing the composition of the mathematics and science teacher workforce between Singapore and Australia, it is clear that Australia has a relatively high proportion of early career teachers and very experienced teachers (see Figure 17 and 18). In part, this reflects relatively high rates of out-of-field teaching among early career teachers — and to a lesser extent, incentives to attract new maths and science teachers.

Figure 16. Qualification background (major) of primary school teachers, Australia, international average, and Taiwan, Hong Kong, and Singapore.



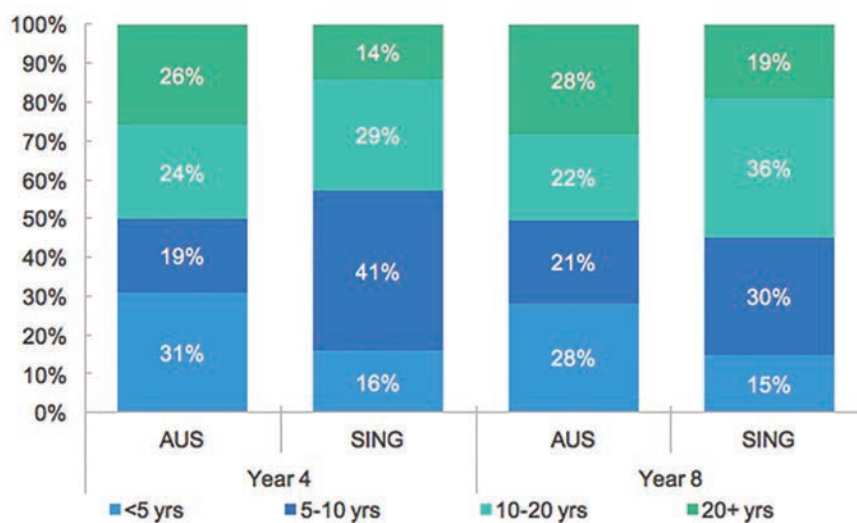
Source: IEA (2020). Trends in International Mathematics and Science Study (TIMSS), Boston College, TIMSS & PIRLS International Study Center.

Figure 17. Distribution of years of experience of teachers providing mathematics instruction, Year 4 and Year 8, Australia and Singapore.



Source: IEA (2020). Trends in International Mathematics and Science Study (TIMSS), Boston College, TIMSS & PIRLS International Study Center.

Figure 18. Distribution of years of experience of teachers providing science instruction, Year 4 and Year 8, Australia and Singapore.



Source: IEA (2020). Trends in International Mathematics and Science Study (TIMSS), Boston College, TIMSS & PIRLS International Study Center.

FACT: Flexible, subject-specific salaries could improve teacher supply in shortage areas

Teachers' pay rates are, by and large, the result of regulated, central determinations, with limited flexibility. However, teacher supply and wage expectations reasonably differ according to subject area specialisations.³¹ For instance, mathematics and science teachers tend to earn lower salaries in teaching than their graduating peers in industry; while in all other subjects, the opposite is true.³² This results in a significant gap between market-determined wage potential and regulated teacher salaries.

In order to incentivise potential teachers to enter the profession, some school systems have introduced a range of interventions — such as loan forgiveness, sign-on bonuses, and retention bonuses.³³ In NSW, for instance, this includes scholarships for tertiary students going into teaching, sponsorships for teachers seeking approval to teach additional disciplines, and incentives to attract teachers to rural and remote locations.³⁴ There is not strong evidence that such programs — particularly those targeted at the preservice end — have consistently resulted in significant increases in the quantity of teachers ultimately joining and staying in the workforce.

While indirect and temporary financial benefits are common to incentive schemes, permanent and meaningful salary differentials for in-demand teachers are rare. That is despite research showing that the outside-teaching salary ratio — or opportunity salary cost — is an important consideration for the decision to enter and stay in teaching for those with science and maths specialisations in particular.^{35 36}

The QITE Review also found that mid-career STEM professions were especially likely to enter teaching if there were offered a salary that more closely matched their market salary from industry.³⁷

There is some international research that suggests a salary supplement equivalent to a 5% permanent differential for science and maths teachers can result in a significant increase in teacher supply and reduction in attrition.³⁸ Moreover, the additional cost associated with this higher wage for maths and science teachers is found to be more cost-effective than having to recruit (and subsidise) additional ITE students and directly impacting salary is more cost-effective than other approaches, such as loan forgiveness.

ASSUMPTION: Teacher attrition is unacceptably high

It is often claimed there is a significant teacher attrition problem, requiring policy intervention.^{39 40 41 42} This is most often related to the turnover of early career teachers in the first five years. To a lesser extent, these claims extend to overall workforce attrition and the retirement of an ageing teacher workforce (the largest single source of attrition).

FACT: Reported intention to leave teaching does not necessarily result in actual attrition of teachers

Concerns for the attrition rate regularly cite teachers' intention to leave the profession. However, this is not an accurate indicator for actual attrition. International research suggests that reported intention to leave teaching of between 40 and 50% may result in around 10 to 15% actual turnover.⁴³ In other words, rates of intentions to leave teaching may be up to four times overstated.

Within the wider workforce, the OECD's TALIS data finds that around 12.7% of Australian teachers (under the age of 50) have an intention to leave the profession within five years — which is less than the OECD average of 14.1%.⁴⁴ Recent Australian data suggests that around 25% of teachers intend to leave the profession before retirement, with around 14% of the workforce intending to leave within ten years. On average, Australian teachers report they intend to work as a teacher for another 16.3 years on average — above the TALIS average of 15.3 years.⁴⁵

FACT: Early career teacher attrition is much lower than is widely reported

Early career attrition claims are generally informed by inaccurate statistics. For instance, it is commonly reported that attrition of early career teachers may range between 25–50% — with a common claim that around one in three teachers leave the profession within the first five years. However, no consistent and reliable data sources validate this.⁴⁶

In fact, available measures of attrition indicate a significantly lower rate — often based on the approach of counting the number of lapsed teacher registrations.

NSW data suggests that 8–10% of teachers leave the profession in their first five years.⁴⁷ This appears to

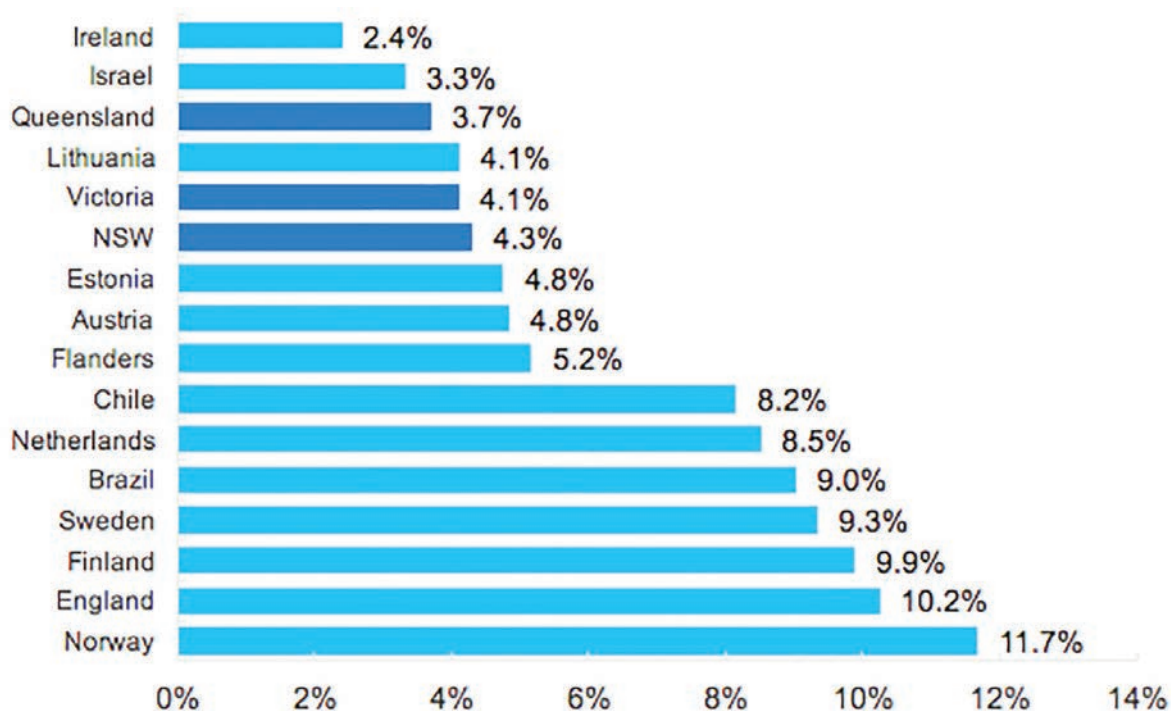
have remained somewhat consistent, as around a 10% attrition rate was previously estimated between 2009 and 2013 in NSW for those within their first six years.⁴⁸

Based on a similar methodology, the attrition rate of early career teachers in Queensland is estimated at around 14%.⁴⁹ Adopting a more expansive methodology, Victorian data suggests around 20% of teachers leave the profession within the first five years.⁵⁰ Recent data also suggests that teacher attrition rates may be improving, rather than worsening — with estimates that the Western Australian attrition rate of early career teachers has halved since the mid-2000s.⁵¹

FACT: Overall teacher workforce attrition is relatively low by international standards

By international standards, the overall attrition of Australian teachers appears to be comparatively low (Figure 19) — with indicative attrition rates ranging from around 3.7% in Queensland, around 4.1% in Victoria, and around 4.3% in NSW. Moreover, the overall rate of attrition also appears to be broadly improving — as previous estimates indicated a national rate of around 5.7%⁵² and an OECD estimate for Australian teacher attrition of around 4.9%.

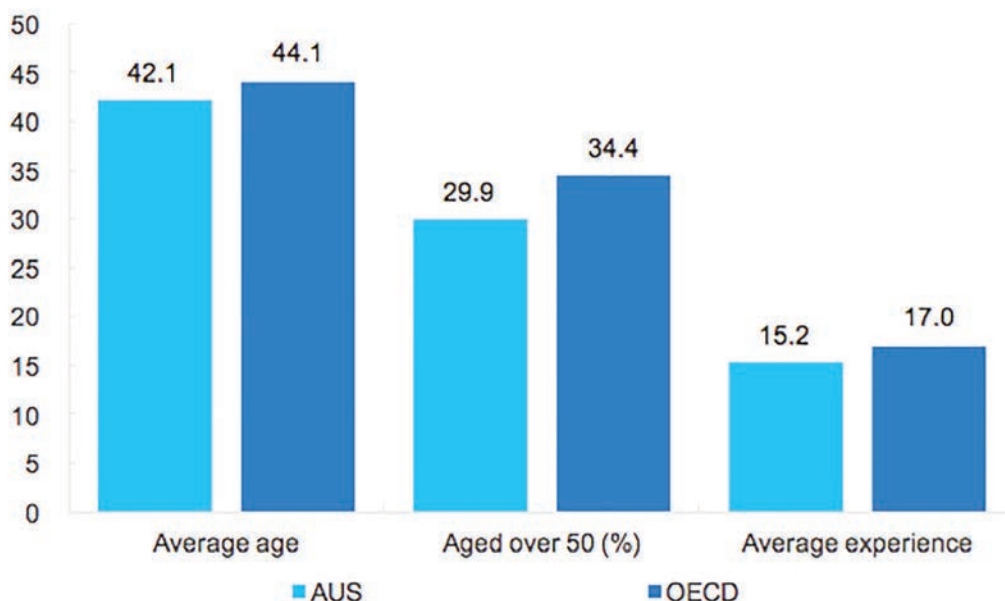
Figure 19. International comparison of approximate teacher attrition rates in government schools.*



Source: OECD (2021). Education at a Glance, Table D7.1; Victorian Education Department; NSW Education Department; Queensland College of Teachers.

OECD figures based on an indirect measure of attrition for 2016, computing attrition based on the number of teachers in two successive reference years and the number of teachers who entered the teaching profession between these two reference years. Australian data is estimated from varying methods from counting lapsed teacher registrations. There are no directly comparable statistics on teacher attrition across Australia or internationally.

Figure 20. Summary of age and experience profile of Australian teachers compared to the OECD.



OECD (2019). TALIS 2018.

FACT: Teacher retirement rates are not especially high

It is often claimed that the ageing of the teacher workforce places it at risk of unsustainable levels of retirements, which may not be sufficiently replaced by new teachers.

However, by international standards, the Australian teacher workforce is relatively young, with a relatively low proportion of teachers aged over 50 (Figure 20). Recent Australian data indicates around 16% of the teacher workforce is aged over 60 years,⁵³ while ABS data finds that workers in education and training, on average, intend to retire at 65.1 years of age (which may be later than assumed in the past).⁵⁴ A UK Education Department review of the working capability of older teachers found no negative impact on workplace functional performance among teachers who continue working in some capacity to the age of 70.⁵⁵

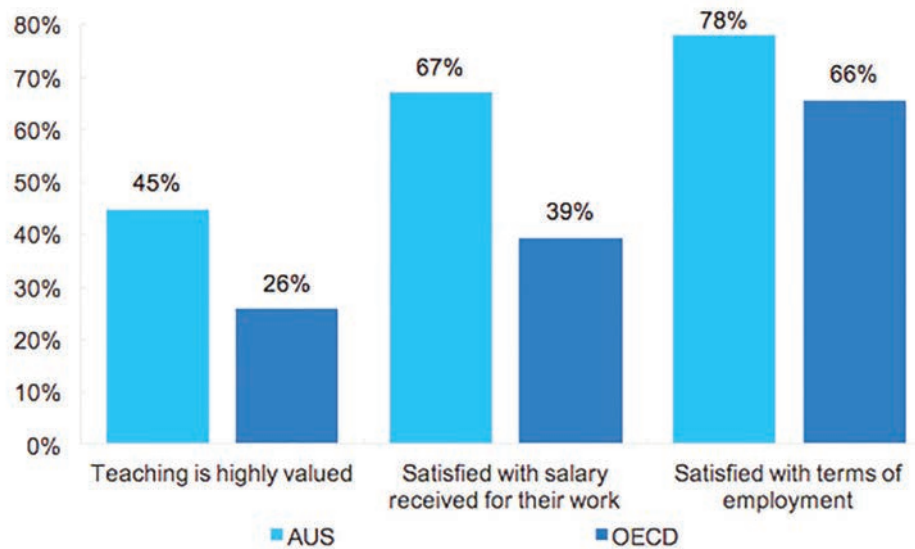
In any case, it is not clear that retirement rates are worsening significantly. In fact, there is reason to believe that retirement rates may have already peaked and are now falling, particularly as many of the Baby Boomer generation of teachers have already reached retirement age. For instance, in NSW the retirement rate averaged 3.4% between 2007 and 2019⁵⁶ and is now around 2.2%.⁵⁷ Victorian data indicates a retirement rate of around 1.8%.⁵⁸

FACT: Teachers' salaries are relatively high by world standards, have been increasing, and are not a major source of teacher attrition

Education unions often argue that attrition of Australian teachers is the result of low levels of remuneration as well as a perceived low status. However, a meta-analysis of Australian teacher attrition found that while salary was raised as a potential issue among teachers, it was not generally considered the key attrition cause.⁵⁹

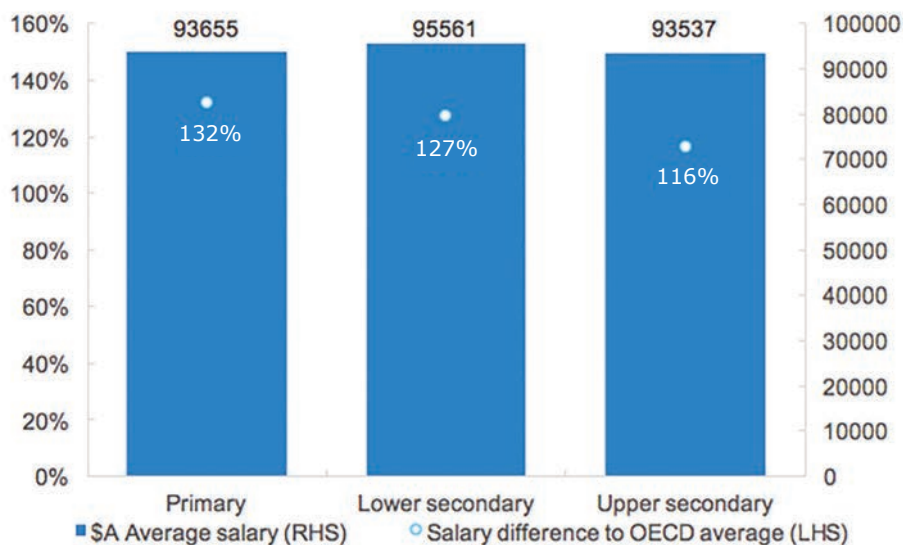
Moreover, OECD data shows that Australian teachers are considerably better remunerated (see Figure 22) than in comparable countries (especially in terms of starting salaries)⁶⁰ and that they are far more satisfied with their salaries than the OECD average (see Figure 21). In addition, a relatively high proportion of Australian teachers report the teaching profession is highly valued and that they are satisfied with their work, compared to similar countries.^{61 62} Nearly twice the proportion of Australia's early career teachers find teaching to be highly valued by society, compared to the OECD average.

Figure 21. Teachers' perceptions of their work, salary, and working conditions, Australia and the OECD average.



Source: OECD (2019). TALIS 2018 Vol 1.

Figure 22. Average teacher salaries (\$A) and ratio compared with OECD average.



Source: OECD Education at a Glance 2021.

While pay rates do impact on who chooses to enter and remain in teaching, this is often misunderstood.

Research shows that when highly effective teachers choose to leave the profession, this is almost entirely explained by the effect of centralisation and inflexible salaries (the 'push hypothesis' — that effective teachers are pushed out by inflexible, compressed salaries). Relatedly, it is not that potentially effective teachers are deterred on the basis of salary comparisons (the 'pull hypothesis' — that effective teachers are pulled to other careers instead of considering teaching).⁶³

FACT: Some attrition of teachers is good and should be welcomed by policymakers

Like any profession, some attrition within the teacher workforce is ultimately desirable. Not all teachers find that the work is suitable for them and not all principals find every teacher to be effective. However, policymakers tend to not appreciate that there is some *good* and some *bad* attrition — resulting in universal retention-promoting policies that are not always conducive to improving outcomes.

What matters is *which* teachers stay and leave the profession, not necessarily just the rate of turnover. To the extent that underperforming teachers who leave the profession are replaced by potentially higher performing teachers, some attrition is suitable and may result in improved outcomes overall.

International research investigating the effectiveness of teachers who remain or leave teaching does not find a consistent negative impact of turnover with student achievement.^{64 65 66 67 68} This is because, on average, it is relatively less effective teachers — not the relatively highly effective teachers — who are more likely to leave the profession.

FACT: While Australian teachers work relatively long hours, job and career satisfaction is comparable to other countries

Understandably, the job satisfaction and working hours of teachers are a matter of serious concern within the workforce and for policymakers. However, such decision-making is rarely based on data sources that properly account for teachers’ time use,⁶⁹ instead

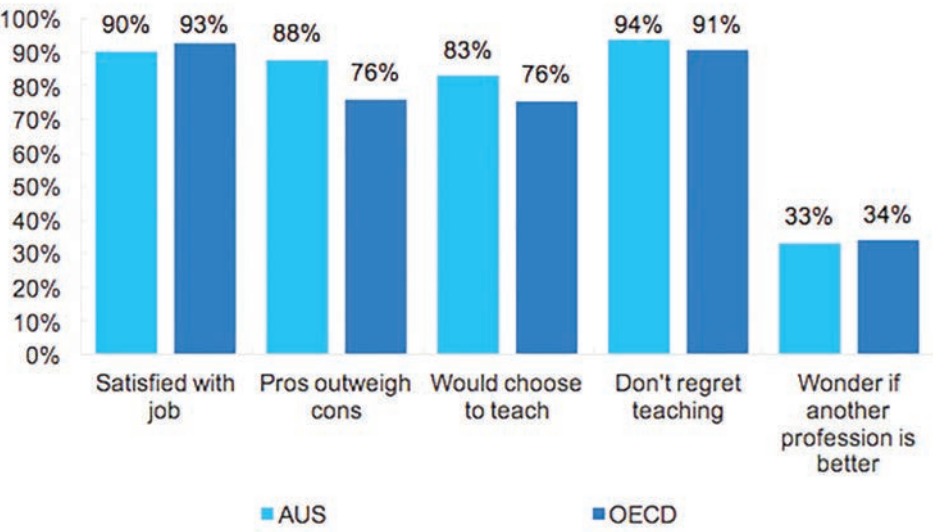
relying on self-reported and subjective measures of teachers’ workload and stress.^{70 71}

In any case, against international comparisons, Australian teachers record a similar level of job satisfaction and are more satisfied overall with the profession (Figure 23).

While Australian teachers’ average working hours are relatively high by international standards, they are comparable to those found in similar labour markets to Australia (see Figure 24). Namely, Australian teachers work slightly shorter hours than in New Zealand, England, the United States, and Alberta (Canada).

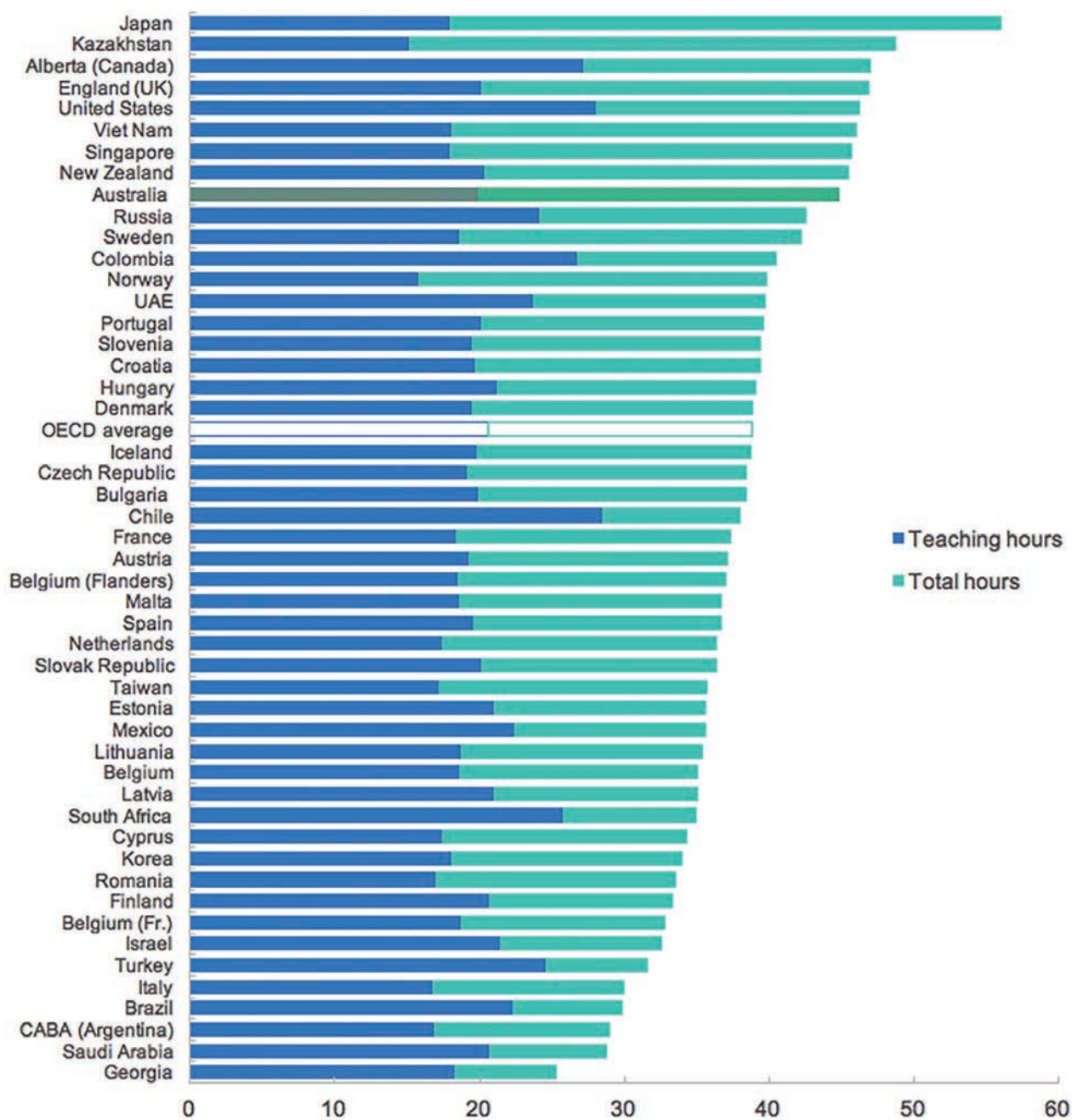
Moreover, Australian teachers’ teaching hours are actually below the OECD average — meaning that the relatively high total work hours are due to non-teaching activities (see Figure 25). Australian teachers spend relatively large proportions of their work hours on school management activities (around 1.03 hours per week more than the OECD average), general administration (around 1.43 hours per week more than the OECD average), and collaboration activities with colleagues (around 0.97 hours per week more than the OECD average).

Figure 23. Teachers’ satisfaction with job and the teaching profession, Australia and OECD average.



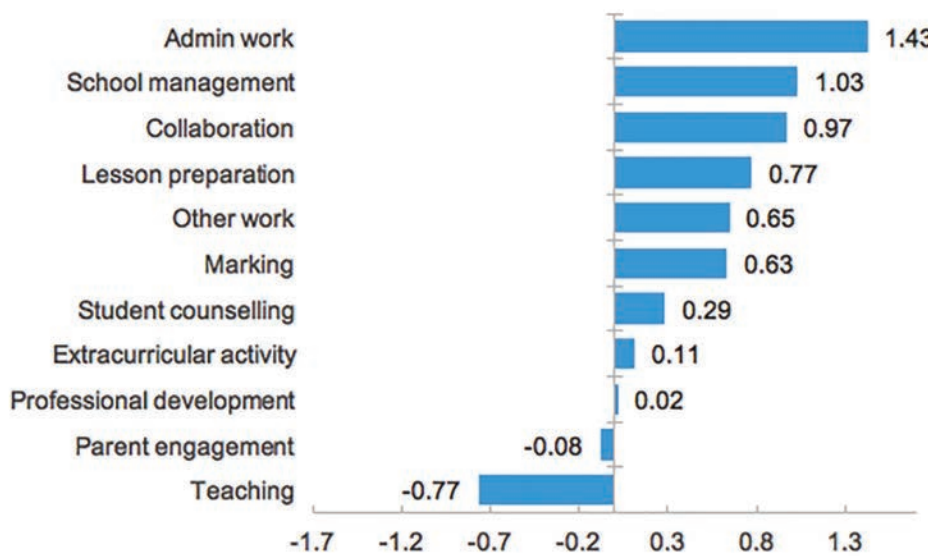
Source: OECD (2019). TALIS 2018.

Figure 24. Teachers' average weekly teaching and working time (lower secondary).



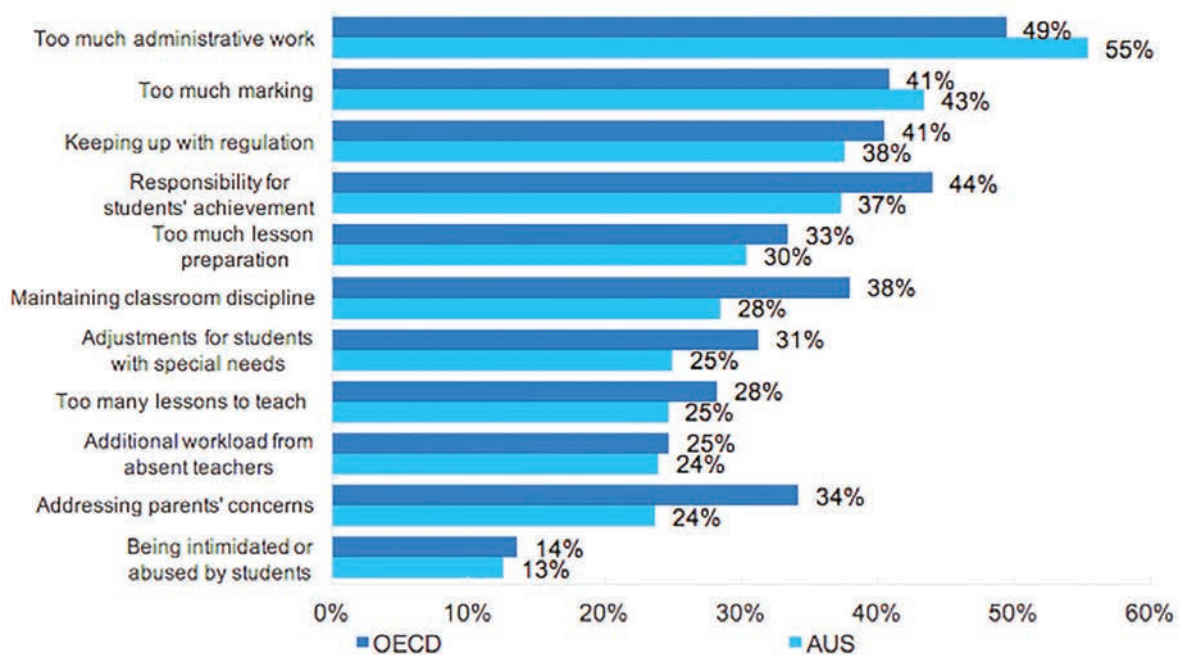
Source: OECD Education at a Glance.

Figure 25. Average number of hours teachers report on the following activities in a regular week, Australian lower secondary teachers compared to OECD average. (NB positive values indicate more time per week spent on this activity compared to the OECD average)



Source: OECD (2020). Teaching and Learning International Survey 2018.

Figure 26. Sources of teacher stress, Australia and OECD average.



Source: OECD (2019). TALIS 2018.

Time use also matters because research shows that different activities disproportionately contribute to teachers' workplace stress.⁷² Namely, an additional hour spent on marking and preparation is around 4.25 and 3.5 times more stressful than an additional hour spent on teaching. There is no relationship between teachers' workload stress and the time spent on management, administration, collaboration, or professional development. Moreover, there is a non-linear effect of total working hours and stress — with little difference in teachers' stress when working between 40 and around 50 hours in a week, however it rises increasingly steeply after that.

Compared to other countries, Australian teachers are more likely to report stress resulting from excess administrative work, but less likely to be stressed by addressing parents' concerns (see Figure 26).

In recent years, red tape reduction has been highlighted by school systems and teachers' representative bodies.

The sources of regulatory burden impacting on schools' work include teacher accreditation (especially in terms of duplication of reporting), financial compliance, school governance, and collecting data relating to students with disability (under the Nationally Consistent Collection of Data).⁷³ Some of the proposed solutions have included reduced duplication of requirements — including departmental assessment of regulatory impacts of requests — facilitating an accessible library of relevant policies and resources, streamlining of data collection and related procedures, and a toolkit for schools on how to reduce in-school administrative burden.⁷⁴

Teacher workforce quality

The wider — and in many cases mistaken — policy emphasis on teacher workforce quantity can detract from the more important matter of quality; in part because it is assumed that quantity alone will result in quality.

The quality of teaching is the greatest in-school, controllable factor affecting student achievement.⁷⁵ Across many studies, research suggests that around 30%,⁷⁶ and as much as 40%⁷⁷ of variation in student performance is at the class- and teacher-level. Accordingly, teachers can make a substantial difference in the education and life outcomes of their students.⁷⁸

79 80 81 82

An important finding in the research — rarely recognised in practice by policymakers — is that there is wide variation in the student learning gains between highly effective and less effective teachers.^{83 84 85 86} Accordingly, researchers have estimated significant economic value of improving teaching quality,⁸⁷ particularly in upskilling or replacing low-performing teachers with average and high performers.⁸⁸

International research shows that replacing an average teacher with a high performer (i.e., moving up one standard deviation in teacher quality) would deliver learning gains equivalent to closing the disadvantaged student achievement gap in maths by between one-quarter and one-third in just one year.⁸⁹ Moreover, having a highly effective teacher as opposed to an average teacher for three to four years in a row would, by available estimates, close the disadvantaged achievement gap.⁹⁰

Yet, to the extent that quality of the teacher workforce is typically considered, it is in very narrow, input-based, ways — such as qualifications, teachers' school-leaving achievement (particularly the ATAR), years of experience, teachers' workplace conditions, teachers' self-efficacy and the like. In other words, teacher 'quality' is looked at in terms of the incoming attributes of teachers (effectively, their inputs), rather than what they can do (and ultimately the achievement of their students; their outcomes).

An OECD analysis linking student results and teacher data provides an authoritative source to compare the relative relationship between teacher effects on achievement (see Figure 27). As the data shows, teacher and school practices have significant effects on student outcomes and are directly controllable by policy and practice, unlike many factors that are regularly discussed in education research.

Consistent with much of the educational literature, it's true that classroom characteristics — particularly the proportion of low SES, low- and high-achieving cohorts of students — are a significant factor. However, many teacher-controllable factors also significantly explain student achievement.

Teachers' use of their working hours, for instance, is the single greatest teacher factor. Interestingly, this analysis found no consistent relationship between teachers' overall working hours (though there is some evidence of a positive relationship between the number of teachers' working hours and students' science achievement). Rather than the number of hours worked, how the hours are used does have a significant effect. Teachers who spent a higher proportion of working hours on marking and correcting student work and those who spent less time participating in school management activities recorded higher student achievement. As a result, allowing teachers to spend more of their time on marking and correcting student work, and less of it on school management activities, could significantly improve students' outcomes.

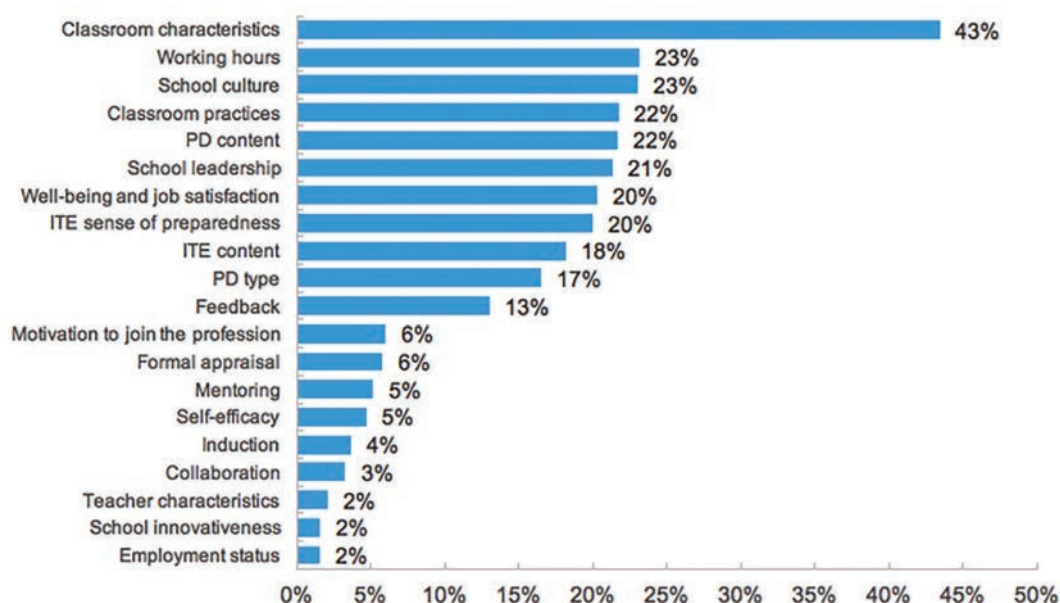
School culture is similarly a relatively large factor. Schools and teachers with better student-teacher relations, and those in schools where involvement with parents and community is greater, record higher student achievement.

Teachers' classroom practices also significantly explain student achievement. Australian teachers who administer more class assessments and those who provide more immediate feedback on students' work record higher achievement, particularly in reading. Australian classes with a poorer disciplinary climate record lower achievement. The frequency with which teachers use inquiry-based teaching practices (such as 'cognitive activation') is not stastically related to the level of student achievement.

Participation in professional development has some mixed outcomes — consistent with recent empirical research that the quality, rather than quantity, of professional development can have a marked difference.⁹¹ Participation in online seminars and courses is negatively related to student outcomes. However, there is some evidence that participating in development such as conferences where researchers and teachers interact on educational issues is positively related to student achievement (at least in mathematics). Using professional development to increase knowledge of the curriculum appears to be positively related to student outcomes.

Teachers' experience with ITE also finds mixed results. Mathematics teachers who are more prepared in terms of 'general pedagogy' record slightly lower student achievement, but more prepared teachers in terms of subject pedagogical knowledge is positively related to achievement.

Figure 27. Individually computed proportion of variance[§] in Australian student achievement averaged across Reading, Mathematics, and Science by teacher factors.



Source: OECD (2021). Positive, High-achieving Students? What Schools and Teachers Can Do.

Wellbeing and job satisfaction is understandably an important consideration for teacher effectiveness. Teachers who are more satisfied with working in their school consistently record higher achievement. There is mixed evidence regarding the relationship with how satisfied teachers are with their work as a teacher more broadly. There is no statistical relationship found between teachers' workload stress, satisfaction with salary and working conditions, or teachers' views of how the teaching profession is valued by society.

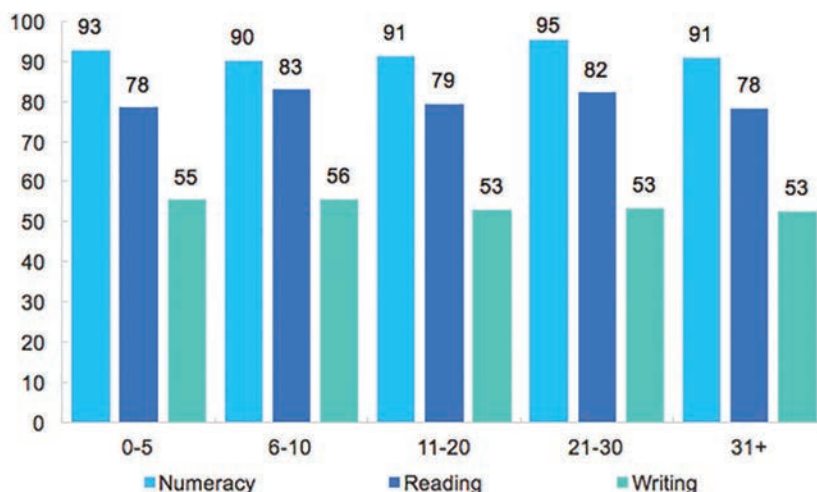
Several factors that are regularly discussed as being significant determinants of teachers' effectiveness — such as a teachers' years of experience, teachers' employment status (whether they are part-time or full-time), teachers' satisfaction with salaries, working conditions, their perceptions of teaching's status, their motivation to join the profession, and their self-efficacy — are found to have virtually no relationship with student achievement.

ASSUMPTION: The Australian teacher workforce is at risk from losing experienced teachers

One motivator for promoting high retention within the teacher workforce is the assumption that more experienced teachers are necessarily more effective than their less experienced counterparts. However, the relationship between teacher experience and effectiveness is more complicated than this assumption.

[§] Proportion of variance is computed individually (not simultaneously) for each of the listed factors. For this reason, the proportion of variance explained exceeds 100%. Higher values indicate that this factor alone explains a relatively high degree of the difference in student achievement. Lower values indicate that this factor alone explains a relatively small degree of the difference in student achievement. The individual computation is used to identify the relative individual contribution to the variance of each of the explanatory factors, without the risk of collinearity (that is, some factors potentially being spuriously mediated when computed together). It is important to note that proportion of variance is non-directional — meaning that it does not discriminate being whether the statistical association between variables is positive or negative. Moreover, by definition, variance is strictly positive because it is the mean squared difference from each data point to the mean.

Figure 28. Average student achievement gain (Year 3 to Year 5) in Numeracy, Reading, and Writing, by years of teaching experience.



Source: Author's analysis from Longitudinal Study of Australian Children Wave 4 (K Cohort), Wave 6 (B Cohort).

FACT: More experienced teachers are no more effective than relatively inexperienced teachers

Analysis of Australian student data suggests there is no clear statistical difference in student achievement gains based on their teachers' years of experience (see Figure 28). As a result, there is little cause for concern that a relatively young and inexperienced teacher workforce — as is found in Australia — is a source of students' underachievement. This is confirmed in OECD analysis linking Australian teacher and student data, which finds no statistical relationship between teachers' years of experience and student achievement in PISA.⁹²

International research further generally finds a non-linear relationship between teachers' years of experience and their effectiveness.⁹³ Students with first-year teachers tend to record lower achievement, after accounting for other factors. International estimates show that students with first-year teachers record lower growth in achievement progress.⁹⁴ However, by the end of the first full year of teaching, nearly half of the achievement deficit (compared to experienced teachers) closes.⁹⁵

Generally, teachers' effectiveness rises steadily up to around five years of experience,^{96 97 98} before levelling out.^{99 100} The research then generally finds that experienced teachers — those with 20 or more years of experience — are no more effective than those with five years of experience¹⁰¹ (though more recent research suggests the effectiveness plateau may be around 12 years of experience instead¹⁰²).

Teachers' effectiveness appears to decline after around 25 years — however, some recent research also suggests that effectiveness may decline after as little as 4–5 years.¹⁰³ In any case, evidence suggests that years of experience *overall* may be a less accurate predictor of effectiveness, compared to the level of experience teaching to the *same grade level*.¹⁰⁴ Inter-disciplinary analysis concerning the observation of

the flattening, and sometimes lowering, of teachers' effectiveness over time concludes this is related to formation of habits of classroom teachers that can be difficult to reverse.¹⁰⁵

ASSUMPTION: Better credentialled teachers are better teachers

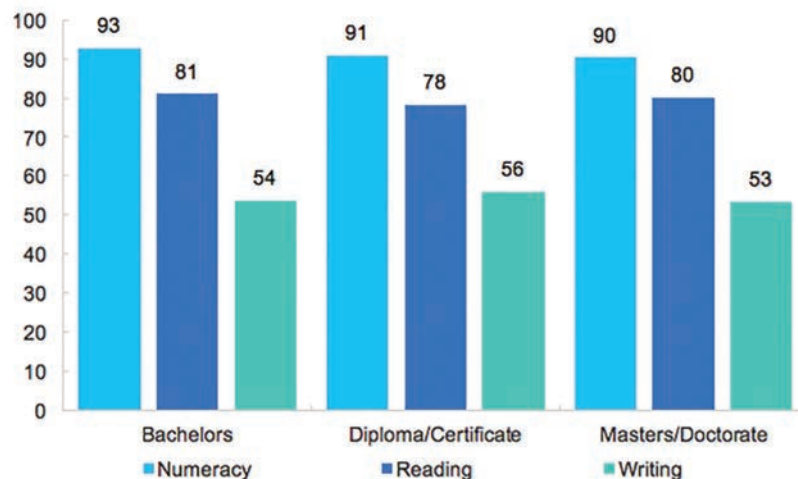
Policymakers have looked to regulating certification and accreditation of teachers as a lever to improve standards of early career teachers; the premise being that regulators can identify what new teachers should be able to demonstrate (both content and pedagogical knowledge) and this can be well articulated in accreditation requirements, licensure assessment, and documented professional standards. Relatedly, this has also encouraged greater coursework requirements in ITE, based on an assumption that additional credentials — such as more and longer postgraduate qualifications — may improve teacher practice.

FACT: Teachers' level of teaching credentials does not appear to impact student achievement

It is often thought that more qualified teachers ultimately lead to better student results. However, the research shows that certification and accreditation practices have little impact on teacher effectiveness.^{106 107} Moreover, teachers with additional years of study — including postgraduate qualifications — are no more effective than other graduate teachers.^{108 109 110 111} However, there is evidence that additional licensing and credential requirements act as a disincentive for some potential teachers^{112 113} and can limit interstate teacher mobility.¹¹⁴

Australian student data shows no difference in student progress based on differences in teachers' qualifications (see Figure 29). Despite this, many teachers are encouraged to complete higher levels of study.

Figure 29. Average student achievement gain (Year 3 to Year 5) in Numeracy, Reading, and Writing, by teachers' highest level of qualification.



Source: Author's analysis from Longitudinal Study of Australian Children Wave 4 (K Cohort), Wave 6 (B Cohort).

FACT: Teachers who enter the profession through alternative pathways are at least as effective as those entering through traditional pathways

Another approach to assess whether credentialling is a significant factor in explaining teachers' effectiveness is to compare outcomes of early career teachers who complete traditional ITE programmes and those who take non-traditional alternative pathways.

The research shows little evidence that formal ITE programmes are more effective than non-traditional training pathways,¹¹⁵ particularly beyond the very initial period of teaching.¹¹⁶

In fact, there is international evidence that alternative certification, such as Teach for America,^{117 118} is often associated with higher, rather than lower, student outcomes.^{119 120 121} And while there's some evidence that alternative certification teachers are slightly more likely to leave teaching sooner than those from formal ITE programmes,^{122 123} this is largely explained by differences in teacher and school characteristics.^{124 125 126}

Teachers who enter the profession through alternative pathways largely bring greater subject matter expertise,¹²⁷ are generally a more diverse population than from traditional ITE programmes, and disproportionately work in hard-to-service schools.^{128 129} There's also evidence STEM teachers in fast-tracked programmes score higher on practical versus theoretical approaches to teaching and demonstrate a more realistic idea of how to measure success in high-needs classrooms.¹³⁰ They also are found to better promote students' mathematical interest.¹³¹

Within the Australian context, there is some available evidence that the Teach for Australia initiative produces similar outcomes to similar, but much larger, US counterparts. An evaluation of the programme's implementation found its teachers were better prepared on completion than those in

traditional training. It also found that its graduates disproportionately fill areas of subject and geographic vacancies.

The QITE review shows significant potential to expand mid-career entrance pathways to teaching. It found that up to four in 10 mid-career professionals would consider a career in teaching, however the majority were unaware or deterred by the hurdle of having to complete a two-year Masters degree in order to enter the teacher workforce.

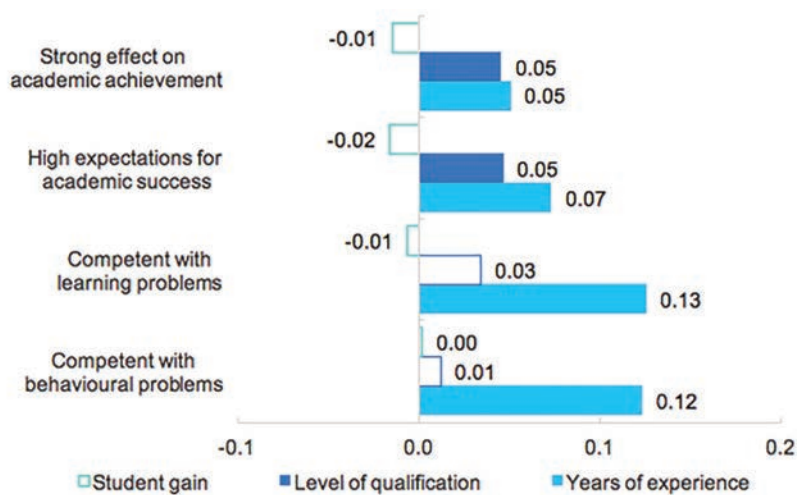
FACT: More experienced and higher credentialled teachers are not necessarily more effective

There is limited evidence that general coursework requirements during ITE predict teacher effectiveness — at best operating as a signal for teachers who are very unlikely to be effective.¹³² Teachers who have completed more preparation coursework tend to report feeling better prepared to teach, but there's not consistent evidence they are significantly more instructionally effective — whether measured by classroom observations or student achievement.^{133 134 135 136}

Australian student data shows no correlation between students' academic progress and how teachers self-assess their competence with learning and behavioural problems, as well as their perceived effect on academic achievement (see Figure 30). This is consistent to OECD analysis finding virtually no difference in student achievement between teachers with different ratings of self-efficacy.

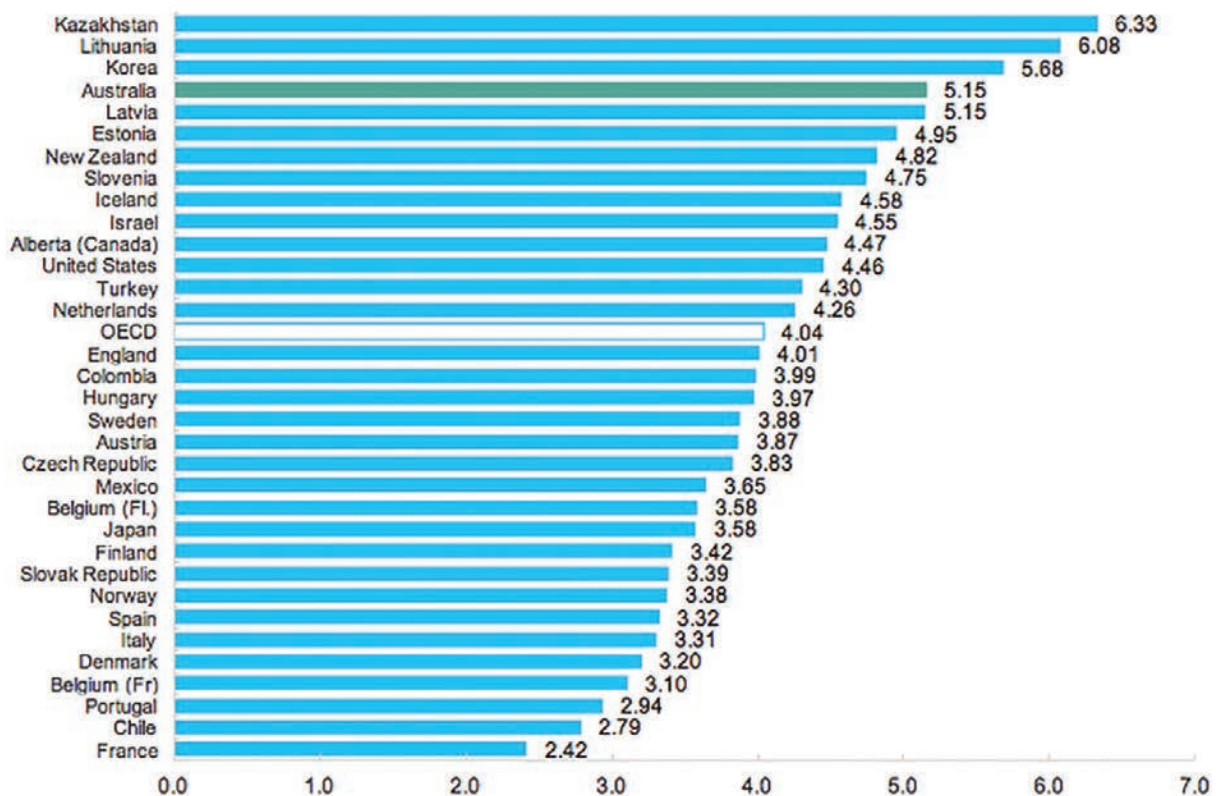
Compared to less experienced teachers, more experienced ones are slightly more likely to self-report competence in handling behavioural and learning problems in the classroom, but are effectively no more likely to report having high expectations for academic success of students or that they have a strong effect on students' academic achievement.

Figure 30. Correlation (τ) between teacher confidence with student achievement (average student gain in Numeracy, Reading, and Writing from Year 3 to Year 5), teachers' qualification level, and years of teaching experience.



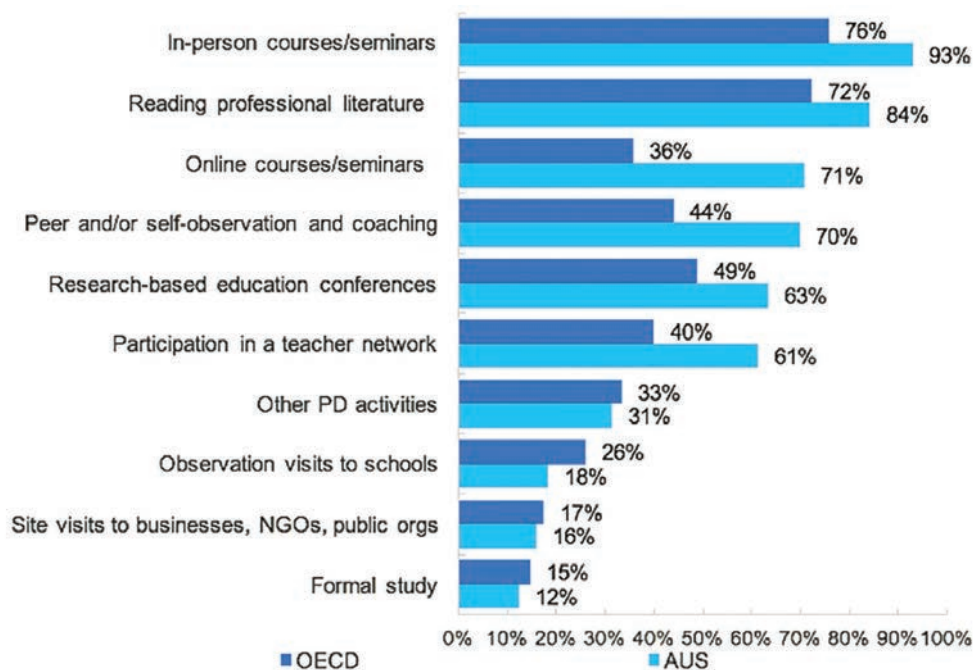
Source: Author's analysis from Longitudinal Study of Australian Children Wave 4 (K Cohort), Wave 6 (B Cohort).

Figure 31. Average yearly number of different professional development activities, 2018.



Source: OECD (2019). TALIS 2018, Vol 1: Teachers and School Leaders as Lifelong Learners, OECD Publishing, Paris.

Figure 32. Percentage of lower secondary teachers who participated in the following professional development activities in the 12 months prior to the survey, Australia and OECD average.



Source: OECD (2019). TALIS 2018 database.

Teachers with a higher level qualification are no more likely to report higher levels of competence in learning and behavioural problems, but are only slightly more likely to report having high expectations for academic success of students or that they have a strong effect on students' academic achievement.

FACT: Better, not necessarily more, professional development can help lift teachers' practice

By international standards, Australian teachers participate in a relatively high level of professional development activity (see Figure 31; see also Figure 25) and around 92% feel that professional development activities have a positive impact on their teaching practices. Australian teachers are relatively likely to participate in most forms of professional development (see Figure 32) — especially in attending online courses and seminars and attending research-based educational conferences.

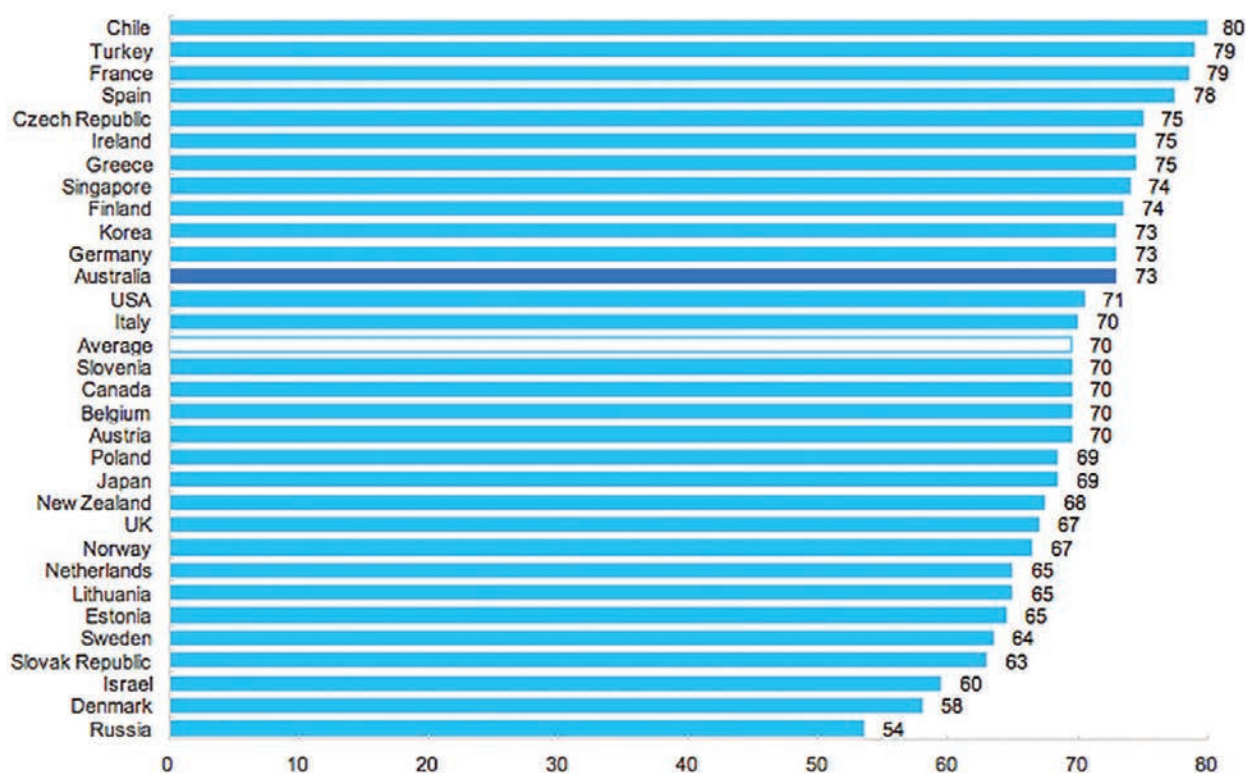
However, decades of research have found that while some professional development activities can have a significant positive effect on students' learning, there is wide variation in the quality of professional development¹³⁷ with many activities demonstrating little or no effect on teachers' effectiveness.

This evidence base has concluded that the contact hours or program duration of professional development has little effect on outcomes, however there is some evidence that programmes with valuable content can be highly effective.^{138 139} Moreover, there is some evidence that having a facilitative school working environment can result in better outcomes from professional development. Namely, teachers working in schools with more supportive work environments (those at the 75th percentile of professional environment ratings) improved 38% more over 10 years than teachers in schools that were less supportive (at the 25th percentile).¹⁴⁰ As a result, improving the evidence base and decision-making on professional development requires looking at the content of programmes as well as implementation and facilitation within schools.

ASSUMPTION: Smarter teachers mean higher achieving students

It has generally been proposed that smarter teachers equate to smarter students.¹⁴¹ This has motivated policymakers to actively promote 'best and brightest' teacher recruitment strategies, placing floors on entrance scores to enrol in ITE programmes, and setting achievement benchmarks on graduate achievement in standardised assessments or undergraduate coursework.

Figure 33. Average percentile of Australian teachers compared to Australian adult population (Adult literacy and numeracy). NB: countries with a higher value in this figure are relatively selective in who is a teacher compared to the wider adult population.



Source: PIAAC2011/12 and 2014/15; adapted from Hanushek, E. A.; Piopiunik, M.; and Wiederhold, S. (2019). The Value of Smarter Teachers: International Evidence on Teacher Cognitive Skills and Student Performance, *Human Resources*, 54 (4), pp. 857-899.

FACT: Australia is already relatively selective about who becomes a teacher

In recent years, there has been concern among stakeholders that the cognitive skills of Australia's teachers have declined as a result of eased entry to ITE programmes. While it's true there remain a relatively high number of low- and no-ATAR entrants to ITE degrees (as there has been since higher education statistics were first collected), there's no evidence that Australian teachers are at a relatively low academic standard (in terms of relative standing with other Australian adults).

Compared to other OECD countries, Australian teachers are sourced from a relatively high proportion of the adult population in terms of their literacy and numeracy capabilities. On average, Australian teachers are in the top 27% of the distribution for adult literacy and numeracy (see Figure 33).

This makes Australian teachers relatively high performers compared to the OECD average, and shows that selection of Australian teachers comes from the same point of the distribution as high-performing countries, like Singapore and Finland. Moreover, Australian teachers come from a relatively high end of the distribution compared to similar Anglosphere countries, like the United Kingdom (from the top 33% of the distribution) and New Zealand (from the top 32% of the distribution).

FACT: Teachers' academic performance is a factor, but not the factor, in how effective they will be

In order to pursue the objective of higher *teacher* quality, policy interventions such as the LANTITE¹⁴² partly serve as a 'gatekeeping' test for admission into teaching,¹⁴³ particularly in the absence of direct control of university enrolment admissions (given persistent concerns over admissions with very low ATARs). Between 2016 and 2020, 92% of first-time LANTITE test takers passed.¹⁴⁴

In any case, while there is a partial relationship between teachers' academic achievement and their effectiveness,¹⁴⁵ the evidence largely suggests that selection approaches based on academic and non-academic measures are only weakly related to improvements in teacher effectiveness¹⁴⁶ — and risk potential unintended consequences.^{147 148 149 150}

This is because differences in teachers' level of overall intelligence (such as measured by teachers' university entrance exam results¹⁵¹) is found to have little relationship with teacher effectiveness — though it does relate to their likelihood of ITE degree completion. When comparing pre-service teachers' performance in standardised assessments and their university GPA, their performance at university is a comparatively stronger predictor of their effectiveness.

¹⁵² There's also evidence that teachers with better performance at university improve more quickly during

their first few years of teaching.¹⁵³ Even still, early teachers' classroom performance is not significantly related to their academic performance,¹⁵⁴ with only between 5–12% of variation in teachers' classroom preparedness explained by teachers' GPAs.¹⁵⁵

The available research on teachers' academic background and ability is more mixed.

Teachers with a mathematics qualification,^{156 157} and those who have completed mathematics content at university,^{158 159} tend to record higher student maths achievement. There's also evidence that teachers' specialised mathematical knowledge and teaching skills are positively associated with gains in students' mathematical achievement.^{160 161 162 163 164} In other words, subject knowledge — rather than general cognitive ability alone — is a better predictor of teachers' likely effectiveness.¹⁶⁵

However, it appears that the level of preservice teachers' mathematical knowledge is not necessarily associated with the overall *number* of university-level mathematics courses,¹⁶⁶ but their *achievement* in coursework.

There's also some evidence that mathematics teachers with specialist mathematical knowledge provide greater instructional clarity in explaining the process of solving problems presented in classrooms.^{167 168 169} There is also evidence that specialised mathematics content and teaching methods are beneficial for preservice primary school teachers,¹⁷⁰ despite the relative scarcity of Australian primary school teachers with a specialised mathematical background.¹⁷¹ Moreover, there's some evidence professional development focused on helping teachers gain understanding of mathematics content and pedagogy¹⁷² can significantly impact on student achievement.¹⁷³

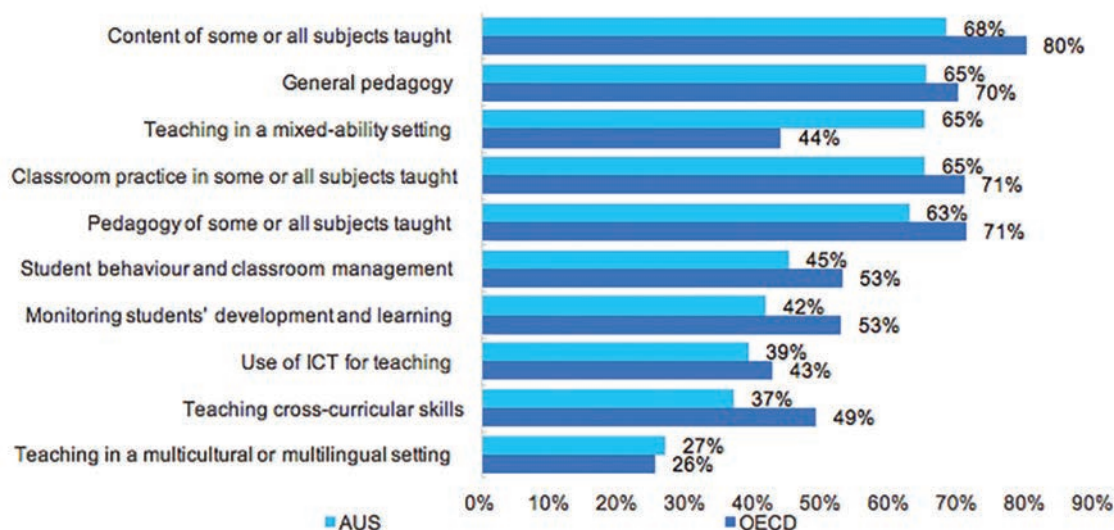
FACT: Australian trainee teachers report being less prepared than in other countries, but this doesn't necessarily make them less effective

Compared to the OECD average, Australian teachers generally report being less prepared for teaching than in other countries (see Figure 34). The gap is relatively large in teachers' content knowledge in the subjects they teach, in handling student behaviour and classroom management, monitoring student learning, and teaching cross-curricular skills (this may be because of the significant emphasis placed on this in the Australian curriculum).

While this may point to potential areas for improvement in ITE programmes, it doesn't necessarily mean new teachers are ineffective in the classroom. In part, this is because feelings of preparedness are subjective and dependent on pre-service teachers' experiences during their initial training. For instance, teachers who have worked in more challenging schools and with students with more learning difficulties tend to report lower levels of preparedness — which appears to be because they are better able to appreciate their limitations.

More generally, research finds that teachers' perceptions of preparedness are not associated with actual effectiveness in the classroom,^{174 175} though they appear to be related to retention.¹⁷⁶ This is consistent with the observations found in the TALIS-PISA link of a mixed relationship between teachers' general pedagogical knowledge and their subject-specific pedagogical knowledge, as well as the non-relationship between teachers' self-efficacy and student achievement. It is also confirmed by the observation in Australian data of no correlation between teachers' self-assessed competence and the progress of their students' achievement.

Figure 34. Percentage of teachers who felt “well prepared” or “very well prepared” for the following elements, Australian teachers and OECD average.



Source: OECD TALIS.

FACT: Teacher effectiveness is well predicted by performance in the classroom, including for early career teachers

Empirical research shows that early career teachers' job performance in their first few years is by far the best available predictor of long-term classroom effectiveness, especially for maths teachers.^{177 178 179}

^{180 181} In addition, higher observational scores during preservice training are also related to lower rates of teacher attrition, after controlling for student teachers' demographic characteristics and their academic achievement.¹⁸²

Empirical research shows that early career teachers' job performance in their first few years is by far the best available predictor of long-term classroom effectiveness, especially for maths teachers. In addition, higher observational scores during preservice training are also related to lower rates of teacher attrition, after controlling for student teachers' demographic characteristics and their academic achievement. In the Australian context, the early performance of teachers — including their practicum component of ITE — are strong indicators of their likelihood of completing their ITE qualifications.

Well calibrated, external, and independent, classroom observations are reliable measures of teachers' effectiveness,^{183 184 185} including for high stakes evaluations of performance.¹⁸⁶ There's also evidence that classroom observations are especially good for distinguishing between weak and sufficient teaching standards of early career teachers, compared to alternative approaches.¹⁸⁷ In classroom observations, classroom management is found to be most strongly and consistently predictive of teachers' value-added scores.¹⁸⁸

FACT: Quality practical pre-service training is the best source of teacher preparation

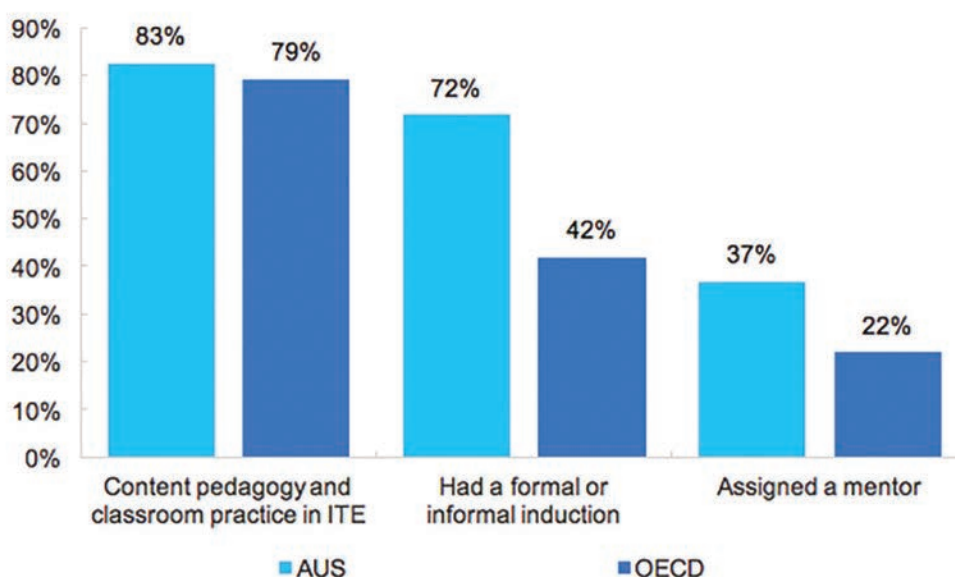
Teacher preparation includes preservice teaching placements with a supervising teacher, as well as processes to onboard new teachers — including an induction programme and having a mentor assigned.

By international standards, Australian trainees are more likely to have content pedagogy and classroom practice included in their ITE programmes, participate in an induction in their first school, and are assigned a mentor, compared to the OECD average (Figure 35). However, the relatively high participation in inductions, in particular, is challenged by other sources. For instance, AITSL's 2019 Stakeholder Survey finds that while 89% of school leaders report that early career teachers receive inductions, just 40% of teachers report this (with a similar disparity also observed in AITSL's 2016 survey).

An OECD analysis of top-performing education systems shows their ITE programmes focus less on preparing preservice teachers to be academics and more on preparing teachers for the classroom — finding that preservice teachers in high-performing countries begin practical teaching in schools earlier, spend more time in practicum, and receive more and better support in the process.¹⁸⁹ Greater attention to classroom management,¹⁹⁰ preparation for the work of first-year teaching,^{191 192} and promoting supportive learning environments¹⁹³ are consistently found in effective ITE programmes.

Pre-service training in schools is formative in teachers' instructional practices once in-service^{194 195 196 197} as well as their likelihood to stay in teaching.¹⁹⁸ Compared to other potential policy interventions, there is evidence

Figure 35. Teacher preparation, induction, and mentor assignment for new teachers, Australia and OECD average.



Source: OECD (2019). TALIS database.

of a significant effect on teachers' effectiveness — with preservice teachers in highly effective practicum as effective when they enter the workforce as a typical third-year teacher.¹⁹⁹

Despite this, many preservice teachers report a lack of opportunities to study, practise, and rehearse teaching.²⁰⁰ Within the Australian context, studies have highlighted that trainee teachers feel they need more practicum time, in a greater range of school settings, and with better linkage between theory and practice.²⁰¹ The TEMAG review also concluded that "it is clear that providers, schools and school systems are not working effectively together in the delivery of professional experience, and that not all programs are providing new teachers with the practical skills they need to be effective teachers." This was confirmed by the QITE review's finding that the quality of professional experience is highly variable and was a source of concern for ITE students.²⁰²

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It is largely recognised that the process of allocating and placing trainee teachers into schools and selecting supervising teachers lacks coordination.²⁰³ For instance, there are few clear incentives for schools to host practicums, which contributes to some reluctance based on perceptions of increased workloads, competing priorities, lack of recognition for supervising teachers and the lack of understanding that ITE students can be useful resources for school initiatives.²⁰⁴ This is compounded because schools are not always sure of their capability to host ITE placements.

Reform in recent years following TEMAG is likely to have improved the practicum experience for schools, teachers, and ITE providers, but there is not yet an evidence base from which to draw in the Australian context.²⁰⁵

Meanwhile, international research has made significant ground in recent years to explain why some preservice practicum is more effective than others.²⁰⁶ This has generally found that more — and especially higher quality — preservice practicum significantly explains teacher effectiveness,²⁰⁷ while also cautioning against evaluating preservice preparedness solely on teachers' confidence but also on demonstrated practice.²⁰⁸

It has found some evidence that alternative models can result in more effective placements than traditional ITE programmes.²⁰⁹ For instance, preservice teachers in full-year internship placements and employment-based placements have recorded higher observational ratings. However, preservice teachers in postgraduate degree programmes are slightly less effective while the benefits of low retention within schools (proxied by the proportion of senior, tenure-track faculty) has a modest benefit.

There is also emerging causal evidence that matching of schools and supervising teachers is important.²¹⁰

Teachers placed in schools with a history of strong achievement gains, with instructionally effective teachers, high rates of teacher retention, and quality teacher collaboration, are more likely to become more effective themselves and have lower rates of attrition.²¹¹ Teachers who are appointed in similar schools and in the same grade as their initial training placement are found to be more effective in their early years.²¹² Encouragingly, there is also evidence that (despite common perceptions) hosting a preservice teacher does not adversely impact on schools' performance levels.^{213 214}

There is especially strong evidence that preservice teachers who are trained by instructionally effective supervisors are themselves more effective.^{215 216 217} This appears to be due to both more effective modelling of practices and more effective coaching.²¹⁸ Moreover, there is also evidence that professional development of supervising teachers in how to be better coaches can contribute to further improving preservice teachers' performance.²¹⁹

FACT: Several policy approaches are likely to better support ITE effectiveness and early career preparedness

Recently introduced inspections of ITE providers in the United Kingdom — judged on observations and interactions with ITE providers, ITE instructors, preservice teachers, supervising teachers, and schools — promise to bring better quality assurance of ITE. Programmes are reviewed according to the knowledge and skills taught in the ITE programme (including whether content aligns with current scientific evidence), how it is being taught, and whether trainees can apply the learnt knowledge and skills into practice. Another promising intervention currently being trialled on a small scale is simulated, mixed reality classroom practice — with applications for preservice training as well as professional development.^{220 221}

²²² Simulations can replicate classroom practice by providing opportunities for teachers to try out new practices prior to stepping into a classroom and to do so in a safe space without the potential of impacting on real students. It also overcomes physical limitations in some schools and simultaneous access to instructional coaches during limited school hours. Empirical evidence

of practice-based, coached mixed-reality simulations shows they can significantly improve instruction in real classroom settings — including improvements in ability to provide remedial instruction and other skills that can be difficult to gain practice with during preservice training.²²³

Another intervention that has been trialled in several contexts (now in 21 US states) is ‘teaching residency programmes’. Residencies are intended to provide extensive clinical preparation (around one full preservice year in the classroom), shadowing and co-teaching with an experienced mentor (and in some cases, with continued mentoring after teachers’ preservice training). Unlike other employment-based tracks (that emphasise mostly learning on the job, rather than formal qualification), residencies generally involve teachers also attending formal ITE training at university and attaining traditional certification (often a Masters degree).

There is some evidence that residency programmes have demonstrated achievement gains for students²²⁴ and have attracted more maths and science teachers.²²⁵ However, some evidence suggests that preservice teachers in residencies don’t report feeling more prepared than those in non-residencies — though researchers suggest that this could be because residents, after spending more time in classrooms, may have developed more realistic views of the demands of teaching given their extended time in classroom and therefore reported feeling less prepared.²²⁶ Other research shows that preservice STEM teachers in residency had more confidence in their ability to provide quality instruction and preferred inquiry-based instruction more often, along with relatively high knowledge of educational theory and how to apply it.²²⁷

FACT: Performance management of in-service teachers remains severely limited

A significant constraint on promoting greater teaching quality is a lack of performance management in Australian schools. Surveys of Australian teachers have identified that 43% feel that appraisal and feedback have little impact on classroom teaching, around 62% say it is primarily an administrative exercise, and 71% feel feedback isn’t based on a thorough assessment of performance.²²⁹ At the same time, Australian teachers have become more ambitious in recent years, while also feeling that their ambitions are not being met in their jobs.²³⁰ 87% of Australian teachers say the opportunity to get promoted is important to them, however 71% say opportunities for promotion happen rarely.

While Australian teachers have procedures in place to monitor performance against a framework of teaching standards, feedback — including from school leaders or from external observations— is limited. For instance, the NSW Audit Office found that only a fraction of teachers receive the required twice yearly classroom observations.²³¹ Moreover, a range of industrially-agreed conditions limit the quality of feedback that teachers receive — including that teachers must agree to all written feedback (which comprises principals’ ability to formally performance manage underperformers), teachers’ goals must be agreed (which may conflict with areas of teachers’ greatest development needs), and teachers can select who conducts observations and negotiates what will be observed (which risks that observers may not necessarily be objective and qualified observers of practice).

Implications for policymakers

Across-the-board pay rises are not a solution to teacher quantity and quality issues, but subject-specific ones may be

Teachers' salaries are almost entirely centrally determined and applied universally across the workforce. The 2020 Gallop Report from the NSW Teachers Federation called for an across-the-board salary increase of 10–15% within two years.²³² And in February 2022, the Australian Education Union negotiated a deal with the Victorian government to see work hours reduced, conditions improved, and a 1% base salary increase every six months from 1 January 2022 to 1 July 2025, along with an additional annual allowance, equivalent to 1% of salary.

However, across-the-board salary rises do not necessarily improve the outcomes — in quantity or quality — of the teacher workforce.²³³ OECD's analysis of PISA data shows no statistical relationship between higher-paid teachers and higher student achievement.²³⁴ Past CIS research shows there is no consistent relationship between schools' resourcing and student achievement.²³⁵

But higher across-the-board salaries do place pressure on school expenditures, including the ability to potentially pay high-performing or in-demand teachers more. A 2019 CIS poll found parents and taxpayers rated paying all teachers more, or hiring more teachers, as among their lowest priorities for school spending.²³⁶

In order to attract and retain teachers in shortage areas — particularly with specialisations in maths and science — policymakers should consider flexible pay rates, making them more market-based, rather than fully regulated.²³⁷ This is because there is evidence that maths and science teachers' salary expectations are relatively sensitive to market salaries outside of teaching. The same is not necessarily true for the wider teacher workforce who, by international standards, earn relatively high salaries and report relatively high levels of satisfaction with pay and conditions.

Subject-specific teacher shortages can be addressed by diversifying the supply of teachers

Despite regular claims, there is not currently convincing evidence of a general teacher workforce shortage. As a result, policymakers should resist alleged attrition-reducing measures — such as reducing class sizes, across-the-board pay rises, and the like — or the introduction of potentially expensive initiatives to try to attract significantly more prospective teachers in general to ITE courses.

But there is a persistent and significant shortage of teachers in specific disciplines, especially in maths. Addressing this subject-specific teacher shortage

requires different policy interventions than addressing general workforce issues. However, to date, there is not yet consistent evidence on what policy interventions are most suited to significantly improve maths teacher numbers — cost-effectively and at scale — in the Australian context.^{238 239}

Policymakers should adopt a range of targeted strategies to diversify teacher supply if they are to recruit more maths and science teachers. For instance, the NSW government's recent Teacher Supply Strategy proposes a range of measures to introduce employment-based pathways (in effect, increased role for learning on the job, rather than in formalised ITE), deregulated entry requirements for those with existing subject matter knowledge and professional experience (in effect, with shortened periods of bridging ITE), and assisting recognition of credentials of international teachers.

Reward high-performing teachers

By and large, teachers are rewarded financially and positionally by achieving higher credentials, being more experienced, and completing more professional development. However, there is consistent evidence that none of these factors significantly contributes to greater instructional effectiveness or to recording greater student outcomes.

International researchers have demonstrated that independent and objective classroom observations can provide greater consistency, reliability, and validity to inform evaluations of teachers' effectiveness.²⁴⁰ However, Australian teachers do not consistently benefit from performance management that involves independent and meaningful classroom observations. It is also not clear that current accreditation frameworks accurately map to classroom effectiveness.

There is some evidence that performance bonuses equivalent to around 20% of teachers' salaries could significantly increase the number of high-ability prospective teachers to the profession.²⁴¹

Review the efficacy of extended postgraduate teacher education programmes

There is consistent and overwhelming evidence that teachers with more and longer education qualifications are no more effective than other graduate teachers. For this reason, the increased offering of longer postgraduate teaching degrees by Australian universities is unlikely to improve the effectiveness of teachers. It does, however, impose a significant barrier to entry — restricting the supply of teachers — by increasing the time and cost of training to become, or upskill, as a teacher.

Research suggests that more subject matter and subject-specific pedagogical knowledge is related to

higher effectiveness of teachers, but general pedagogy and the number of additional general education units of study are either negatively related or unrelated to teachers' effectiveness. This suggests that beyond a threshold level of general pedagogical understanding, teachers' training needs are greater in subject-specific areas, as well as in the practical application of this knowledge.

The NSW Productivity Commission has recommended a review into the costs and benefits of the current two-year Masters course offering (compared to a one-year program). The findings of such a review should be considered by all relevant policymakers with a view to identifying and endorsing the essential characteristics of ITE programmes that provide sufficient content for teachers to be instructionally effective. The QITE review suggests that a one-year qualification could be offered for candidates with prior experience and subject content knowledge, or for those with demonstrated suitability to teach in areas of workplace demand.

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Review the process, experience, and effectiveness of student teaching practicums

Of the available interventions to potentially improve the preparedness and effectiveness of new teachers, improving practicum has the greatest potential impact. While the duration and structure of practicum for preservice teachers in Australia has improved in recent years, some gaps remain and the matching of preservice candidates to school and supervising teacher placements can be effectively ad hoc.

For instance, while preservice teachers now have greater support in receiving a placement and documenting performance, there remain few incentives to motivate schools or highly effective supervising teachers to host practicums (or to know that they are good candidates to host practicums). This is especially important given the evidence that preservice teachers who are placed in high-performing schools and with

high-performing supervising teachers are as effective as the typical third-year teacher when they enter the workforce.

For this reason, policymakers should consider how to better match and motivate placements that are most likely to result in more prepared and effective new teachers. This could include frameworks to assist ITE providers in assessing the suitability of potential host schools and the available supervising teachers. Policymakers should consider the merits of potential incentives to compensate schools and supervising teachers to help high-performing schools facilitate more placements. This could include specialist roles for highly effective supervising teachers.

To support the Australian evidence base, better data needs to be collected and consolidated (see also below). While there are some examples of high-performing placement schools — such as the NSW Professional Experience Hubs — there remains some opportunity to role model best practice at scale.

Review the best uses of teachers' working time through an outcomes-based lens

Educators and policymakers are understandably concerned about teachers' workload, given considerable attention placed on the working hours, stress, burnout, and job satisfaction of teachers. While there are regular negative reports on working conditions,²⁴² this contrasts with evidence that, by international standards, Australian teachers actually report comparable levels of satisfaction with their current jobs and with teaching as a profession.

While Australian teachers work longer hours than in most European countries, they work slightly fewer hours than in Anglosphere countries — including slightly fewer teaching hours than the OECD average.

The emphasis on teachers' workload and stress is often limited to its impact on the teaching workforce, not necessarily its potential impacts upon students' educational outcomes. The available evidence suggests that the level of working hours does not significantly impact on students' achievement, though how that time is used does. The more time spent on teaching and the more time spent on marking and correcting students' work, the better their students achieve. However, the more time that teachers spend on school management activities, the poorer their students achieve. It is not clear why the huge increase in non-teaching staff in schools has not resulted in relief to teachers' non-teaching duties.

The responsibility on school administrators and policymakers is to ensure that teachers' time is used as wisely as possible.

In order to inform evidence-based policy, independent and objective assessment of teachers' time use is required. However, available data is limited to self-reported assessment of teachers' time use. A potential approach to monitoring teachers' time use could be

to replicate a similar assessment of principals' time use commissioned by the NSW Education Department, which produced quantitative observational measures of actual activity. In doing so, such a review of time use should evaluate opportunities to meaningfully reduce red tape and administrative burden — building on recent reviews conducted by AITSL and Catholic Schools NSW.

Lift the quality of ITE courses, rather than attempting to raise the 'quality' of ITE candidates

While it's true that ITE candidates with higher academic ability may ultimately become more effective teachers, these effects are relatively small. The quality of ITE provided to trainee teachers, however, directly and significantly impacts on the practices of all new teachers. As recent CIS research has identified, there are significant deficiencies in the quality of *teaching* practices in Australian ITE programmes.²⁴³ Teachers' practices and performance early in their career significantly predict their long-term effectiveness in the classroom.

For this reason, stronger quality assurance measures of the ITE sector are required from policymakers.²⁴⁴

As the primary regulator of the university sector, the federal government can use its funding leverage to monitor the content within ITE qualifications. Recent CIS analysis recommended that all ITE students should complete at least one unit of training dedicated specifically to explicit instruction.²⁴⁵ Failure to meet current standards of commitment to evidence-based teaching practices should be met with intervention from government. This can include more transparency of ITE providers who consistently fail to meet this obligation as well as defunding of offending ITE programmes (through reductions in Commonwealth Supported Places and amendments in the Performance Based Funding component of university resourcing).

As the primary employer and certifier of teachers, state and territory policymakers should provide more quality signals to prospective ITE students — and those teachers seeking to upskill — so that they know which institutions and programmes are likely to provide the highest quality training. In the event of consistent underperformance of ITE providers, state and territory policymakers should give notice of intention to decline endorsing graduating teachers from underperforming ITE providers.

Improved data collection and reporting on teacher supply, demand, and attrition is needed for more effective workforce planning

Poor data coverage of the full range of factors impacting on supply and demand of teachers hinders evidence-based decision-making on workforce strategy.²⁴⁶ The outcome of poor data collection and reporting is that teacher workforce matters are

dominated by unvalidated claims of vested interests, rather than on evidence.

Given the clear disparity according to discipline and location, supply and demand data needs to be disaggregated accordingly. Namely, policymakers and ITE providers should be more readily able to identify (and act on) areas of shortage and surplus by geography and discipline. By way of example, Colorado's Educator Shortage dashboard and database provides detailed, district-level data and mapping of teacher supply and demand.

Policymakers, the public, and ITE providers should be armed with measurable indicators of teacher shortage and surplus, such as teacher vacancy rates (the proportion of positions left unfilled due to a lack of suitable candidates), out-of-field teaching rates, projected future areas (geographic and discipline) of need, staffing needs and allocations by discipline, the number of partially qualified teachers soon entering the workforce, and the size of the available casual and relief teacher pool. To monitor the matching of industry need and ITE provision, indicators should track not only the employment rate of graduating teachers from ITE providers, but also their full-time employment rates, and the number of ITE completers in areas of policy need (particularly maths disciplines).

A nationally consistent measure of attrition should be collected and reported — rather than relying on surveys of teachers' intention to leave the profession. Attrition is most accurately measured by direct measures — using data on the total number of teachers and the actual number of teachers leaving the teaching profession, with and without retirements — especially using longitudinal data to monitor the destinations of teachers that leave the workforce, either temporarily (say, for family or reskilling reasons), permanently (say, for retirements or to pursue another career), or provisionally (say, to remain in non-school-based education work or transferring across school systems).

Establish a national education data hub to produce a longitudinal data collection examining teacher effectiveness in the Australian context

Though there are several longitudinal data collections that effectively match teacher (including both preservice and in-service information), school, class, and student characteristics in the United States, there is very limited collection of such data in Australia.²⁴⁷ This contributes to a vacuum of quantitative evidence to inform policymaking regarding the teacher workforce.²⁴⁸ Despite handing down recommendations for improving education data collections, a 2016 Productivity Commission report has not received an official, published response from government.

While initiatives to improve the collection of data, such as the Australian Teacher Workforce Data (ATWD), are welcome, they provide only a descriptive, rather than analytical, resource. Combined with the other existing, but siloed, data sources available (such as

NAPLAN, the Early Development Census, and the like), there is significant unmet capacity for improved data consolidation to support analysis for research purposes, and ultimately, to inform evidence-based policy decisions.²⁴⁹ Moreover, access to the ATWD should be made available to approved users for research purposes and the ongoing governance of the ATWD should extend beyond education system bureaucracies.

A national hub of education data should be established with the purpose of producing and analysing data for research purposes. At the centre of this collection must be a commitment to match critical teacher, teaching, school, and student data so as to better understand the factors that contribute to improved outcomes for students and teachers.

An example of research collaboration focused on these matters is the National Center for Analysis of Longitudinal Data in Education Research (CALDER) in the United States — an 11-university joint venture supported by the Institute of Education Sciences. The Deans for Impact has proposed a data framework to further facilitate improved research and evaluation of teacher education and effectiveness, including a longitudinal collection of teachers' data prior to commencing ITE, during their ITE programme, and after entering the workforce.²⁵⁰

Given the disjointed governance and administrative framework concerning data collection, this would require significant levels of collaboration between policymakers, stakeholders, bureaucracies, school administrators, and ITE providers. However, the potential benefits can also be shared among all parties.

Longitudinal data that tracks teachers' preservice ITE course choices and completions, their school placements, their certification status, their satisfaction with ITE, induction and mentoring participation could be linked with future data collected once in the field — such as their retention rates, school mobility rates, out-of-field teaching, level and type of professional

development needs, observations of teaching practice, principal ratings of performance, and their students' achievement. This would assist policymakers in identifying the highest- and lowest-performing ITE programmes and institutions.²⁵¹ There is evidence that analysis of preservice teachers' performance assessments can contribute to directing teachers' improvement as well as assessing performance of ITE providers.²⁵²

In order to make the greatest possible contribution to the Australian evidence base, a range of data should be collected and analysed that provides robust indicators of teachers' effectiveness. The Measures of Effective Teaching (MET) project in the United States may provide a suitable framework for piloting an analysis of a sample of Australian teachers.

The MET has a track record of data collection and research that has made significant inroads to reliably and accurately measure teacher effectiveness, and ultimately aid schools and teachers to develop improved teaching practice. MET collects performance data across a range of indicators, including:

- value-added measures based on students' standardised assessment results;
- classroom observations based on a range of scoring methods;
- teachers' pedagogical content knowledge (based on teachers' ability to choose appropriate strategies and to recognise and diagnose common student errors);
- student perceptions of classroom instruction, based on surveys about their experience in the classroom and their teachers' ability to engage them in the course material;
- and teachers' contribution to colleagues and school environment.

Conclusion

Policymakers are understandably concerned about the state of the teacher workforce, given its importance in affecting education outcomes. However, as this paper demonstrates, teacher workforce policies are rarely informed by evidence, with many misconceptions gaining traction. This situation is made worse in Australia by poor data collection and integration, particularly at a national level, which limits policymakers' ability to make optimal decisions.

The conclusions from this analysis can be distinguished according to those most relating to the *quantity* of the teacher workforce and those most relating to the *quality* of the teacher workforce.

The management of the quantity of the teacher workforce requires consideration of both supply and demand of teachers. While there are many supply and demand dynamics impacting on the workforce, analysis shows there is little evidence of an imminent and significant overall teacher shortage. To this end, policymakers should resist calls to introduce additional measures intended to prevent teacher attrition — such as across-the-board pay increases.

While better data will assist decision-making and understanding of the sources of teacher attrition, there is no available evidence on which to conclude there is a significant attrition problem in Australia; nor that high-performing, early career teachers are leaving the profession. Rather than focusing on teacher attrition, further exploring opportunities to increase supply of potentially effective teachers is likely to

improve teacher workforce — and overall education — outcomes.

The monitoring of quality of the teacher workforce requires more sophisticated policy approaches.

The dominant policy interventions impose academic gatekeeping and stringent regulation on potential teachers to aim for a higher quality workforce — but with no available evidence that this will in fact improve teaching instruction or student outcomes.

Instead, the research shows that the quality, though not necessarily quantity, of preservice practical training (and the conditions in which it takes place) significantly explains differences in teachers' effectiveness. Moreover, their effectiveness is reliably measured by observations of early career classroom performance. Graduate teachers' self-reported classroom-readiness is not found to have any relationship with actual effectiveness in the classroom.

As a result of the above, policymakers should more directly monitor the practices and effectiveness of preservice teachers, rather than focusing on teacher selection, accreditation, and other related policy approaches.

Evidence-based management of the teacher workforce is critical to lifting Australia's education outcomes in the years to come. But it will be policies that directly promote better *teaching* quality — rather than *teacher* quality — that will prove to support these objectives.

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