

# The economic impacts of longer postgraduate initial teacher education

A cost-benefit analysis

January 2023



## Acknowledgment of Country

We acknowledge that Aboriginal and Torres Strait Islander peoples are the First Peoples and Traditional Custodians of Australia, and the oldest continuing culture in human history.

We pay respect to Elders past and present and commit to respecting the lands we walk on, and the communities we walk with.

We celebrate the deep and enduring connection of Aboriginal and Torres Strait Islander peoples to Country and acknowledge their continuing custodianship of the land, seas, and sky.

We acknowledge the ongoing stewardship of Aboriginal and Torres Strait Islander peoples, and the important contribution they make to our communities and economies.

We reflect on the continuing impact of government policies and practices and recognise our responsibility to work together with and for Aboriginal and Torres Strait Islander peoples, families, and communities, towards improved economic, social, and cultural outcomes.

Artwork:

*Regeneration* by Josie Rose



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## About the NSW Productivity Commission

The NSW Productivity Commission ('the Commission') was established by the NSW Government in 2018 under the leadership of the state's inaugural Commissioner for Productivity, Peter Achterstraat AM.

The Commission is tasked with identifying opportunities to boost productivity growth in both the private and public sectors across the state to continuously improve the regulatory policy framework and other levers the NSW Government can pull. Productivity growth is essential to ensure a sustained growth in living standards for the people of NSW, by fully utilising our knowledge and capabilities, our technology and research, and our physical assets.

The Commission's priorities include:

- productivity and innovation
- fit-for-purpose regulation
- efficient and competitive NSW industries
- climate resilient and adaptive economic development.

Since its inception, the Commission has undertaken several reviews on productivity matters and published the landmark *Productivity Commission White Paper 2021: Rebooting the economy*.

### Expert advisers

The NSW Productivity Commission engaged four expert advisers for this project:

- Professor Tania Aspland
- Joe Connell
- Dr Ben Jensen
- Mary-Ann O'Loughlin AO.

The Commission thanks the advisers for their assistance, noting that all research, opinions, and recommendations in this report are solely those of the Commission. The expert advisers are not to be taken as endorsing any views or recommendations expressed in this report and bear no responsibility for any errors.

### Disclaimer

The views expressed in this report are those of the NSW Productivity Commission alone, and do not necessarily represent the views of NSW Treasury or the NSW Government.

Regarding the recommendations in this report, NSW Productivity Commission recommendations only become NSW Government policy if they are explicitly adopted or actioned by the NSW Government. The NSW Government may adopt or implement recommendations wholly, in part, or in a modified form.

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## Glossary and abbreviations

Term	Definition
AITSL	Australian Institute for Teaching and School Leadership
BOSTES	NSW Board of Studies, Teaching and Educational Standards
CBA	Cost-benefit analysis
Counterfactual	The situation or condition that would have occurred had the program or intervention not taken place
DESE	Commonwealth Department of Education, Skills and Employment
DoE	NSW Department of Education
FTE	Full-time equivalent
GSP	Gross state product
GST	Goods and services tax
HSC	Higher School Certificate
ITE	Initial teacher education
LANTITE	Literacy and Numeracy Test for Initial Teacher Education Students
NESA	NSW Education Standards Authority
NPV	Net present value – the sum of the present value of benefits
OECD	Organisation for Economic Co-operation and Development
PISA	Program for International Student Assessment
Standards and Procedures	Shorthand title for the AITSL book <i>Accreditation of Initial Teacher Education Programs in Australia: Standards and Procedures</i>
STEM	Science, technology, engineering and mathematics
TAS	Technological and applied studies
TIMMS	Trends in International Mathematics and Science Study
TPP17-03	Shorthand title for the NSW Government Guide to Cost-Benefit Analysis

# Executive summary

In 2011, a national reform established new Australia-wide standards for initial teacher education (ITE) programs. The reform required aspiring teachers who are already university graduates to undertake a two-year Master of Teaching degree if they want to enter the teaching profession. Previously a one-year Graduate Diploma of Education was sufficient. The reform was phased in gradually across Australia. All states and territories have now implemented the change, with NSW doing so in 2014.

This report evaluates the costs and benefits of moving to the two-year postgraduate ITE requirement. The NSW Productivity Commission (Commission) has undertaken a comprehensive review of the evidence on this topic and identifies the societal costs and benefits of lengthening the ITE pathway for the NSW community.

The Commission has found that the implementation of the two-year master's is a disincentive for mid-career professionals looking to become teachers. It has cost the NSW community around \$3 billion in lost welfare over the past seven years. These costs comprise loss of teacher earnings, additional student debt for teachers, and loss of lifetime income for students. Had ITE remained as a one-year graduate diploma, we could expect more than 9,000 additional ITE completions over the 2015 to 2022 period.

If steps are taken today to reverse this policy, then the welfare cost of the change can be limited to around \$3 billion.

While the Commission's analysis focuses on NSW, the reform in question is national, so issues we identify have clear national implications.

## The costs to students

It is universally accepted that access to quality teaching improves students' lifetime earnings, and that missing out on good quality teachers is harmful. But the link between the longer qualification and teaching quality has not been demonstrated. Based on a review of empirical evidence, the Commission estimates that teachers with an additional year of ITE have a negligible impact on student achievement. On the other hand, the literature consistently points to additional years of on-the-job teaching experience having a positive impact, especially for early-career teachers.

Even if there is some additional benefit of an additional year of ITE, it is very unlikely to outweigh the benefit of an additional year of on-the-job experience for student outcomes.

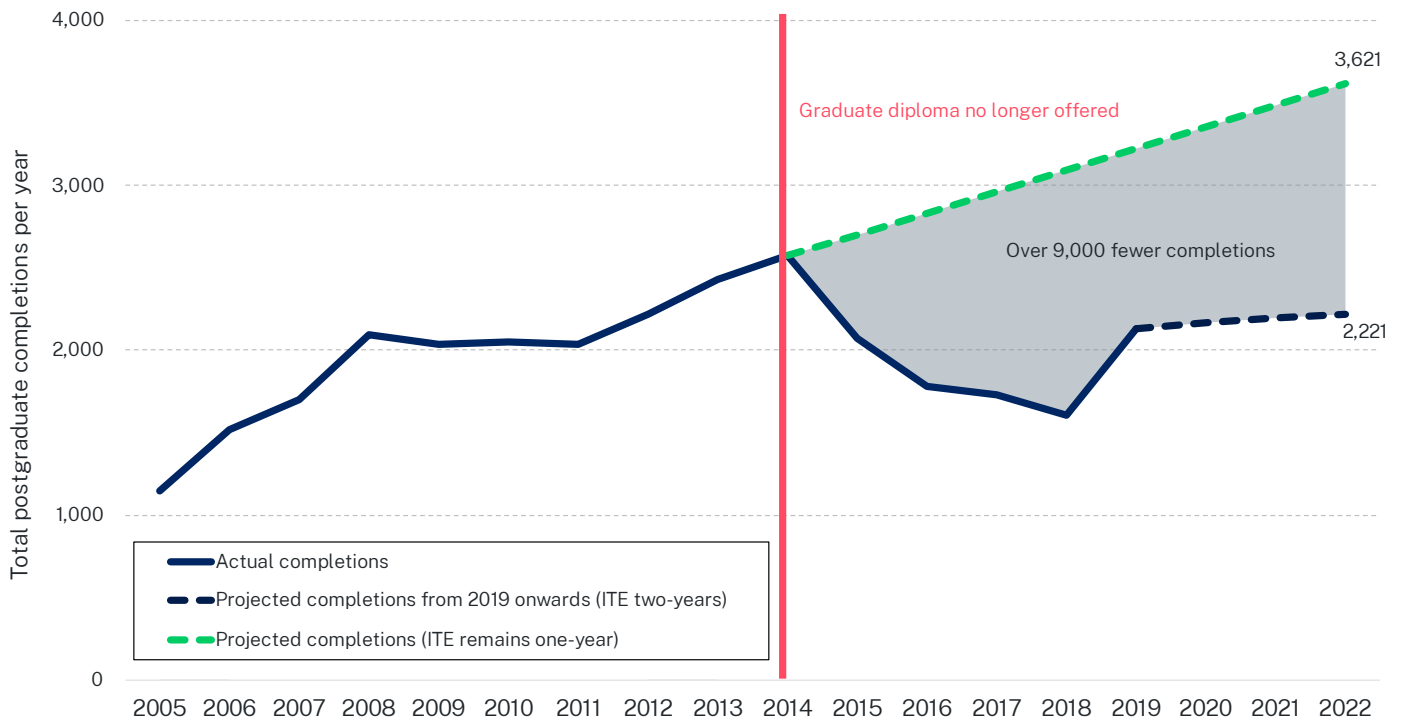
This evaluation focuses on the cost of the teacher shortage to students. Since NSW doubled the length of postgraduate ITE in 2014, ITE completions have trended down. If the pre-2014 completions trend had continued, there would have been more than 9,000 more ITE graduates than there are today (Figure 1).

The impact of this shortfall in teaching graduates with specialised skills on out-of-field teaching is concerning. The Commission estimates that the poorer outcomes from this additional out-of-field teaching — that is outside of a teacher's area of specialty — costs around 95,000 students \$25,000 each in lost lifetime earnings (present value).



Figure 1: NSW's missing teaching graduates

Total completions in postgraduate initial teacher education, NSW, projected vs actual, 2005–2022



Source: AITSL, NESAs, NSW Productivity Commission

## The costs to aspiring teachers

The two-year master’s requirement has also been costly to aspiring teachers themselves. For nearly a decade, postgraduates aspiring to a teaching job have had to study for an extra year before they could begin earning a salary. While losing a year of professional income, they have also been required to take on an extra year of student debt. A generation of teachers has also had to wait an extra year before accumulating crucial on-the-job experience and earning salary progressions.

For those that aren’t deterred by the additional barriers, the Commission estimates this policy change has cost them around \$60,000 each. But this is only part of the story. The teachers that would have preferred to go into teaching but cannot justify the higher cost still face a loss of welfare, estimated to be around \$20,000 each.

## The net welfare cost of lengthened ITE

The Commission has applied cost-benefit analysis to evaluate the impact of the change in ITE accreditation policy on the NSW community. The distributional effects on certain groups — prospective teachers, school students, universities and governments has also been considered.

The Commission estimates that the welfare costs of the policy change outlined above far outweigh the benefits. The lack of an *ex-ante* business case and post-implementation evaluation plan made quantifying the impacts difficult (particularly for the benefits), but the results are robust to sensitivity tests. Sensitivity tests include reducing the number of ITE completions assumed to have been deterred by the greater barriers to entry and removing the increase in students’ lifetime incomes. As highlighted above, the groups most harmed by the reform are:

- aspiring teachers who commenced ITE between 2015 and 2022 and were required to undertake an extra year of university and need to pay an additional year of fees
- NSW school students who will have less access to qualified or experienced teachers because the two-year master's requirement restricted teacher supply.

## Recommendations

Lengthening postgraduate ITE to two years has imposed around \$3 billion of net costs on the NSW community – primarily impacting school students and recent teacher graduates. The Commission's analysis indicates these costs will grow with each year the requirement remains in place.

### **Recommendation 1: Allow and equip postgraduates to teach with a one-year graduate diploma as soon as practicable**

- Reduce the minimum duration for postgraduate ITE programs to one year of full-time study.
- That the NSW Department of Education and Training investigate opportunities to provide additional resources to graduate teachers and out-of-field teachers.

### **Recommendation 2: Undertake additional research to determine best practice content, length and structure for initial teacher education (ITE)**

- That Australian Institute for Teaching and School Leadership (AITSL):
  - review the national teaching and ITE program standards
  - be commissioned to assess variation in ITE provider quality from a range of perspectives, including graduate outcomes, from provider program evaluations and in-depth consultation with universities, schools and education departments.
- That NSW Education Standards Authority (NESA):
  - undertake random audits to assess NSW ITE programs against their approved accreditation submissions
  - every three years, review and report on progress improving program quality in NSW.

### **Recommendation 3: Embed regulatory impact assessment and evaluation into education policy, including teaching and program standards**

- Ensure changes to education regulation and policy (including intergovernmental agreements) comply with the NSW Government best practice regulation requirements. Use regular evaluation to refine and improve policy for the benefit of the NSW community.

## Continuing the discussion

The Commission has made its best efforts to identify, review and consider the publicly available research and evidence regarding the ITE requirement for a two-year master's. Unfortunately, at the time of publication, we could find little on the public record explaining the intended objectives of introducing the requirement and how it was expected to achieve these objectives. The Commission welcomes any further information that members of the community may be able to provide on the evidence base and rationale for this reform.

More broadly, the Commission welcomes evidence, information, research, discussion and feedback from stakeholder groups or members of the community on this and other productivity issues. You can contact the Commission via the NSW Productivity Commission website.

# 1 Background

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## 1.1 Project overview

Initial teacher education (ITE) is the gateway to the teaching profession. It provides aspiring teachers with the knowledge, skills, and behaviours they need for success in the profession (Department of Education, Skills and Employment, 2021). These aspiring teachers must successfully complete coursework and practice teaching from an accredited ITE course.

National reforms phased in from around 2014 lengthened the minimum postgraduate ITE qualification to two years. Though well-meaning, this reform has not had any discernible positive impact on teaching quality and student attainment. Australia's results in the well-regarded PISA (Program for International Student Assessment) test have fallen steeply, even as governments have significantly ramped up education funding under the Gonski-led reforms. NSW's results in the National Assessment Program – Literacy and Numeracy (NAPLAN) have not improved in line with the other states.

Neither greater funding nor longer initial teacher training has provided the answer to falling student results. In fact, the changes have made ITE more onerous for aspiring teachers and have likely made things worse.

In 2021, the NSW Productivity Commission published its *White Paper 2021: Rebooting the economy*. Among a number of productivity recommendations it included a recommendation to review the evidence, benefits, and costs of the two-year master's requirement for ITE. This report implements the White Paper's recommendation.

This report reviews the costs and benefits of lengthening the postgraduate ITE requirements from the one-year Graduate Diploma of Education. The Commission aims to quantify the benefits and costs of that change.

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## 1.2 Report overview

Our *ex-post* evaluation compares two possible worlds:

- the **One-year ITE scenario** is the base case where ITE remained a single year (it did not change in 2014)
- our present situation, where ITE has lengthened to two years (**Lengthened ITE scenario**).

The **One-year ITE Scenario** is a world where postgraduate ITE length was not lengthened in 2014. The Commission assumes a shorter postgraduate ITE requirement (that is, the continuation of a one-year program) would attract more candidates, and that these candidates would complete their training sooner and at a lower cost than the two-year equivalent master's candidates, giving them a year of extra classroom experience.

This paper will examine the impact on the NSW education system from the reform in 2014. It will cover the process of becoming an accredited teacher in NSW today, as well as examining trends and statistics related to the education system in NSW and broadly across Australia. Following this, a section explores the evidence for what affects student educational achievement. It concludes that a student's teacher is one of the most important in-school factors for student achievement. This paper

then explores the factors contributing to a teacher's impact on student achievement, focusing on formal university qualifications.

The report has six sections:

- an explanation and history of ITE, with a focus on ITE in NSW (**Section 1**)
- the economic benefits of higher student achievement (**Section 2**)
- evidence on improving teacher quality (**Section 3**)
- impacts of changes to ITE on teacher supply, particularly on enrolment and completion of ITE (**Section 4**)
- the cost-benefit analysis of changes to ITE (**Section 5**)
- recommendations and further research (**Section 6**).

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## 1.3 ITE in NSW has undergone substantial reform since the 1850s

### 1.3.1 Aspiring NSW teachers can choose from four paths

There are four main pathways to becoming an accredited teacher in NSW:

1. Complete an accredited four-year teaching degree, such as a Bachelor of Education.
2. Complete a combination of degrees of at least four years, comprising discipline studies and professional studies, such as a Bachelor of Arts combined with a Bachelor of Education.
3. Completing a three-year undergraduate degree providing the required discipline knowledge, plus a two-year graduate-entry professional qualification such as a Master of Teaching degree.<sup>1</sup>
4. Teachers who are already qualified or accredited by a relevant overseas or interstate authority can apply for accreditation by the NSW Education Standards Authority (NESA), where a mutual recognition agreement is in place.

Within the above frameworks, some jurisdictions also offer employment-based pathways such as:

- The Teach for Australia program is an Australian example of an employment-based teacher training pathway to address teaching shortages. Since 2008, the program has placed high-achieving teacher candidates into hard-to-fill positions in disadvantaged schools across Victoria, the Northern Territory, Western Australia, Tasmania and soon, NSW. Following a fast-tracked course in teaching and simultaneous two-year placement, participants obtain a Master of Teaching degree and are fully qualified to teach.

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<sup>1</sup> For more details on the latest accreditation process see <https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/teaching-qualifications/studying-teaching>

- Similarly, La Trobe University's Nexus program offers teaching candidates employment-based pathways into secondary teaching while studying (Department of Education, Skills and Employment, 2022).
- The NSW mid-career pathway is a program run by the NSW Department of Education. It supports individuals that possess significant prior experience to complete a Master of Teaching (secondary) or a Bachelor of Education (secondary) and enter a career in secondary teaching. Participants are given the opportunity to be employed at a school part-time as a paraprofessional while completing their teaching qualification (NSW Department of Education, 2022b).

These programs, however, still require participants to complete a two-year full-time equivalent Master of Teaching degree.

Some universities offer a compressed or accelerated Master of Teaching. This condenses the workload, so that prospective teachers complete their ITE faster. For instance, the University of Newcastle has a trimester system, meaning that the postgraduate degree can be completed in one-and-a-half years instead of two. While this may get the teacher into the classroom more quickly, the cost and study load for the aspiring teacher remains unchanged.

### **1.3.2 Over the long term, ITE has evolved from an apprenticeship to a university model**

Up until 1850, teacher preparation was unregulated. Australian states began to formalise teacher training in the 1860s, initially using an apprenticeship system used in English schools. In this pupil-teacher model, candidate teachers trained on the job as pupil-teachers. This system lasted into the new century (NSW Department of Education, 2019).

In the early 1900s, teacher training colleges began to emerge, delivering training through formal study. This resulted in a transition from the pupil-teacher system to university degree courses followed by a university diploma of education, or a one-year professional course at a teachers' college (NSW Department of Education, 2019).

Teacher colleges remained the primary means of ITE until the 1970s, when colleges of advanced education began delivering ITE (O'Donoghue, 2018). In the late 1980s, the Unified National System was introduced meaning that colleges of advanced education were merged with universities, and universities delivered all teacher training. This resulted in a more scholarly approach to ITE, focused both on practical preparation for the classroom and on coursework (Aspland, 2006). This tertiary model is the dominant model today.

In 2011, the Australian Institute for Teaching and School Leadership (AITSL) released the *Accreditation of Initial Teacher Education Programs in Australia: Standards and Procedures*, which we will refer to from here on just as *Accreditation Standards and Procedures*. This set the postgraduate requirement of a two-year Master of Teaching degree for those wishing to become accredited teachers but had not previously completed university studies in education.

Prior to NSW adopting the *Accreditation Standards and Procedures*, a graduate who already had a curriculum-relevant degree could undertake a one-year graduate ITE qualification. The NSW Institute of Teachers adopted the *Accreditation Standards and Procedures* in 2012, and NSW phased out one-year graduate diplomas by no longer enrolling students (NSW Education Standards Authority, 2022). The last intake of students enrolled in the NSW graduate diploma was 2014 (NSW Education Standards Authority, 2022).



Currently, state and territory governments manage teacher and course accreditation according to AITSL's standards. In NSW, NESAs monitor schools, curriculum, ITE and teacher accreditation. ITE is accredited in NSW by NESAs under the *Education Standards Authority Act 2013* (NESAs Act), ensuring graduating teachers meet the required *Accreditation Standards and Procedures*.<sup>2</sup> This process maintains a standard of ITE courses, aims to make universities accountable for the ITE courses they provide, and ensures all teachers graduating meet the professional knowledge, professional practice, and professional engagement required to become a teacher. Appendix A discusses in more detail the formation of NESAs.

### 1.3.2.1 Reforms from 2011 onward lengthened ITE

The 2011 release of the *Accreditation Standards and Procedures* was designed to respond to widespread concern that teachers:

- were not adequately equipped to address diverse learning needs
- did not have sufficient knowledge of teaching theory
- were not equipped to teach numeracy and literacy.

The *Accreditation Standards and Procedures* made explicit the professional expectations, professional knowledge, professional practice, and professional engagement of those graduating from ITE programs.

The objectives of the *Accreditation Standards and Procedures* were twofold:

1. To improve teacher quality through continuous improvement of ITE, and
2. To increase the accountability of providers of ITE for their delivery of quality teacher education programs based on transparent and rigorous standards and accreditation processes.

The *Accreditation Standards and Procedures – Standard 4: Program structure and content* called for discipline-specific curriculum and pedagogical studies as well as professional experience (Australian Institute for Teaching and School Leadership, 2011). It stated that for both secondary and primary ITE programs, 'professional studies in education will comprise at least two years of full-time equivalent study'.

The 2014 report, *Teacher Education Ministerial Advisory Group's Action Now: Classroom Ready Teachers* called for universities to teach aspiring teachers more curriculum and theories of teaching, which drove the introduction of the two-year master's degree requirement for ITE (Department of Education, 2014).

The postgraduate Master of Teaching degree consists of core and curriculum-oriented components. The core component generally covers aspects of teaching theory, childhood development, and fostering a learning environment. This is complemented with courses addressing inclusion and diversity.

The curriculum component is prescribed for primary school teachers, given they are generalist educators. Secondary school teachers specialise in one or more elected disciplines, e.g.

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<sup>2</sup> NESAs are part of a national system of initial teacher education program accreditation and work with the AITSL.

mathematics or fine arts. Professional experience is also a critical and compulsory aspect of the course but can vary in location and duration depending on the university. The courses in this component all give an overview of the subject's current curriculum, how to create lesson plans and program lessons, and any relevant teaching stratagems particular to that discipline.

## 2 The economic benefits from higher student achievement are significant

This section shows the relationship between student achievement and economic productivity. The Commission shows the decline in standardised testing results in NSW and discuss the importance of reversing this trend for ensuring NSW's future productivity.

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### 2.1 Higher student achievement increases economic growth

When NSW maximises the learning of its students, it creates lifetime gains for individuals and increases social and economic prosperity. In narrower economic terms, education reform that improves student achievement improves the economy's human capital. As school students transition to the labour force, that improved human capital leads to better economic outcomes.

Empirical research has shown that education is one of the most important determinants of long-run economic growth (Woessmann, 2016). For school learning, a sustained lift in student performance and achievement will require, among other factors, improving the quality of day-to-day teaching. A 10 per cent improvement in teacher effectiveness (an improvement in student test scores by 19 PISA points) would lift Australia's education systems into the highest-performing group of countries (Jensen, 2010). This improvement in academic achievement would:

- improve productivity
- increase long-term economic growth (by an additional 0.2 per cent each year)
- increase Australia's gross domestic product (GDP) by an estimated \$90 billion by 2050 (Jensen, 2010).

Modelling suggests that improving school teaching quality could be one of the biggest things NSW can do to improve its productivity and increase the wealth of its citizens (Commonwealth Productivity Commission, 2012; NSW Productivity Commission, 2021; Denny and Douglas, 2022). Improved student outcomes due to improved teaching quality has the potential to boost NSW gross state product (GSP) by \$11.5 billion in 2041. This translates into a rise in GSP per capita of around \$1,100 for NSW.

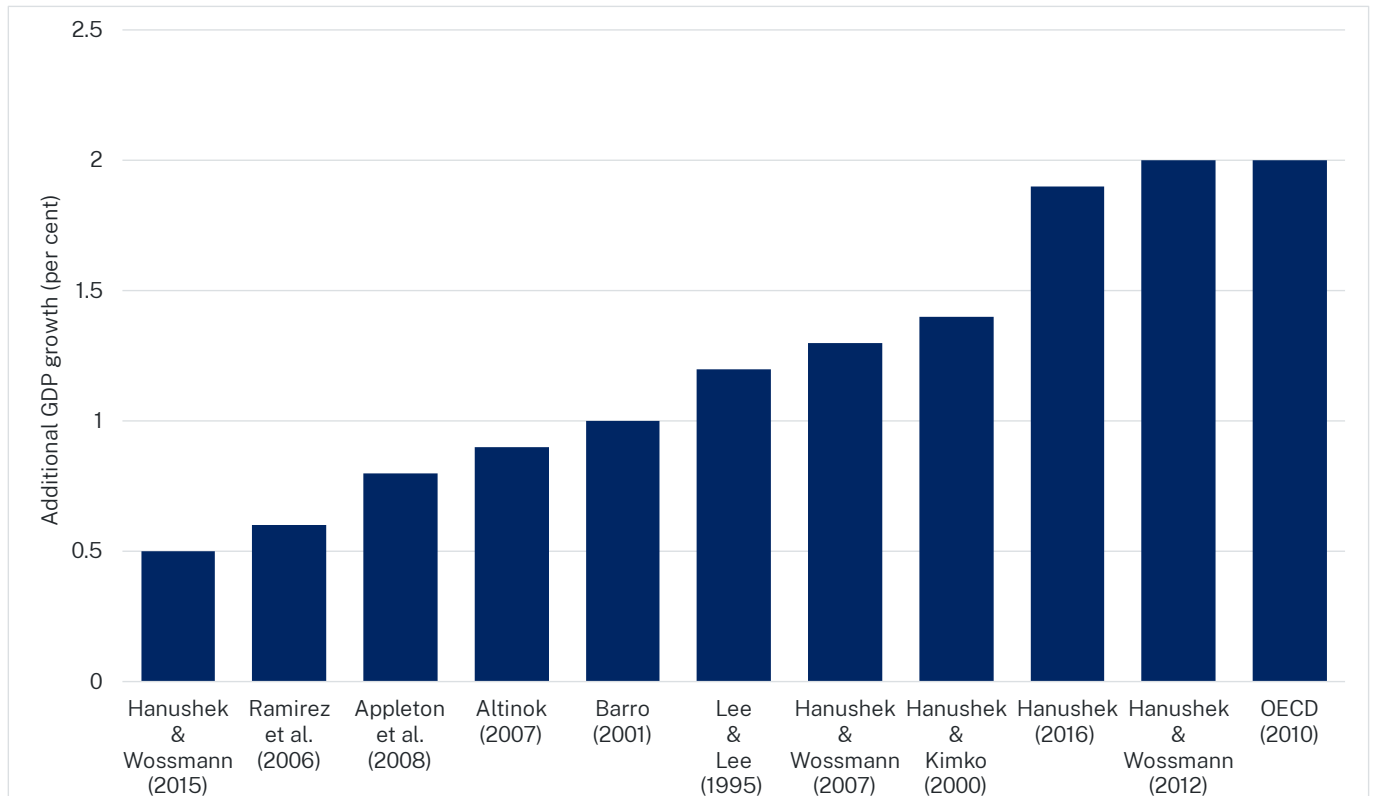
Improvements in academic results and GSP operate in a virtuous cycle. Improvements in schooling increases national output such as GSP and higher levels of GSP can enable better resourcing of schools continuing the improvement in schooling outcomes. Higher educated workers raise output directly because better school achievement raises their marginal productivity (Breton, 2013).

Most studies examining the link between changes in the long-term economic growth rate and student achievement have found a positive relationship. They broadly conclude that an improvement of one standard deviation in student achievement is linked to an increase in the economic growth rate between 0.5 and 2.0 percentage points (see Figure 2). For example, an increase of one standard

deviation in PISA results (24.7 PISA points) by Australian students would add approximately 0.5 percentage points to Australia’s annual GDP growth (Hanushek and Woessmann, 2015).<sup>3</sup>

Figure 2: School’s growth dividend

Relationship between economic growth and student achievement, added GDP growth from a one standard deviation increase in student achievement, measured by range of studies.



Note: Where authors provided a range, the upper estimates are shown in the figure. Period of higher GDP growth differs by study. On average in high-income countries, students’ test scores increase by approximately one-quarter to one-third of a standard deviation per year.

Source: Jensen (2010), NSW Productivity Commission

Improving student learning is especially urgent in the wake of the impacts of COVID-19. Health measures which mandated school closures and/or remote learning, quarantine requirements affecting students and teachers, and the illness itself have all significantly disrupted student learning over the past three years (Sonnemann and Goss, 2020). This is despite significant efforts by the sector to adapt. Disadvantaged students have been disproportionately affected (Howard-Jones et al., 2022).

<sup>3</sup> Hanushek and Woessmann (2015) assume a worker remains in the labour force for 40 years. This means the labour force will not be made up of ‘fully skilled’ workers until 55 years have passed (15 years of reform and 40 years of replacing less-skilled workers as they retire). On average in high-income countries, students’ test scores increase by about one quarter to one-third of a standard deviation per year.

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## 2.2 Academic results are connected to large increases in personal income

This report focuses on ITE because it is one of the factors that has the potential to contribute to better education outcomes for school students. Numerous studies have shown a strong relationship between learned skills and education, and the income earned in the labour market. Generally, for each extra year of schooling, a student can expect to earn up to ten per cent more annually (Hanushek and Woessmann, 2020).

A US study of more than one million children examined the relationship between teacher performance, student achievement, and student income (Chetty, Friedman and Rockoff, 2014). The study found students assigned to high-performing teachers in primary school were more likely to attend university, earn higher salaries and contribute higher amounts to retirement savings plans. Students who had a higher-performing teacher in primary school recorded steeper increases in their salaries throughout their twenties. Specifically, an increase of one standard deviation in teacher quality in a single grade was associated with increased student annual earnings of 1.3 per cent by age 28, equating to a lifetime gain of approximately US\$39,000.

In the same paper, the earnings of two groups of students exposed to different teaching quality over a single year of schooling are compared. One group was taught by a low-performing teacher (bottom 5 per cent), the second by an average-performing teacher. They projected that replacing a low-performing teacher with an average teacher would increase an average student's lifetime income by approximately US\$50,000.

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## 2.3 Our academic results are falling, slowing our future growth

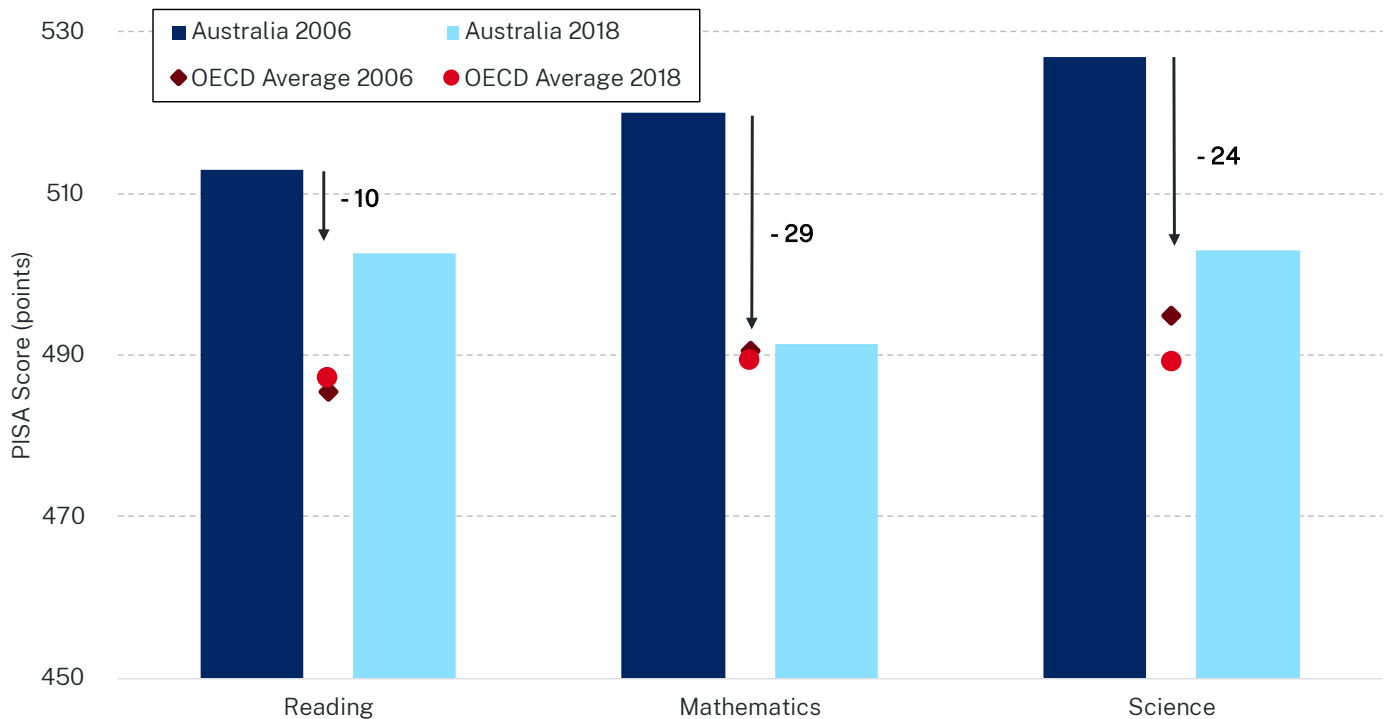
We are examining the impact of reforms to ITE requirements in a context where Australian schooling outcomes have been getting worse over time. The latest OECD PISA (Program for International Student Assessment)<sup>4</sup> results show years of continuous decline across reading, mathematics, and science. These results were the lowest recorded for Australia since PISA testing began (see Figure 3 which displays the PISA results by subject for Australia for 2006 and 2018 compared with the OECD averages. Based on the results, Australian students placed 16th in the world in reading, 29th in mathematics and 17th in science (OECD, 2022).

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<sup>4</sup> The OECD PISA compares the performance of 15-year-olds in reading, mathematical and scientific literacy for 79 countries (including all OECD countries). PISA is the best available method for comparing educational attainment across countries and years. In 2018, PISA tested more than 600,000 students from 79 countries. Within Australia, the assessment used a nationally representative sample of 14,273 Australian students from 740 schools in 2022.

Figure 3: Australia is experiencing falling PISA scores

PISA results by subject, Australia, and OECD average, 2006 and 2018



Note: Arrow represents the change in Australia's score for the specific subject between 2006 and 2018

Source: OECD (2022)

More generally, in Australia all socioeconomic groups, school type, and both high- and low-performing groups experienced a slide in academic performance (OECD, 2018). Differences in performance between school types were almost entirely explained by their students' different socioeconomic backgrounds.<sup>5</sup> This suggests there was no significant difference in the effectiveness of Catholic, independent and government schools (Thomson, 2021).

PISA results also highlight a lack of progress made in closing gaps in educational attainment for disadvantaged groups. Since 2000, average PISA results for students in the lowest quartile have lagged their peers in the highest quartile by around three years of schooling. Large gaps also remain between students of First Nations descent and those not of this descent. Results suggest that by age 15, the average student of First Nations descent lags around two and a half years behind their peers in reading skills (Dreise and Thomson, 2014).

Other developed nations recorded falls in PISA scores over this 18-year period, including South Korea, Japan, Switzerland, Sweden, Finland, New Zealand, Canada, the United States (US), France, and the United Kingdom. However, none of these countries recorded a decline as significant to that experienced by NSW, whose score fell by nearly 40-points (Baker, 2019; World Bank, 2021).

NAPLAN results tell a similar story for NSW. NSW's relative performance has declined significantly compared to other Australian states. NSW has underperformed compared to the Australian average across all year levels. For example, Grade 3 NAPLAN results have improved 3.9 per cent between

<sup>5</sup> School types include Catholic, Independent and Government schools.



2008 and 2019 compared to 6.1 per cent across Australia. On average, Year 7 results has declined 0.14 per cent in NSW whereas Australian results improved 0.6 per cent over the same period.<sup>6</sup> These differences in performance across the nation show there is ample room to improve NSW policy settings to lift student achievement (NSW Productivity Commission, 2021).

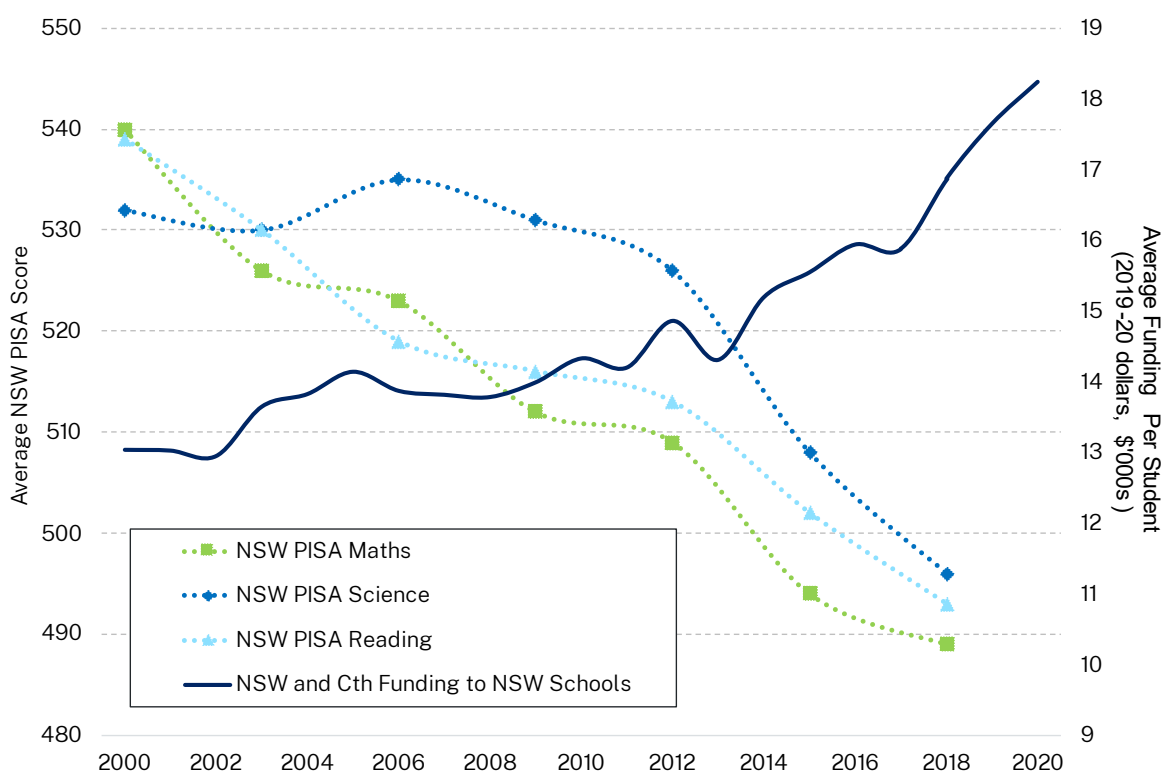
## 2.4 Falls in NSW and Australian educational achievement are not about funding

While adequate funding is certainly a prerequisite for an effective education system, over the past decade, academic results have continued to decline while funding per student has increased. The relative decline in student achievement in NSW, as measured by PISA have occurred alongside significant increases in government expenditure on NSW education (see Figure 4).

Commonwealth and NSW Government expenditure on NSW schools rose from around \$14,200 per student in 2010-11 to around \$18,300 in 2019-20 (in 2019-20 dollars), a 29 per cent increase.<sup>7</sup>

Figure 4: Test scores fall while funding rises

Scores in key subjects (left-hand scale) and per-student funding (right-hand scale), 2000–2020, 2019-20 dollars



Source: Australian Council for Education Research, Commonwealth Productivity Commission, OECD

<sup>6</sup> Average of the Grammar and Punctuation, Numeracy, Reading, Writing and Spelling test results.

<sup>7</sup> Authors calculations using <https://www.pc.gov.au/ongoing/report-on-government-services/2022/child-care-education-and-training/school-education>.

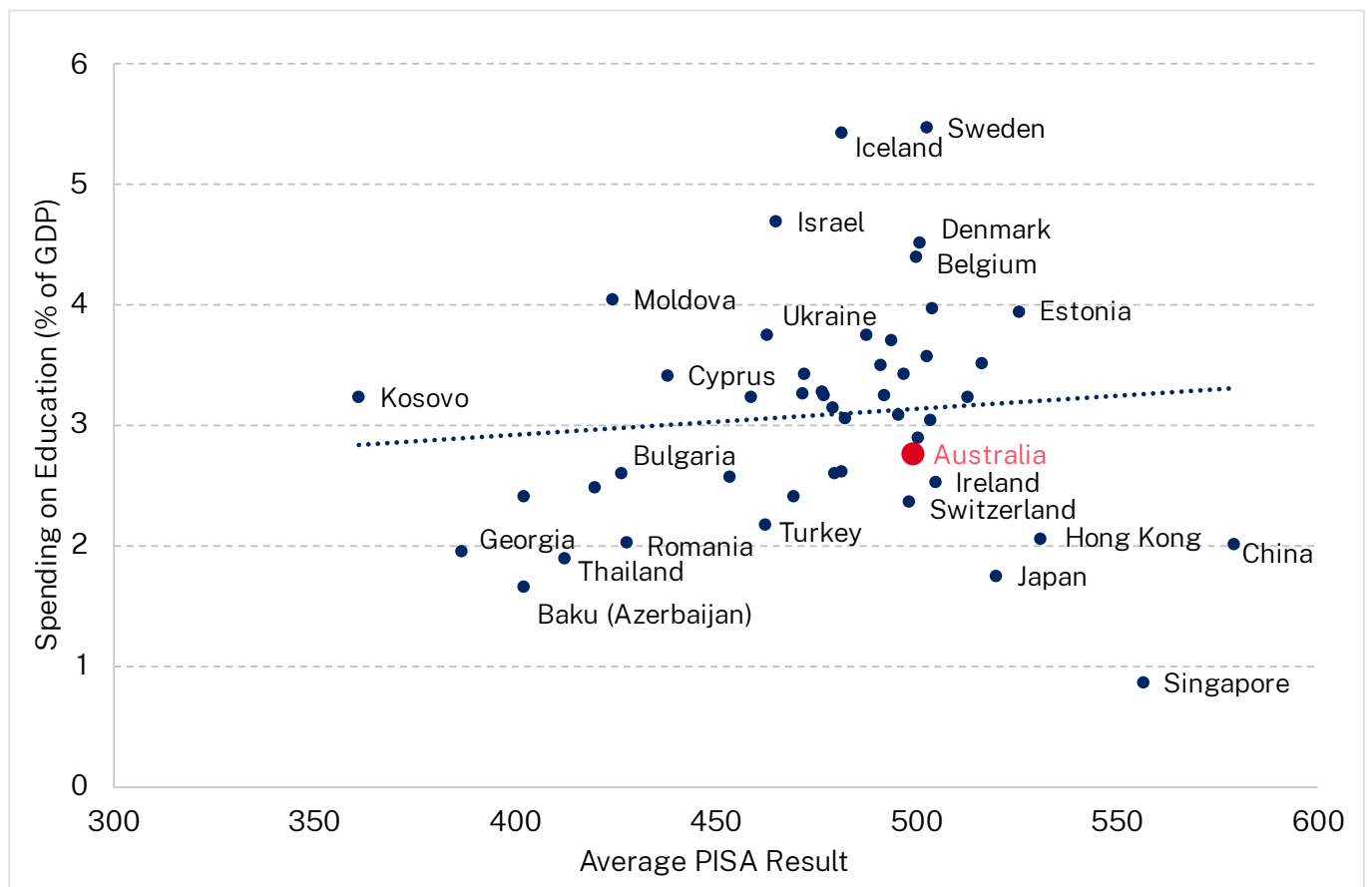
At the same time, other Australian states, such as Victoria, have consistently lower per student school funding yet achieved better average student performance (Commonwealth Productivity Commission, 2022). Commonwealth and Victoria Government expenditure on schools rose from around \$13,100 per student in 2010-11 to around \$16,200 in 2019-20 (in 2019-20 dollars).<sup>8</sup>

International literature shows that the relationship between government spending on schooling and student achievement is relatively weak.

Figure 5 displays the average PISA result and government spending on education as a proportion of GDP for a range of jurisdictions.

Figure 5: Education spending doesn't determine results

Average PISA result versus government spending on education, 2018



Note: Spending on education as a percentage of GDP includes spending on pre-primary, primary and secondary schooling. Percentage of GDP values are for 2018, consistent with the latest PISA data.

Source: IMF, OECD

Higher spending does not guarantee proportionately higher results. Instead, some jurisdictions show strong academic results at relatively low levels of spending, achieving excellent returns on their

<sup>8</sup> Recurrent expenditure per student

education investments.<sup>9</sup> These jurisdictions, including Singapore, Japan, China, and Hong Kong are shown in the bottom right quadrant of Figure 5.<sup>10</sup>

Australia is not among the leading nations on this measure, but it still performs relatively well. Australia spent close to three per cent of GDP on school education in 2018 yet achieved a result similar to that of Sweden, which spent close to 5.5 per cent. Australia achieves PISA results comparable to developed economies like Denmark, Belgium, and Sweden, but at a much lower cost to taxpayer.

The very substantial increases in spending may, or may not, have assisted in reducing the decline in student achievement, but on its own, not been enough to stabilise or raise student achievement. If the decline in student achievement is to be reversed, funding must be accompanied by changing the structures and practices of our education system.

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<sup>9</sup> As a percentage of a country's GDP

<sup>10</sup> This quadrant represents countries that achieve high PISA scores with low spending on education – an indication of a cost-effective and academically high achieving country.

# 3 Teaching quality is the biggest in-school driver of student achievement

This section reviews relevant literature on drivers of teacher quality, in particular, the impact of higher qualifications levels (i.e. master's degrees) and the impact of teachers' experience on student achievement.

ITE is important because it has the potential to impact the quality of teaching that happens in our schools. Both in-school and out-of-school factors significantly influence students' achievement. Appendix B details the important factors for student achievement.

The report *Visible Learning* analyses more than 800 meta-analyses of more than 50,000 academic studies on student achievement (Hattie, 2008). Hattie's extensive analysis broadened the understanding of influences on student learning and concluded that among an array of factors, the teacher and their teaching quality was the most important in-school factor influencing student achievement. Since 2008, independent studies have supported this finding (Hanushek, 2011; Chetty, Friedman and Rockoff, 2014)

Curriculum and school peers play a role, but teachers and school leaders directly affect learning, by determining how teaching is delivered in classrooms and how the curriculum is conveyed to students.

If we focus on factors within the school environment which governments can influence directly through policy, teaching quality makes a bigger difference than anything else for student achievement. Because student achievement powerfully influences lifetime economic outcomes, improving school teaching quality could be one of the biggest things NSW can do to improve its economic productivity.

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## 3.1 Longer ITE has little or no association with better student achievement

Australian and international evidence on higher accreditation requirements, including teacher certification, shows a mixed to weak relationship with improved student outcomes (Commonwealth Productivity Commission, 2012).<sup>11</sup> The bulk of empirical evidence finds higher teacher certification bears little relationship to teacher effectiveness, as measured by impacts on student achievement (Decker, Mayer and Glazerman, 2004; Gordon, Kane and Staiger, 2006; Ladd and Sorensen, 2015; Ryan, 2017).

This is not to say that all teaching qualifications have no benefit. It is only to say that there appears to be a point where the demonstrable benefits from extra years of study are not enough to justify the costs. Box 1 discusses why Australian governments may have lengthened ITE, and the problems with arguments for longer ITE.

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<sup>11</sup> One US study found traditional certification did improve student outcomes (Darling-Hammond, Holtzman, Gatlin and Heilig, 2005). However, the study's methodology has drawn significant criticism, particularly for failing to appropriately control for differences in students' socio-economic status (Podgursky, 2006).

### **Box 1: Why was postgraduate ITE lengthened?**

Despite weak evidence about the links between teacher certification and teacher effectiveness, the teacher quality reform agenda has, over the past decade focused primarily on raising the requirements to enter teaching. New teachers must now meet increased academic requirements to enter ITE programs.

A national policy change in 2011 led to NSW postgraduate ITE requiring a master's degree from 2014. The NSW Productivity Commission has not, to date, discerned what evidence was relied upon in making this national policy change. If a cost-benefit analysis or literature review was published to support the change, we have not been able to find it.

It may have been believed that that studying education for longer would increase the skills and knowledge of teaching graduates and thereby improved student outcomes.

But while 'raising the bar' for new teachers seems a plausible way to raise teaching quality and the profession's status, in practice, it has several flaws:

- Higher qualification barriers – sometimes called credentialism – can conflate credentials with quality.
- More onerous and lengthy qualifications for new teachers can unintentionally raise barriers to talented people entering the profession.
- Evidence suggests that quality of candidates is an important predictor of a future good teacher, while the length of training is not.

The Commission would welcome further information regarding the evidence and reasons behind the 2011 decision to require a master's degree for postgraduate ITE. Contact us via the [NSW Productivity Commission website](#).

Several studies cite higher and longer qualification requirements in high PISA-ranking countries like Finland as evidence for increasing teacher credentials (Darling-Hammond, 2017). But, as noted by the Commonwealth Productivity Commission, it is difficult to separate credential effects from broader reform that occurred over the same period (Murtough and Woods, 2013). Finland's PISA performance, like Australia's, has been declining since at least 2006. Finland is now outperformed by China, Singapore, Hong Kong, South Korea, Macao, and Estonia.

We also have examples of very high-performing jurisdictions that do not require master's degrees. Singapore – the second-ranked country in PISA globally – offers a one-year graduate teaching qualification alongside an employment-based pathway for those with no teaching qualification (Singapore Ministry of Education, 2022). These pathways complement Singapore's world-class undergraduate teacher degree offerings. Other jurisdictions such as New Zealand and Hong Kong offer a one-year postgraduate teaching qualification (The University of Canterbury, 2022; The University of Hong Kong, 2022).

The sections below summarise the research on the impact of master's degrees on student achievement. Much of the transition to a two-year master's has significant opportunity costs but has

been enforced without strong evidence that teaching quality would improve (Hanushek, 2011). Box 2 discusses our concerns and difficulties applying the evidence.

### **Box 2: There is limited evidence on longer ITE**

We have reviewed evidence of the relationship between ITE qualifications and student achievement. We had hoped to obtain strong evidence within the NSW and Australian context detailing the relationship between a teacher's qualifications and their students' academic achievement. However, in the absence of Australian evidence, we were forced to look at international evidence. The studies we looked at represent the most robust and relevant empirical data we been able to find on the potential value of longer ITE qualifications on student achievement.

These studies do not consistently show any benefit from master's degrees, and we are unaware of any robust evidence that does.

Most of the robust studies we could find were conducted in the US, which has some similarities with Australia but also important differences. Caution is required in applying US findings to the Australian context. That said, it is likely that if the evidence was reviewed prior to implementing the two-year ITE qualification in Australia, these studies would have been relied on, because they were the most relevant and robust evidence available.

There are further limitations on the available evidence on how teachers' master's degrees impact student achievement:

- Variations in accreditation processes and requirements between jurisdictions means some study results may not be directly applicable to NSW.
- Most of the available evidence is somewhat dated (2015 or earlier), meaning recent developments in ITE practice might affect the applicability of these studies.
- The type of master's degree awarded – whether in education or another discipline – is often not specified in the available studies. It is therefore difficult to tell whether subject-matter or pedagogical knowledge is driving the observed results.
- Care must be taken when interpreting results. Observing an association between student achievement and teacher experience and/or teacher qualifications does not necessarily mean that one causes the other. Other factors may be at work, and research needs to examine these before firm conclusions can be drawn.

The Commission welcomes any information members of the community can provide explaining the evidence and reasons behind the 2011 decision to require a master's degree for postgraduate ITE.

### **3.1.1 Primary school teachers with master's degrees do not get better results**

Most studies find no statistically significant impact on the achievement of primary students if their teacher has a master's degree.



Table 1 summarises the findings of relevant studies for elementary school (kindergarten through to fifth grade) teachers.

Clotfelter et al. (2006) examined a US dataset from North Carolina and found that teachers with master's degrees were associated with worse reading and maths scores among primary-aged students. Not one of the specified studies found a statistically significant positive effect of a master's degree on primary school students' reading scores. In other words, any positive effect seen may have been random. Of the two US studies that specified a Master of Elementary Education, both found a small positive impact on primary school maths scores but no significant effect on reading scores.

We found only two studies that look at the specific relationship between master's degrees in education and student scores. The results of these studies were mixed. They found that the students of teachers with education master's degrees achieve higher maths scores, and this finding was statistically significant. But they could not find a statistically significant association with better reading scores. The studies did not examine science scores at all. Even where the results were positive, it is not clear whether master's degrees in education make maths teachers better, or whether better maths teachers just happen to do master's degrees in education.

Given that the evidence in these two studies is limited, mixed and qualified, and other studies have conflicting findings, there is not enough evidence to support a general proposition that education master's degrees improve student results. Further, none of the studies considered the systemic effects of making master's degrees mandatory. This would require weighing possible benefits (like improving maths teaching) against potential costs (like deterring potential maths teachers from joining the profession at all).

Table 1: Teacher qualifications and student achievement, elementary school

Source	Reading achievement	Maths achievement	Science achievement	Master type specified
Henry et al. (2014)	Yellow	Yellow		Not specified
Rockoff et al. (2011)		Yellow		Not specified
Betts et al. (2003)	Yellow	Green		Not specified
Clotfelter et al. (2007)	Red	Yellow		Not specified
Croninger et al. (2007)	Yellow	Green		MA of elementary education
Croninger et al. (2007)	Red			Master's not in education
Hanushek et al. (2005)		Yellow		Not specified
Jepsen (2005)	Yellow	Yellow		Qualifications higher than a bachelor
Rockoff (2004)	Red	Yellow		Not specified
Collier (2013)	Yellow	Green		MA of elementary education
Collier (2013)	Red			Master's not in education
Croninger et al. (2007)	Yellow	Yellow		Not specified
Harris and Sass (2011)	Yellow	Yellow		Not specified
Clotfelter et al. (2006)	Red	Red		Not specified
Dee (2004)	Yellow	Green		Not specified
Ding and Lehrer (2005)	Yellow	Yellow		Not specified
Nye et al. (2004)	Yellow	Green		Not specified
Chingos and Peterson (2011)	Yellow	Yellow		Not specified
Wedel, K. (2021)	Green	Green	Green	Bachelor of higher + Specialisation
Darling-Hammond et al. (2005)	Yellow	Red		Not specified

Note: Green indicates a significant positive effect; Red indicates a significant negative effect; yellow indicates an insignificant effect. Where it is blank indicates the study did not examine that subject.

Similar to the findings in the primary school literature, master's degrees tend to have no significant relationship with better student achievement at the late primary and early high school levels (middle school is grades six to eight). Most studies find no significant link between having a teacher with a master's degree and the level of student achievement in reading and mathematics. Table 2 outlines studies that examine the relationship between having a teacher with a master's degree (of any type) and the student's achievement across the late primary and early high school level.<sup>12</sup>

One study that specified a Master of Mathematics found a positive impact on middle school mathematics scores in examining a US database (Goldhaber and Brewer, 1996). Another study by Henry et al. (2014) examined a US dataset from North Carolina and found teachers with a master's degree were associated with worse reading and maths scores among middle-school-aged students. Not one of the studies found that master's degrees had a significant association with positive effects on middle school students' reading scores.

Table 2: Teacher qualifications and student achievement, middle school

Source	Reading achievement	Maths achievement	Science achievement	Master type specified
Henry et al. (2014)	Red	Red		Not specified
Greenberg et al. (2004)		Yellow		Not specified
Goldhaber & Brewer (1996)	Yellow	Yellow		Not specified
Goldhaber & Brewer (1996)		Green		Master's in mathematics
Rockoff et al. (2011)		Yellow		Not specified
Betts et al. (2003)	Yellow	Yellow		Not specified
Hanushek et al. (2005)		Yellow		Not specified
Rivkin et al. (2005)		Yellow		Not specified
Harris and Sass (2011)	Red	Green		Not specified
Chingos and Peterson (2011)	Yellow	Yellow		Not specified

Note: Green indicates a significant positive effect; red indicates a significant negative effect; yellow indicates an insignificant effect. Where it is blank indicates the study did not examine that subject.

### 3.1.2 Secondary students with master's-qualified teachers do not get better results

At the secondary school level, master's degrees do not correspond to better student achievement in a statistically significant way. Table 3 outlines the studies that examine the relationship between having a teacher with a master's degree and the student's achievement in high school (grades nine to 12). One study that specified a Master of Mathematics found a positive impact on high school mathematics scores. However, the study found that a master's in science had no significant effect.

<sup>12</sup> These studies specifically specify middle school.

This study examined a US dataset from 1988. Harris and Sass (2011) examined a US dataset from Florida and found that high-school-aged students whose teacher had a master's degrees did worse in reading and maths.

Table 3: Teacher qualifications and student achievement, high school

Source	Reading achievement	Maths achievement	Science achievement	Master type specified
Aaronson, et al. (2007)				Not specified
Henry et al. (2014)				Not specified
Goldhaber and Brewer (2000)				Master's in mathematics
Goldhaber and Brewer (2000)				Master's in science
Goldhaber and Brewer (2000)				Not specified
Goldhaber and Brewer (2000)				MA major in education
Betts et al. (2003)				Not specified
Clotfelter et al. (2010)				Not specified
Ladd and Sorensen (2015)				Not specified
Harris and Sass (2011)				Not specified
Kane and Staiger (2012)				Not specified
Monk (1994)				Not specified

Note: Green indicates a significant positive effect; Red indicates a significant negative effect; yellow indicates an insignificant effect. Where it is blank indicates the study did not examine that subject.

Overall, at all levels of schooling, across the many studies examined, we cannot find a reliable association between a teacher's attainment of a master's degree and better student achievement. This finding concurs with research that shows teachers with a master's degree are, on average, no more or less effective than teachers without such qualifications (Hanushek, 2011).

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## 3.2 Early years of experience have considerable returns to student achievement

The additional year of university required by a traditional master's degree extends the period an aspiring teacher is not gaining in-class teaching experience.

Several studies have examined the impact of a teacher's experience as a teacher on student achievement and found a positive relationship between teacher experience and student achievement (Kini and Podolsky, 2016; Podolsky, Kini and Darling-Hammond, 2019).

However, as with studies that have examined the impact of a master's degree, substantial evidence exists for the US, but not for Australia.<sup>13</sup> The Commission notes the following caveats:

- A teacher's experience in the US may not be directly comparable to experience in Australia.
- There are concerns about the quality of the research literature on experience and teacher effectiveness, as many older studies use only observed student traits to account for student differences.
- Measurement of the effect of experience might be impacted by a correlation with teacher attrition. For example, if there is a bias towards less effective teachers being more likely to leave or quit the profession, it may appear that experience has a positive effect on student achievement as fewer ineffective teachers remain (Wright, 2012).

Kini and Podolsky (2016) examined 30 studies that analysed the effect of a teacher's experience on student outcomes in US public schools. Of the 30 studies, 28 showed a positive and significant relationship between a teacher's experience and the impact on student achievement.

Table 4 outlines studies that examine the relationship between a teacher's experience and student achievement in school. Overall, most studies show that a teacher with more experience delivers, on average, better student achievement. For example, Clotfelter et al. (2007) found that more experienced teachers improve student achievement in mathematics and reading more effectively than less experienced teachers. Chingos and Peterson (2011) found teachers became, on average, more effective with more teaching experience.

Research by Hass and Sass (2011) found that the first few years of experience for a teacher yield the largest achievement advances. Evidence points towards the fact that there are diminishing returns to experience and impact on student achievement where the first years result in considerable gains, but the gains lessen after the first five years (Harris and Sass, 2011). Kini and Podolsky (2016) similarly reinforce the importance of the first years of experience finding teachers' improvements are greatest in the first few years of their careers. They conclude teachers continue to improve throughout their careers, albeit at lesser rates.

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<sup>13</sup> The majority of the studies in our review drew their samples from a limited number of US states and areas such as Florida, New York, North Carolina, Tennessee and Texas. These states employ monitoring and evaluation systems that match student and teacher data which facilitates the studies (Kini and Podolsky, 2016).

Table 4: Teacher experience and student achievement

Source	Reading achievement	Math achievement
Aaronson, et al. (2007)		Yellow
Betts et al. (2003)	Yellow	Yellow
Boyd et al. (2006)	Green	Green
Chingos and Peterson (2011)	Green	Green
Clotfelter et al. (2006)	Green	Green
Clotfelter et al. (2007)	Green	Green
Clotfelter et al. (2010)	Green	Green
Croninger et al. (2007)	Green	Green
Dee (2004)	Green	Yellow
Ding and Lehrer (2005)	Green	Yellow
Goldhaber & Brewer (1996)	Yellow	Yellow
Greenberg et al. (2004)		Green
Hanushek et al. (2005)		Green
Harris and Sass (2011)	Yellow	Yellow
Hill et al. (2005)		Green
Jepsen (2005)	Green	Green
Kane and Staiger (2012)	Red	Red
Kane, et al. (2006)	Green	Green
Nye et al. (2004)	Green	Green
Rivkin et al. (2005)	Green	Green
Rockoff (2004)	Green	Yellow
Wedel, K. (2021)	Red	Red

Note: Green indicates a significant positive effect; Red indicates a significant negative effect; yellow indicates an insignificant effect. Where it is blank indicates the study did not examine that subject.

Although many of these studies apply to the US context, a shortened degree in NSW would bring forward the time when new teachers start to acquire classroom experience. This would give new teachers earlier experience, improving student outcomes in the long run. Based on the review of the evidence, the benefits of an extra year of study – as in the current traditional master’s degree – are likely outweighed by the value of earlier experience. Evidence suggests that in their early years, teachers’ development produces considerable gains for effective student learning (Kini and Podolsky, 2016). If NSW can get teachers in the classroom more quickly, the earlier experience looks likely to promote long-term benefits for the students and the economy.

Kini and Podolsky (2016) find positive spillovers from having more experienced teachers within a school. Schools with more experienced teachers tend to support greater student learning among their colleagues. Secondly, schools with more experienced teachers tend to not only do better in standardised testing, but also in other measures such as school attendance.

One qualification to this conclusion is that the degree to which an extra year of study results in a delay in acquiring practical experience varies depending on the structure of the master’s program.

Some master's programs are more academic, whereas others feature more in-classroom experience. It is difficult to say to what extent these master's programs are able to replicate the benefits of additional years of teaching. These kinds of programs may become more common in future, with the recent Quality Initial Teacher Education (QITE) Review recommending ITE incorporates more practical experience.

However, the possibility of making the master's more 'practical' only raises further problems:

- It is unclear to what extent a master's degree, however practical in its structure, can simulate the experience and exposure of simply working as a teacher.
- There are additional benefits to commencing work that even a more practical master's cannot offer, such as earning a full teacher's income and avoiding higher education fees.
- The possibility of making the master's more practical does not establish its net benefits over a one-year pathway, which could equally be made more practical.



## 4 Changes to ITE had considerable impact but not on student achievement

This section looks at the impacts of the shift to the requirement for a master's degree for ITE in NSW on:

- the teaching profession
- enrolment in and completion of ITE
- student-teacher ratios in schools
- prospective teachers.

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### 4.1 Longer teacher training does not signal a higher status for the profession

If longer training and higher credentials have not improved teaching quality, we might hope they have had other benefits. We do know that recruiting and retaining teachers are significantly impacted by how the community views teachers (Australian Institute for Teaching and School Leadership, 2020). Thus, if the mandatory master's degree helps the community view teachers more positively, it may have positive impacts for the recruitment and retention of quality teachers.

The case of Finland seems to provide some circumstantial evidence for this view. In examining education systems, analysts often cite Finland as having raised teaching's status by requiring all teachers to obtain a master's degree (Barber and Mourshed, 2007).<sup>14</sup> Sahlberg (2013) argues that the Finnish master's requirement helped to attract highly talented and motivated individuals to the profession there.

But as Horn and Jang (2017) pointed out, the high status of Finnish teachers has other possible explanations. Finland's master's degrees may act as a proxy for other attributes that give the Finnish teaching profession a high status. Given that the Finnish teaching profession attracts high achievers, these individuals enjoy many opportunities beyond the classroom, such as educational administration, private sector jobs, and further studies such as a doctorate. All these opportunities may play a role in raising the status of the profession. In other words, while teachers have prestige in Finland, it may not be because of their master's degrees.

We have been able to find little evidence to support the proposition that the master's requirement has raised the status of the teaching profession in NSW over the past eight years. Indeed, the data suggests that since the additional year of study, potential ITE candidates have been discouraged from studying ITE and joining the teaching profession.

The master's degree requirement is not widely known in the Australian context. This raises doubt that raising ITE requirements operates as a signal to elevate the status of the teaching profession. The BETA survey found that of those open to teaching, approximately two-thirds were not aware of the two-year master's requirement, as shown in Figure 6 (Department of Education, Skills and

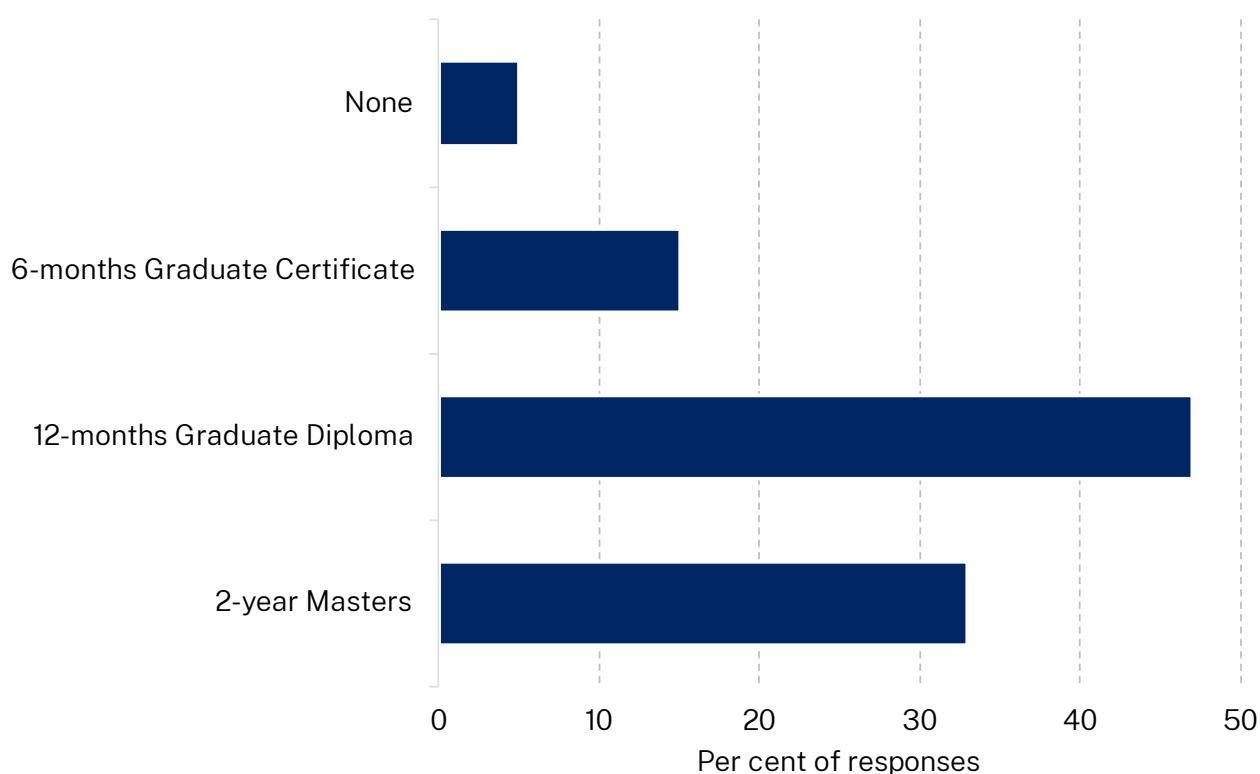
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<sup>14</sup> The Report was released in 2007.

Employment, 2021). The Commission considers it likely that the general population would be less aware of the master’s requirement. The degree to which the master’s requirement is unknown suggests that it is not a major driver of perceptions of the teaching profession, positive or otherwise. This further suggests that ITE qualifications do not determine the public view of the teaching in NSW, or Australia.

Figure 6: Master’s degree awareness is low

Mid-career professionals’ survey response to the question ‘What qualifications do you need to work as a teacher?’, 2021



Source: Behavioural Economics team of the Australia Government (BETA) survey

## 4.2 Barriers to ITE entry tend to reduce the number of ITE candidates

The additional year of studying ITE imposes costs on:

- potential teachers, deterring them from teacher training
- society, by leaving it with less teachers (with little evidence that there is an offsetting benefit of new teachers being of higher quality than previously).

A 2007 report by McKinsey found that many of the top-performing education systems removed obstacles to entering the teaching profession and created alternative pathways for individuals with experience (Barber and Mourshed, 2007). A survey of mid-career professionals by the Behavioural Economics Team of the Australian Government (BETA) found that a condensed one-year ITE course was as attractive as a \$20,000 increase in top pay (Department of Education, Skills and

Employment, 2021). This suggests potential candidates place value to shortening the time spent out of the workforce for mid-career changers.

#### **4.2.1 Longer ITE requires higher student fees**

The average ITE master's degree costs annually between \$4000 for a Commonwealth-supported place and \$30,000 for full-fee place. An additional year of ITE doubles the cost of getting a degree and increases student debt.

#### **4.2.2 Longer ITE means forgoing more salary**

The master's degree also requires two years of course content and practicum, which is likely to require the student to switch from full-time employment to full-time study. The Australian median salary is equivalent to \$85,300 for graduates with postgraduate qualifications and \$62,600 for bachelor's degree graduates.<sup>15</sup> Consequently, the master's degree incurs a high opportunity cost for the individual in terms of forgone salary and time and the payment of student fees while studying. While, on average, master's graduates tend to earn more than bachelor's graduates across occupations, this is not necessarily the case for teachers. Pay rates do not differ between teachers with master's degrees and diplomas of education, at least in public schools. Pay rates are generally based on years of service.

Longer pathways increase the cost – and the risks – of becoming a teacher, particularly when teachers come to the profession later in life. Longer university courses cost aspiring teachers more, and taxpayers pay more too. Mid-career professionals will face substantial additional barriers when faced with an additional year of ITE. Not only may they take a potential pay-cut from their previous career, but the additional year of ITE will further contribute to loss of income will act as a barrier. Potential ITE students express concerns around ITE course length and the consequential loss of income which exacerbate barriers for mid-career professionals considering a move to a career in teaching (Department of Education, Skills and Employment, 2021; Society for the Provision of Education in Rural Australia, 2022). Two-thirds of mid-career professions who consider teaching may be deterred by requirement to obtain a two-year master's degree (The Centre for Independent Studies, 2022) .

#### **4.2.3 Postgraduates now face a longer pathway than undergraduates**

Since the abolition of the one-year diploma pathway, postgraduate ITE now takes a minimum of five years – a three-year bachelor's degree plus a two-year master's. Those who undertake an undergraduate ITE degree in NSW (a Bachelor of Education), only face a four-year course of study. Due to the increase time commitment, the postgraduate pathway penalises those postgraduate ITE candidates relative to undergraduate candidates (five-years vs four-years). This is a pathway that should be encouraged as it supports greater subject-matter expertise among teachers.

#### **4.2.4 Longer ITE delays discovery of unsuitability**

An aspiring teacher who is a university graduate must now complete an extra year of ITE before teaching in NSW schools. Some teachers realise that they are poorly suited to teaching only upon

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<sup>15</sup> <https://www.news.futurestudents.unsw.edu.au/understand-commonwealth-supported-places>

entering the classroom. This extra university training delays this discovery, raises its cost and reduces the time available to pursue more suitable careers.<sup>16</sup>

#### **4.2.5 It costs high achievers and mid-career professionals pay more**

Longer paths into teaching are particularly costly for two significant categories of potential applicants: high-achieving graduates and mid-career professionals.

- High performers have more options and a greater lifetime earning potential, so they sacrifice more income for each year they spend out of the workforce.
- People moving into teaching in mid-career have fewer working years remaining and often have financial commitments and families to support. An extra year out of the workforce presents a significant barrier to entry.
- Low socioeconomic and disadvantaged cohorts are disproportionately affected by higher barriers to entry into the profession.

#### **4.2.6 ITE commencements are lower today than in 2014**

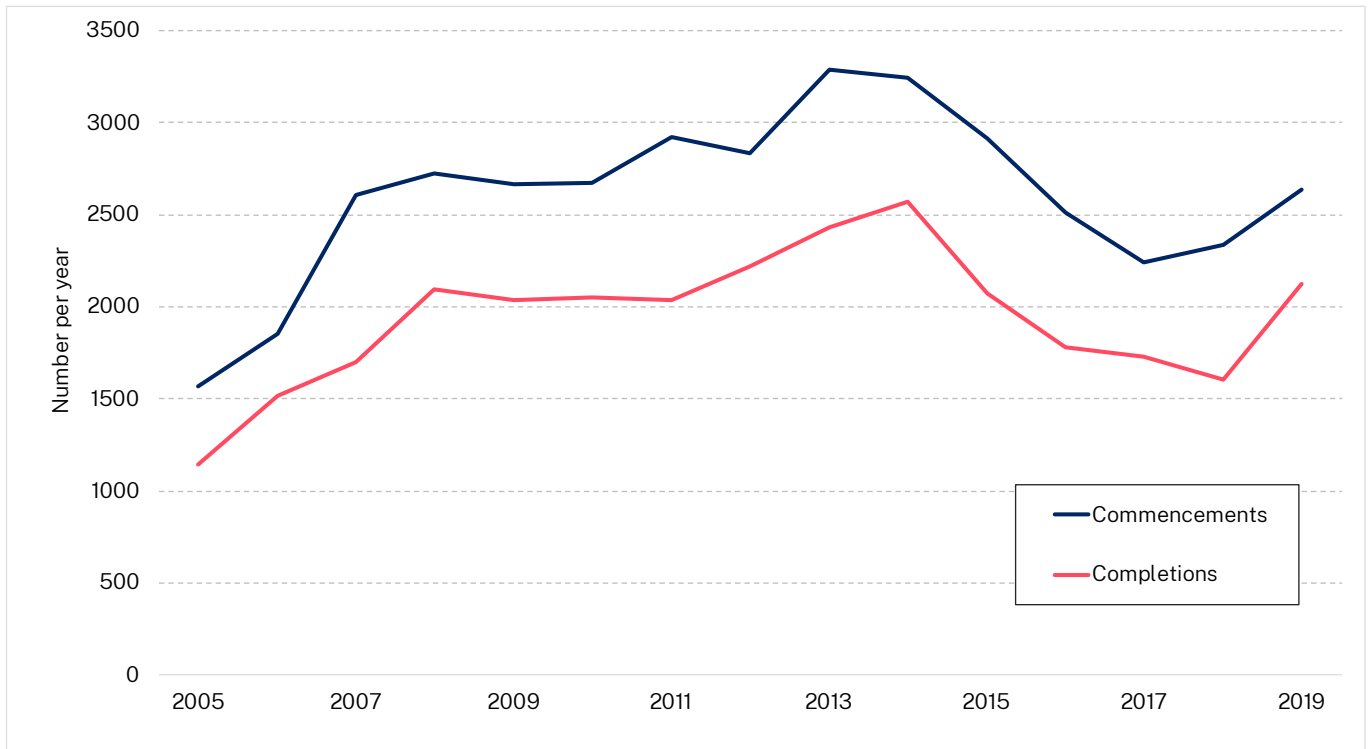
Trend analysis illustrates the before, and after, impact of the two-year requirement on the number commencements, and completions, of ITE as shown in Figure 7. Data on commencements in, and completion of, ITE supports the conclusion that longer ITE courses act as barriers to entry (Society for the Provision of Education in Rural Australia, 2022). This is supported by The Centre for Independent Studies (2022) which suggests that the phasing out of one-year postgraduate ITE degrees may contribute to declining ITE enrolments. Postgraduate ITE completions has declined by 17 per cent, and the number of commencements has declined by 19 per cent, since 2014 as shown in Figure 7.

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<sup>16</sup> Minimum three-year bachelor plus a two-year master degree

Figure 7: Postgraduate ITE completions and commencements follow similar trends

Trend in education degree commencements and completions, NSW, 2005–2019



Source: AITSL

Domestic education postgraduate degrees recorded a decline in commencements after 2014, coinciding with the replacement of the graduate diploma with the master's degree. NSW accepted the last intake for accredited ITE graduate diplomas in 2014. However, universities began to phase out the course as early as 2011, resulting in the transition to master's degrees. By 2015, the two-year master's degrees had replaced the graduate diploma in NSW as the minimum accredited postgraduate ITE degree. As of May 2022, 110 ITE programs are accredited by NESA in NSW.<sup>17</sup> Of the 110 accredited NSW courses, 28 are master's degrees, and 82 are bachelor's degrees.

While the trend in ITE completion and commencements follow a similar trend, it is still difficult to determine attrition from postgraduate ITE. This is because there is a lag between those then commence and complete ITE. Due to the phasing out of one-year ITE, some aspiring teachers may have taken two years rather than one to complete depending on the university.

Also, some students may have taken longer to complete postgraduate ITE due to reducing the number of courses taken, repeating courses, or deferring altogether. Figure 7 does however, imply that the level of attrition has remained rather constant between 2005 and 2019. From this the Commission implies that the drop-off in ITE completions is driven by a lack of commencements rather than an increased drop-out rate.

The decline in commencements and completions in part, may have been driven by potential ITE candidates rushing in to complete ITE while it was one-year. Candidates bringing forward their timeline would have a dampening impact on completions and commencements in later years. The

<sup>17</sup> This may be subject to change. PRB has removed all courses accredited up to 2021 and pending accreditation. Source: <https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/teaching-qualifications/accredited-degrees>

Commission tests for projected trends of completion prior to 2011, and compare with 2014 projections. If there was a dampening impact, the 2014 projections would be higher than 2011. We find that this is not the case in NSW indicating that the decline in ITE completions post 2014 was not driven by potential candidates enrolling and completing ITE earlier. *Appendix C* explains this further.

#### **4.2.7 Completion of ITE is lower today than in 2014**

Completion of postgraduate ITE declined over the period from 2011 to 2020, as shown in Figure 8. This coincided with the phasing out of graduate diplomas. The number of students completing postgraduate education degrees peaked in 2014 at 4,237 people. By 2020, postgraduate ITE completion had declined by 31.2 per cent to 2,893 people.<sup>18</sup> The decline in completion was driven mostly by enrolment numbers declining rather than significant changes in the level of attrition for those who did enrol.

Many other fields of postgraduate study have recorded improvements in the number of students completing meanwhile postgraduate education degrees have declined since 2011. This illustrates that the level of postgraduate degree completion is not uniform across postgraduate degree categories. Figure 8 displays the trend in postgraduate degree completion by field of study.

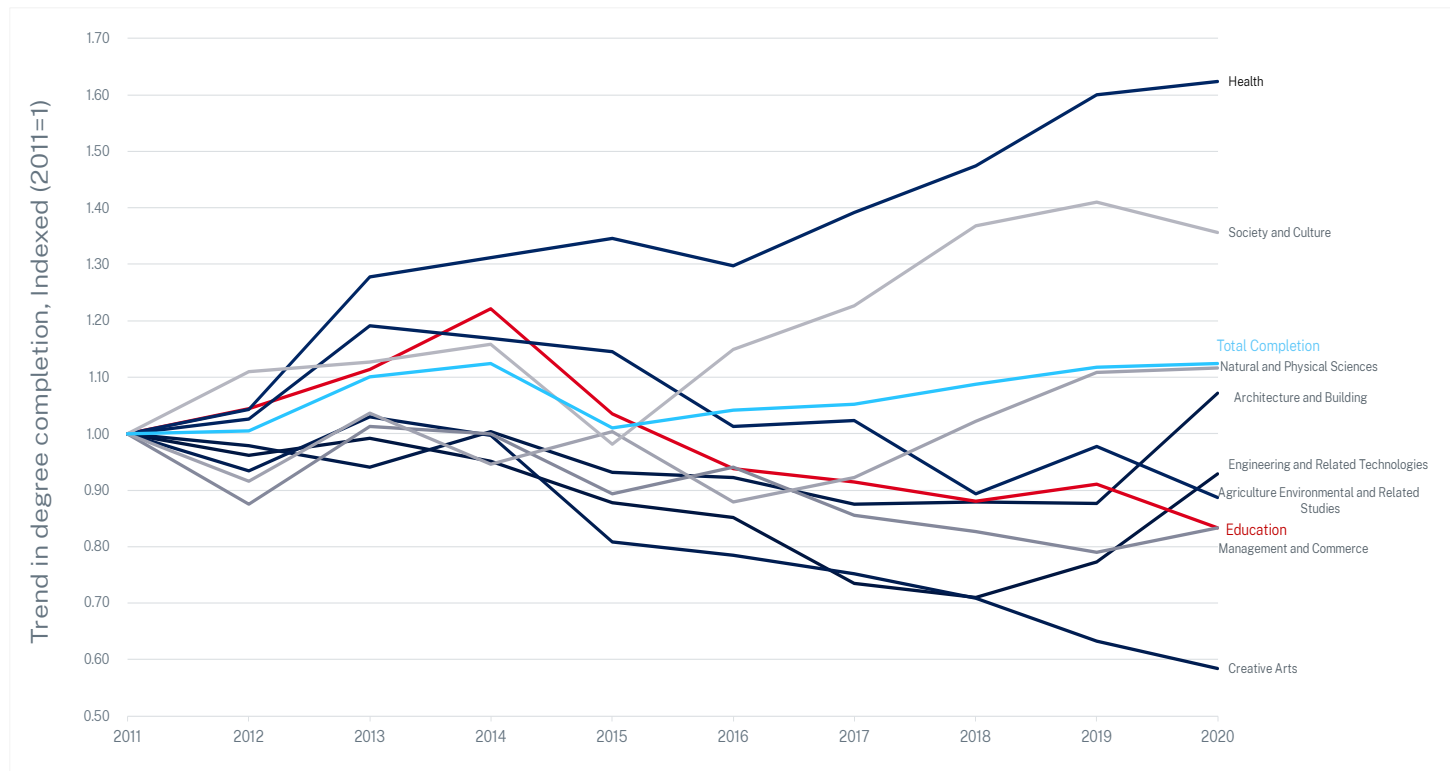
At the aggregate level, the number of domestic students completing postgraduate courses has increased by 12.4 per cent since 2011. However, the completion of postgraduate education degrees by domestic students has declined by 16.6 per cent over the same period. Some studies have increased substantially, for example postgraduate studies in health have increased by 62 per cent over the same period.

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<sup>18</sup> Between 2014 and 2020 using DESE data. To facilitate comparisons between ITE and other fields of study we have used DESE data.

Figure 8: NSW education degree completion falls after 2014

Trend in postgraduate education degree completion, by field of study, 2011–2020, NSW. Index; 2011=1.



Note: Data are only available up to 2020. This uses Department of Education, Skills and Employment (DESE) data for degree completions. Information Technology has been removed to simplify the graph. Completion of Information Technology postgraduate degrees increased by 125 per cent over the period.

Source: DESE, ABS, NSW Productivity Commission

Across Australia, the number of postgraduate ITE completions has fallen by 25 per cent between 2014 and 2019.<sup>19</sup> Other states have similarly recorded a decline following the lengthening of postgraduate ITE as shown in Figure 9.

Queensland and Western Australia continued to offer the Graduate Diploma in Education up until the end of 2017 (Cervini, 2016; The University of Queensland, Australia, 2018). As of 2018, the two-year equivalent Master of Teaching degree is now the prerequisite for becoming a teacher via the postgraduate pathway across Australia (Cervini, 2016).

In 2017, 1,305 people completed postgraduate ITE in Western Australia. The latest data from AITSL shows that just 458 people completed ITE in Western Australia, an almost 60 per cent drop in completion from 2017.<sup>20</sup> There has also been a 40 per cent decline in ITE commencements between 2017 and 2019, this may indicate that Western Australia may be observing a trend in postgraduate ITE similar to that in NSW. Queensland recorded similar falls in enrolments and completions.

Western Australia, Queensland and NSW's downward trend occurred as soon as one-year ITE was no longer offered. Victoria's downwards trend in ITE completions began two years prior to introducing the two-year requirement. However, from what the Commission has been able to

<sup>19</sup> Includes ITE qualifications of primary school teaching, secondary school teaching and mix/other school teaching.

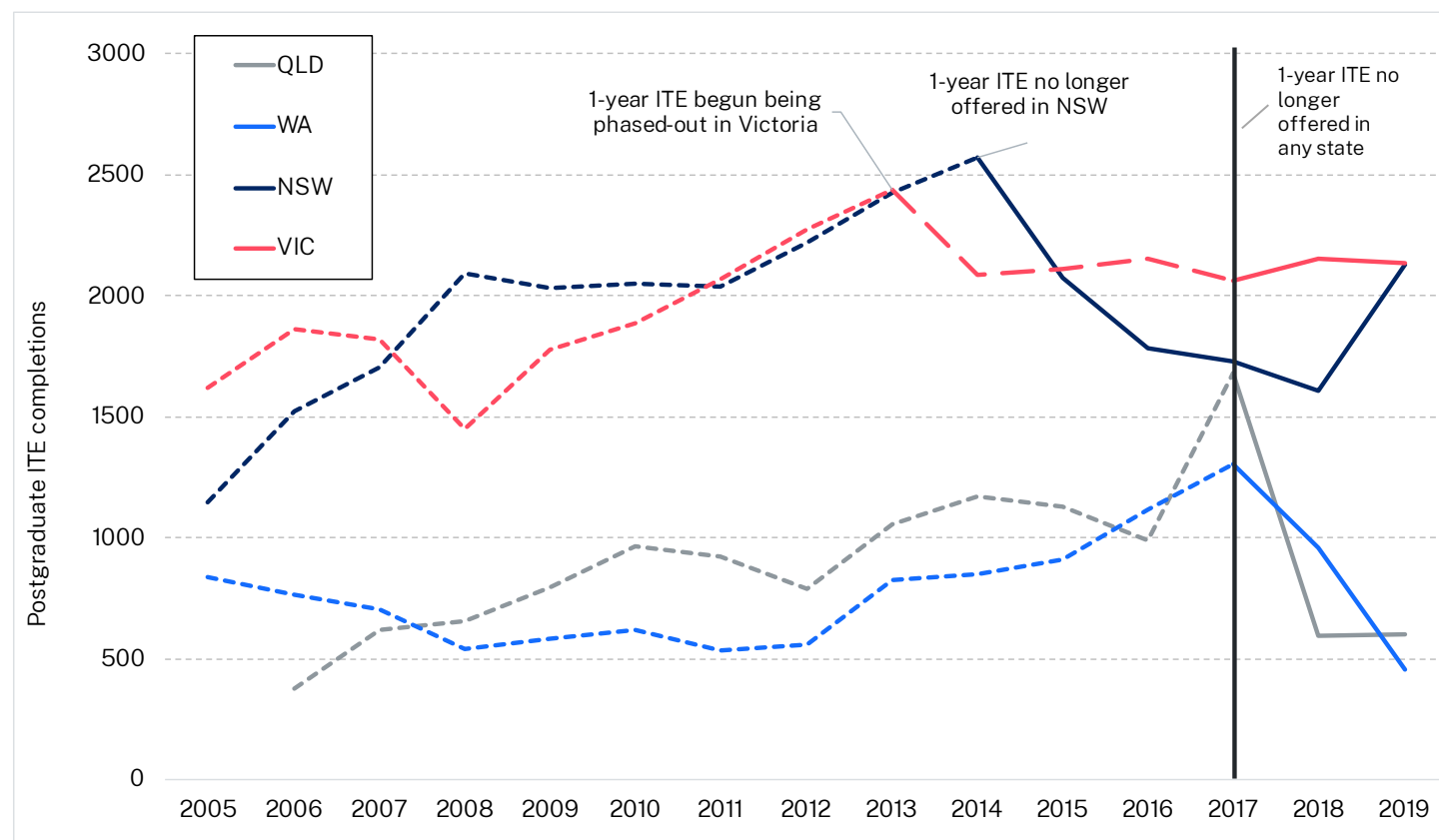
<sup>20</sup> This is using AITSL completion data that is available up until 2019.



understand from university course guides, some Victorian universities no longer offered the graduate diploma in 2014. Victoria consequently began switching out the graduate diploma as early as 2013<sup>21</sup> This coincides with Victoria's downwards trend. Regardless, the latest ITE completions in Victoria are below 2016 levels which marked the mandate of two-year ITE.

Figure 9: Other states recorded declines in ITE following the lengthening of ITE

Total completions in postgraduate initial teacher education, by state, 2005–2019



Note: States and territories with less than 500 students completing ITE per year have been removed. The implementation of the two-year ITE varies state-by-state. We have used information available to determine when each state implemented the change (Cervini, 2016; Cook, 2017; The University of Queensland, Australia, 2018).

Source: AITSL, NSW Productivity Commission

The decline in ITE enrolments, coincident with the lengthening of the course requirements, across three states at different points in time, provides a *prima facie* basis to conclude that a major reason for the decline in ITE commencements has been the lengthening of ITE.

It should be noted that there may have been a substitution effect. This is where aspiring ITE candidates relocated to the states that were still offering accredited one-year ITE. If this is the case, it shows that people are willing to relocate interstate rather than undergo two years of ITE. This means that the barriers to longer ITE exceed the barriers of relocating. If this is true, then the substitution effect will have dampened the impact of falling ITE completions across the country. If

<sup>21</sup> A minimum of two years full-time equivalent professional studies in education has been a requirement of initial teacher education programs since the Ministerial Council for Education, Early Childhood and Youth Affairs endorsed the 2011 *Accreditation Standards and Procedures*. In Victoria, as part of the transition from the state-based accreditation system to the nationally agreed system, some one-year ITE awards remained until 2015, at which point all submissions from accreditation of ITE programs needed to meet the minimum two-year equivalent study requirement.

the substitution effect was occurring and now that ITE is no longer offered in any state as a one-year pathway, the Commission could expect to see larger declines moving forward as there is no option to relocate for ITE.

#### **4.2.8 The falls in NSW were not because of a broader loss of interest in ITE**

Like postgraduate ITE completions, completions of undergraduate domestic education degrees also fell in NSW between 2014 and 2019, by 6.3 per cent, or 253 students.<sup>22</sup> Figure 10 displays a similar trend in undergraduate and postgraduate ITE commencements.

On its face, this result suggests the possibility that falls in postgraduate ITE enrolment might not have been driven by the master's degree requirement, but by a broader decline in interest in ITE that affected both undergraduates and postgraduates. The Commission examined the evidence closely to test this and have concluded it is not the case.

Firstly, while there are some common factors that affect both undergraduate and postgraduate ITE completions, there are also important differences. Postgraduate and undergraduate ITE attract different cohorts of students, who face different career options. Undergraduate ITE students are generally school leavers, without an existing degree, whereas postgraduate ITE students always have a previous degree and generally also have some career experience.

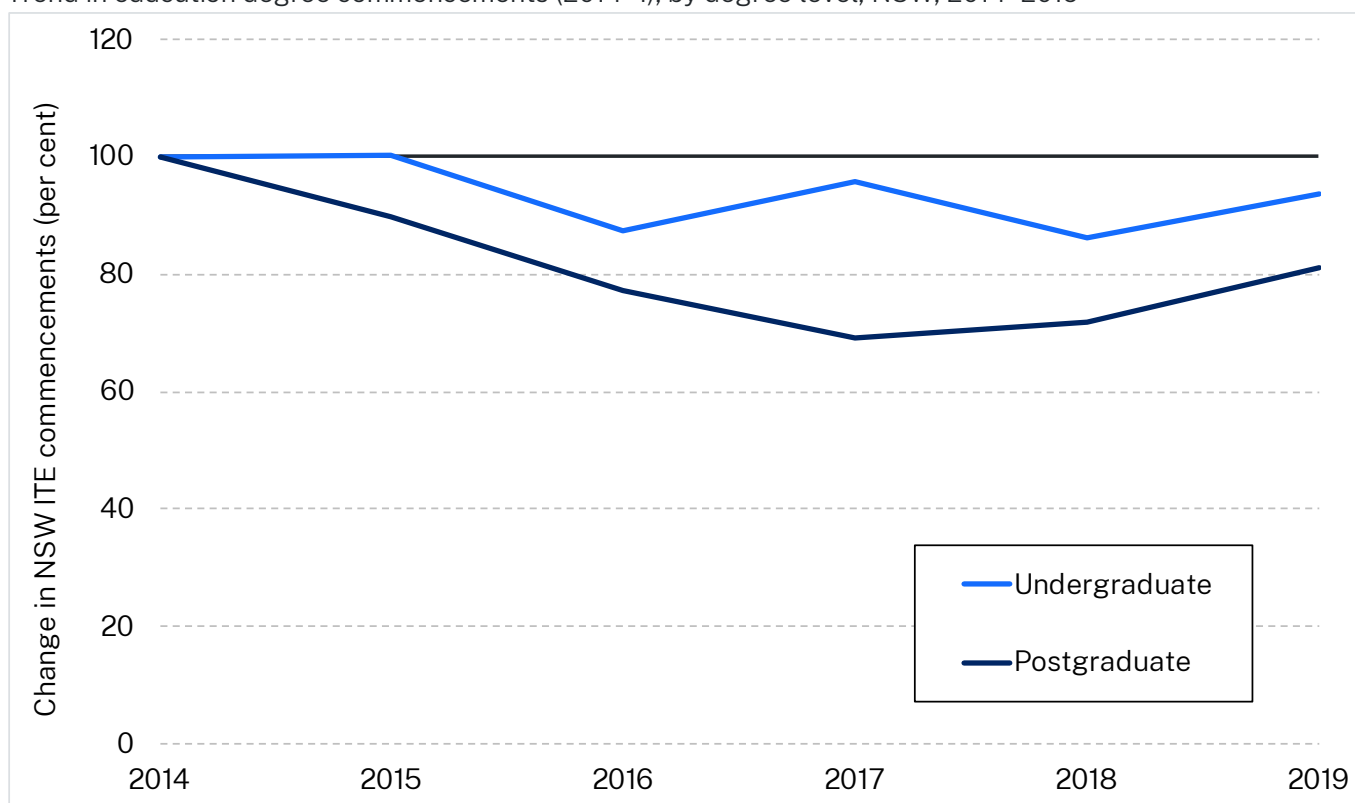
Second, the decline in undergraduate and postgraduate ITE commencements started at different times for undergraduates and postgraduates in NSW, suggesting that the falls were driven by different factors for each cohort, rather than a common factor.

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<sup>22</sup> AITSL data

Figure 10: NSW domestic education degree commencements falls after 2014

Trend in education degree commencements (2014=1), by degree level, NSW, 2014–2019

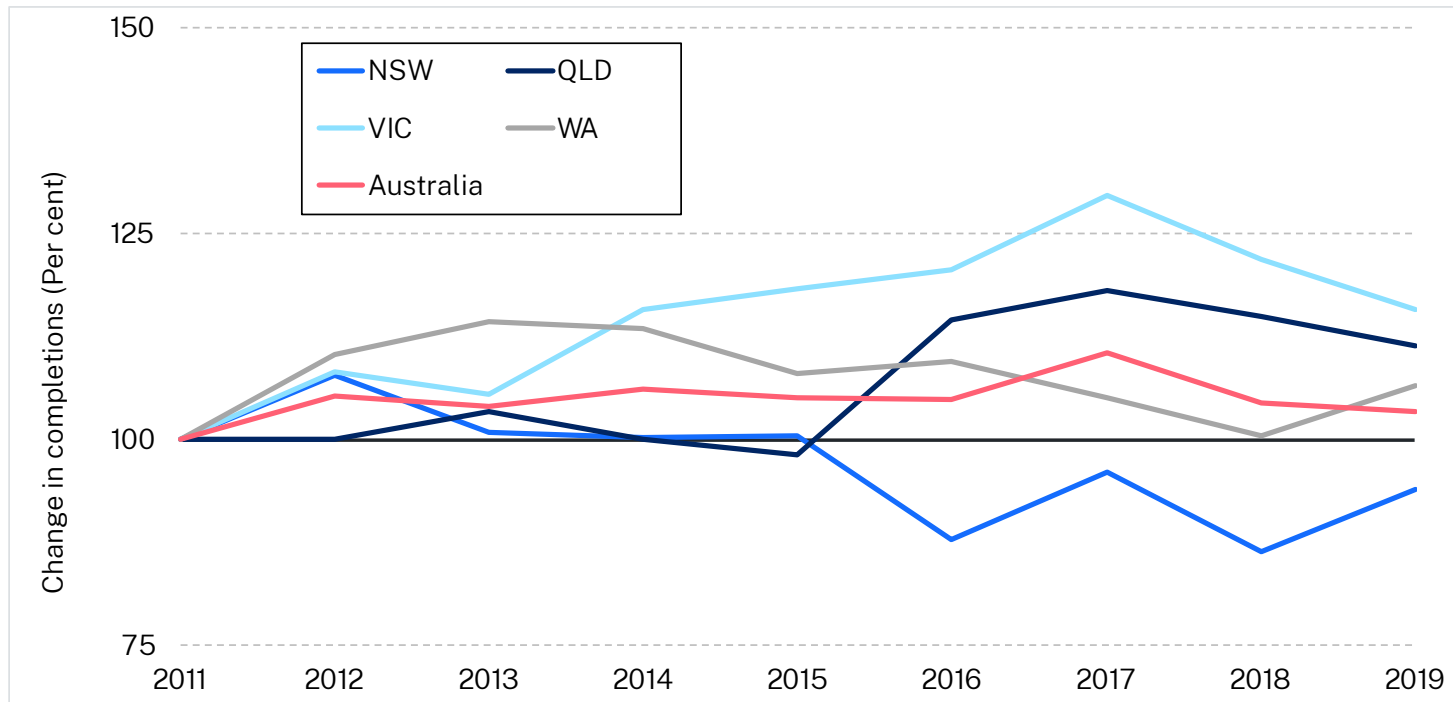


Source: AITSL, NSW Productivity Commission

Third, the Commission looked at the experiences of other states. Undergraduate ITE trends in other states contradict the idea that ITE was losing its appeal across the board. Figure 11 shows the drop in undergraduate ITE completions in NSW was an exception. Queensland, Victoria, and Western Australia have all recorded increases in the number of undergraduate ITE completions since the *Accreditation Standards and Procedures* were introduced in 2011. In total across Australia, the number of ITE undergraduate completions increased by 367 between 2011 and 2019. Victoria recorded the largest percentage increase equal to a 16 per cent increase. Figure 11 shows the trend in ITE completions across Australian states. Since 2011, NSW has recorded a decline in undergraduate ITE completion. Given this is the outlier, we can confirm that there has not been a uniform decline in ITE across the nation. *Appendix C* provides more details on the decline in postgraduate ITE.

Figure 11: Only NSW has recorded a decline in undergraduate ITE completions

Trend in undergraduate education degree completions, (2011=1), by state, 2011–2019



Note: South Australia, Northern Territory, Tasmania, and ACT excluded due to low numbers of ITE completions. They are included in Australia aggregate.

Source: AITSL, NSW Productivity Commission

### 4.2.9 Projecting postgraduate completion with continued one-year ITE

The declines in enrolments and in ITE completions coincide with the changes to ITE requirements. To gauge the impact of this change, the Commission has estimated the difference in the completions before and after the reform. This was conducted by analysing the trends in ITE completions under two scenarios.<sup>23</sup>

#### 4.2.9.1 The two scenarios

Figure 12 displays the total reported and forecast completions in NSW postgraduate initial teacher education to 2022, based on the scenarios:

##### 1. Lengthening of ITE to Two Years Scenario

This first scenario shows what actually happened to postgraduate ITE completion in NSW through to the present day. This scenario depicts the changes that were made to postgraduate ITE. It uses actual data available to 2019 (dark blue line), and then projects forward to 2022 based on this data (mid-blue dashed line).

In this scenario, an estimated 2221 people will complete postgraduate ITE in NSW in 2022.

<sup>23</sup> Appendix C provides a sensitivity analysis using 2005 to 2011 to project 2012 onwards. The year 2011 is chosen as it was when the *Accreditation Standards and Procedures* announced the recommendation to lengthen ITE.

## 2. One-year ITE Scenario

The second scenario is a hypothetical or counterfactual path that shows what may have happened if ITE remained one-year. As a result, it depicts a NSW with facts different from what actually happened – a NSW where students are able to continue to complete one-year ITE. The Commission used data up to 2014 to project what would have happened between 2014 and 2022 if ITE standards had never changed in 2014 (green dashed line).

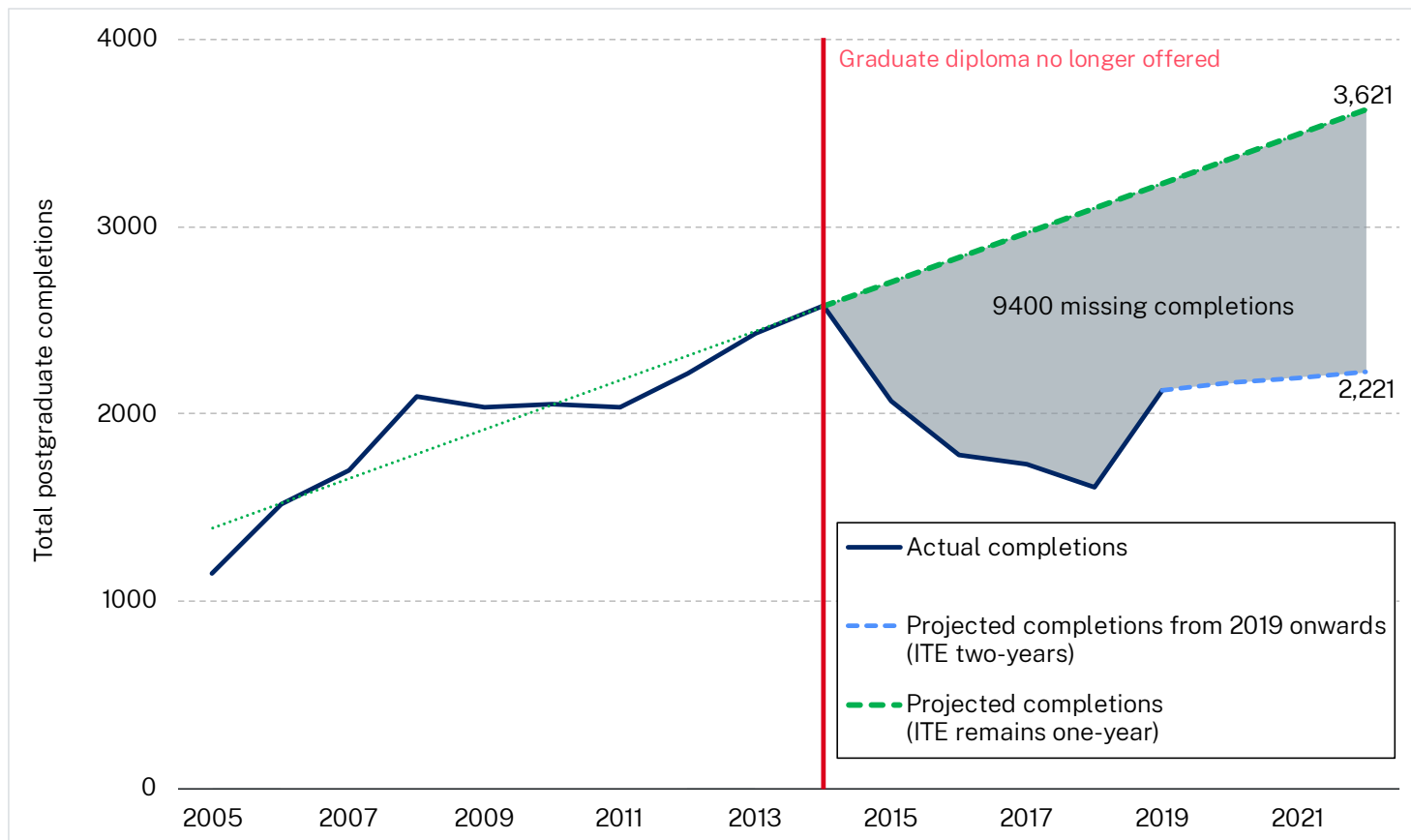
In this scenario, an estimated 3621 people would complete postgraduate ITE in NSW in 2022.

Under the **One-year ITE Scenario**, ITE completion would remain substantially higher than it is today.

We note that this analysis assumes that the trend in the prior years would continue, and therefore future shocks (post-2014 and 2020) are not accounted for in the analysis. An example of a shock is the impact of COVID-19 on postgraduate completion of ITE.

Figure 12: What might have been in postgraduate ITE

Total completions in postgraduate initial teacher education, NSW, one-year ITE scenario vs two-year ITE scenario, 2005–2022



Source: DESE, AITSL, NSW Productivity Commission

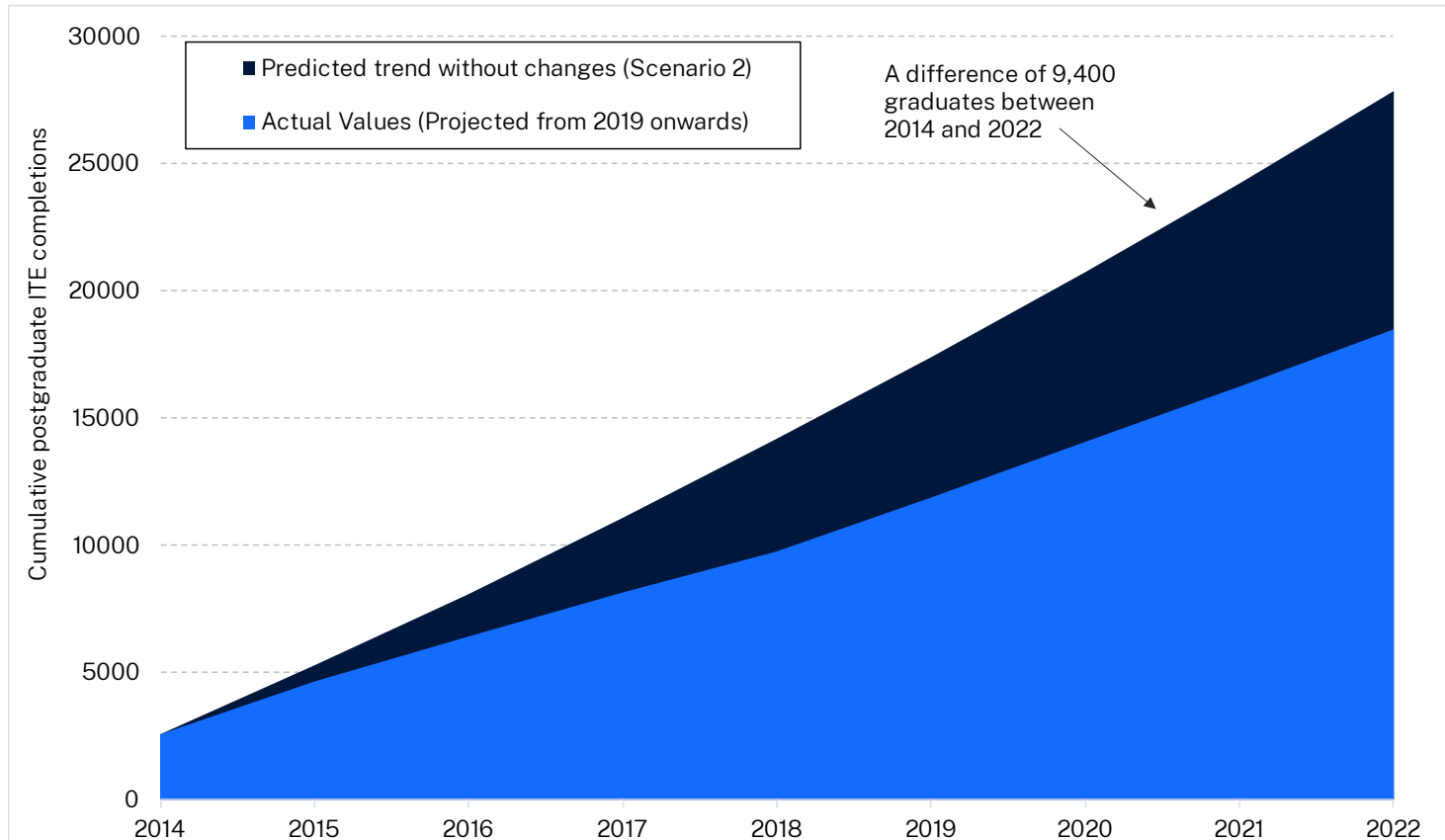
Our **One-year ITE Scenario** continues existing postgraduate ITE at the 2005–2014 trend rate (when ITE was available as one-year), rather than the actual rate that occurred under **Two-year ITE Scenario**. Under the **One-year ITE Scenario**, the Commission estimates NSW would have gained an additional 9,400 ITE completions between 2014 and 2022. Figure 13 displays the cumulative total of ITE completion, comparing the two scenarios.

The aggregation of each year provides an estimate of the cumulative total of ITE completions that may have occurred had ITE remained as a one-year graduate diploma.<sup>24</sup>

Approximately 86 per cent of postgraduate ITE students are employed within a year of graduation, and this increases to 94 per cent within three years.<sup>25</sup> Given this, it can be assumed that many of these ITE graduates would have become teachers. These additional teachers might have alleviated the current growing shortage of qualified teachers which is well documented (Shah, Richardson, and Watt 2020; Commonwealth Productivity Commission 2012c; Timms et al. 2018).

Figure 13: There could have been more than 9,000 more graduates without the lengthening of postgraduate ITE

Cumulative difference in postgraduate ITE completions, NSW, one-year ITE scenario vs two-year ITE scenario, 2014 -2022



Source: AITSL; NSW Productivity Commission

#### 4.2.10 More ITE completions would have improved student-teacher ratios

More than 802,000 students or 9.8 per cent of the NSW population enrolled is in government schools. Figure 14 displays the trend in the number of students enrolled in primary or secondary schools in NSW and the year-on-year percentage change. In 2021, the number of students enrolled

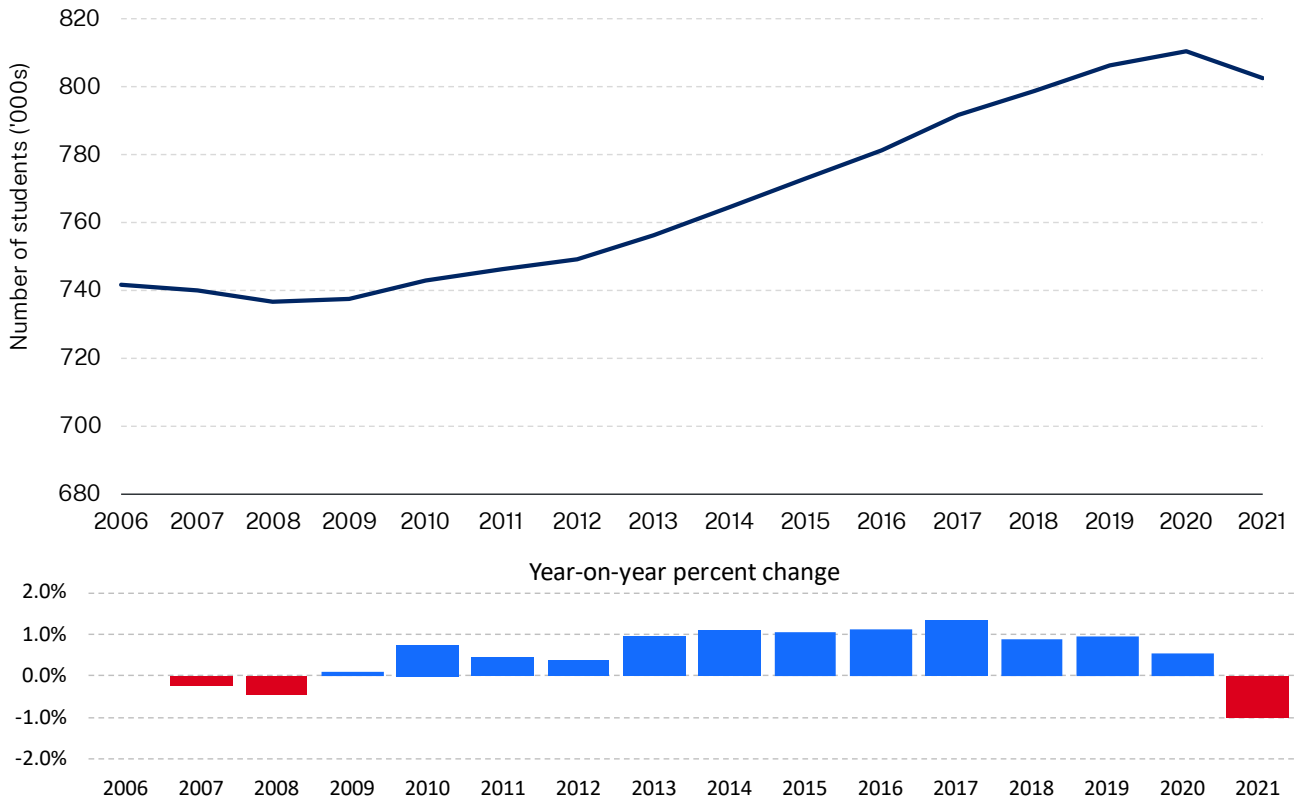
<sup>24</sup> The difference between the One-year ITE Scenario and the Two-year ITE Scenario shows the number of additional ITE completions for a given year had one-year ITE remained.

<sup>25</sup> QILT – Graduate Outcomes Survey

in NSW schools declined by 0.98 per cent from the previous year, the equivalent of 7,929 students.<sup>26</sup> Non-government schools had more than 440,000 enrolments in 2021.

Figure 14: NSW school enrolments have increased over time

Trend in the number of students enrolled in NSW Government primary or secondary schools, 2006 – 2021



Source: ABS

Increasing teaching staff is essential to maintaining the number of students per teacher. Since 2014, the number of teaching staff has steadily increased, and as of 2021 NSW had more than 64,500 teaching staff. Similarly, the number of specialist support staff and other staff has increased over the same period. The total number of full-time equivalent (FTE) staff in NSW schools was at its highest level on record in 2021.

The NSW student-teacher ratio remains the highest across Australia — a position it has held in five of the last seven years. This could have been impacted by the decline in postgraduate education degree completions and enrolments coincident with the change in ITE requirements. Care must be taken in interpreting the significance of student-teacher ratios. There is limited evidence that

<sup>26</sup> The border restrictions due to COVID-19 may have impacted this reduction. However, students were considered active in a NSW education program, regardless of whether the program had been temporarily disrupted by COVID-19 or delivered online or remotely.



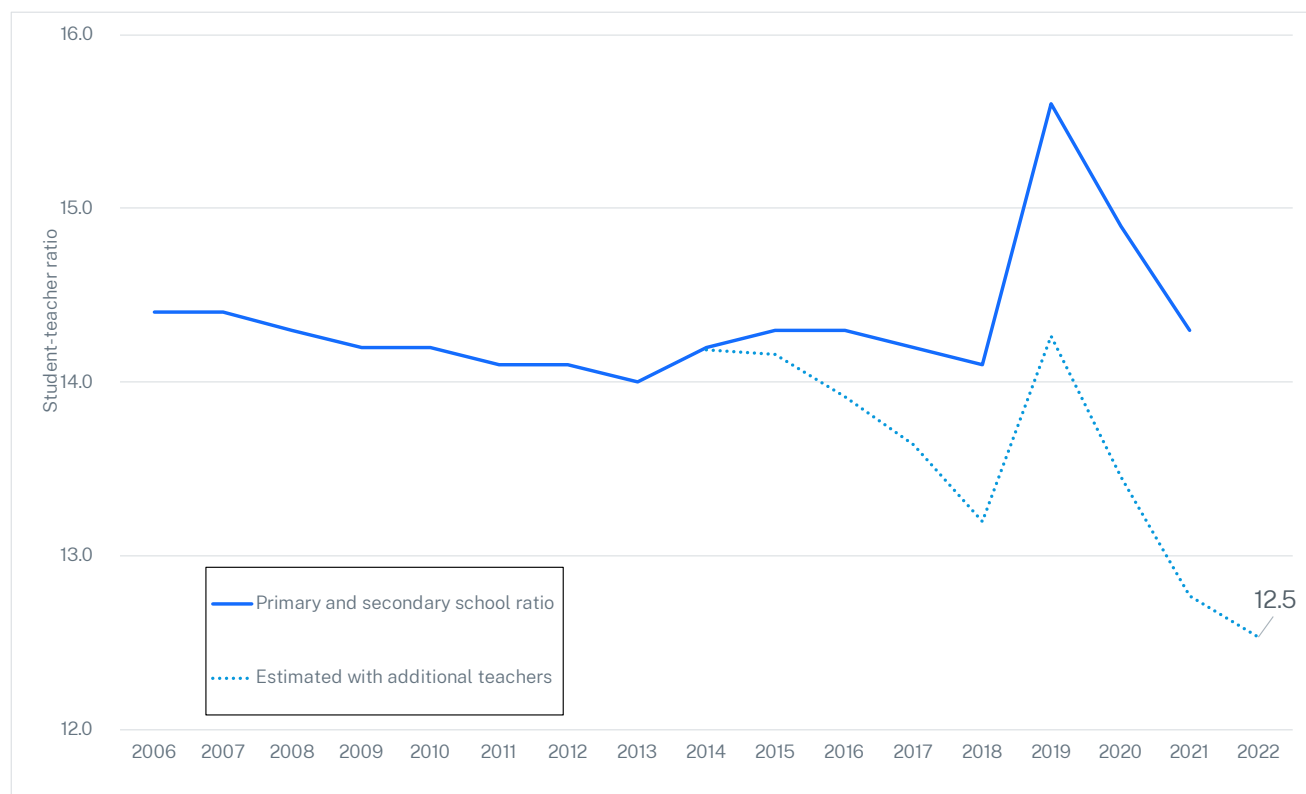
student-teacher ratios are a key driver of student outcomes. The evidence suggests that the quality of the teaching is more important than how many students are in a class.<sup>27</sup>

Student-teacher ratios do provide a proxy indicator of the overall supply of teachers relative to students. Given the NSW student-teacher ratio has increased since two-year ITE was introduced indicates that NSW is experiencing a teacher supply challenge.

Using the previous projection from ITE completion, if the additional ITE graduates completed postgraduate ITE – as depicted in the 2014 to 2022 projection—and began teaching in NSW schools, the average student-teacher ratio would reduce to 12.5 as shown in Figure 15.<sup>28</sup> This assumes 85.8 per cent of ITE postgraduate students become FTE teachers, there are no resignations, and the total number of students enrolled stays at 2021 levels. While this may paint an oversimplistic picture, had an additional 9,400 aspiring teachers completed ITE, NSW could expect fewer students per teacher. Furthermore, this could reduce the number of out-of-subject teachers.

Figure 15: The student to teacher ratio would be lower with additional teachers'

Student-teacher ratio, government schools, NSW, 2006–22



Source: ABS, NSW Productivity Commission

<sup>27</sup> To an extent, since 2006, the student-teacher ratio has fluctuated between 14.0 and 15.6 students per teacher in NSW. This is largely consistent with the Organisation for Economic Co-operation and Development (OECD) average of 14.5 for primary schools and 13.0 for secondary schools.

<sup>28</sup> This ratio is calculated as follows: 56,005 FTE teachers + 85.80 per cent of the 9,400 additional ITE completions, totals 64,070 FTE teachers. This is then divided by current student cohort of 802,776 to equal 12.5. Calculation accounts for fulltime employment outcomes for ITE graduates.

## 4.3 Teacher shortages raise out-of-subject teaching

As discussed, lengthening postgraduate ITE has contributed to a reduction in both ITE enrolments and completions, contributing to teacher shortages across NSW. As early as 2012, the Commonwealth Productivity Commission raised concerns of the lengthening of postgraduate ITE accreditation requirements and its negative impact on teacher shortages. They also stated that the lengthening should not be mandated as the potential net benefits are uncertain (Commonwealth Productivity Commission, 2012). Ten years later, there is an inquiry into teacher shortages in NSW (Parliament of NSW, 2022).

Estimates of the magnitude of the teacher shortage differ substantially. The NSW Department of Education (DoE) estimate 4100 additional teachers are required in 2022 (NSW Department of Education, 2021a). The number of open permanent teaching positions has fluctuated between 995 and 3000 positions over the past 18 months in NSW public schools (Mitchell, 2021). This does not account for temporary or casual positions. As of October 2022, the number of permanent FTE teacher vacancies was 2,963 in NSW public schools (Mitchell, 2022b). This underestimates the true shortage, as data is not available on vacant temporary positions in NSW public schools (NSW Teachers Federation, 2022).

Between 11,100 and 13,700 additional teachers would be required over the next decade according to estimates (NSW Teachers Federation, 2021).<sup>29</sup> Furthermore, the demand for secondary teachers between 2021 and 2025 will exceed the number of graduates who enter the profession by 4100 teachers across Australia (Department of Education, 2022).

NSW reports a growing shortage in STEM teachers (NSW Department of Education, 2021b). Teacher shortages have led to high levels of out-of-subject teaching in NSW (NSW Teachers Federation, 2022). As many as 109,000 secondary students were being taught by out-of-subject teachers in 2020 (NSW Department of Education, 2020). This is equivalent of one in five students in NSW secondary schools. While one in five students seems high, NSW has the lowest percentage of out-of-field teachers in Australia (NSW Government, 2022). For rural and regional areas, out-of-field maths teaching exceeds 25 per cent in NSW.

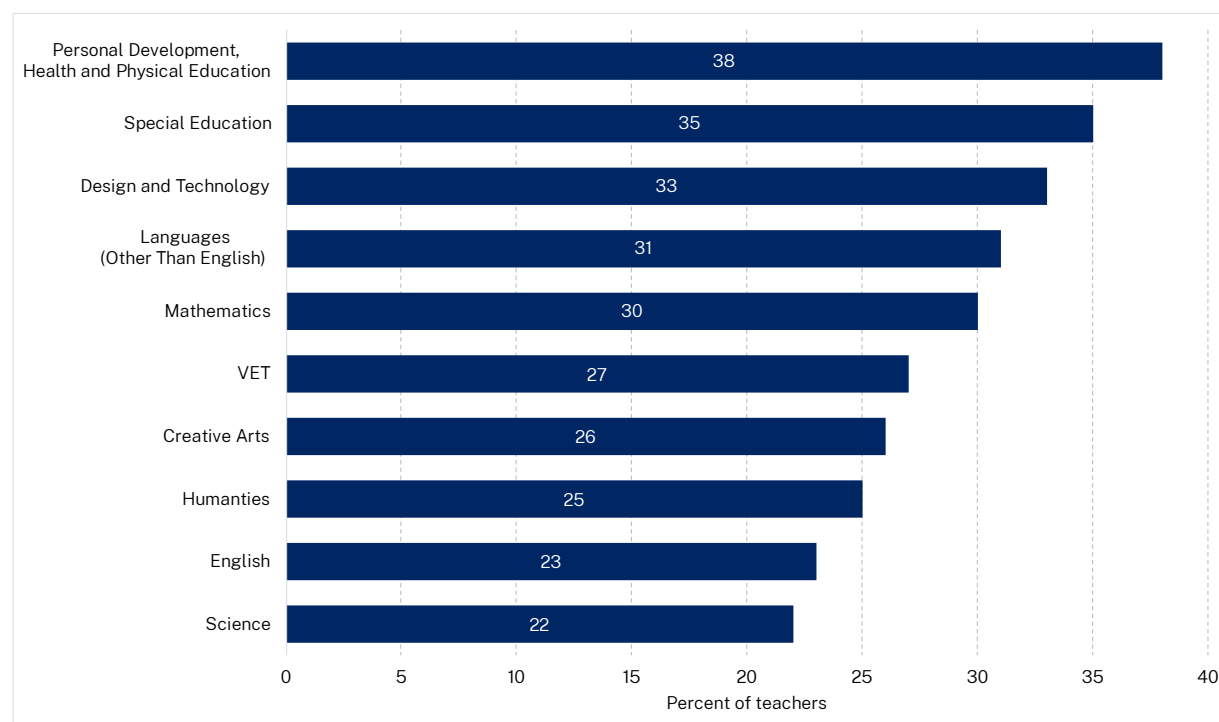
Growing shortages of teachers have mean out-of-field teaching has become a concern. AITSL's Australian Teacher Workforce Data (ATWD) found in a survey that 22 to 38 per cent of teachers in NSW in a given subject received no tertiary study in that subject (Australian Institute for Teaching and School Leadership, 2022) (see Figure 16).

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<sup>29</sup> 11,000 is to meet the current 10-year average student-teacher ratio. 13,700 additional teachers is to improve average student-teacher ratio so that it is equal to the national average.

Figure 16: Out-of-field teaching is as high as 38 per cent in some subjects

Subject-specific ITE preparation, secondary teachers, NSW, proportion of secondary teachers teaching out-of-field, 2021



Note: Survey questions: 'Select all subjects that you are teaching in 2018' and 'Did you complete at least one semester learning content knowledge or pedagogy in the following subject/s during your teacher education program or other tertiary study?'

Source: ATWD, AITSL

Projections illustrate that the shortages in STEM could affect 70,000 NSW students each year by 2030 (NSW Department of Education, 2021b). In a survey of school principals, 67 per cent reported a shortage of maths teachers and 55 per cent reported a shortage of physics teachers (Carroll, 2022).<sup>30</sup>

Casual teachers are also in short supply. Approximately 1300 additional casual teachers are needed daily to meet the current demand (NSW Department of Education, 2021a). The number of casual teachers has declined from 5729 to 4557, the equivalent of a 20 per cent drop from 2012 to 2021 (Mitchell, 2022a). This is despite an increase in the number of students enrolled in NSW schools over the same period as shown in Figure 14.

More than 21,000 temporary teachers are employed in NSW schools (Mitchell, 2022a). A recent Government publication announced that at least 10,000 temporary teachers and support staff across the state will be offered permanent roles as part of the NSW Government's plans to shift teachers into permanent positions. The aim of increasing the number of permanent staff is to attract and retain more teachers in our schools (Minister for Education and Early Learning, 2022).

The impact of teaching shortages has significant impact on those in the education sector such as teachers and support staff, as well as on the students they teach. A recent survey of teachers on the impact of teaching shortages indicated higher workloads, less preparation time, less professional

<sup>30</sup> Survey by Association of Heads of Independent Schools of Australia (AHISA).

learning, reduced curriculum offerings, increased class sizes, reduced student support, declining student and staff morale and reduced student discipline and attendance (NSW Teachers Federation, 2022).

Extra teachers would reduce individual burdens such as the amount of yard, pick-up and drop-off duty, and would free up teacher time. This additional time could be spent on:

- planning lessons
- tailoring individual student learning plans
- support students and giving them extra assistance
- conducting professional development
- reskilling and retraining to gain additional subject expertise.

All of these activities boost student achievement and teaching quality (Hunter, Sonnemann and Joiner, 2022). There may also be secondary effects from having additional teachers in schools, such as reduced teacher burnout and improved teacher retention due to the additional support (Walker, 2021).

The strategies to manage teacher shortages may include increasing class sizes, merging classes, having teachers cancel their professional development time, and cancelling lesson planning (NSW/ACT Independent Education Union, 2021). These will all have negative impacts on students and their academic achievements. Solutions to teacher shortages include assigning teachers to subjects in which they lack the necessary credentials (Hobbs *et al.*, 2020). Redirecting teachers to teach out-of-field, in subjects beyond their expertise negatively impacts student achievement.

### **4.3.1 Teachers with subject knowledge improve student results**

Students taught by teachers qualified in the subject have been shown to achieve higher scores in their Higher School Certificate (Henebery, 2021). Of all in-school factors, quality teachers have the greatest impact on student achievement. Higher School Certificate (HSC) scores for all courses increased, on average, when all teachers who taught subjects were accredited in that subject.<sup>31</sup> This impact was largest in technology key learning areas (KLAs) when students were taught by teachers accredited with a competency in technology KLAs (NSW Department of Education, 2020).<sup>32</sup>

The Australian Tertiary Admissions Rank (ATAR) is a solid predictor of first year university success, both in terms of grade point average (GPA) and completion rates (Manny, 2020). Supporting this, the Grattan Institute finds that students with ATARs below 60 are twice as likely to drop out of university as similar students with ATARs above 90 (Norton and Cherastidham, 2018). Increasing school grades improves opportunities to successfully complete higher education and improve labour market outcomes. HSC graduates with post-schooling qualifications, on average, earn more than those without (NSW Department of Education, 2022a).

Evidence of out-of-subject teachers having lower results among their students is evident beyond the HSC – for example, in the Trends in International Mathematics and Science Study (TIMSS)

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<sup>31</sup> HSC scores for all courses increased by 0.131 to 0.812 out of 50, on average, when all teachers who taught subjects were accredited in that subject.

<sup>32</sup> The HSC scaled mark converts the raw mark for the subject to a mark out of 50 for each unit of study. Having a teacher accredited in a competency in Technology key learning areas (KLAs) on average results in HSC scores 1.575 - 3.732 higher in those Technology KLAs.

assessment.<sup>33</sup> Students with an expert teacher in maths, with specialist teacher training, scored substantially higher in maths in the TIMSS test compared to other groups. Students taught by teachers with neither subject-matter knowledge nor pedagogical knowledge scored 30 points lower (0.3 of a standard deviation) relative to students with an expert teacher who had specialist teacher training (ACER, 2021). This is equivalent to nine months of additional schooling.<sup>34</sup>

Substantial academic gains can be achieved by addressing out-of-field teaching, given that as many as 109,000 secondary students are being taught by out-of-subject teachers. This further provides evidence of the importance of in-subject knowledgeable teachers. Given that higher student achievement is linked to higher productivity and wider economic benefits, increasing the number of subject-specific teachers in every NSW school will result in lifetime gains for students.

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<sup>33</sup> The TIMSS summarises achievement with a mean score of 500 and standard deviation of 100.

<sup>34</sup> US reports found a one stand deviation increase in school results is equal to 36 months of schooling (T. Kane and Staiger, 2012; Cremata *et al.*, 2013).

# 5 Estimating the welfare impact of increased postgraduate ITE requirements

This section sets out the *ex-post* cost-benefit analysis (CBA) of changing postgraduate ITE requirements from a one-year minimum graduate qualification to a two-year minimum.

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## 5.1 Overview of framework

CBA is an appraisal and evaluation technique that estimates policies' economic, social, and environmental costs and benefits for the NSW community. Where possible, costs and benefits are stated in monetary terms (2022 \$Net Present Value (NPV)) to allow comparison and assessment. Following NSW Government best practice (NSW Treasury Policy and Guidelines Paper TPP 17-03), the Commission has adopted a cost-benefit analysis (CBA) approach to estimate the economic value of lengthening postgraduate ITE. Qualitative costs and benefits are also included, and may influence the way the quantitative results are interpreted.

The CBA considers the two scenarios outlined in **Section 4**:

- the **One-year ITE Scenario** (base case) where a one-year diploma pathway remained widely available beyond 2014
- the **Lengthened ITE Scenario** that has played out in reality, with two-year programs becoming the minimum requirement for gaining postgraduate teaching accreditation from 2014.

We test whether the NSW community was better or worse off under the lengthened ITE scenario policy change than the 'base case'.<sup>35</sup>

The policy change is taken to have occurred in 2014, although in reality it was phased in over a number of years. NSW began to phase out the one-year 'Dip Ed' graduate pathway and transition to a two-year full-time equivalent minimum prior to 2014. Almost all one-year graduate diplomas of education had been phased out by 2014.

A full post-implementation evaluation evaluates the policy change not only from the economic (welfare) perspective, but also against its intended outcomes and the process of implementation:

- Given most of the benefit and cost categories relate to the likely intended outcomes (benefits to students and teachers), this analysis goes some way to meeting the outcome evaluation requirement.
- Process evaluation is out of scope, although we reflect on the process in **Section 6.2**.

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<sup>35</sup> The base case is ITE remained one-year

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## 5.2 Net change in welfare (NSW) from lengthening ITE to two years

This economic evaluation finds that the quantified costs of lengthening the postgraduate ITE requirements are \$3.3 billion.

This result be considered as a 'break even' threshold for the value of the qualitative benefits to society. In other words, if society is confident that there are broader benefits to students and teachers, and that they are worth the cost of \$3.3 billion, then the policy was worthwhile. Typically, an ex-ante business case would need to articulate the objectives and attempt to provide some evidence for the magnitude of the expected benefits, but this policy change appears not to have gone through this process. Table 5 lists the benefits and costs discussed.



Table 5: Benefits and costs of longer ITE

Item	Description	Net present value (2022 \$)
<b>Benefits</b>		
Student productivity (due to improved teaching quality)	Assumed that additional benefits of a second year of training on student performance are offset by the costs of reduced in-the-classroom experience.	\$0 (net)
Broader student wellbeing (due to improved teaching quality)	Wellbeing impact on students from having teachers with longer qualifications and more completed subjects. No available evidence to quantify one way or the other.	Unquantified
Improved teacher welfare	Wellbeing impact on <i>teachers</i> from having an additional year of university. Qualitative evidence to suggest some teachers are more confident/feel less stressed. <sup>36</sup>	Unquantified
<b>Costs</b>		
Additional cost of training	One year of foregone wages for teaching students, resources costs for extra training and possible earnings while training.	\$0.9 billion
Misallocation of human capital	Welfare cost to those that would have entered teaching but did not proceed.	\$0.2 billion
Human capital (teacher shortages and out-of-field teaching)	Lifetime income lost for more students having out-of-field teachers.	\$2.1 billion
<b>Net social welfare impact</b>		-\$ 3.3 billion
<i>Note: distributional analysis</i>		
- <i>Prospective teachers</i>	ITE candidates incur an additional year of tuition, lost salary and lost welfare.	-\$1.2 billion
- <i>School students</i>	A proportion of NSW HSC students incur lower lifetime incomes.	-\$2.1 billion
- <i>Universities</i>	Universities provide postgraduate ITE and benefit from the additional year	\$52 million

## 5.2.1 Benefits

### 5.2.1.1 Student productivity (due to improved teaching quality)

Teaching quality is the biggest in-school driver of student achievement. There is strong evidence that additional experience, especially in the earlier years of a teacher's career, have a positive impact on student achievement. And likewise, there is a strong body of evidence that improved student achievement translates into improved human capital/economic outcomes.

<sup>36</sup> (Mayer *et al.*, 2015)

As outlined in **Section 3**, the weight of evidence suggests there is negligible benefit of a master's level education when it comes to student achievement, at the primary or secondary level. The Commission acknowledges that the evidence discussed has substantial limitations such as:

- Variations in accreditation processes and requirements between jurisdictions means some study results may not be directly applicable to NSW.
- Most of the available evidence is somewhat dated (2015 or earlier), meaning recent developments in ITE practice might affect the applicability of these studies.
- The type of master's degree awarded is often not specified in the available studies.
- Much of the available evidence identifies correlations but falls short of proving causation

As discussed in **Section 1.3**, the general intent of lengthening the minimum course length was to provide 'sufficient time for student reflection, learning and professional experience'. The evidence underlying this intention is unclear as not well documented and may have been influenced by expert opinion from within the education field.

The two year program does include a minimum requirement of 60 days' professional experience component in graduate programs (Australian Institute for Teaching and School Leadership, 2019); this compares with the previous minimum of 50 days under the one-year diploma.

There may also be benefits of undertaking practical experience over a longer period, alongside formal learning. One *ex-post* defence of the longer qualification suggested the combination of the practical experience with the learning, under appropriate supervision, may be particularly beneficial (Caldwell, 2012).

Consistent with evidence that more teacher experience is associated with better student achievement (see **Section 3**) the Commission expects that there is some benefit. The relevant question, however, is whether the benefit of an additional 10 days of experience, *albeit* under different circumstances, will yield better student performance than another person with a full year of graduate experience but only one year of formal ITE (as in the base case).

For the purposes of this evaluation, the Commission makes the conservative assumption that there is no improvement in student achievement (nor lifetime earnings) from a teacher being trained under a two-year course over a one-year course, once the loss of experience is factored in.

#### **5.2.1.2 Broader student wellbeing (due to improved teaching quality)**

While central to the school's purpose, academic achievement is not the only role that schools play in our society. The additional year of initial teacher education provides some scope to equip teachers with a broader range of skills.

One of the arguments for the additional year of postgraduate ITE was that more was being 'crammed' into the single-year qualification. The core component of the current two-year course varies slightly across institutions but generally covers aspects of teaching theory, childhood development, and fostering a learning environment. This is complemented with courses in addressing inclusion and diversity, working with those with disabilities, and education in a First Nations context.

The Commonwealth Department of Education asserts that the nationally consistent standards now 'are prepared for the know how to support students' wellbeing' (Department of Education, 2014).

It may be that the additional training enables teachers to realise these broader wellbeing benefits. Academic studies have quantified the benefits of improved student wellbeing. For example, lower incidence of mental illness (depression, eating disorders, suicide attempts and alcohol abuse) have economic benefits that ranges from \$1,507 to \$5,281 annually per illness avoided (Kezelman, 2019). A cost-benefit analysis of children in the Aboriginal and Islander Independent Community School healing program which compared outcomes of Aboriginal and Torres Strait Islander children both within and outside the program found benefits as large as \$58,000 (includes costs avoided) from improvements in student wellbeing (Deloitte Access Economics, 2017).

This evaluation treats broader student wellbeing as a qualitative benefit. First, there is insufficient evidence to suggest that the differences in the training programs equips teachers with the skillset to increase student wellbeing.

Second, even if large social benefits can be achieved with this training, it is not clear that it needs to be provided as part of the ITE program rather than through specialised on the job training for practising teachers. Given around 18 per cent of the teaching workforce hold graduate diploma in education, if there was a positive wellbeing impact from the broader courses, there might even be greater benefits from opening this training up to practicing teachers (AITSL, 2021).<sup>37</sup>

Due to the lack of evidence to suggest that the additional year of postgraduate ITE training improves student wellbeing, and the difficulty disentangling wellbeing from student performance covered in the previous benefit category, the Commission treats this as a possible *qualitative* benefit.

### 5.2.1.3 Improved teacher welfare

Further education can provide a range of benefits for aspiring teachers beyond entry into the teaching profession. Before the lengthening of the postgraduate ITE requirement, some students still elected to undertake a master's degree over the shorter qualification. This suggests that for those students, the perceived benefits outweighed the additional cost in tuition and forgone income.

Following the introduction of the two-year minimum for postgraduate courses, it is plausible that there were many who would still see *some* benefit in it over the lower-cost course. Put another way, many teaching students would be willing to pay *something* for the higher degree, would not voluntarily pay the full cost of the additional year (in tuition fees and forgone income).

One example of a possible benefit to teachers is additional confidence (or alternatively, reduced stress) in their first year. Mayer et al. (2015) provides survey evidence that the teachers that graduated with a master's qualification perceived themselves as marginally more prepared and effective than those with a graduate diploma qualification.<sup>38</sup> Of the teachers who felt that they were not prepared to teach, a higher proportion had a graduate diploma.

While intuitive, this evaluation treats teacher welfare benefits as qualitative in the absence of more robust evidence. As with student wellbeing, it is difficult to disentangle the benefit of teacher confidence from the student performance benefit discussed above.

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<sup>37</sup> The teacher qualification data only cover NSW, Northern Territory and South Australia.

<sup>38</sup> Due to the early timing of the survey, it captured mostly diploma graduates (n=558 vs n=124); the differences might also capture student selection or university specific effects.

## 5.2.2 Costs

### 5.2.2.1 Additional training cost

The clearest cost of increasing postgraduate ITE requirements is the cost to teaching students that would otherwise have chosen to do pursue a one-year postgraduate pathway. The three main components of this cost are

- the additional resource cost of training for an additional year
- the additional time taken to complete the degree
- earnings while completing ITE

To quantify the value of this additional time (one year), the Commission considers the opportunity cost to teachers undergoing their second year of training – that is, the additional salary they would have received in the base case from commencing employment one year earlier. There is a further benefit from progressing through the pay scale earlier, but this is not quantified for the sake of simplicity.

The total income foregone by second year postgraduate ITE students in the Lengthened ITE scenario is \$0.9 billion.

Additional costs have been excluded, either because they are likely to be incurred while working anyway (e.g. transport costs), or because they are relatively small (e.g. textbooks and course materials).

### 5.2.2.2 Misallocation of human capital (welfare costs for deterred teachers)

In **Section 4** the Commission estimated that the increased personal cost of undertaking a master's degree had deterred 9,400 potential teachers from completing postgraduate ITE between 2015 and 2022.

These 'deterred' teachers are those that would have received some positive welfare benefit in spending one year studying to become a teacher (in the base case), but the benefit was not sufficient to motivate them to complete more burdensome accreditation requirements (in the lengthened ITE scenario).

At one end of the spectrum, you would have some prospective teachers that would have been close to indifferent between teaching and another career under the one-year ITE policy. These individuals would perceive negligible welfare cost as a result of the lengthened requirement and would simply opt for the alternative career. Put differently, they had no willingness to pay for additional training.

At the other end, you would have individuals that had a strong preference to pursue teaching, but for whom the additional costs associated with the master's degree were higher than they were willing to pay. These individuals would still opt for the alternative career option, but they would be materially worse off.

Using the 'rule of half' to quantify the aggregate welfare loss, we assume that on average, the 'deterred' teachers would have been willing to pay halfway to the full cost the additional year, comprising a teacher's graduate salary plus an additional year of tuition. In total, this cost amounts to \$187 million (NPV) in lost welfare.

### 5.2.2.3 Student productivity (teacher shortages and out-of-field teaching)

There is a well-established relationship between educational achievement and improved lifetime earnings. Higher student test scores, indicating greater learning and student academic achievement, are associated with higher lifetime productivity and expected future incomes. See **Section 2** for more detail.

Under the lengthened ITE scenario we estimate students completing HSC between 2015 and 2022 would have performed more poorly than under the base case (One-year ITE Scenario; see **Section 4**). This is due to:

- a reduced supply of postgraduate pathway teachers, and, in particular, teachers with subject-specific knowledge.
- fewer years of experience gained by teachers due to the delayed start to their career.

In 2021, approximately one in five students were taught by an out-of-subject teacher in NSW secondary schools. We assume one in five of all HSC completions between 2015 and 2021 would have recorded higher student achievement under the base case, driven by in-subject specialist teachers.

The methodology for translating this into lifetime earnings is outlined in Appendix D. In short, we estimate that each year, the 20 per cent of high school completions see a 0.3 standard deviation worse performance, and that this translates into 2.25 per cent lower lifetime earnings.

The total cost, across all 95,000 students that we assume would have performed better under the base case, is \$2.1 billion (NPV).

### 5.2.3 Sensitivity analysis

To test the robustness of the results of the economic evaluation to estimated or assumed parameter values, we change one variable at a time and hold all other assumptions constant. Changes include:

- the estimated number of ‘deterred teachers’ - additional students who would have completed ITE under the One-Year Scenario (base case) but did not under the Lengthened ITE Scenario
- the number of NSW school students that see lifetime salary increase,
- the increases in students’ lifetime incomes
- the discount rate
- The annual tuition fees

Appendix F details the sensitivity analysis and explains the changes to parameters and the consequential impact on the Benefit Cost Ratio and the Net Present Value.

Under even a combination of the most conservative assumptions such as zero increase in students’ lifetime incomes, and reducing the number of ‘deterred teachers’, the NPV remains negative.

### 5.2.4 Distributional analysis

For this CBA, the following stakeholders are impacted: prospective teachers, students, universities and NSW Government.

Many of costs and benefits applied in this CBA are treated as transfers between the different stakeholders and do not affect the total net welfare. See Appendix E for more detailed discussion on some of the impacts categorised as transfers in this CBA.

Distributional analysis however provides additional informative value from a CBA because it articulates how costs and benefits are distributed across different population cohorts. Transfers are therefore relevant to this analysis.

Table 6 summarises the impacts from the policy change for the three major stakeholders.

Table 6 – Impacts by stakeholder

Stakeholder group	Impacts
Prospective teachers	ITE students are likely worse off under the Lengthened ITE scenario. While there may be some benefits, such as greater confidence in the early days in the classroom (unquantified), the costs of a year’s foregone wages and additional resource costs fees amount to \$29,000 per student in 2022. Those deterred from ITE study under the Lengthened ITE scenario are estimated to be on average \$19,000 worse off (using the ‘rule of half’). The aggregated costs to all prospective teachers (including those deterred) is \$1.1 billion
Students	School students are estimated to be worse off under the Lengthened ITE scenario. The negative effects of reduced teacher experience (in the early years) and more out of field teaching (due to the barriers to new teachers with specialist skills) are expected to far outweigh any benefits of a longer degree. The total cost to students is \$2.1 billion
Universities	Universities are estimated to have been the biggest beneficiaries of the transition to longer postgraduate ITE qualifications. The doubling of the fees received by universities more than offsets the smaller number of students enrolled in their courses. Some of the fees are paid by teaching students, and the remainder is paid by the Commonwealth Government. The total benefit to universities is \$52 million
NSW Government	The cost savings of a smaller teaching workforce, net of casual teaching expenses and administration costs. Unquantified

For simplicity, we have not excluded the Commonwealth Government from our CBA framework. The Commonwealth government is likely substantially worse off under the Lengthened ITE scenario (and by extension, taxpayers) due to two main factors.

First, the Commonwealth will receive less income tax due to lower student lifetime earnings.

Second, they would need to spend more on assistance for aspiring teachers. There have been fewer students studying to become teachers, but each Commonwealth supported place now receives greater assistance due to the doubling in the length (and fees). Further, with the worsened teacher shortage under the Lengthened ITE scenario, there is likely more pressure for the Commonwealth to increase its numbers of supported places; in the October 2022 Budget the Commonwealth committed to 4,000 additional Commonwealth Supported Places for underrepresented groups, over the next two years.



## 6 The way forward

Early last decade, the decision was made to increase the postgraduate pathway to a teaching career from a one-year course to that of two-years.

The original intent was likely good – to ensure NSW school students are getting a certain quality of teacher, by ensuring teaching students are tested against a wider range of standards and while also receiving some practical class-room experience.

Indeed, there may have been a range of benefits from the expanded ITE requirement, whether on student performance, such as broader student wellbeing or even teacher wellbeing. The evidence base for this change however appears to have been weak and poorly documented in terms of explaining the intended objectives of the change and how it was expected to achieve the objectives.

Major policy changes such as this come with costs, though. Any improvement in student performance from the additional year of training is very unlikely to justify the loss of classroom teacher experience gained in that year.

But there are two other material costs. The two-year requirement is a significant barrier to those individuals looking to become teachers via the postgraduate pathway. Had the ITE remained as a one-year graduate diploma the Commission expects up to 9,400 fewer ITE completions over the 2015 to 2022 period. It has imposed additional costs on teachers themselves, those that are deterred from teaching as a profession. It has increased their student debt, increased their foregone income and time spent balancing study, work and life.

This cost benefit analysis does not claim to capture every impact of this policy. It captures, as best as possible, the available evidence on the benefits and the costs. In particular, quantifying the broader benefits of this policy was challenging, with no evaluation plan or evaluation of outcomes known to have taken place to date.

Looking ahead, policymakers should reduce the barriers to entry as soon as is practicable. Doubling the postgraduate pathway into teaching has cost the NSW community around \$3.3 billion in lost welfare over the past seven years. This cannot be recovered but if nothing is done to reverse the pathway back to one year, then the costs will continue to mount.

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### 6.1 Recommendations

#### **Recommendation 1: Allow and equip postgraduates to teach with a one-year graduate diploma as soon as practicable**

A practical and responsible approach would be to immediately reintroduce a one-year graduate diploma as a recognised pathway into teaching. This change would remove the disincentive to prospective career changers and cap the net costs to the NSW community.

Returning to the one-year pathway does not mean sacrificing teacher quality to attract more people into teaching. This change is low-risk because:

- There is limited to no evidence that longer training pathways result in better quality of teaching.
- Many high-achieving education systems overseas, i.e. Singapore (ranked second worldwide in PISA results) offer one-year postgraduate teaching qualifications.

- The shortened pathway would be operating alongside post-2014 introduced standards-based environment of academic entry thresholds, literacy and numeracy tests, teacher performance assessments and ongoing professional learning requirements.

Consistent with Recommendation 2.2 of NSW's Productivity Commission White Paper 2021, there is also room to test alternative ITE pathway designs, with appropriate monitoring and evaluation. AITSL (2022b) has suggested a residency- or internship-based model would allow graduates to meet the national teaching standards while removing or lowering the barriers to entry. They also note the benefit of greater engagement with employers in providing input to ITE programs. The National Catholic Education Commission (2022) likewise supports further consideration of a one-year model focused on the 'craft' of teaching, and recognise that 'some level' of on-the-job training could occur in the initial years of a teacher's career.

Relatedly it is clear that there is concern about graduate teacher preparedness, as well as out of field teaching. There is also an opportunity to improve the support given to graduate teachers and out of field teachers, regardless of which pathway they take into teaching. This could include lesson plans and coaching by highly skilled teachers. This is consistent with other *White Paper* recommendations, including 2.5: *Create a Centre for Teaching Excellence*.

*Recommendation:*

- *Reduce the minimum duration for postgraduate ITE programs to one-year full-time study.*
- *That the NSW Department of Education and Training investigate opportunities to provide additional resources to graduate teachers and out-of-field teachers.*

## **Recommendation 2: Undertake additional research to determine best practice content, length, and structure for ITE**

Alongside the reintroduced one-year pathway, there is a need to take a more rigorous, evidence-based approach to designing ITE programs (and the teaching standards they need to meet). By far the biggest challenge in evaluating the increased postgraduate ITE requirements was the availability of information, in particular: information on objectives, evidence to support the original decision, a plan to evaluate the policy change.

More than ten years on from the creation of the nationally consistent standards, AITSL has suggested it should review the graduate teacher standards (AITSL, 2022a). This review should consider their appropriateness and relative importance, and identify the most effective way to impart these skills on teaching students.

To determine the best way to configure ITE to improve the performance of new teachers, further research should also take into account:

- The effectiveness of early and mid-career professional support and development in NSW and any improvements to better support new teachers.
- What the right structure and mix of on-the-job and early career experience looks like, and how it should relate to ITE, teaching standards, and accreditation. In doing so, it should also consider best practice models of early career support, mentoring, career progression and professional development.
- Other ways of delivering ITE beyond returning to the graduate diploma. This report focuses on the impacts from moving from a single-year graduate diploma to two years Master of Teaching. Additional research to determine the best way of configuring ITE should include all



feasible options, including making ITE shorter than a year, making ITE voluntary, or introducing vocational or apprenticeship models alongside university delivered ITE.

There may also be room to use existing evidence to improve existing ITE courses, whose structure and outcomes vary markedly between providers (ref to QITE Review). Program providers are required by the national standards to clearly define outcomes (Standard 1), and to regularly evaluate the courses and provide evidence of graduate outcomes, among other things, to teacher regulatory authorities (TRAs; Standard 6). The disclosure requirements and powers of the TRAs are broad reaching, and, along with broader evaluation (e.g. including principal perspectives) would help to improve teacher preparation and effectiveness.

A move to evidence-based ITE policy will likely depend on the availability of better data on teaching and learning in general. For example, the Australian education system lacks survey data, randomised trials and value-add metrics for Australian classrooms. All of these are standard measures of teacher evaluation that can help to monitor teacher quality and value-add. Their absence limits measurement and hinders the practical usefulness of academic studies of in the domestic context.

*Recommendation:*

- *That AITSL:*
  - *review the national teaching and ITE program standards*
  - *be commissioned to assess variation in ITE provider quality from a range of perspectives, including graduate outcomes, from provider program evaluations and in-depth consultation with universities, schools, and education departments.*
- *That NESA*
  - *undertake random audits to assess NSW ITE programs against their approved accreditation submissions*
  - *every three years, review, and report on progress improving program quality in NSW.*

### **Recommendation 3: Embed regulatory impact assessment and evaluation into education policy, including teaching and program standards**

Evaluation is critical to ensure policies meet their intended outcomes and improve community welfare, and to inform future policy development and implementation. It is far easier to evaluate changes if business cases (or regulatory impact assessments) and post-implementation evaluation plans have been prepared to justify the decisions in advance, and preferably used in policy design. This pre-planning can even identify evidence gaps, and what data need to be collected to understand the policy impacts.

With regulatory policy like standards, it is best practice to do evaluate every five years. These reviews need to be proportionate to the magnitude of the changes in the intervening period, both to the policy itself and the context.

Thorough regulatory impact assessment and evaluation are already NSW Government requirements for any regulatory proposals submitted to Cabinet or Executive Council (Treasury Circular 19-02). NESA should adopt NSW best practice in negotiating policy changes with Commonwealth and other states and territories.

*Recommendation:*

- *Ensure changes to education regulation and policy (including intergovernmental agreements) comply with the NSW Government best practice regulation requirements. Use regular evaluation to refine and improve policy for the benefit of the NSW community.*
- 

## 6.2 ITE is just one piece of the education policy puzzle

This report has focused on one key structural issue that can affect schooling outcomes: the length of the postgraduate ITE. But there are numerous other core issues that merit the consideration of education policymakers. These include:

- the structure of the teaching profession
- pay progression
- performance and development frameworks and practices
- teaching resources
- the efficient use of teachers' time
- best practice teaching methods
- industrial relations.

While ITE is undoubtedly important, a holistic approach to the issues will likely improve student outcomes more effectively than improving ITE in isolation, because the above issues impact teaching quality across the entire workforce, not just new entrants.

Indeed, it is possible that there has been a disproportionate focus on using ITE to drive teaching quality and student outcomes, because ITE is easier to reform than other parts of the education system. ITE reform does not encounter the same industrial relations barriers as other education reforms. Unlike incumbent teachers, the prospective teachers whom ITE reform primarily affects have no professional associations to represent their interests. Many people affected by the last wave of ITE reform did not even realise it would affect them, because they had not yet decided to undertake ITE.

If there has been a historical overemphasis on ITE reform, this report should serve as a corrective. It demonstrates there are limits to what ITE reform can achieve, and that an overemphasis on ITE has had unintended consequences.

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## Appendix A: ITE is currently regulated by state bodies

In NSW, ITE is accredited by NESA under the *Education Standards Authority Act 2013 (NESA Act)*, ensuring graduating teachers meet the required *Accreditation Standards and Procedures*.<sup>39</sup> This process maintains a standard of ITE courses, aims to make universities accountable for the ITE courses they provide, and ensures all teachers graduating meet the professional knowledge, professional practice, and professional engagement required to become a teacher.

NESA was established in 2017 to replace the Board of Studies, Teaching and Educational Standards NSW (BOSTES).<sup>40</sup> This followed a review of BOSTES in 2016, which sought to ensure the education standards body could best serve the NSW community by setting high and consistent education standards, including a quality teacher workforce. The review identified a need for clarity of regulatory roles and responsibilities of BOSTES and for it to adopt more strategic goals.

The modifications to BOSTES came from the BOSTES Review and other reforms in NSW aimed at improving teacher quality, such as minimum admission requirements for teaching degrees. Some of the responsibilities of the then-BOSTES and now NESA was the endorsement of teachers' professional learning, the accreditation of initial teacher education degrees, the accreditation of teachers, and establishing professional teaching standards.

Since 1 January 2017, NESA has had the regulatory function of approving ITE programs under the NESA Act. ITE program approval is delegated to NESA's regulatory committee, the Initial Teacher Education Committee (ITEC). Prior to the establishment of NESA, the NSW Minister for Education approved programs based on ITEC's advice. ITE programs are accredited by NESA according to AITSL's national *Accreditation Standards and Procedures* as well as additional NSW-specific requirements. This involves a comprehensive examination of a course's design, content, assessment, and practicum components. Course accreditation lasts for up to five years, and accredited programs are included on the NSW list of accredited teaching programs managed by NESA.<sup>41</sup>

The NESA Act sets out the principal objectives of NESA. These are to:

- provide strategic leadership in improving standards of school education
- promote an evidence-based approach in improving standards of school education
- ensure that the quality of teaching, school curriculum, forms of assessment and regulatory standards under the NSW education and teaching legislation are developed, applied, and monitored in a way that improves student learning while maintaining flexibility across the entire school education and teaching sector.

NESA has functions under the education and teaching legislation for:

- the accreditation of teachers

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<sup>39</sup> NESA is part of a national system of initial teacher education program accreditation and works with the AITSL.

<sup>40</sup> BOSTES was formed from the merger of the Board of Studies and the NSW Institute of Teachers in 2014 with the responsibility for the school curriculum, the HSC and teaching and regulatory standards in NSW schools.

<sup>41</sup> For a more comprehensive explanation of the actual criteria and documentation required for new or amended programs accreditation requirements see <https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/teaching-qualifications/initial-teacher-education-providers/get-a-program-accredited>

- the monitoring of the accreditation process
- the approval of initial and continuing teacher education courses that are relevant to the accreditation of teachers
- the development, content, and application of professional teaching standards
- the school curriculum for primary and secondary school students
- basic skills testing
- the granting of Records of School Achievement and Higher School Certificates
- the registration and accreditation of schools
- the approval of providers of courses at schools to overseas students.

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## Appendix B: Impacts on student achievement

### **Out-of-school factors are important for student achievement**

We know that many factors affect student performance. Among them are socioeconomic status, family characteristics, and parental involvement. In the US, a landmark report by sociologist James Coleman found that familial and socioeconomic factors had the most impact on US student learning outside of the classroom (Coleman, 1968). The finding on the importance of family and background factors has been broadly supported since Coleman's report.

In Australia, the Longitudinal Study of Australian Children found that children living in poverty were likely to be more than a third of a school year behind their peers by Year 3. It also found that lower levels of family cohesion and school attendance had negative effects on NAPLAN scores. A vast body of literature shows that from the very beginning of schooling through to early adulthood, more advantaged students tend to perform better in school than disadvantaged peers (Victoria University, 2020). Within Australia, disadvantaged students are less likely to attend preschool, finish secondary school, gain a post-school qualification and are less likely to be developmentally ready for primary school (Victoria University, 2020).

Strong parental engagement in student learning has also been shown to have positive effects on student mathematics scores. The numerous forms this can take, however, makes identifying the impacts of specific approaches difficult (Sheldon & Epstein, 2005; Emerson et al., 2012).

Student personality has also been found to influence academic outcomes, with conscientiousness being the strongest predictor (Nofhle and Robins, 2007).

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## Appendix C: Sensitivity analysis of ITE completions

In **Section 4** the Commission provide estimates of the number of ITE completions based on projections of pre and post 2014 trends. Had the ITE remained as a one-year graduate diploma we could expect an additional 9,400 ITE completions over the 2015 to 2022 period.

Sensitivity testing helps us identify how much other factors could have contributed to the fall in ITE completions that NSW saw following the policy change requiring a two-year Master of Teaching. Some factors that could have caused the fall, besides the master's, include:

- A possible bring forward in Postgraduate ITE completions prior to 2014 which led to a bigger post-2014 reduction in postgraduate ITE completions than the master's alone
- A possible general fall in the appeal of teaching careers relative to other careers at around the same time as the master's requirement was introduced, meaning the post-2014 fall in ITE completions is not attributable to the requirement alone.

The sensitivity analysis demonstrates that the estimated 9,400 loss of potential teachers is a conservative estimate that is not sensitive to changes in key assumptions including: changes in trend estimates used to estimate the number of ITE completions without any policy change (One-year ITE Scenario) or a decline in the broader appeal of teaching.

### **2011 policy announcement did not lead to a bring forward effect from 2014 policy change**

To determine if there is a 'bring-forward' effect which would lead to an overestimate of the reduction in the number of post-2014 ITE completions post 2014 from the policy change, different scenarios were developed (see Box 3).

The scenario modelling demonstrates that the estimated reduction in the number of teachers from the 2014 Lengthening ITE Scenario (9,400 fewer teaching candidates) does not display a bring forward impact on ITE completions from announcing in 2011 the lengthening of ITE.

### Box 3: Sensitivity analysis – ITE completions under different 2014 ITE policy scenarios in NSW (2015-2022)

To test the veracity of the estimated reduction in ITE completions due to the 2014 policy change, three different scenarios were developed:

#### Lengthening ITE Scenario

This scenario shows that 18,467 people completed the two-year Master of Teaching degree in NSW between 2015 and 2022.

#### One-year ITE Scenario

This scenario estimates that 27,867 people would have completed the one-year graduate diploma of education between 2015 and 2022, based upon the trend in ITE completions prior to 2014 when the ITE requirement was lengthened.

#### One-year ITE Scenario, (based upon ITE completions trend prior to 2011)

This scenario estimates that 29,299 people would have completed the one-year graduate diplomat of education between 2015 and 2022, based upon the trend of ITE completions prior to the announcement of the introduction of the two-year Master of Teaching degree in 2011.

#### The number of postgraduate ITE completions under each scenario

ITE scenarios	Completions (2015-2022)	Difference in ITE completions due to 2014 policy change
Lengthening ITE Scenario	18,467	
One-year ITE Scenario	27,867	-9,400
One-year ITE Scenario (based upon ITE completions trend prior to 2011)	29,299	-10,832

Source: AITSL, NSW Treasury PC

## Other jurisdictions recorded large declines in completions after lengthening ITE

Both Queensland and Western Australia offered the last intake for one-year ITE in 2017. Whereas Victoria no longer offered the graduate diploma in 2016.<sup>42</sup>

Figure 17 displays the trend in ITE completions by state. ITE completions in NSW, Queensland and Western Australia all peaked in the final intake of their one-year ITE. In the year following the lengthening ITE requirement, both Queensland and Western Australia have seen a decline in ITE commencements and completions supporting the theory that lengthening ITE has become a barrier to entry and decreased the number of ITE completions.

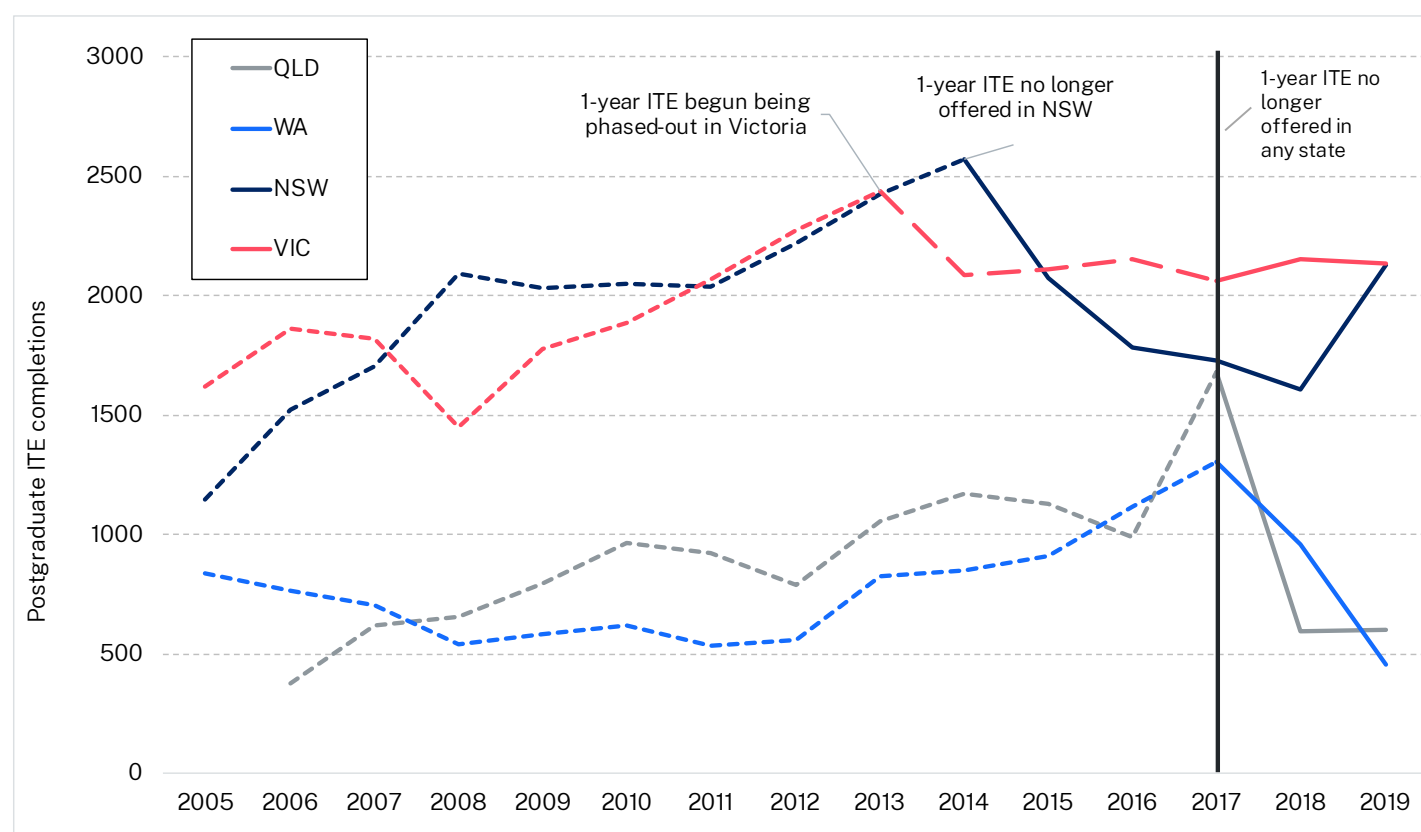
<sup>42</sup> In this analysis we look at the states that have the largest number of ITE completions. In Victoria, as part of the transition from the state-based accreditation system to the nationally agreed system, some one-year ITE awards remained until 2015, at which point all submissions from accreditation of ITE programs needed to meet the minimum two-year equivalent study requirement.

Victoria has recorded a slight decline in ITE completion since ITE was lengthened to two years. However, the decline is not comparable to the declines recorded in NSW, Queensland and Western Australia which occurred as soon as two-year ITE was mandated. Victoria's downwards trend began earlier to the mandatory change and coincided with Victorian universities gradually phasing out the one-year graduate diploma. In Victoria, some one-year ITE programs remained until 2015.

Given other states have recorded declines since the introduction of mandatory two-year ITE we believe our theory holds that the lengthening of ITE has been a barrier to entry leading to lower numbers of ITE completion.

Figure 17: Other states show a similar trend in postgraduate ITE completion to NSW

Total completions in postgraduate initial teacher education, by state, 2005–2019



Note: States and territories with less than 500 students completing ITE per year have been removed. The implementation of the two-year ITE varies state-by-state. We have used information available to determine when each state implemented the change (Cervini, 2016; Cook, 2017; The University of Queensland, Australia, 2018).

Source: AITSL, NSW Productivity Commission

## Smoothing out the fluctuations in NSW postgraduate ITE

Postgraduate ITE completions more than doubled between 2005 and 2014, increasing from 1145 completions to 2574. Using our projections (Figure 12) we estimate ITE completions would have increased an additional 41 per cent from 2014 to total 3621 completions.

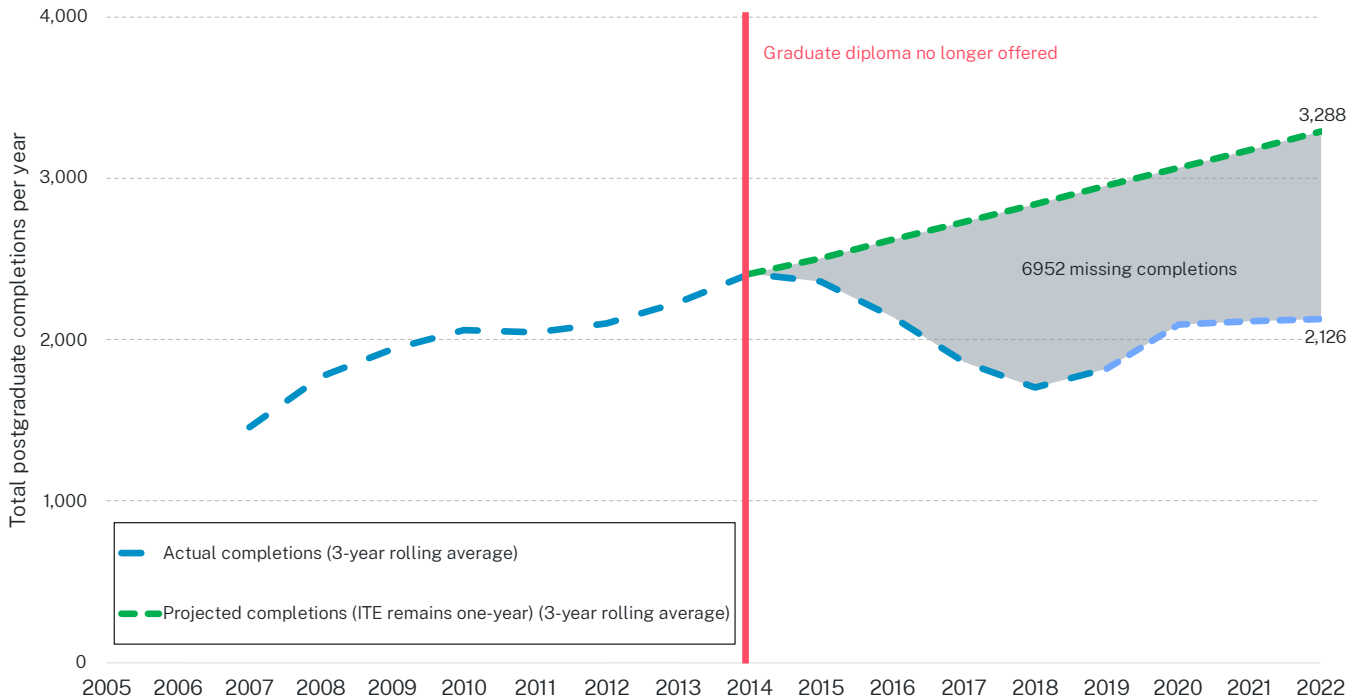
There are fluctuations in the number of completions year-to-year between 2005 and 2014 as shown in Figure 12. We use a simple moving three-year average to address these fluctuations and 'smooth out' the trend. The moving average with address the short-term fluctuations in the number of ITE completions. When accounting for the short-term fluctuations, ITE completions would have been around 7000 completions higher between 2015 and 2022 had ITE remained one-year (Figure 18).



This is an increase of 37 per cent from 2014.<sup>43</sup> As this is very similar to our central estimate (a 41 per cent increase), we do not believe short-term fluctuations drive our central estimates.

Figure 18: ITE completions would remain substantially higher even when addressing short-term fluctuations

Trend in postgraduate ITE completions, simple 3-year moving average, NSW, 2005–2022



Source: AITSL, NSW Productivity Commission

## Undergraduate ITE follows a different trend to postgraduate ITE

The fact that NSW has experienced a simultaneous decline in undergraduate and postgraduate ITE completions since 2014 could indicate that the decline in postgraduate ITE completions is attributable to the lower appeal of teaching within the broader community.

Rather than a result of the 2014 ITE policy changes. To test this, we have reviewed the trend in undergraduate ITE completions in NSW and in other jurisdictions over the same 2014-2022 period.

We examine undergraduate ITE completions to test whether the decline in postgraduate ITE completion could instead be explained by the lower appeal of teaching within the broader community.

Figure 19 displays the trend in NSW ITE completions for both undergraduate and postgraduate programs. Despite the decline in both NSW undergraduate and postgraduate ITE completions, there are differences in the trends, undergraduate ITE completions:

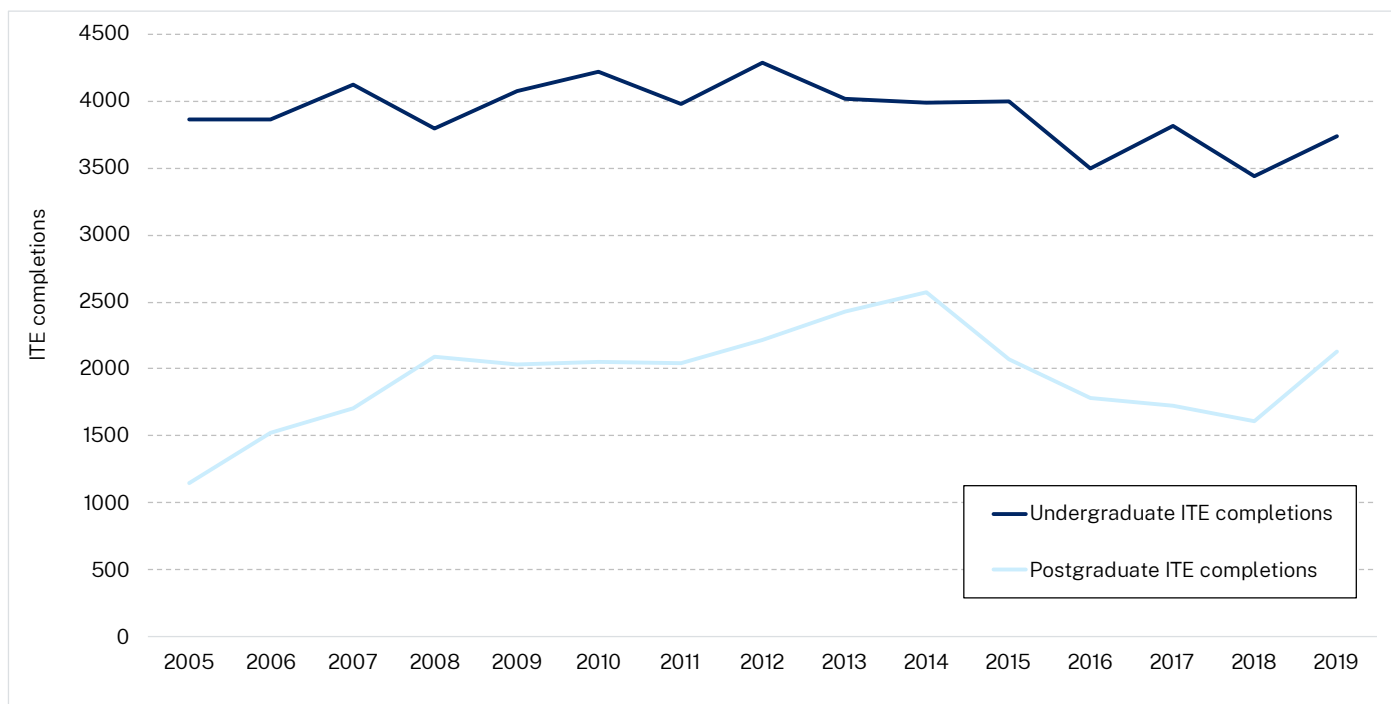
- began a slight downwards trend in 2012, two years prior to the drop in postgraduate ITE completions (while postgraduate completions kept increasing until 2014).
- have shown relatively less volatility between high and low points.

<sup>43</sup> Using the rolling average, the number of ITE completions in 2014 is 2407.

This indicates that the decline in undergraduate ITE completions is not simply mirroring the decline in undergraduate ITE completions.

Figure 19: Postgraduate ITE completions has followed a different trend compared to undergraduate ITE completions

Total completions in initial teacher education, NSW, 2005–2019

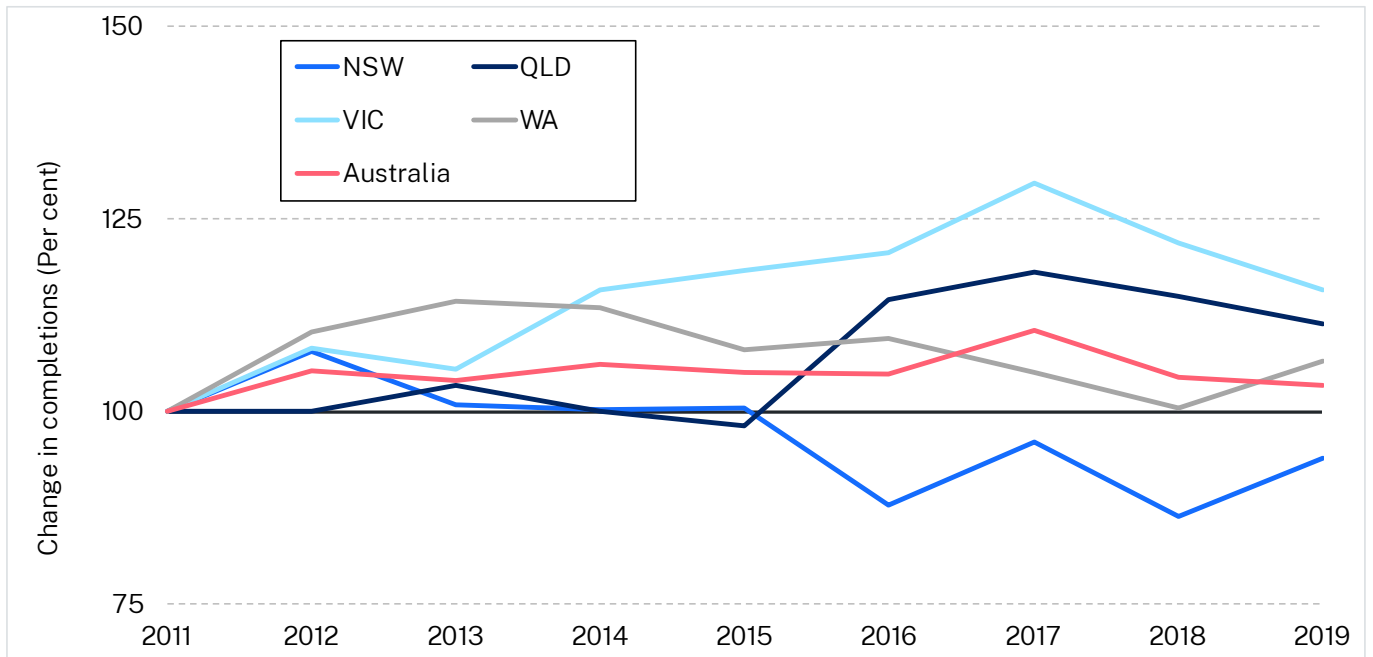


Source: AITSL

Figure 20 shows the trend in undergraduate ITE completions across Australian states. When examining other states, we observe that their postgraduate ITE completions have declined yet their undergraduate completions have increased over the same period. Queensland, Victoria, and Western Australia have all recorded increases in the number of undergraduate ITE completions since the postgraduate ITE policy change (*Accreditation Standards and Procedures*) was introduced in 2011, reinforcing that the decline in postgraduate ITE completions may be influenced by the lengthening of ITE rather than a general fall in the appeal of teaching careers.

Figure 20: Only NSW has recorded a decline in undergraduate ITE completions

Trend in undergraduate education degree completions, (2011=1), by state, 2011–2019



Source: AITSL, NSW Productivity Commission

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## Appendix D: Calculating the improvement in student achievement and the impact on students' lifetime incomes

### Assumptions

Currently there is a shortage of subject-qualified teachers in the critical subject areas of STEM. As a result, a sizeable number of students are being taught these subjects by non-specialist teachers. There is evidence that this has a detrimental impact on teaching quality, and hence student outcomes, in these key areas. The extent of the teacher shortage ranges depending on the estimate, year level and subject. This is further discussed in **Section 4**.

We assume all students completing HSC between 2015 and 2022 would have achieved higher student achievement under the **One-year ITE Scenario**. This is due to:

- an increased supply of teachers, especially those with subject-specific knowledge.
- increased years of experience of teachers (by one year)

In the **One-year ITE Scenario**, we apply an increase in lifetime earnings due to the impact of the three reasons listed. We have reviewed the literature and found students taught by teachers with specialist subject teacher training achieve higher grades than students without. More details on studies regarding the relationship between lifetime earnings and student achievement are shown in **Section 3**. These research papers indicate that a one standard deviation increase in test scores may result in an increase in lifetime earnings between 7.5 to 14 per cent.

Over 109,000 students are being taught by out-of-field teachers in NSW secondary schools (NSW Department of Education, 2020). In 2021, 535,000 students were in NSW secondary schools (ABS, 2022). Therefore, one in five students are being taught by an out-of-subject teacher at just the secondary school level.

The 2019 Trends in International Mathematics and Science Study (TIMSS) assesses maths and science for high school students. The results of TIMSS shows a large achievement difference between students taught by expert in-subject teachers and students taught by out-of-field teachers.

TIMSS summarises achievement on the test on a scale with a mean of 500 and standard deviation of 100. Students with expert teachers in maths, with specialist teacher training, scored significantly higher in maths in the TIMSS test than any other group scoring 531.

Students taught by teachers with neither the subject-matter knowledge nor the pedagogical knowledge in scored 501 (ACER, 2021).

A difference of 30 points between in-field and out-field teacher on TIMSS results. Given that one SD on the TIMSS is 100 points, for simplicity 30 additional points is equivalent to 0.3 of a SD. In US studies, 0.25 standard deviations are equal to nine months of schooling. The rule is one SD is equal to 36 months of schooling (T. Kane and Staiger, 2012; Cremata *et al.*, 2013).<sup>44</sup>

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<sup>44</sup>  $36\text{months} \times 0.25 \text{ SD} = 9 \text{ months}$ .

Ensuring all students have an in-subject teacher we assume an increase in grades equivalent to 0.3 of a SD. To apply this to the wage increase we take 0.3 of the lifetime income increase. This is 2.25 to 4.2 per cent increase in lifetime earnings (that is 0.3 of 7.5 to 14 per cent).

Under the **One-year ITE Scenario** we assume one in five of all HSC completions between 2015 and 2021 would have recorded an improvement in student achievement driven by in-subject specialist teachers.<sup>45</sup> We use 1/5<sup>th</sup> of students as they will be the students that benefit from being taught by in-subject teachers. To these students we apply a 2.25 per cent increase in lifetime incomes.

It is plausible that under the **One-year ITE Scenario** later cohorts of HSC completers will experience higher levels of student achievement relative to earlier cohorts due to the compounding impacts of having additional access to qualified teachers and teachers with more years of on-the-job experience for a larger number of schooling years. For simplicity we assume the increase in lifetime earnings is constant across all years of the analysis.

Secondly, we only apply the increase in students' lifetime incomes to a proportion of students who complete HSC. A secondary school student who leaves school before completing HSC is assumed to not receive the benefit of higher lifetime earnings although they may experience better access to qualified and experienced teachers under the **One-year ITE Scenario**. An example would be a student who unenrolls in secondary school and leaves in Year 10 in 2017. We assume that this student would have more exposure to qualified and experienced teachers under the **One-year ITE Scenario**, and therefore higher student achievement and higher lifetime income. However, for simplicity and to produce a more conservative estimate, we only include students that successfully complete HSC between 2015 and 2021 in the analysis.

## Increase in lifetime earnings calculation

This increase in productivity/earnings uses the wage increase provided in the framework for non-capital education initiatives by DoE (NSW Department of Education, 2022a). The average value for the present value of lifetime wages can be calculated as follows:

$$= \gamma + \gamma * \frac{1 - \frac{1}{(1 + \delta)^{\tau-1}}}{\delta}$$

Where  $\gamma$  is the average annual earnings

Where  $\delta$  is the discount rate

Where  $\tau$  is the working life

Within our model we use the May-2015 earnings data from the average weekly full-time earnings for NSW is \$1,512.10. This equates to an annual salary of \$78,629.20. This assumes a 40-year working life and a discount rate of 7%.

$$\begin{aligned} PV \text{ of lifetime income} &= 78,629.20 + 78,629.20 * \frac{1 - \frac{1}{(1 + 0.07)^{39}}}{0.07} \\ &= \$1,048,261.60 \end{aligned}$$

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<sup>45</sup> A previous study found students with access to subject-specialist teachers achieved higher grades relative to students without teachers who have subject specialisation. We also know students with higher academic results in school earn a higher lifetime salary.

Based on the calculation, the average full-time lifetime earnings for an NSW citizen is \$1,048,261.60.

Assuming the intervention has a 0.3 standard deviation increases in test scores resulting in an increase lifetime earnings by 2.25 per cent. The average value for the present value of lifetime wages can be calculated as follows:

Applying our numbers

$$PV \text{ of lifetime income} = \left( 78,629.20 + 78,629.20 * \frac{1 - \frac{1}{(1 + 0.07)^{39}}}{0.07} \right) * (1 + 2.25\%)$$
$$PV \text{ of lifetime income} = \$1,071,847.49$$

The incremental benefit is the difference between the two values. Based on the calculations the increase in the average full-time lifetime earnings is \$23,585.89.<sup>46</sup>

To determine NSW students' increase in lifetime incomes we multiply the difference between the lifetime earnings and the higher lifetime earnings by the number of students completing school. We take 1/5<sup>th</sup> of students completing HSC as current estimates suggest one in five students are being taught by an out-of-subject teacher. We therefore assume that under the **One-year ITE Scenario** the one in five students that currently are being taught by an out-of-subject teacher receive an in-subject high-performing teacher.

For each cohort of HSC finishers, we apply an increase in students' lifetime incomes to 1/5<sup>th</sup> of the students. Each student receives an additional lifetime salary equivalent to 2.25 per cent per year. The benefit is discounted at a 7 per cent discount rate for each year from 2015 to 2022.

## Underestimating the impact of changes to ITE

This approach to take 1/5<sup>th</sup> of each HSC cohort and increase their lifetime income by 2.25 per cent may underestimate the actual lifetime gains. This is because we are not accounting for the effects of having:

- additional teachers on reduced class sizes
- additional support, less administrative tasks
- the additional year of experience a teacher gains under the **One-year ITE Scenario**
- We use the lower end of the DoE (2022) estimate.
- spillover effects from raising the achievement of all students, which then benefits all HSC students.

As these are difficult to determine in the **One-year ITE Scenario**, we follow best practice CBA and take a more conservative approach using the available literature. We also apply sensitivity testing to check the robustness of the results.

Table 6 shows studies examining the impact on students' lifetime earnings from higher academic achievement. NSW Department of Education (2021b) and NSW Department of Education (2022a)

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<sup>46</sup> This is in 2015 prices.

find a one standard deviation increase in academic achievement to be associated with a 7.5 to 14 per cent increase in lifetime earnings.

Table 6: Improvements in lifetime earnings from improved student academic achievement

Outcome	Parameter	Quantity and units	Sources
Improved test scores	One standard deviation increase in test scores	14% increase in lifetime earnings	Hanushek & Woessmann (2012)
	One unit increase in high school GPA	12%-14% increase in lifetime earnings	French et al. (2010)
	One standard deviation increase in average test scores	7.5% higher lifetime earnings for women	Rose (2006)
	One standard deviation increase in test scores	8% increase in lifetime earnings	Kruger (2003)
	Shift from lowest academic achievement quintile to top two quintiles	9% increase in chance of being employed above minimum wage	NSW Department of Education (2022a)
	One standard deviation increase in class quality (covering a wide range of influences)	9.6% increase in earnings at age 27	Chetty et al. (2010)
	One standard deviation increase in test scores	7.5% increase in lifetime earnings	Hanushek & Woessmann (2011)
	An additional year of schooling	10% increase in lifetime earnings	Leigh and Ryan (2005)
	An additional year of schooling	8% to 10% increase in lifetime earnings	Jensen (2010)

Source: NSW Department of Education (2022a), NSW Department of Education (2021b), NSW Productivity Commission

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## Appendix E: Summary of CBA central estimate assumptions and parameters

This appendix summarises the assumptions made and parameters used for the Cost Benefit Analysis in Section 5.

### Assumptions underlying CBA

To model the postgraduate ITE policy change in the CBA we assume:

#### *'Empirical literature indicates master's degrees don't promote student academic achievement'*

We assume the additional year of study undertaken by a teacher in training doing a two-year Master of Education rather than a one-year graduate diploma has no effect on student academic achievement. The empirical literature discussed in **Section 3** indicates that such an increase in teachers' qualifications does not increase student performance. We acknowledge that policymakers likely made the opposite assumption when ITE was lengthened to two years.

#### *'A teacher's on-the-job experience matters, especially in the earlier years'*

We assume the extra year of study between a one-year graduate diploma and a two-year Master of Teaching delays the employment of new teachers by one year. The empirical evidence, discussed in **Section 3**, indicates that when a teacher has more years of experience, this has a positive impact on student achievement, especially in the earlier years of a teacher's career. In other words, a teacher with one year of experience is much better than a teacher with no experience, while a teacher with 11 years of experience is marginally better than a teacher with 10 years of experience. Therefore, we assume that a teacher who has an additional year of experience will impart higher academic results to students. For this reason, student achievement will improve under the One-year ITE Scenario.

#### *'Higher barriers to entry deter aspiring teachers'*

Increasing the time requirement to complete postgraduate ITE acts as a barrier that restricts the supply of teachers. The trend analysis in **Section 4** shows that increasing ITE length coincided with a substantial reduction in ITE enrolments and completions. Therefore the One-year ITE Scenario thus assumes more people would have enrolled in and completed ITE, and commenced employment as teachers. As a consequence, there are more teachers, a lower student-teacher ratio, a reduced teacher shortage and fewer out-of-field teachers assumed under the One-year ITE Scenario. The net results of these impacts are benefits to school students and an improvement in student academic achievement.

#### *'More exposure to experienced, in-field teachers creates lifetime gains for students'*

Currently there is a shortage of subject-qualified teachers in the critical STEM subject areas of maths, science and technological and applied studies (TAS). As a result, a sizeable number of students are being taught these subjects by non-specialist teachers. There is evidence that this will have a detrimental impact on teaching quality, and hence student outcomes, in these key areas. The extent of the teacher shortage ranges depending on the estimate, year level and subject. This is discussed in **Section 4**.

#### *'Streamlined courses and employment-based pathways are out of scope'*

To ensure a fair, 'apples for apples' comparison in the CBA, we exclude streamlined pathways and condensed courses from the analysis and focus on comparing the standard mode of course delivery



in both scenarios. Many universities now offer alternatives to the traditional two-year ITE master's degree.

While accelerated delivery has strong potential to reduce the barriers created by a two-year master's degree, the same methods could equally be used to accelerate a one-year pathway. A fair comparison of one- and two-year pathways requires comparing similar modes of delivery.

*'When ITE is shorter, content is prioritised by importance'*

In the One-year ITE Scenario, ITE students complete a one-year graduate diploma instead of a two-year master's, and hence receive less university instruction. We assume that universities deliver similar course content in the single-year qualification, and prioritise content that is the most essential. A change in the length of qualification does not equate to a change in quality.

*'Shorter ITE will not impact the structure of university departments'*

We assume that administration and facilities of universities are identical in both scenarios. We also assume that there are no differences in how the university is run. This means that in both scenarios, universities have identical facilities and university workforce composition. In other words, all teachers of ITE courses would be employed under both scenarios. In reality, there would have been transitional costs to introduce the two-year ITE from the previous one-year which have not been accounted for. The only change that affects universities is the change in university tuition for those who enrol in ITE between the scenarios.

## **Central estimate parameters**

This section describes the variables behind each cost and benefit. Table 7 includes these key assumptions used to calculate to central estimate costs and benefits. The remainder of the section provides more details on the parameters used.

Table 7: Central case estimates used for cost-benefit analysis

Items	Central case assumption
<b>Impact on prospective teacher incomes</b>	
Resource cost (university tuition)	\$29,000
Annual salary	Band 1 teaching salaries (\$73,737 in 2022)
Reservation wage	\$28,000 in 2016 – adjust for consumer price index in other years
<b>Impact on student educational outcomes and incomes</b>	
Average annual salary	\$78,629
Additional Wage growth	2.25 per cent
Students impacted	HSC completions between 2015 and 2021
Number of students	One in five
<b>Impact on ITE candidate welfare for forgoing qualification</b>	
Average annual salary	\$73,737
One year's tuition	\$4,000
Students impacted	9,400 fewer candidates
<b>General central case assumptions</b>	
Discount rate	7 per cent

### Assumptions on prospective teacher incomes

An ITE candidate that successfully commences a position as a teacher begins earning a salary in the year following ITE completion.

In both scenarios, ITE candidate students are assumed to earn a salary while studying ITE. While studying, university students earn far less compared to graduate teachers. There are a few options for estimating the reservation wage which include:

- Estimating the weighted average of student earning from Australian Bureau of Statistics (ABS) data – this is \$28,000 per annum.
- Adopting the Austudy maximum payment - this is \$13,790 per annum for a single person with no children.

### Impact on student educational outcomes and incomes

Under the One-year ITE Scenario we assume students completing HSC between 2015 and 2022 would have recorded higher student achievement under the One-year ITE Scenario. This is due to:

- an increased supply of teachers (see **Section 4**)
- more years of experience gained by teachers as they graduate from ITE sooner and gain an additional year of experience (see **Section 4**)
- an increased number of teachers with subject-specific knowledge (see **Section 4**).

The NSW Department of Education (2021b) and NSW Department of Education (2022) provide a review of the literature on student achievement and lifetime incomes - see Appendix D.

The original average lifetime wage before an 'education' intervention is calculated using the ABS data series, Average Weekly Earnings (NSW Department of Education, 2022a). Under both

scenarios, the same number of students – approximately 550,000 students - are assumed to complete the HSC in NSW between 2015 and 2022.

We assume that all students that complete HSC in a given year between 2015 and 2021 will commence employment in the following year. Therefore the benefit accrues in the year post completion of HSC. The annual lifetime salary is set to \$78,629.10.

DoE estimates suggest as many as 109,000 secondary students, or one in five, are being taught by out-of-subject teachers (NSW Department of Education, 2020). Under the One-year Scenario, we assume one in five of all HSC completions between 2015 and 2021 would have recorded an improvement in student achievement driven by more in-subject specialist teachers.

### **Impact on ITE candidate welfare for forgoing qualification**

As previously discussed, ‘deterred’ teachers would receive positive welfare benefits studying to become a teacher (in the base case). We use the ‘rule of half’ to quantify the aggregate welfare loss on the 9,400 ‘deterred’ candidates. We assume a graduate teacher’s salary and a year of full-paying university tuition for a Master of Teaching.

### **Transfers in the CBA**

Transfer payments are financial transfers between groups that do not involve the use of economic resources. These payments are excluded from a CBA because they have no impact on net benefits of the policy, as the benefits to one group are offset by costs to other groups. They are however relevant to the analysis of the distributional impacts on various cohorts affected by the change.

An example of a transfer from lengthening the ITE pathway is the additional university fees incurred by prospective candidates compared to the base case where they would only have to incur one year of fees.

### **Tuition fees**

A postgraduate Master of Teaching degree student undertaking an equivalent full-time study load incurs an average tuition cost between \$4,000 to \$30,000 per annum in 2022.<sup>47</sup> This cost captures the student contribution to the overall qualification price of postgraduate ITE courses. While an ITE candidate will incur this fee, the university will receive the fee.

Longer ITE represents a higher cost to ITE candidates as they are required to pay an additional year of tuition. However universities benefit from the additional year of tuition.

For reasons of simplicity, we assume all students incur the highest possible student fee for a given qualification and pay the fee on the first day of training. Such an outcome is unlikely, given many students receive Commonwealth supported places (CSPs) and most defer fees. We consider our assumptions produce a conservative estimate of the maximum possible cost to ITE candidates and is therefore appropriate.

Had ITE remained a one-year course, we estimate more candidates would have commenced postgraduate ITE, which would have a commensurate cost.

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<sup>47</sup> Universities charge different tuition fees for postgraduate ITE

Under the One-year ITE Scenario we would expect the fees per student to decrease due to the shorter qualification, however, we also expect the number of students to increase partially offsetting one another.

## CBA results from lengthening ITE on a yearly basis

As shown in **Section 5**, the lengthening of ITE has come at a substantial cost to NSW. We estimate lengthening postgraduate ITE has had a net present value of -\$3.3 billion. This clearly indicates that lengthening of ITE to two years has represented a net cost to NSW. An annual breakdown of the net results is presented in Table 8.

Table 8: The impact of lengthening ITE to two years, CBA results (\$m)

	2015	2016	2017	2018	2019	2020	2021	2022
Net NSW teaching candidates	-157.3	-155.4	-157.5	-179.2	-197.4	-206.1	-214.9	-148.4
Net NSW students' lifetime incomes	0.0	-397.1	-397.1	-397.1	-397.1	-397.1	-397.1	-397.1
<b>Total</b>	<b>-157.3</b>	<b>-552.5</b>	<b>-554.5</b>	<b>-576.3</b>	<b>-594.4</b>	<b>-603.2</b>	<b>-612.0</b>	<b>-545.5</b>
<b>Present value of total costs</b>	<b>-3,259.5</b>							

Source: NSW Productivity Commission

## Appendix F: CBA sensitivity analysis

Sensitivity testing is applied to explore the extent to which the central estimates of the analysis vary with key inputs and parameters.

Sensitivity analysis was conducted for all assumptions in the analysis such as:

- the estimated number of ‘deterred teachers’ - additional students who would have completed ITE under the One-Year Scenario (base case) but did not under the Lengthened ITE Scenario
- the number of NSW school students that see lifetime salary increase,
- the increases in students’ lifetime incomes
- the discount rate
- the annual tuition fees.

The below tables display the actual value, the sensitivity analysis value and the sensitivity analysis NPV. Note each assumption is tested independently of the other assumptions. In other words, the sensitivity analysis only changes one variable at a time and hold all other assumptions constant.

### ITE candidate parameters

From Table 9 we see the NPV remains clearly below negative for all assumptions tested in relation to the ITE candidate. For example, in the central estimate we assume an additional 9,400 ITE completions in the **One-year ITE Scenario**. This increases the number of additional teachers earning a salary. To test this assumption of additional candidates we halve the number of additional ITE completions in each year. This results in an additional 4700 completions between 2015 and 2022 rather than 9,400.<sup>48</sup> Holding all other assumptions constant and halving the number of ITE candidates, the NPV is -\$3.2 billion. This indicates that the model is not sensitive to halving the number of teaching candidates.

As demonstrated by the results in Table 10, the central estimates are not particularly sensitive to our assumptions surrounding the ITE candidate. The findings that the lengthening to a two-year master’s requirement for aspiring teachers reduced community welfare are robust.

Table 9: ITE candidate factors sensitivity analysis

Cost/Benefit	Actual value	Sensitivity value	Source	Sensitivity NPV (\$millions)
Incremental ITE completions	9,400	4,700	Authors’ calculation	-\$3.166.1
Reservation wage	\$28,000	\$13,790	AUSTUDY	-\$3,536.5
University fees	\$4,000	\$29,000	Non-subsidised place	-\$3,365.5

Source: NSW Productivity Commission

The benefits forgone from an increase in students’ lifetime incomes represent the most significant cost in the model. Under all assumptions tested, the NPV remains clearly negative for all assumptions tested in Table 10.

<sup>48</sup> See Figure 12 in **Section 4** for more details on the 9,400 candidates.

The impact of lengthening ITE to two years on students' lifetime incomes is tested by varying:

- the number of students that will see an increase in students' lifetime incomes
- the average annual salary
- the percentage increase in students' lifetime incomes
- the percentage of students that receive an increase in lifetime incomes.

We consider the central estimate is not particularly sensitive to the assumptions chosen. However, given the size of the impact from the forgone increases in students' lifetime incomes, the NPV changes from the central estimate by as much as \$2.1 billion depending on the assumption. It remains negative for all assumptions tested.

We test the impact of altering the number of students completing HSC. The central estimate uses all students completing HSC for a given year. In the sensitivity analysis, we hold all other assumptions constant and include only students at NSW government schools. This has the impact of reducing the number of NSW students that would receive an increase in lifetime incomes had ITE remained one-year.<sup>49</sup> As to be expected this increases the NPV although it remains negative.

The second assumption tested for student lifetime gains is the average annual salary. In the central estimate we use an annual salary of \$78,629.20. For the sensitivity test we reduce it to:

- the average income earned by all adults in NSW regardless of whether they work full-time or not (\$59,935.20 per year)
- the minimum wage which is calculated as \$34,158.80.

Reducing the average annual salary increases the NPV compared to the central estimate. The NPV still remains negative.

Thirdly, we alter the percentage increase in students' lifetime incomes while holding all other assumptions constant. We test the central estimate by changing the percentage increase from 2.25 per cent. We test for:

- a zero per cent increase
- a 4.2 per cent increase.<sup>50</sup>

When the increase in students' lifetime incomes is set to zero, the NPV remains negative.<sup>51</sup> The NPV improves by approximately \$2.1 billion to a NPV of -\$1.1 billion when there is zero increase in

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<sup>49</sup> Note we still use one in five students completing HSC. However, this assumption accounts for one in five government HSC completions.

<sup>50</sup> A 4.2 per cent increase in students' lifetime incomes is the upper limit from the literature for an increase in student achievement and the impact of a student's lifetime income.

<sup>51</sup> Using a zero per cent increase effectively means there is zero benefit or cost on NSW school student lifetime earnings from ITE remaining one year. This is a very strong assumption, not supported in evidence given we would see improvement in school achievement. Nevertheless, we include it to highlight the robustness of our findings.

students' lifetime incomes from additional teachers, more experienced teachers and more in-subject teachers.

When the increase in students' lifetime incomes is set at 4.2 per cent, the NPV becomes -\$5.1 billion indicating a significantly larger cost to NSW.

We also look at the effect of changing the number of students who complete HSC that will receive an increase in lifetime incomes from one in five students to:

- one in ten
- one in three

Using one in ten HSC students improves the NPV to -\$2.2 billion.

When we apply the increase in a students' lifetime income to one-third of HSC completions between 2015 and 2021 the NPV worsens to -\$4.7 billion.

In summary, the central estimate is responsive to changes in lifetime earnings of HSC students however it doesn't change the findings that increasing ITE to two years reduced the welfare to the NSW community. This finding is robust to a range of inputs and assumptions.

Table 10: NSW school students lifetime incomes factors – sensitivity analysis

Cost/benefit	Actual value	Sensitivity value	Source	Sensitivity NPV (\$million)
Number of year 12 completions	All HSC student completions	Only government school pupils	HSC completions from CESE tables	-\$2,355.9
Average annual salary over lifetime	\$78,629.20	\$59,935.2	ABS lifetime earnings data from the average weekly earnings for NSW is \$1,152	-\$2,750.7
Average annual salary over lifetime	\$78,629.20	Minimum wage = \$34,158.8 (\$656.90*52)	ABS	-\$2,049.2
Proportion of students recording an increase in lifetime earnings	1/5 <sup>th</sup> of students that complete HSC	1/10 <sup>th</sup> of students that complete HSC	NSW Department of Education, 2020	-\$2,189.5
Proportion of students recording an increase in lifetime earnings	1/5 <sup>th</sup> of students that complete HSC	1/3 <sup>rd</sup> of students that complete HSC	NSW Department of Education, 2020	-\$4,685.7
Additional wage growth/uplift in lifetime income (higher student achievement)	2.25%	0.0%	DoE (2021;2022)	-\$1,119.6
Additional wage growth/uplift in lifetime income (higher student achievement)	2.25%	4.2%	DoE (2021;2022)	-\$5,114.0

Source: NSW Productivity Commission

It is common to test the central estimate to differing discount rates. The central estimate was tested with discount rates set to:

- three per cent
- five per cent
- ten per cent.

The results of these discount rates are presented in Table 11. We consider the central estimates are not particularly sensitive to the discount rate chosen.



Table 11: Sensitivity analysis of discount rates

Cost/Benefit	Central estimate	Sensitivity value	Source	Sensitivity NPV (\$millions)
Discount rate	7%	3%	NSW Treasury guidelines	-\$4,691.0
Discount rate	7%	5%	NSW Treasury guidelines	-\$3,822.3
Discount rate	7%	10%	NSW Treasury guidelines	-\$2,733.2

Source: NSW Productivity Commission

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For further information or clarification on issues raised in the report, please contact:  
NSW Productivity Commission  
52 Martin Place  
Sydney NSW 2000

GPO Box 5469  
Sydney NSW 2001  
W: [productivity.nsw.gov.au](http://productivity.nsw.gov.au)

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