



PRIMARY SCHOOL EFFICACY - THE BEST LEVER WE HAVE TO IMPROVE THE NATION'S PRODUCTIVITY

SUBMISSION TO THE PRODUCTIVITY COMMISSION
INQUIRY INTO AUSTRALIA'S PRODUCTIVITY
PERFORMANCE

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Overview

Primary Focus argues that primary school efficacy is the best policy lever that Australian State and Federal governments have to improve Australia's productivity performance.

There are lifelong social and productivity benefits from good literacy and numeracy

Concurrent with the decline of productivity growth in Australia is the decline in educational outcomes relative to international standards and our own past performance in primary and secondary school. While correlation is not causation, we argue in this submission that a key driver of national productivity is cognitive capacity of the entire population, that K-12 education is the primary vehicle for a nation to lift its cognitive capacity and that primary school efficacy is necessary for successful high school outcomes at the population level. A strong foundation in reading, writing, spelling, grammar, mathematics and general knowledge are the fundamentals of a productive workforce. We know the capability of the workforce is declining in these domains year on year. This is a profound drag on the nation's productivity performance as it affects every workforce and every industry in this country.

Low efficacy of primary schools leads to serious economic and social costs

Furthermore, for the educationally disadvantaged, poor literacy and numeracy outcomes in the primary school years creates a widening achievement gap that lasts a lifetime and the cost to Australia's economic, social, health and justice systems is enormous.

Even if our primary schools perform at an average rather than excellent level of efficacy, it is still a significant lost opportunity for Australian society and economy. Across the population, the range of vocabulary, reading fluency, the ability to do mental arithmetic and basic mathematical functions are all on a consistent decline compared to peaks in the 1990s. A return to excellence is required.

Sadly, many Australian children, more than one in four (28.4%), receive what can only be described as a poor primary school education¹. The consequence of this is significant. Poor primary school learning outcomes for large percentages of the population. **The staggering fact is that Australia, one of the wealthiest income per capital countries in the world, has an adult population where 44% are not functionally literate and 55% are not functionally numerate².** This vastly diminishes the ability of this large proportion of the population to make a contribution to the modern economy and workplace. This has an irreparable impact on the Australian

¹ Lamb, S, Jackson, J, Walstab, A & Huo, S (2015), Educational opportunity in Australia 2015: Who succeeds and who misses out, Centre for International Research on Education Systems, Victoria University, for the Mitchell Institute, Melbourne: Mitchell Institute.

² In 2012, the OECD Survey of Adult Skills ranked Australia as 5th in literacy, 14th in numeracy and 6th in problem-solving. Since this survey of Adult Skills, primary school outcomes have declined as evident from both PISA and NAPLAN standardised test results.

economy and our productivity. It also has a large impact on other social costs and negative personal experiences. It is humiliating to be illiterate in the modern world. This places a large psychological burden on people who are often already battling. More research needs to be done on the mental health consequences of low literacy and numeracy and the benefits to mental health of programs which tackle poor literacy and numeracy preventatively and early in schools.

How you spend the money on improvement is what counts

Of interest to the Productivity Commission should be that, this decline in literacy and numeracy outcomes in Australia is occurring despite growing government expenditure in education. Real spending on teachers per student increased by 14 per cent from 2010-11 to 2019-20³.

It is time for the nation to recognise that poorly directed additional funding does not improve the education system or the economic and social lives of Australians. The reality is that in the past attempts to improve education have failed to focus on the highest impact strategies.

Most education reform diffuses energy and focus across the whole Kindergarten to year 12 experience without being specific enough about what needs to happen in schools and classrooms in each stage of education. There has not been a Productivity report which has guided States and education systems on where their improvement energy and resources would be best deployed.

It can be done, primary school efficacy can be dramatically improved

The good news is there are now several hundred schools in Australia who are deploying the effective techniques and approaches required to improve the performance of the schools to deliver significantly better literacy and numeracy outcomes and therefore the productivity of the nation's primary schools and therefore the productivity of the nation itself.

Line of sight to classroom practice in primary schools

This submission contends that effective education reform, starting with the nation's primary schools, focused on a line of sight from improved classroom practice by teachers to better student learning outcomes is the best medium to long term strategy policy-makers have to improve Australia's productivity performance. We provide the evidence base of why and how to achieve it in this submission to the Productivity Commission.

³ Fahey, G. (2022), Teacher workforce: fiction vs fact. Research Report, Centre for Independent Studies.

This submission contains three parts:

1. The economics of education
2. Primary School as a predictor of productivity performance
3. How to improve the productivity of primary schools

There is a clear evidence base for what needs to be done to improve primary school performance.

- 1) Focus on teacher practice in primary schools
 - Australia's history of high level and subject agnostic policy initiatives aren't making a difference because they are too far removed from the classroom to impact student learning.
 - What teachers do in the classroom is the most important in-school factor for educational success⁴.
 - Students with high performing teachers can learn four times as much in a year as children with low performing teachers⁵.
 - If schools are not supporting every teacher to deliver practices that have the greatest impact, in every classroom, performance will not improve.
- 2) Focus on evidence-based teacher practice
 - In our universities teachers are not taught the instructional approaches that research shows have the greatest impact.
 - Evidence shows that students with the best outcomes receive teacher-directed instruction in most or all cases.
 - However, teacher-led instruction is often omitted in favour of student-led approaches such as inquiry learning and project-based learning, where students drive their own learning.

Large impact but over a longer time horizon

In advocating for primary school efficacy as a critical productivity lever for Australian governments, the payoff is long term. **The nation's children receiving better learning foundations in 2025 will mean a more productive workforce from 2045 onwards.** These are long term investments. However, if these investments are not made, there are no other activities or investments that can make up for them. Investing in post-school training can never recover the lost opportunity of high levels of vocabulary, reading fluency, mathematical ability and broad knowledge. Productivity enhancing attainment at TAFE and University are bounded by the limits of achievement at earlier levels of schooling. Poor readers make poor students at any stage of education.

⁴ Hattie, J. (2015) 'Visible Learning into Action', Corwin Press, 2015

⁵ Hanushek, E. (2014) 'Boosting Teacher Effectiveness' in What lies ahead for America's children and their schools, edited by Chester E. Finn Jr. and Richard Sousa, Hoover Institution Press, p 23-35.

Investments of this nature will require policy-makers and successive governments to be patient and track the incremental progress which will be achieved firstly through improved primary school outcomes and then school completion, participation in further education and training and then the labour force.

1. Introduction

Primary Focus' submission to improve Australia's productivity performance will provide an evidence-base for prioritising educational reform to achieve primary school efficacy as the best policy lever the government has to improve productivity performance in Australia.

The Australian Government has asked the Productivity Commission to undertake an inquiry into Australia's productivity performance and provide recommendations on productivity-enhancing reform including advice on (1) what the key driver(s) of productivity growth the government should be influencing and, (2) which reform(s) should governments prioritise to improve productivity in the next couple of years and in the longer term, with a focus on economic policy rather than social policy.

While the Call for Submission document states that "policy settings should encourage the economy to adapt to the growing importance of digital technologies, including through developing a skilled labour force" and, that "They must also be forward looking and support an environment that promotes economic dynamism, entrepreneurship and appropriate risk-taking, and innovation and technological adoption", this submission argues that Australia's productivity performance is declining due to the failure of policy-makers to maintain a contemporary understanding of the relationship between the choices made in our education system and productivity over the long-term. More specifically, current economic policy settings in education do not correlate with the evidence we have on the relationship between cognitive capacity – which is underpinned by literacy, numeracy and knowledge - and productivity. Without improving the cognitive capacity of the entire population, which is best achieved in universally accessed primary school, then aspirations to achieve improved productivity performance through such measures as a more skilled workforce, economic dynamism, innovation and technological adoption, will not be forthcoming. Our current failure to drive actual productivity improvements in the education system, which would result in improved cognitive capacity, ultimately denies Australia the ongoing productivity benefits of a population who is best placed to be dynamic. In fact, current discourse and settings are a case of putting the cart before the horse.

Given this intellectual and policy weakness, Primary Focus argues that the assumption the biggest productivity gain that could be made in our economy is digital transformation is potentially misplaced, or a short-term measure at best. Without taking a long-term view, Australia is at risk of being stuck in a vicious cycle of oscillating productivity performance.

Policies that extend years of schooling may be very different from the best policies to improve cognitive skills and the quality of educational achievement.

Hanushek, 2008

Primary Focus asserts that improving the literacy, numeracy and knowledge of the population would be a more powerful lever for the productivity and growth of our economy over the long term than efforts to accelerate digital transformation and other innovation because it would make the entire population undertaking all of these tasks - in every workforce - in every industry - more able to navigate change and innovation and to identify the constant refinements and improvements to all business and across the economy processes that make us more productivity. Conversely, the low levels of literacy and numeracy and their continued decline disempowers employees in every business in Australia to engage with improvement. Economy wide cognitive function sets a limit on the rate of growth and improvement. It goes under appreciated that the large number of low literacy and numeracy participants in the Australian workforce as well as the lower level of literacy and numeracy attainment that prior graduates achieve is having a drag effect on the Australian economy. Employer groups have long argued that policy and performance failure to provide the entire workforce with good literacy and numeracy in primary school and high school are a drag on workforce productivity. This is not a side issue. It is a central economic issue for the nation.

Other organisations advocating for better literacy and numeracy skills

Business representative organisations such as the Business Council of Australia and the Australian Industry Group have already recognised that communication, literacy and numeracy are critical workforce skills which are currently impacting the productivity of their workforces, their organisations and their industries.

In its *The Modern Worker, A Guide to What Employers Want*, the Business Council of Australia outlines the minimum capability requirements for trade and technical jobs as well as professional roles. These skills include occupation-specific reading comprehension, writing and oral communication skills, numeracy capabilities and digital literacy. These occupation specific skills cannot be acquired without solid foundational language, literacy and numeracy knowledge and skills in the first place.

In its *Workforce Development Needs 2018* report, the Australian Industry Group found that **99% of employers are affected in some way by low levels of literacy and numeracy in their workforce with 39% highly affected**. The employers reported dissatisfaction with the use of English and basic numeracy and literacy levels of over

one-fifth of school leaver workforce entrants. The most significant effect on the business was cited as poor completion of workplace documents and reports followed by teamwork and communication problems. The impact of these low levels of literacy and numeracy include time and/or material wastage, unsafe work practices, financial loss, teamwork challenges, and lack of confidence. Due to a lack of specific workplace literacy and numeracy programs, employers are increasing their internal resources to mitigate the effect of the problem in the workplace, at considerable cost.

The relationships between the productivity of the nation's primary schools and the productivity of the nation

Primary Focus was established because *primary school efficacy is the best policy lever the government has to improve productivity performance in Australia.*

In his 2012 speech, *Productivity policies: the 'to do' list*, Gary Banks, Chairman of the Productivity Commission, stated that "The essential insight underlying this policy framework is that productivity begins in workplaces" and "that [people] who sometimes ask at events such as this 'What is the single most important reform to improve Australia's productivity performance?'. My usual response to that question, ..., is that there is no single thing that can do the job. Indeed, a policy approach based on such a presumption would be destined for failure."⁶

'[Australia's international literacy and numeracy performance] deepen our concern about the level of foundation skills in the workforce and are a continuing drag on the nation's productivity.'

Primary Focus agrees that the productivity of the nation is visible in its workplaces. But that is not where it starts. While productivity is measured in workplaces, it starts in school. In fact, the economic literature suggests that the single most important thing a policy-maker can do to improve productivity performance is increase *cognitive capacity*. The best level of the education system to do this in is Primary School which is universal. It is the foundation for all other learning and, therefore, future productivity.

**AI Group Chief Executive, Innes Willox
Tackling Foundation Skills in the Workforce**

The good news is we now know how to improve the productivity of the nation's primary schools to improve the productivity of the nation.

In the same speech above, Gary Banks stated that human capital is inherent in underpinning productivity growth and that the skills required for the demands of a technologically driven economy reliant on innovation are "grounded in the literacy and numeracy acquired progressively at school and developed through higher education." And that, "ensuring quality teaching is fundamental in all areas, but has been a neglected area of education policy. Indeed, certain policies have undermined it. Recent

⁶ Banks, G (2012), *Productivity Policies: the 'to do' list*, Economic and Social Outlook Conference, 'Securing the Future', Melbourne, 1 November 2012.

attempts under COAG to rectify the situation, and enhance the performance of education and training systems generally, have resulted in a proliferation of programs, not all of which have been evidence-based.”

In considering the ‘to-do list’, Gary Banks mused on why productivity-enhancing reforms have not been achieved. Citing Governor Stevens’ suggestion that the Productivity Commission has got a long list of things to do and that they should ‘go get the list and do them’, Banks argued that the things on the list were not popular and had proven difficult for governments. He suggested this was why the independence of the PC was sought by the government of the day. Banks concluded that the items that remain on the Commission’s ‘to do list’ are generally those which have proven most difficult — ‘the hardest political nuts to crack’. He went on to say, “achieving enduring reform in such areas to date has required the concerted support and skilful advocacy of political leaders at both Commonwealth and State levels, and across the political divide ... and associated resources. [These] must be harnessed to focus on priorities and sequencing that are manageable and can yield the highest payoffs over time”.

As such, despite the political contentiousness and that governance stretches to multiple jurisdictions, Primary Focus contends that educational reform to a quality, evidence-based, high impact, school improvement policy framework for developing, acquiring and deepening cognitive capacity in primary school needs to be reinstated as a priority for economic reform to improve Australia’s long term productivity performance.

Shifting the Dial 2017 Productivity Commission report contribution to the productivity of education

Since Gary Banks’ speech in 2012, the Productivity Commission released the inaugural Shifting the Dial 5 Year Productivity Review in 2017⁷ in which it stated, “We can make significant gains just by recognising the case for change and embracing it.” (p. Foreword), noting that “something is awry in our economic fundamentals” (p29). The PC found that “a fundamental quandary for some parts of the [education] system — particularly in primary school education — is that failure to act early has consequences for people’s job and lifetime outcomes that may only emerge many years later, but are at that point largely irreversible. This requires clear directional reforms with a long-term focus.” (p86). Primary Focus agrees.

The review stated that “A good school system ensures that people have the key foundational skills — numeracy, literacy, analytical skills — and the capacity to learn so that they can easily acquire knowledge throughout their lives.” As such, the PC recommended that Australia needed to improve the educational outcomes of school students (Recommendation 3.1) and that Australian Governments should:

⁷ Productivity Commission (2017), Shifting the Dial 5 Year Productivity Review, Inquiry Report, No. 84, Australian Government

- improve the skills and effectiveness of the existing teacher workforce, with comprehensive professional development initiatives and other mechanisms, supported by evidence that these are genuinely effective
- continue the current reforms to improve the quality and effectiveness of new teachers, but test their value.

Primary Focus agrees.

To achieve a better functioning education and training system geared to long-run productivity improvement and manageable transitions in the nature of work, governments need to improve the education outcomes of school students through ensuring that the best possible teaching methods are being used in the school system, supported by an educational evidence base and the employment of high-quality, well-trained teachers in the fields where they are needed.

Noting that, “to improve teacher effectiveness, a more rigorous micro evidence base about what works in schools and how it should be implemented is required”.

Further, the PC stated that “the next 5 yearly Productivity Review (i.e. this one in 2022) could assess the impact and effectiveness of policies to raise student performance outcomes.”

Despite the strong evidence in the 2017 Shifting the Dial Productivity Review supporting the need for educational reform, particularly strengthening foundational skill acquisition in primary school, there is little evidence that any educational reform has been achieved since then.

The need for heightened knowledge formation and to achieve higher quality outcomes from the education system as a key goal for policy was also identified in the Productivity Commission’s 2020 Productivity Insights report (p17)⁸. Perhaps, as Gary Banks alluded to in 2012, the resistance to reform by interest groups which may be disadvantaged or experience reputational risk as a result of any reform to improve educational outcomes for all Australians, has been stronger than the desire (or understanding of the need) for educational reform within the wider community and electorates.

Primary Focus argues that now the time is right. Both major political parties are aligned in the need to improve educational outcomes in Australia. They also agree that the improvement needs to led by reform informed by a sound evidence-base⁹.

Here we provide the evidence base that that primary school efficacy is the best policy lever the government has to improve productivity performance in Australia.

⁸ Productivity Commission (2020), PD Productivity Insights, Can Australia be a productivity leader?, No 2/2020, Australian Government

⁹ Ashman, G. (2022) Dud Teachers and Red Herrings, Filling the Pail blog, <https://fillingthepail.substack.com/p/dud-teachers-and-red-herrings?s=r>

2. The economics of education

Cognitive capacity not years in education

In the past, investment in human capital accumulation through education and training has been considered one of the easiest policy levers to manipulate to achieve improved economic and social outcomes at the individual and macro levels, particularly in relation to productivity enhancement. As a result, considerable investment has been made over the decades to increase access and participation in education to complete school successfully and to pursue further education and training.

However, numerous empirical studies show that the increase in the quantity of education, measured by levels of educational attainment or years of schooling, has not resulted in a corresponding increase in productivity growth, as was expected by policy makers. As a result, it is often conceded that the contribution of education to economic growth may be overestimated.

Primary Focus disagrees and argues that the measurement and quantification of education's contribution to economic growth and productivity is wrong. School attainment and access to schools are very incomplete and ineffective measures of the relevant knowledge and skills required in the economy, and therefore serve as an imperfect basis for setting economic policy for policy improvement¹⁰. Measurement should focus on the outcomes achieved through education (i.e. the quality of education) rather than the quantity of education (i.e., years of schooling) assumes that education is homogenous and does not differentiate between the quality of educational outputs.

Empirical evidence over three decades suggests that **the quality of education, measured by knowledge and cognitive skills – demonstrated through standardised tests in literacy, numeracy and science - that students gain during their schooling years is substantially more important for economic growth than the mere quantity of schooling**¹¹. This research shows that ignoring differences in the quality of education significantly distorts the picture of how education and economic outcomes are related.

When the cognitive skills of the population – referred to as knowledge capacity - is included in the production function, a statistically and economically significant positive effect of the quality of education on economic growth is apparent. This effect is far larger than the association between the quantity of schooling and economic growth. Further, when cognitive capacity is included in the model, the association between years

¹⁰ Hanushek, E. (2020). Quality Education and Economic Development. In *Anticipating and Preparing for Emerging Skills and Jobs* (pp. 25-32). Springer, Singapore.

¹¹ Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. *The economics of education*, 171-182.

of schooling and economic growth turns insignificant and is reduced to close to zero¹². In fact, **models that include direct measures of cognitive skills can account for about three times the variation in economic growth than models that include only years of schooling**¹³. Ignoring quality differences in education very significantly misses the true relationship between education and economic growth and thus productivity¹⁴.

Primary Focus therefore argues that an alternative policy lever should be considered to improve Australia's productivity performance; focus on outcomes achieved through the quality of education provided, particularly in primary school.

Primary school efficacy is the best policy lever the government has to improve productivity performance in Australia.

Education and the production function

It is widely accepted, and empirically proven, that economic growth, and associated productivity performance, determines the future economic and social well-being of a nation. Therefore, better understanding the determinants of growth is a high-priority area of economic research and policy-making.

The extensive body of theoretical and empirical analysis relating to economic growth includes education as a central element.

"...the growing importance of knowledge in the society, the increased uncertainty in the labour market and the more complicated ways in which people acquire skills... requires economists to investigate the production and use of human capital more explicitly. Many questions that at first sight appear to be educational, turn out to have important economic aspects."¹⁵

The foundations for the theoretical framework linking education to economic growth and productivity is referred to as human capital theory (HCT)¹⁶. Individuals accumulate human capital over their lifetime. It is their stock of knowledge, skills and personal characteristics acquired formally through schooling, education and training and the provision of health services and also informally through family, social networks and workplaces. Human capital can be defined as the potential productive wealth embodied in labour, skills and knowledge and is included in the factors of production to determine the output of an economy, alongside capital, labour and technology. The overarching

¹² Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of economic literature*, 46(3), 607-68.

¹³ Ibid..

¹⁴ Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. *The economics of education*, 171-182.

¹⁵ Borghans, L & Heijke, H 2005, 'The production and use of human capital: Introduction', *Education Economics*, vol. 13, no. 2, pp. 133.

¹⁶Becker, GS 1962, 'Investment in human capital: A theoretical analysis', *The journal of political economy*,

premise of HCT is that both individuals and the broader society and economy derive benefit from investment in human capital and can be invested in, particularly through education and health policy measures. The benefit attached to individuals is evident in improved lifetime earnings, and to the economy in the form of economic growth.

More specifically, the theoretical supposition is that higher levels of education increase the human capital inherent in the labour force which, in turn, increases labour productivity.

Greater human capital also increases the innovative capacity of the workforce and economy and thus the development of new technologies, products and processes and including the diffusion and transmission of the knowledge needed to understand and process new information and to successfully imitate new technologies which influence economic growth, an objective of the current Productivity Commission Inquiry¹⁷.

Despite this theoretical understanding, policy measures and the associated increase in spending to improve access to, participation in and completion of school have not resulted in the expected increase in productivity growth.

Most human capital empirical models in the production function focus on the economic returns to differing levels of school attainment¹⁸, so much so that human capital has become synonymous with educational attainment. Using educational attainment alone as a proxy for human capital, combined with the inability to clearly define the problem, led Blaug¹⁹ to conclude that, in terms of empirical analysis of HCT, "everyone has been wrong and everyone has been right because the problem proved to be more complicated than was originally envisaged."

This is because human capital is a constructed means of production, and cannot be assumed to be homogenous²⁰. Three decades of intensive analysis by Hanushek and colleagues (and others) has concluded that the lack of correlation relates to the measurement of human capital, rather than education per se. They conclude from their

The economic impact of improving schooling quality by a 10% lift in education performance would make Australia one of the most advanced education systems in the world resulting in a 1.5% increase in GDP once realised. For high-skilled occupations, a 1% increase in the quality of educational achievement would lead to an 0.23% higher wage level.

Deloitte Access Economics, 'The economic impact of improving schooling quality', Department of Education and Training, 2016.

¹⁷ Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. *The economics of education*, 171-182.

¹⁸ Sweetland, SR 1996, 'Human capital theory: Foundations of a field of inquiry', *Review of Educational Research*, vol. 66, no. 3, pp. 341.

¹⁹ Blaug, M 1976, 'The empirical status of human capital theory: a slightly jaundiced survey', *Journal of economic literature*, vol. 14, no. 3, pp. 827.

²⁰ Bowles, S & Gintis, H 1975, 'The problem with human capital theory--a Marxian critique', *The American Economic Review*, vol. 65, no. 2, pp. 74.

extensive research that the relationship between the quality of education, that is aggregate cognitive skills - the knowledge capacity of a population-, and the long-run economic growth rate is extraordinarily strong²¹.

Using a quantity measure (i.e., level of educational attainment or years of schooling) as the human capital measure assumes that a year of schooling is homogenous and that it delivers the same increase in knowledge and skills regardless of the school, sector or system. This may be because relevant data is readily observable, consistent, available and measurable. It also wrongly assumes that formal schooling is the primary source of education and that variations in the quality of non-school factors affecting learning and improving human capital have a negligible effect on education outcomes²². Using a quantitative measure also neglects the qualitative differences in the knowledge and cognitive skills acquired through the schooling experience and other sources of learning. Further, it distorts both the empirical analysis and resulting policy development. Rather than just quantitative measures alone, including achievement outcomes such as cognitive skill measures in literacy and numeracy when estimating the effect of education on economic growth would be more prudent and provide a true reflection of the value of education to the economy. This has important policy implications because policies that extend years of schooling may be very different from the best policies to improve cognitive skills and the quality of educational achievement.

In reality, knowledge capacity and cognitive skills are a product of both the quantity and quality of schooling.

Using measures of educational achievement captures variations in the knowledge and skills that the education system aims to produce and is also acquired through other sources such as in the family, through social networks as well as inherent ability. Importantly, by allowing for differences in educational achievement and quantity of schooling in calculating the economic effects of education, the opportunity to develop different policies designed to affect the quality aspects of education systems is enabled.

Several recent studies distinguish between the effect of high- and low-quality education on the economy and suggest that education is important both as an investment in human capital as well as in facilitating research and development and the diffusion of technologies. The studies conclude that lower levels of education are more important for imitation and that higher quality education is more important for

Several studies conclude that lower levels of education are more important for imitation and that higher quality education is more important for innovation and productivity.

Hanushek and Woessmann, 2020

²¹ Hanushek, E. A., & Woessmann, L. (2020). Education and Economic Growth, ifo Institute, Ludwig Maximilian University of Munich

²² Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. The economics of education, 171-182.

innovation and productivity²³. Both require quality outcomes to be achieved in primary school.

The accumulated evidence from analyses of economic outcomes is that the quality of education - measured as an outcome basis of cognitive skills - has powerful economic effects and is substantially more important for economic growth and productivity than the quantity of education.

3. Primary school as a predictor of performance

Australia's rankings on international tests such as PISA have been falling for many years in most curriculum areas.

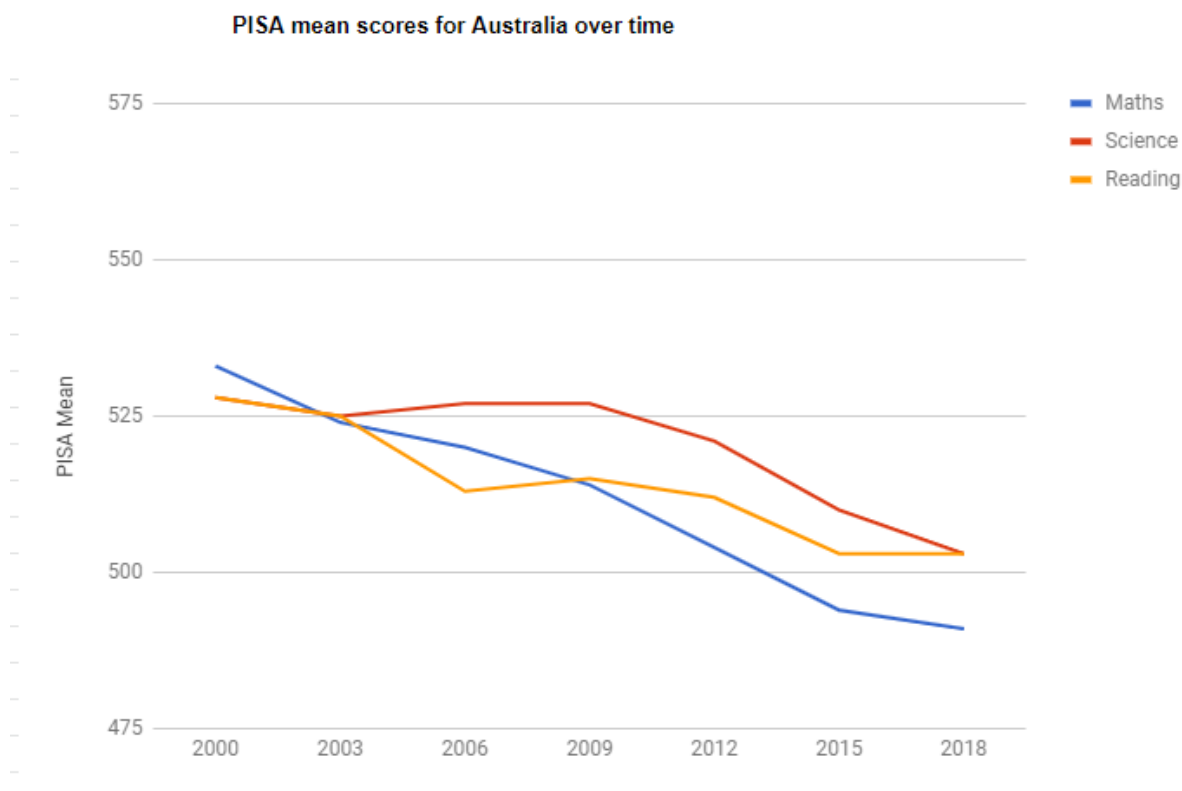
Average (measured as the mean) performance in Australia has been steadily declining in reading (between 2000 and 2018) and in mathematics (between 2003 and 2018). Performance in science has been declining since at least 2012 from initially high levels of performance (See Figure 1 below). In reading, more rapid declines were observed amongst the country's lowest-achieving students. In mathematics and science, performance declined to a similar extent at the top and at the bottom of the performance distribution, as well as on average²⁴.

The proportion of top-performing students (scoring at Level 5 or 6) remained stable in reading (between 2009 and 2018), but decreased in mathematics (between 2012 and 2018) and in science (between 2006 and 2018). At the same time, the proportion of low-achieving students (scoring below Level 2) increased in all subjects.

²³ Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. *The economics of education*, 171-182

²⁴ Thomson, S., De Bortoli, L., Underwood, C., and Schmid, M. (2019), *PISA 2018: Reporting Australia's Results. Student Performance*, Australian Council for Education Research

Figure 1. PISA mean scores for Australia over time.



Source: Thomson, S., De Bortoli, L., Underwood, C., and Schmid, M. (2019), PISA 2018: Reporting Australia's Results. Student Performance, Australian Council for Education Research

This decline is associated with poor primary school outcomes. The proportion of students missing out on educational opportunities increases steadily between the early years and completing primary school. **By the time they start year 7, around 28.4% of Australian students have not acquired the core knowledge, literacy or numeracy skills required to access and engage in further educational opportunity**²⁵. While three quarters of a school cohort go on to complete year 12, only 6 in 10 students are engaged fully in employment, education or training by age 24²⁶. Not completing Year 12 and not achieving well in school are predictors of later work and life outcomes which have serious long-term implications for Australia's workforce, economic growth and productivity performance.

Successful completion of year 12 is associated with prior achievement in literacy and numeracy throughout the schooling experience, more so than parental education or

²⁵ Lamb, S, Jackson, J, Walstab, A & Huo, S (2015), Educational opportunity in Australia 2015: Who succeeds and who misses out, Centre for International Research on Education Systems, Victoria University, for the Mitchell Institute, Melbourne: Mitchell Institute.

²⁶ Ibid.

socio-economic background²⁷. It is year 9 academic results that predict year 11 and 12 performance²⁸.

Further, it is sound writing skills, a key component of literacy, that is regarded as a critical prerequisite for employment and higher education in adult life by graduates, employers and higher education institutions²⁹. Writing skills are also correlated with year 11 and 12 performance³⁰. Underpinning proficient writing skills is the ability to use and manipulate multiple language conventions efficiently; spelling, grammar and punctuation, all taught and learned in primary school.

John Sweller and colleagues correlate this deteriorating academic performance with the increased emphasis on 'inquiry-based' learning over explicit instruction in Australian classrooms³¹. Extensive theory and empirical evidence support explicit instruction (i.e., teaching practices) as a more effective and efficient method for teaching new knowledge – cognitive skills – than inquiry-based learning. This will be discussed in Part 3.

Literacy as a predictor of year 11 and 12 performance

Several studies using multivariate analysis³² to predict academic performance have concluded that it is prior achievement in primary school which has the most influence on young people's overall educational outcomes, followed by parental education and/or occupation.

While there is a plethora of longstanding evidence that the early (pre-school) skills of language, cognitive development, communication and general knowledge are key predictors of future academic performance³³ which has influenced policy development in the early childhood development sector, a large body of research also shows that the

²⁷ Brendan Houg and Moshe Justman (2014), NAPLAN Scores as Predictors of Access to Higher Education in Victoria, Working Paper No. 22/14 October 2014, Melbourne Institute of Applied Economic and Social Research; Getenet, S., & Beswick, K. (2021). Predictors of children's achievement: analysis of the Australian National Numeracy Assessment Program. *Educational Assessment, Evaluation and Accountability*, 33(4), 591-620. Goss, P., & Sonnemann, J. (2016). Widening gaps: What NAPLAN tells us about student progress. Grattan Institute.

²⁸ ABS (2014a) 'Educational outcomes, experimental estimates, Tasmania 2006-2013'

²⁹ Daffern, T., Mackenzie, N. M., & Hemmings, B. (2017). Predictors of writing success: How important are spelling, grammar and punctuation?. *Australian Journal of Education*, 61(1), 75-87.

³⁰ NSW Centre for Education Statistics and Evaluation, Analysis of Writing, 2021

³¹ Sweller, J (2021), Why Inquiry-based Approaches Harm Students' Learning, Analysis Paper 24, The Centre for Independent Studies; Kirschner, P., Sweller, J., & Clark, R. E. (2006). Why unguided learning does not work: An analysis of the failure of discovery learning, problem-based learning, experiential learning and inquiry-based learning. *Educational Psychologist*, 41(2), 75-86; Ashman, G., Kalyuga, S., & Sweller, J. (2020). Problem-solving or explicit instruction: Which should go first when element interactivity is high? *Educational Psychology Review*, 32(1), 229-247.

³² Using variables such gender, indigenous status, language background, geolocation, sector, parents' educational background, parents' occupation status and children's prior achievement

³³ Duncan, R. J., Duncan, G. J., Stanley, L., Aguilar, E., & Halfon, N. (2020). The kindergarten Early Development Instrument predicts third grade academic proficiency. *Early childhood research quarterly*, 53, 287-300.; Brinkman, S., Gregory, T., Harris, J., Hart, B., Blackmore, S., & Janus, M. (2013). Associations between the early development instrument at age 5, and reading and numeracy skills at ages 8, 10 and 12: a prospective linked data study. *Child Indicators Research*, 6(4), 695-708.

proportion of students not meeting the expected standard for their age increases steadily as they progress from the early years to primary school to secondary school³⁴. Not only do those that 'start behind, stay behind', the spread of student achievement more than doubles as students move through school with the majority of the learning gap developing between years 3 and 9, not before year 3³⁵.

For this reason, productivity improving policy reform must focus on education policy settings to ensure that foundational literacy and numeracy knowledge and skills are learned proficiently in primary school and supported as students progress through their schooling.

Analysis undertaken in 2021 by the NSW Government Centre for Education Statistics and Evaluation (CESE) found that **Year 9 NAPLAN writing results were the strongest predictor of year 11 and year 12 performance, more so than reading, spelling, grammar or numeracy³⁶. Writing ability is predicted jointly by spelling, grammar and punctuation, with spelling being the strongest predictor³⁷**. Further, proficiency in English is a strong predictor of mathematical achievement³⁸.

A proficient writer is able to efficiently use and manipulate language conventions such as vocabulary, spelling and syntax when composing written text. Writing well requires deliberate choices at the word, sentence, paragraph and whole-text levels to meet the purpose of communication³⁹.

Yet, year 9 Australian student's writing performance on the NAPLAN writing test has been declining considerably since 2011 for both male and female students. Several studies reveal a picture of accelerating negative change⁴⁰. The average student in 2018 performed nearly 1.5 years behind the average student in 2011⁴¹. Not only does under-achievement in writing in year 9 impact successful school completion, it filters through to the Australian workforce, economy and broader society.

³⁴ Lamb, S, Jackson, J, Walstab, A & Huo, S (2015), Educational opportunity in Australia 2015: Who succeeds and who misses out, Centre for International Research on Education Systems, Victoria University, for the Mitchell Institute, Melbourne: Mitchell Institute.; Goss, P., & Sonnemann, J. (2016). Widening gaps: What NAPLAN tells us about student progress. Grattan Institute; Adams, E. K., Hancock, K. J., & Taylor, C. L. (2020). Student achievement against national minimum standards for reading and numeracy in Years 3, 5, 7 and 9: A regression discontinuity analysis. *Australian Journal of Social Issues*, 55(3), 275-301.

³⁵ Goss, P., & Sonnemann, J. (2016). Widening gaps: What NAPLAN tells us about student progress. Grattan Institute.

³⁶ Baker, J. (2021), Year 9 NAPLAN writing results the best predictor of HSC success: study, *Sydney Morning Herald*

³⁷ Daffern, T., Mackenzie, N. M., & Hemmings, B. (2017). Predictors of writing success: How important are spelling, grammar and punctuation?. *Australian Journal of Education*, 61(1), 75-87.

³⁸ Getenet, S., & Beswick, K. (2021). Predictors of children's achievement: analysis of the Australian National Numeracy Assessment Program. *Educational Assessment, Evaluation and Accountability*, 33(4), 591-620.

³⁹ Thomas, D (2020), Rapid decline and gender disparities in the NAPLAN writing data, *The Australian Educational Researcher* (2020) 47:777–796; Daffern, T., Mackenzie, N. M., & Hemmings, B. (2017). Predictors of writing success: How important are spelling, grammar and punctuation?. *Australian Journal of Education*, 61(1), 75-87.

⁴⁰ Wyatt-Smith, C and Jackson, C, (2016), NAPLAN data on writing: A picture of accelerating negative change, *Australian Journal of Language and Literacy*, Vol. 39, No. 3,

⁴¹ Thomas, D (2020), Rapid decline and gender disparities in the NAPLAN writing data, *The Australian Educational Researcher* (2020) 47:777–796

Poor writing is problematic for children and adults alike. To become effective writers in year 9, students must be proficient in spelling, grammar and punctuation, skills learned in primary school.

However, primary school students' progress in writing lags behind that of reading because they are not receiving effective instruction in spelling and other language conventions. When the cognitive demands of writing are heightened by the arduous task of spelling, effective writing is compromised, also impacting confidence and motivation. As a result, many children fail to achieve standards of writing to support their personal and academic needs at secondary school and beyond.⁴² Students who experience difficulty with writing may be less likely to use writing to support and extend their learning to the wider curriculum. This impacts eventual school completion and the flow on effects to the economy and productivity.

Literacy and wages

Not only are literacy skills correlated with year 11 and 12 performance, but also income. Cognitive skills, as measured by international tests of mathematics, science and reading, are powerfully related to individual earnings, to the distribution of income and the economic growth of a nation⁴³.

Research undertaken by the Productivity Commission in 2014 found that **up to 40% of the association between education and employment is attributable to literacy and numeracy skills** and that an increase in literacy and numeracy by one skill level is associated with an increased likelihood of employment of 2.4 and 4.3 percentage points for men and women, respectively⁴⁴. The analysis also found that, regardless of highest level of educational attainment, **an increase in literacy and numeracy by one skill level is associated with about a 10% increase in wages for both men and women**⁴⁵.

The report identified that proficient literacy and numeracy skills and knowledge are a critical 'foundation for developing higher order skills that contribute to a more productive workforce'. The report further acknowledged that the increasing demands for improved-productivity enhancing innovation, technology and adaptation in the economy are grounded in analytical and communication skills. These skills are underpinned by literacy

⁴² Daffern, T., Mackenzie, N. M., & Hemmings, B. (2017). Predictors of writing success: How important are spelling, grammar and punctuation?. *Australian Journal of Education*, 61(1), 75-87.

⁴³ Thomson, S., De Bortoli, L., Underwood, C., and Schmid, M. (2019), PISA 2018: Reporting Australia's Results. Student Performance, Australian Council for Education Research

⁴⁴ Shomas, A. and Forbes, M. (2014), Literacy and Numeracy Skills and Labour Market Outcomes in Australia, Productivity Commission Staff Working Paper, May 2014

⁴⁵ Shomas, A. and Forbes, M. (2014), Literacy and Numeracy Skills and Labour Market Outcomes in Australia, Productivity Commission Staff Working Paper, May 2014

and numeracy knowledge and skills acquired progressively throughout the schooling system from primary school to secondary school.

These findings are consistent with a 2013 study undertaken by the National Centre for Vocational Education Research (NCVER) which found that both educational qualifications and literacy skill levels are positively associated with income and that income increases with literacy skill level, regardless of level of educational attainment⁴⁶. Further, the analysis found that

inclusion of literacy skills lowers the estimated income effects of qualifications, reducing the effect by around two thirds for men and 80 per cent for women, concluding that both education levels and literacy skill levels are important in determining income. The NCVER report also commented that it is the skills of workers which explain a considerable part of their earnings that may not be attributable to formal education, so much so that within education levels, the labour market operates in such a way that more skilled individuals in literacy receive higher remuneration.

The NCVER report concludes that qualifications or credentials are not all-important in determining labour market outcomes and that it is the quality of the education and training systems in providing the requisite skills not just for positive labour market outcomes but for income and ultimately, higher levels of productivity, which is paramount.

An increase in literacy and numeracy by one skill level is associated with an increased likelihood of employment of 2.4 and 4.3 percentage points for men and women, respectively.

Shomas and Forbes, 2014

4. How to improve the productivity potential in primary schools

The empirical evidence demonstrates decisively that it is improved knowledge capacity in the form of cognitive skills that contributes to improving economic growth and productivity performance. 'Cognitive skills' is another word for the foundational knowledge and skills of literacy and numeracy learned in primary school that predicts school completion and educational attainment and the potential for a productive workforce.

The key to improving Australia's productive performance is therefore in ensuring that literacy and numeracy are both taught and learned effectively in primary school.

⁴⁶ Chesters, J., Ryan, C., & Sinning, M. (2013). *The returns to literacy skills in Australia*. National Centre for Vocational Education Research.

Unfortunately, calls for Australian education to reform for the twenty-first century have fuelled unproven ideas about how best to develop higher-order skills such as focusing on the 4C's – communication, collaboration, critical thinking and creativity⁴⁷.

There is no evidence-base to validate that teaching students critical and creative thinking will improve their cognitive capacity. To improve cognitive capacity, you need knowledge - knowledge is what we think with⁴⁸.

Sadly, education systems captured by the 21st century skills zeitgeist have implemented policies, programs and practices that refocused pedagogy, curriculum and teaching completely on developing only these unproven higher order skills. This misinterpretation of the need to cultivate 21st century skills and how to develop these critical skills for the future workforce has had a detrimental impact on the quality of Australia's educational outcomes. As is evident in the Australian Professional Standards for Teachers which requires teachers at all levels to demonstrate the use of teaching strategies to develop student's "knowledge, skills, problem solving and critical and creative thinking".

What has been lost in these ideological changes is that a strong foundation in literacy and numeracy – taught and learned in primary school - is necessary for the development of advanced skills for the future, when the pace of technological advancement will likely render many jobs obsolete.

Purpose of education

Recognising that the purpose of education is to acquire knowledge and skills to use effectively in society and the economy, over a number of decades scholars in the fields of cognitive science and educational psychology have been able to develop an architecture of how people learn, think and solve problems. This discipline is known as human cognitive architecture.

Knowledge - the storage of information in the long-term memory - is acquired in two ways. One, through the process of evolution and exposure to a wide range of experiences and does not need to be explicitly taught, referred to as biologically primary knowledge; and two, domain-specific, biologically secondary knowledge, which is not acquired naturally and unconsciously, and needs to be explicitly

While students are able to acquire information slowly and with considerable effort via inquiry learning, students can also acquire it far more rapidly and easily via explicit instruction from other people, such as teachers.

Sweller, 2022

⁴⁷ Centre for Education Statistics and Evaluation (2019), General Capabilities: A perspective from cognitive science, NSW Government

⁴⁸ Ashman, G. (2022) Dud Teachers and Red Herrings, Filling the Pail blog, <https://fillingthepail.substack.com/p/dud-teachers-and-red-herrings?s=r>

taught. The purpose of the education system is to teach this domain-specific, biologically secondary knowledge.

Cognitive scientists further argue that if knowledge is not being added to long-term memory efficiently then education practices are not effective. These scholars show that while students are able to acquire information slowly and with considerable effort via inquiry learning, students can also acquire it far more rapidly and easily via explicit instruction from other people, such as teachers⁴⁹.

These scholars provide further evidence that creativity and critical thinking cannot be taught as our cognitive architecture has evolved to do this innately without instruction⁵⁰. They argue that what requires teaching is the knowledge base from which students are able to apply their '21st century skills' to; knowledge held in long-term memory is the first prerequisite of critical and creative thinking. They provide the evidence that **differences in students' creativity and critical thinking is not due to differences in thinking strategies, but rather on differences in students' knowledge.**

It should be this evidence-based knowledge and understanding of human cognitive architecture and the process of knowledge acquisition which informs Australia's education systems, pedagogy, curriculum and teaching practices.

Differences in cognitive abilities and the impact on learning outcomes within a classroom can be positively (and negatively) impacted by teacher instruction.

John Sweller and colleagues assert that unless a student has extensive prior domain-specific knowledge and is able to retrieve that information with automaticity to apply in their learning process, then educational instruction in the classroom should be explicit, particularly for younger, more 'novice' student such as those in primary school⁵¹.

Starting in primary school, children apply their cognitive abilities to learn (acquire knowledge) first and then, as they get older, apply existing knowledge to enhance their knowledge and learning as well as utilise emerging metacognition skills to reflect on their learning process.

In order to reverse Australia's deteriorating academic performance and to reposition Australia on a productivity growth trajectory, urgent reform of the education system is required, with a particular emphasis on primary school education.

⁴⁹ Sweller, J (2021), Why Inquiry-based Approaches Harm Students' Learning, Analysis Paper 24, The Centre for Independent Studies; Kirschner, P., Sweller, J., & Clark, R. E. (2006). Why unguided learning does not work: An analysis of the failure of discovery learning, problem-based learning, experiential learning and inquiry-based learning. *Educational Psychologist*, 41(2), 75-86.

⁵⁰ Sweller, J (2022), Some Critical Thoughts about Critical and Creative Thinking, Analysis Paper 32, The Centre for Independent Studies

⁵¹ Sweller, J. (2016). Working memory, long-term memory, and instructional design. *Journal of Applied Research in Memory and Cognition*, 5(4), 360-367.; Sweller, J., van Merriënboer, J. J. G., & Paas, F. (2019). Cognitive architecture and instructional design: 20 Years later. *Educational Psychology Review*, 31(2), 261-292.

Clear evidence on what needs to be done

There is a clear evidence base for what needs to be done to improve primary school performance.

- 1) Focus on teacher practice in primary schools
 - Australia's history of high level and subject agnostic policy initiatives aren't making a difference because they are too far removed from the classroom to impact student learning.
 - What teachers do in the classroom is the most important in-school factor for educational success.
 - Students with high performing teachers can learn four times as much in a year as children with low performing teachers.
 - If schools are not supporting every teacher to deliver practices that have the greatest impact, in every classroom, performance will not improve.
- 2) Focus on evidence-based teacher practice
 - In our universities teachers are not taught the instructional approaches that research shows have the greatest impact.
 - Evidence shows that students with the best outcomes receive teacher-directed instruction in most or all cases.
 - However, teacher-led instruction is often omitted in favour of student-led approaches such as inquiry learning and project-based learning, where students drive their own learning.

The creation of the new agency the Australian Education Research Organisation (AERO) signals the Australian government's increasing understanding that the focus needs to be on knowledge acquisition to build cognitive capacity. The Productivity Commission should liaise with AERO on the best means to improve education in Australia.

There's a growing sense of confusion about what we actually mean when we speak of a 'twenty-first century education' ... I say 'engage children through real-world problems' – and people hear 'great, let's toss out the textbooks.' I say 'children should develop the passion to learn' – and people hear 'let's leave it up to the children to decide what they want to be taught'. I can't explain why so many well-meaning people associate being a twenty-first century worker with knowing less and talking more ... in 2018, there is still a fundamental duty to teach students content: concepts, facts and principles. Taught by teachers trained as experts in that content, with all the status and resources and professional development that we would demand in any other expert occupation.'

Dr Alan Finkel, Australia's Chief Scientist

5. Conclusion

Primary Focus contends that primary school efficacy is the best policy lever the government has to improve productivity performance in Australia.

While Primary Focus acknowledges the Australian Government's desire to improve productivity performance in the immediate- to short- term through policy settings that "encourage the economy to adapt to the growing importance of digital technologies, including through developing a skilled labour force" and, that "they must also be forward looking and support an environment that promotes economic dynamism, entrepreneurship and appropriate risk-taking, and innovation and technological adoption", we argue that the Australian Government must also take a long term position to improve productivity performance perpetually.

This submission has provided the evidence that to improve long term productivity performance in Australia, economic policy development must prioritise improving the learning outcomes in schools of the nation's students. To do this, Australian schools need to be more successful at teaching more knowledge each and every day. This requires a dramatic change in classroom practice in curriculum, pedagogy and assessment so that we build more intellectual capacity in the nation's young people. This is what it means to increase the aggregate cognitive capability of the Australian population.

Improving cognitive capacity and intellectual capability must begin in primary school. Primary School's must be very well run and ensure that all teachers are using the best, most evidence-based practice in curriculum, pedagogy and assessment. The task of every primary school is to ensure that all Australian students exceed the expected level in the foundational cognitive skills of literacy, numeracy and science before they start high school. These are the cognitive skills which predict school completion. **Over time, as these students succeed in completing school and pursuing further education and work, the knowledge capital of the nation will increase, and better educated young Australians will enter the workforce as more productive members of our labour force, contributing to the sought-after economic dynamism.**

The accumulated evidence is powerful. The quality of education - measured as educational achievement in cognitive skills - has powerful economic effects. Economic growth is strongly affected by the knowledge capital of the workforce. Knowledge capital accrues first in primary school. Economic policies must therefore prioritise the quality of the education system in primary school. **There is no substitute to improving Australia's long-term productivity performance than improving educational outcomes, rather than outputs.**

As Hanushek and colleagues⁵² show in their model, a twenty-year reform plan to improve educational outcomes would yield a 5 per cent increase in GDP (compared with an economy with no increase in cognitive skills)⁵³. They explain that five per cent of GDP is significantly greater than a typical country's spending on all primary and secondary schooling, providing evidence that the significant change would enable the growth dividend to more than exceed the cost of investment in improving primary and secondary school outcomes. Projecting these net gains from improved educational achievement in cognitive skills further past the reform period shows clearly the long run impacts of reform. For example, over a seventy-five year horizon, a twenty year reform yields a real GDP that is 36 per cent higher than would be with no change in cognitive skills.

There is a growing community of practice of over 200 Australian schools including over 150 schools participating in the Fogarty EDvance program in Western Australia⁵⁴, one 56 school system⁵⁵, the Kimberly Schools Project⁵⁶ and numerous individual schools throughout Australia who are pursuing an entirely evidence-based approach to teaching and learning in every classroom.

In the past, education systems have received considerable attention and investment by policy-makers under the assumption that improving educational attainment (quantity of schooling) provides a direct relationship with improved economic growth and productivity. However, this outcome has not necessarily translated as effectively as was expected. It is important that any reform agenda focuses on improving the *outcomes* of education and improving the knowledge capacity of the population.

While Primary Focus acknowledges that its assertion that primary school efficacy is the best policy lever the government has to improve productivity performance in Australia, we also acknowledge that the time taken to realise the return on investment in primary school reform will involve a lengthy time period until these future generations join the workforce. This will require policy-makers and successive governments to be patient and track the incremental progress which will be achieved firstly through improved primary school outcomes and then school completion, participation in further education and training and then the labour force.

Primary Focus believes the time is now right for this reform agenda – the success of over 200 schools in Australia pursuing the evidence-based approach shows the benefits that could accrue to the nation from this refocus of energies.

⁵² Hanushek, E. A., & Woessmann, L. (2008). The role of cognitive skills in economic development. *Journal of economic literature*, 46(3), 607-68.

⁵³ Based on 2008 figures in the US.

⁵⁴ Fogarty Edvance (2021), Impact Report: Cohort 5, School Improvement Program, 2018-2020

⁵⁵ Catholic Education Canberra Goulburn

⁵⁶ For more information see <https://kdc.wa.gov.au/our-region/kimberley-schools-project/>

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