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Educating New Zealand's future workforce

**Technological change and the future
of work**

Draft report 4

January 2020

The New Zealand Productivity Commission

Te Kōmihana Whai Hua o Aotearoa¹

The Commission – an independent Crown entity – completes in-depth inquiry reports on topics selected by the Government, carries out productivity-related research and promotes understanding of productivity issues. The Commission aims to provide insightful, well-informed and accessible advice that leads to the best possible improvement in the wellbeing of New Zealanders. The New Zealand Productivity Commission Act 2010 guides and binds the Commission.

You can find information on the Commission at www.productivity.govt.nz or by calling +64 4 903 5150.

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¹ The Commission that pursues abundance for New Zealand

About this inquiry

This inquiry explores the impacts of new and changing technology on the quantity and nature of work. It builds on research and modelling carried out by governments, academics and other organisations in New Zealand and throughout the world. The inquiry aims to answer two main questions:

- What are the current and likely future impacts of technological change and disruption on the future of work, the workforce, labour markets, productivity and wellbeing?
- How can the Government better position New Zealand and New Zealanders to take advantage of innovation and technological change in terms of productivity, labour-market participation and the nature of work?

The Terms of Reference asks two specific questions related to the education system:

- How can New Zealand's education and training system be more effective in enabling adaptation to technological disruption?
- How can we address the digital divide in New Zealand?

The first of these questions is the focus of both draft report 3 and this report (draft report 4). This report addresses the digital divide question.

The inquiry will release five draft reports

The five draft reports address different aspects of this inquiry's terms of reference.²

Report 1 – September 2019 ***New Zealand, technology and productivity***

- Defining technology, technological change and disruption
- What factors affect technology adoption and diffusion?
- What are the labour-market effects of technology diffusion to date?
- What might future technology adoption and labour market change look like?
- Preparing for an uncertain future

Report 2 – November 2019 ***Employment, labour markets and income***

- How has technology affected NZ's labour market?
- Are digital platforms and gig jobs changing the nature of work?
- How well do employment laws balance protections and flexibility?
- How can income support for displaced workers be improved?
- Can the Government better support those affected by labour-market change?
- What might improve NZ's technology adoption rates, and its labour market?

Report 3 – December 2019 ***Training New Zealand's workforce***

- How well does NZ's training and skills system support people in work to retrain and acquire new skills over time?
- What changes would make the system more responsive to the needs of a dynamic labour market?

Report 4 – January 2020 ***Educating New Zealand's future workforce***

- How well does the NZ education system prepare people for future uncertainty?
- Does the national curriculum help or hinder?
- How well does the system promote flexibility and adaptability in students?
- Are there attributes of the system that close off student options too early?

Report 5 – January 2020 ***Technology adoption by firms***

- How do markets for land, labour, capital and other inputs affect technology adoption by firms?
- What is the role of the business environment – market scale, competition, regulation, risk and uncertainty?
- How can governments better encourage technology uptake by firms – and hence productivity growth?

² See the inquiry's [issues paper](#) or [draft report 1](#) for the terms of reference, or visit www.productivity.govt.nz/assets/Documents/8170d4518e/Terms-of-reference_Technology-disruption-and-the-future-of-work.pdf.

Register your interest

The Commission seeks your help in gathering ideas, opinions and information to ensure this inquiry is well informed and relevant. The Commission will keep registered participants informed as the inquiry progresses. You can register for updates at www.productivity.govt.nz/have-your-say/subscribe, or by emailing your contact details to info@productivity.govt.nz.

Make a submission by 17 February 2020

The Commission is interested in hearing comment, feedback and other evidence on the draft reports, and is conscious that different people and groups will have differing levels of interest in each of them. The Commission therefore welcomes separate submissions on each of the reports, submissions that respond to cross-cutting themes in multiple reports, or a single submission that covers all four of the reports. Please pick the format and approach that suits you best.

The **due date for submissions** on the five draft reports is Monday, **17 February 2020**.

Anyone can make a submission. Your submission may be written or in electronic or audio format. A submission may be a short note on one issue or a substantial response covering multiple issues. Please provide relevant facts, figures, data, examples and documents where possible to support your views. Multiple, identical submissions will not carry more weight than the merits of your arguments. Your submission may incorporate relevant material provided to other reviews or inquiries.

Your submission should include your name and contact details and the details of any organisation you represent. The Commission will not accept submissions that, in its opinion, contain inappropriate or defamatory content.

Sending in your submission

Please make a submission via www.productivity.govt.nz/have-your-say/make-a-submission. The Commission appreciates receiving submissions in searchable PDF format.

What the Commission will do with submissions

The Commission wants to have as much information as possible on the public record. Submissions will become publicly available documents on the Commission's website. This will occur shortly after receipt, unless your submission is marked "in confidence" or you wish to delay its release for a short time. Please contact the Commission before submitting "in confidence" material.

Other ways you can participate

The Commission welcomes feedback about this inquiry. Please email your feedback to info@productivity.govt.nz or contact the Commission to arrange a meeting with inquiry staff.

The inquiry team is running a blog on technological change and future of work topics until February 2020. Individual staff members post regularly at www.productivity.govt.nz/futureworknzblog/. You can subscribe at www.productivity.govt.nz/have-your-say/subscribe. Comments and guest posts welcome.

Final report in March 2020

The Commission will deliver a **final report to the Government in March 2020** bringing together themes, findings, recommendations and participant feedback from the draft reports.

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Key


F

Finding


Q

Question

Overview

How should policy makers, parents and other members of the community think about the education of young learners in the context of future changes in work? A report for the New South Wales Department of Education entitled *Preparing for the best and worst of times* argued that the “central challenge is not to predict the future but to prepare for uncertainty. This is best achieved by developing in individuals the capacity to adapt successfully to changing situations” (Buchanan et al. 2018, p. 3).

Two desirable characteristics of an education system preparing people for the future of work are its ability to: empower people to learn new skills and knowledge throughout life; and to help people make well-informed choices and avoid closing off viable options inadvertently, unnecessarily or too early. An education system that can learn and adapt to changing circumstances is likely to be better at supporting successful approaches and initiatives and at dropping those that are less successful.

Over time, education in New Zealand has expanded to include mass participation in schooling, early childhood and tertiary education. The school system, and associated curricula and assessment, has become more flexible and devolved, and students’ learning more competency-based.

The education system is characterised by long periods of stability punctuated by significant reforms. The system is in one such period of reform. There is an opportunity to assess how the education system can be made more effective in preparing learners to adapt to future changes in work.

Taking a “future of work” perspective, this report highlights several areas of concern. There is consistent evidence that the system is not performing well in developing core skills for some learners or in addressing the persistent long tail of underachievement between the highest and lowest performing students. There has been a system-level failure to properly implement the national curriculum in all schools. Implementation of the New Zealand Curriculum’s key competencies is far behind intended timeframes.

Research undertaken for this inquiry shows how alternative pathways into work can be obscured by the more “well-lit” pathway towards university. In schools, timetabling constraints and regulatory requirements (especially those related to University Entrance) mean that vocational pathways receive less attention, respect and resources. Too often, careers advice for alternative pathways is inadequate.

There are also significant barriers to changing direction in tertiary education. The Commission has previously found that the current system makes it hard for students to change course as they learn more about their preferences and the opportunities open to them. Students bear high costs from making initial mistakes or to change their minds.

The findings in this report highlight areas of concern and opportunities for improvement during this period of reform to the education system. The Commission is not proposing any specific recommendations at this stage, but the final report of this inquiry may do so.

The report identifies opportunities to:

- better promote innovation and good practice across the education system;
- support better curriculum implementation;
- remove barriers (such as University Entrance) that constrain the ability of schools to provide relevant learning and career pathways for students;
- improve students’ ability to change what, how and where they study in tertiary education; and
- address digital inclusion for young people.

Taking these opportunities for improvement will better prepare young learners for a changing world of work.

1 Education for the future of work

Key points

- Over time, education in New Zealand has expanded to cater for a wider group of learners. The school system, and associated curricula and assessment, has also become more flexible and devolved, and students' learning more competency-based.
- New Zealand does not explicitly split its secondary education into vocational and academic streams as some other countries do, such as Germany and the Netherlands. But there is an implicit divergence of future career options, largely set in place by choices students have made by year 11.
- The New Zealand education system has been characterised by long periods of stability punctuated by significant reforms. The current reform period provides an opportunity to assess how the system can be made more effective in preparing people to adapt to future changes in work.
- A good education system is one that can respond to changes in the mix of skills demanded and rewarded in the labour markets of the future. Therefore, instead of attempting to predict the future, one of the goals of the education system should be to prepare people to be adaptable and manage change as it happens.
- Desirable characteristics of an education system for the future of work are its ability to empower people to learn new skills and knowledge throughout life, and to help people make well-informed choices and avoid closing off viable options inadvertently, unnecessarily or too early.
- To do this the education system needs to provide a strong foundation of core skills and have a well-implemented and coherent curriculum. It should also provide well-guided, clear learning and career pathways, and allow people to keep their options open and change course.
- As well as enabling learners to adapt, a good education system is itself adaptable to changing circumstances. An education system that can learn and adapt to changing circumstances is likely to be better at supporting successful approaches and initiatives and at dropping those that are less successful.

1.1 Change is a constant

This report looks at how the New Zealand education system could better prepare young learners for a world of work that, while possibly no more uncertain and changeable than past or current labour markets, will undoubtedly be different.³

Someone who started school in the early 1960s would be in their 60s today and quite likely still participating in the labour force. The formal education they received was for a very different world than the world of today. Big changes have occurred in the New Zealand economy and in the work people do (Coleman et al., 2019). There are now occupations that were unheard of in the 1970s, while other occupations have all but disappeared (Maré, 2019).

Looking to the future, a young person starting school in 2020 will not finish until at least 2030 and will not retire (if there is still such a thing) until approximately 2080. This cohort will likely face significant changes to the work they undertake over their lives.

³ *Training New Zealand's workforce* (NZPC 2019c) looked at work-related education and training for people in the workforce and for those soon to join it. This included training in people's workplaces, on-campus at a tertiary education provider, and through online or distance learning.

1.2 A very short history of education in New Zealand

Over time, education in New Zealand has expanded substantially to cater for wider groups of learners. The system, and associated curricula and assessment, has also become more flexible and devolved, and students' learning more competency-based. The history presented below, while necessarily selective, offers a sense of how much the education system has evolved, and foreshadows some of what might still need to change.

The expansion of education

The Education Act 1877 established New Zealand's first secular, compulsory and free national system of primary education for Pākehā children from ages 7 to 13. However, despite compulsion, many children still did not attend school, especially those from rural areas where their labour was important to their families' livelihoods. Formal state primary school education was made compulsory for Māori children nearly 20 years later in 1894 (Ministry for Culture and Heritage, 2018).

At the turn of the 20th century, secondary schooling was generally for those who intended to go to university or enter professional careers. As a result, in 1901, fewer than 3% of children aged 12–18 attended secondary school (Olssen, 1992).⁴ This changed with the Education Act 1914, which required secondary schools to offer free education to all those who passed a proficiency examination.

By 1921 nearly 13% of 12- to 18-year-olds attended secondary school (usually for two years). Participation rose to 25% by the beginning of the Second World War (ibid). Girls were less likely to attend secondary school, with attendance rates only matching that of boys once secondary school attendance became both free and compulsory up to the age of 15 in 1944 (Else, 2018). Before the 1940s, few Māori had access to secondary education: fewer than 9% of Maori boys in the 1930s experienced *any* secondary education (The Aotearoa History Show, 2019).

With the expansion of secondary education, its associated assessment – the certificate of proficiency – became a major determinant of job and career opportunities.

Formal education also expanded to younger age groups. As more women moved into paid work in the latter half of the 20th century, services to care for their children increased in number.⁵ In the late 1980s, the Meade Committee report, *Education to Be More*, took the view that early childhood services of high quality benefited the whole of society, and therefore government needed to promote access and regulate standards. Thus, the Government's focus shifted to services providing early childhood education (ECE) rather than child-care, and responsibility shifted from the Department of Social Welfare to the Department of Education.

Government funding for ECE increased over the 1990s to improve access for children and the quality of staffing. A national curriculum based on interwoven competencies and learning outcomes, *Te Whāriki*, was established in 1996. Today, 82% of children aged four participate in ECE (Ministry of Education, 2019a).

Participation rates for formal tertiary education qualifications remained comparatively low into the 1980s. However, driven by rising demand for skills and higher education in the later 1980s and into the 1990s, the government pursued tertiary education reforms aimed at increasing access and supply. The "Learning for Life" agenda emphasised making tertiary education accessible to a wider group of students with diverse learning needs and aspirations, throughout their lives.

The 1988 *Report of the Working Group on Post Compulsory Education and Training* opined:

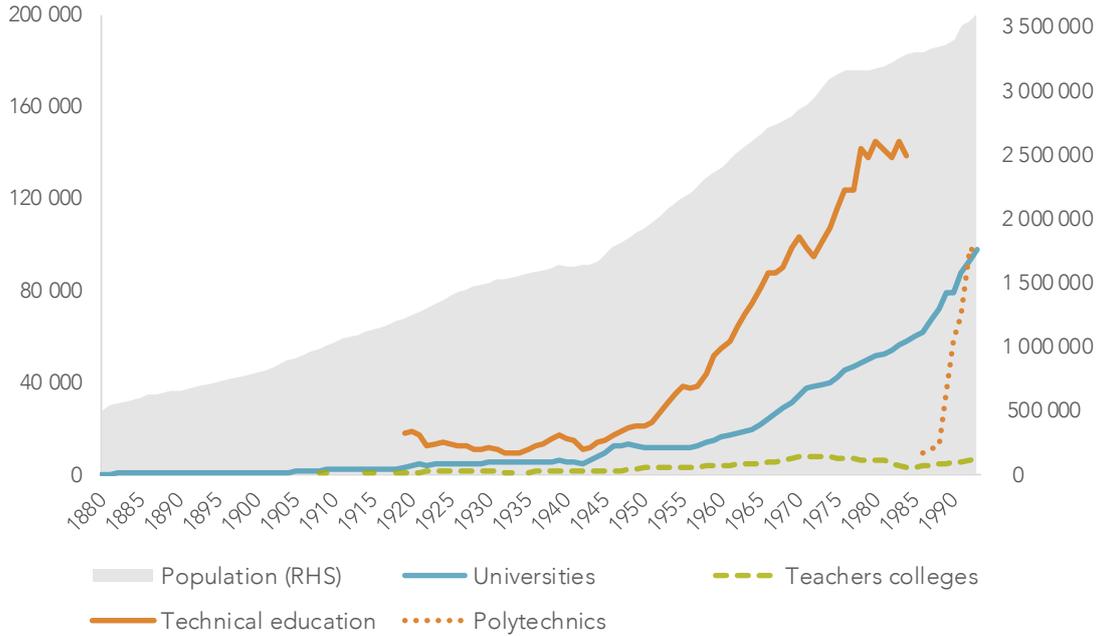
There is virtual unanimity that access to education and training is so important that it should be ensured for all New Zealanders. Whatever other role government chooses, it should continue to accept a responsibility for ensuring that [tertiary education] is available to all groups in society. (Hawke, 1988, p. 18)

Figures 1.1 and 1.2 show how participation in tertiary education has grown over the last 140 years.

⁴ Some students attended district high schools or Standard 7 (an extra year on primary school). Fees were charged for secondary school attendance.

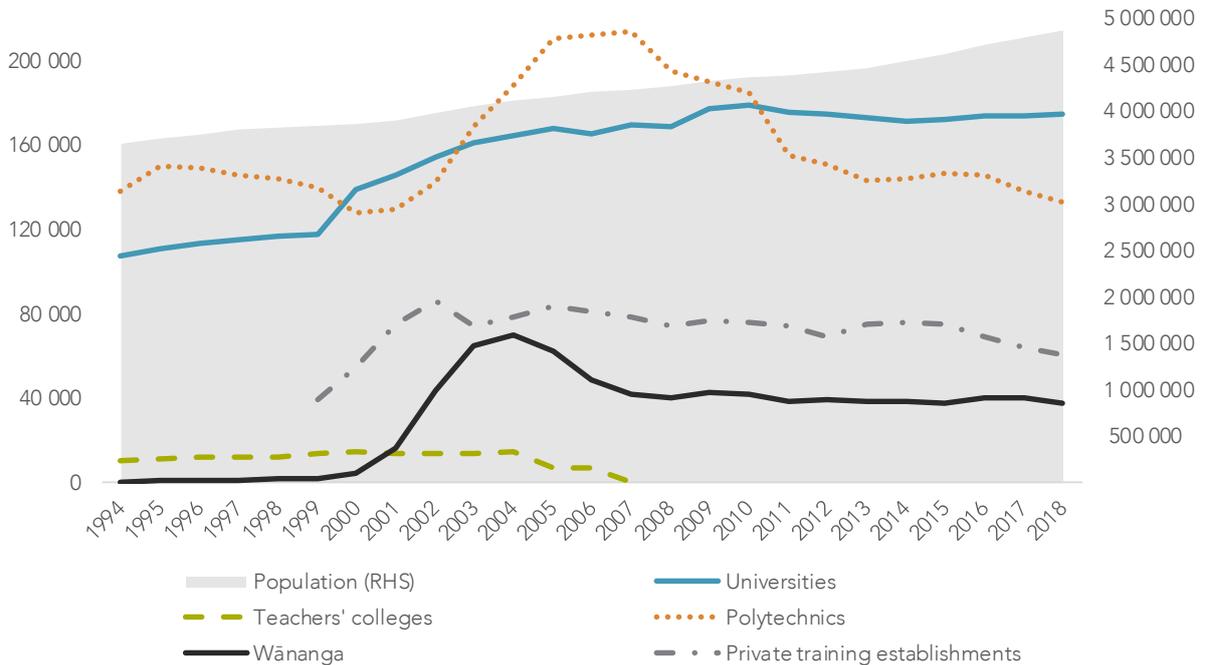
⁵ The first kindergarten opened in Dunedin in 1889, the first playcentre in Wellington in 1941, and Te Kōhanga Reo was established in 1982.

Figure 1.1 Tertiary student enrolments by subsector, 1880–1993



Source: Productivity Commission analysis of New Zealand Official Yearbook data.

Figure 1.2 Tertiary student enrolments by subsector, 1994–2018



Source: Ministry of Education, Tertiary Sector Performance Analysis team.

Notes:

1. The data is provided in two graphs given the discontinuity of the data series pre- and post-1994.
2. Enrolment headcounts include both full-time and part-time students, and international students. Data for Figure 1.2 excludes work-based industry training.
3. Population figures for 1879 to 1925 are five yearly, with intervening years linearly interpolated.
4. Technical education in Figure 1.1 includes technical, community and agriculture colleges and part-time secondary school students (as these were mainly adults taking courses). Data consistent with the historical series cease in 1984.
5. Teachers college enrolments exclude early childhood teacher trainees.
6. Enrolment trends include the results of structural changes, such as the merger of teachers' colleges into universities by 2007, and the Auckland Institute of Technology's re-classification as Auckland University of Technology (AUT) in 2000.

Population growth, economic and technological progress, and changing demand for skills have driven steady growth in the demand for tertiary education. However, supply has changed more sporadically, as government funding and policy changes responded to demand pressures.

- University enrolments grew at their fastest rates in post-war years, during the 1960s and early 1970s, and from the mid-1980s to the mid-1990s.
- In the late 20th century, polytechnics and institutes of technology consolidated a variety of technical and community education programmes that had evolved as secondary education expanded, and participation patterns changed toward longer programmes and full-time study.
- Growth in wānanga and private providers' enrolments followed changes in government policy that allowed these institutions to meet pent-up demand for different models of education and training.

During the brief period in the early 2000s during which enrolments were uncapped (as seen in the large spike in institute of technology or polytechnic enrolments in Figure 1.2), providers had incentives to identify and meet latent demand from many people still poorly served by the tertiary education system, including older Māori students, part-time students and those wishing to study extramurally.⁶

Private education and training providers, and wānanga (whose mission involved serving their whole population rather than focusing on school leavers), were able to grow rapidly. Green (2005, p. 2) concluded that the uncapped system was “spectacularly successful in expanding learner choice and improving equality of opportunity”. The system was subsequently recapped, largely to address concerns about fiscal control and quality assurance.

During 2018, 335 000 New Zealanders (8.6% of the resident population aged over 15) participated in a tertiary education programme receiving some public funding.⁷ A further 138 000 people (3.5% of the population aged over 15) participated in recognised industry training programmes (Ministry of Education, 2019f, tables ENR.1 and ITP.1).

A move towards standardised, but streamed learning

Prior to the 1940s, students received different curricula in different types of schools. Alongside public primary and secondary schools, there were state Māori village schools, technical schools district or agricultural high schools, and private schools (including Māori mission schools). Technical high schools were set up in 1905 as part of a trend in the Western world for vocational training. But they were not a success. Traditional secondary schools were seen by parents as providing a pathway into high-status professions, and a better life, while technical schools were regarded as being for the less-able (Lee & Brooking, 1993). Over a century later, similar mindsets are still to be found (ERO, 2016).

Between 1944 and 1946 a common core secondary school curriculum was established, with associated examinations: School Certificate in fifth form, and University Entrance (UE) in sixth form. This nationwide assessment system remained in place for 50 years. The syllabus drew from both practical and academic strands, aiming to cater to students of differing abilities, interests and backgrounds. Nevertheless, students were streamed into different ability classes. Streams were divided into academic, commercial, and domestic or trades, and students received different versions of the core curriculum (Nolan, 2009).

By the 1950s, over half of Māori primary students attended “mainstream” public schools. Secondary education for Māori was still limited, and delivered mainly by church-run Māori boarding schools. But Māori were increasingly attending public secondary schools and new state-run Māori district high schools.⁸ Māori schools controlled by the Department of Education continued to focus their curriculum on “courses of a practical nature specially suited to the needs of the Maori pupils” ... “unlike the private denominational schools” (Stats NZ, 1955, sec. 6), which the Department had long pressured to also adopt a less academic

⁶ Despite recent trends to full-time study, New Zealand has relatively high numbers of part-time and older students (NZPC, 2019c).

⁷ This represents 220 000 equivalent full-time students.

⁸ Māori district high schools were established from the late 1930s as “native district high schools” and renamed in 1949.

curriculum. This was despite School Certificate being introduced in Māori schools in 1945 following Māori parents' demands to improve academic education for their children (Walker, 2016).

Unfounded assumptions about Māori learners' kinaesthetic "learning styles" (Alton-Lee, 2012) and aptitudes remain to this day. One example is the persistence of trades training as the focus of government-promoted tertiary education programmes specifically targeting Māori learners.

In 1966 the University Bursaries exam was introduced in the Seventh Form for students doing an extra year at school before going to university – so catering for more academically inclined students. In 1969 Sixth Form Certificate was introduced allowing schools to offer more vocational (non-UE) subjects.

In the present, New Zealand does not explicitly split its secondary education system into vocational and academic streams as do some other countries such as the Netherlands or Germany.⁹ But there exists an implicit divergence of future careers, largely set in place by choices students have made by year 11 (Hipkins & Vaughan, 2019).

Reforms to assessment and curriculum

Prior to the 1990s, school curricula were set through more than a dozen syllabi and guidelines. These documents were developed for individual subjects since the 1960s and described what teachers would teach in each subject and year level. There was no overarching approach to their development and no coherent vision or purpose (Ministry of Education, 2007a).

After 1990 a coherent national outcomes-focused curriculum framework was developed. It established principles; identified learning areas, skills, attitudes and values; and defined achievement aims and objectives. The national curriculum, made up of the *New Zealand Curriculum* for English-medium education and *Te Marautanga o Aotearoa* for Māori-medium education, was launched in schools from 2010–11.

Making education about the competencies needed for a successful life was part of a world-wide trend that owes its origins to future thinking for the new millennium. For example, the United National Educational, Scientific and Cultural Organisation (UNESCO) established an international commission on education for the 21st century in 1993, and in 2005, the OECD's Definition and Selection of Competencies project (DeSeCo) sought to answer the question "What competencies do we need for a successful life and well-functioning society?" given the increasing complexity of life in the 21st century (OECD, 2005).

The National Certificate of Educational Achievement (NCEA) was introduced as the main secondary school qualification between 2002 and 2004. These qualifications were designed to be broad-based subject-wise, and replace the old School Certificate, UE, Sixth Form Certificate and University Bursary qualifications. Nevertheless, UE remains in the form of required minimum NCEA credits in prescribed subjects to attend a New Zealand university.

A devolved schooling system

The Tomorrow's Schools reforms of the late 1980s saw a major decentralisation of school decision-making, with most responsibilities devolved from the then-Department of Education and Education Boards (in the case of primary schools) to individual schools' Boards of Trustees comprised mainly of elected parent representatives. Responsibilities included the employment of staff and the appointment of the principal, use of staffing and funding on a day-to-day basis, management of school property, and oversight of the education of all students (Ministry of Education, 2017a).

These reforms assumed that, if the accountability structures were right and if parents were involved in school governance, students would receive a good education. However, Tomorrow's Schools also assumed all schools would have sufficient and consistent access to a skilled teaching workforce, professional leadership from principals, and support from parents and whānau.

⁹ Note however that in 2013, vocational pathways were introduced in New Zealand secondary schools, supported by a Vocational Pathways Award, first targeted towards those young people unlikely to go on to university study, and then broadened to achieve meaningful pathways for all secondary school students.

As time went on it became clear that some schools struggled to meet the demands placed on them by school administration workloads, changes in teaching practice demanded by the national curriculum, and the increasingly complex needs of students.

We have implemented significant changes in the way teachers approach the curriculum, with this also being devolved to the school level within a national framework. These changes have increased expectations of teachers to have a greater focus on the individual needs of diverse students and design a learning programme that meets the needs of all students. There is a much greater emphasis on using data and information to plan the next learning steps for students, classes, and at a school level. This ensures that planning reflects student progress and learning needs. However, there is still work to be done in this area as the practice is not always in alignment with the framework. (Tomorrow's Schools Independent Taskforce, 2017)

This system has been in place for 30 years and is now being reformed, with anticipated changes due to be implemented over several years from 2020 onwards (Ministry of Education, 2019h).

A period of major reform

The New Zealand education system has been characterised by long periods of stability punctuated by significant reforms. New Zealand is currently in a reform period. Major changes include the reviews of Tomorrow's Schools (Ministry of Education, 2019h) and of NCEA (Ministry of Education, 2019e), and the reform of vocational education (Ministry of Education, 2019g). See Appendix A for short summaries of these reforms. Together, these reforms offer an opportunity to assess and improve the effectiveness of the education system.

While there are many perspectives from which to view the system, this report considers how New Zealand's education system can be made more effective in preparing people to adapt to future changes in work.

The Commission is conscious that education providers and agencies are facing significant change and large workloads as a result of this reform agenda. The opportunities for improvement outlined in Chapter 3 of this report are designed to work with the grain of the current reform agenda.

1.3 The value of education

The attainment of education and skills matters for individuals in the economy and society because:

- People with higher qualifications and skills typically experience lower unemployment and higher incomes. This "skills premium" (McAdam & Willman, 2015) (also known as the private return to education) is lower in New Zealand than in many other countries (Zuccollo et al., 2013) but qualifications enhance both individual and nation-wide future prospects (NZPC, 2017).¹⁰
- Firms' ability to successfully adopt new technologies can depend on the availability of complementary skills in the workforce (NZPC, 2019b). Investment in skills development therefore has "an important part to play in fostering productivity growth" (Mason & Rincon-Aznar, 2015, p. 23).
- More advanced educational achievement is associated with higher levels of physical, mental and emotional wellbeing, including the ability for individuals and whānau to participate fully in their communities (Ministry of Education, 2008).¹¹

¹⁰ Zuccollo et al. found that about half the gap is due to OECD measurement issues. To explain the rest of the gap, the authors identified, among other things, the following factors: low rates of innovation, fewer large firms, low capital per worker, a high proportion of immigrants, and taxation.

¹¹ The Ministry of Education noted that different types of learning contribute towards wellbeing. For example, adult and community education, as a "flexible and low-stakes form of education" can serve to "improve employment prospects and mental wellbeing, including for learners who lack the confidence to commit to formal study" (sub. 48, p. 7).

1.4 An education system that is fit for the future of work

A good education system is one that can respond to changes in the mix of skills demanded and rewarded in labour markets over time. It does so by meeting the needs of all participants – those beginning their education journey in ECE, school students and school leavers preparing for their adult lives and careers, and adults continuing their education and training to meet the needs of a changing labour market.

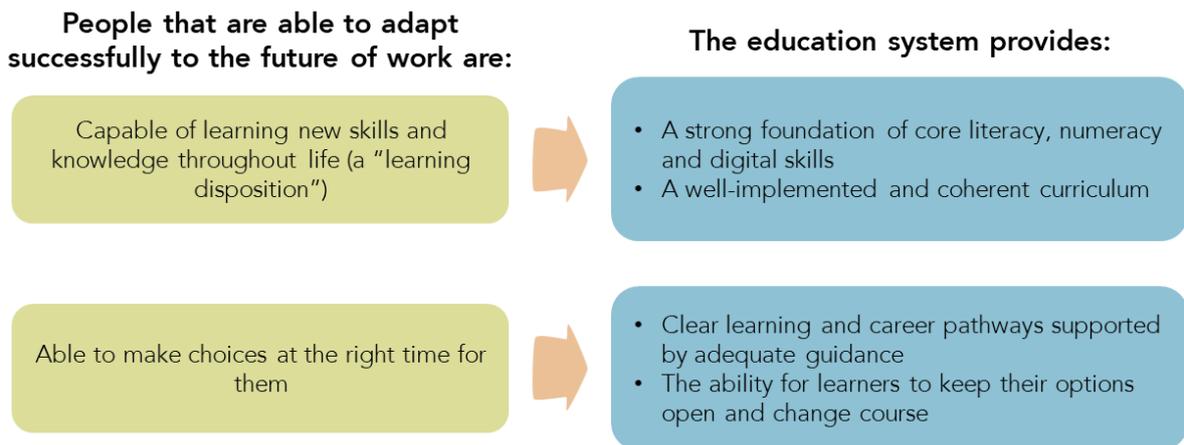
Preparing people to adapt to and manage change

How should policy makers, parents and other members of the community think about the education of young learners in the context of future changes in work? It is impossible to predict with any useful precision how technological progress will play out, and over-reliance on forecasts that turn out to be wrong may lead people to invest in skills and knowledge for which there is no future demand.

Instead of attempting to predict the future, one of the education system's aims should be to prepare people to be adaptable and to manage change *as it happens*. As Buchanan et al. (2018, p. 3) wrote in *Preparing for the best and worst of times*, the "central challenge is not to predict the future but to prepare for uncertainty. This is best achieved by developing in individuals the capacity to adapt successfully to changing situations".

The capacity to learn and the ability to make choices appear particularly valuable (Figure 1.3).

Figure 1.3 A system that prepares people to adapt to and manage change for the future of work



The capacity to learn new skills and knowledge throughout one's life means having a learning disposition (Box 1.1). To support the development of a learning disposition the education system must provide a strong foundation of core skills, as well as a coherent curriculum.

Box 1.1 What is a learning disposition?

A learning disposition is about developing a positive habit towards learning and includes being curious, having an ability to concentrate, and being resilient. If well-nurtured, learning dispositions "result in people empowered to learn, wanting to learn and excited by learning. If not developed early, their absence can have lasting effects on people's willingness, interest in and capacity to learn and adapt" (Buchanan et al., 2018, p. 3).

People learn more about themselves, their interests and strengths, and about potential careers as they progress through the education system and their working lives. The career landscape also changes over time. Especially for young people with little work experience, the education system should provide clear learning and career pathways (supported by guidance) that help people make well-informed choices, and to avoid closing off viable options inadvertently, unnecessarily or too early.

F1.1

Desirable characteristics of an education system for the future of work are its ability: to empower people to learn new skills and knowledge throughout life; and to help people make well-informed choices and avoid closing off viable options inadvertently, unnecessarily or too early.

A system that learns

As well as enabling learners to adapt, a good education system is one that itself is adaptable to changing circumstances. An education system that is able to learn and adapt to changing circumstances is likely to be better at supporting successful approaches and initiatives and dropping those that are less successful.

The Commission's inquiries into *More effective social services* (NZPC, 2015) and *New models of tertiary education* (NZPC, 2017) both noted that a system that learns has:

- the flexibility to try, new ways of doing things;
- information flows that provide ongoing feedback about what is working;
- a willingness to try new approaches, and a willingness to deal with failed approaches quickly; and
- the flexibility to take up and spread successful innovations.

2 Challenges facing the education system for the future of work

Key points

- Attainment of basic skills, such as literacy and numeracy, is a prerequisite for participation in society, and the foundation upon which more complex skills are built. Increasingly, elementary digital skills are considered as a part of these basic skills.
- There is evidence of declining achievement in the core skills areas of reading, mathematics and science over the last decade. While New Zealand students' average scores remain near or above reported international averages, their performance is declining over time.
- For example, Programme for International Student Assessment (PISA) results have been trending down across all three subjects studied (since 2000 for reading, and since 2009 for mathematics and science). The decline in average scores has been sharpest in mathematics, where the share of New Zealand 15-year-olds in the top two levels of proficiency fell by almost half.
- The system is struggling to address a persistent long tail of underachievement. There are persistently poor outcomes for some groups of learners, especially children in socio-economically disadvantaged communities, and Māori and Pasifika learners.
- Many New Zealand school-age children are without home internet access, with an associated impact on the attainment of digital literacy.
- The national curriculum, in its expressed intent, is well-suited to prepare young people for an uncertain future of work. However, there is clear evidence of systematic implementation failure of the national curriculum. For many students, their experience of the national curriculum falls far short of its intent. Contributing causes include:
 - variable teacher capability;
 - inadequate provision of professional learning and development for teachers and school leaders;
 - a highly devolved schooling system, which is a barrier to sharing good practice; and
 - a tension between curriculum-based teaching and learning versus teaching and learning for qualification attainment.
- There is uneven readiness across schools to implement the new digital curriculum in 2020.
- A “well-lit” pathway towards university study, along with timetabling constraints and regulatory requirements (especially those related to University Entrance), means that vocational pathways receive less attention, respect and resources. Too often, careers advice for alternative pathways is inadequate.
- While the education system is flexible in theory, in practice it can be difficult for young people to change course throughout their learning journey. Barriers to changing course in tertiary education are particularly apparent and result from incentives in the funding system for tertiary providers.

2.1 Declining achievement and a widening gap in core skills

Attainment of basic skills, such as literacy and numeracy, is a prerequisite for participation in society, and the foundation upon which more complex skills are built. Elementary digital skills are increasingly considered alongside literacy and numeracy as basic skills. Skills attainment begins in early childhood (Box 2.1) and continues throughout a person's formal education and beyond.

Box 2.1 Quality early childhood education

Quality early childhood education (ECE) is important for developing cognitive socio-emotional and physical skills for future success (Gertler, 2014). Because "brain malleability is much greater earlier in life and brain development is sequential and cumulative, establishing sound foundations can lead to a virtuous cycle of skill acquisition" (World Bank, 2019, p. 69).

Gains from participation in ECE can endure. New Zealand-based research has found links between ECE participation and improved skills and competencies (such as literacy, mathematics and social skills with peers, and attitudinal outcomes) at age 10 (Wylie & Thompson, 2003) and at age 16 (Hodgen, 2007). International research has also identified "strong and positive effects" of ECE attendance on labour market outcomes, such as wage rates and the likelihood of working full-time (Fessler & Schneebaum, 2019, p. 3531). However, other research argues that gains from ECE can "fade out" (Kay & Pennucci 2014, p. 1) within a few years. A determining factor is the quality of the ECE, rather than mere attendance (Mitchell, 2012).

Declining achievement in core skills

International standardised surveys such as the *Programme for International Student Assessment* (PISA), the *Trends in International Mathematics and Science Study* (TIMSS) and the *Progress in International Reading Literacy Study* (PIRLS), and national monitoring projects such as the *National Education Monitoring Project* (NEMP) and the *National Monitoring Study of Student Achievement* (NMSSA) (Appendix B) indicate that while New Zealand students on average remain near or above reported international averages, their performance is declining over time.

For example, average PISA scores have been trending down across all three subjects studied (since 2000 for reading, and since 2009 for mathematics and science) (Figure 2.1; Figure 2.2; Figure 2.3).

The decline in average scores has been sharpest in mathematics, where the share of New Zealand 15-year-olds in the top two levels of proficiency fell by almost half (Figure 2.4).

Figure 2.1 Trends in average PISA scores – Science, 2006–18

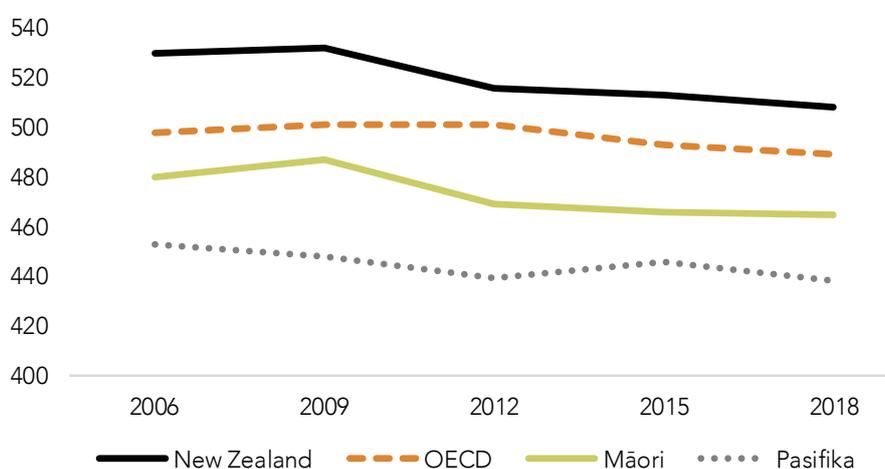


Figure 2.2 Trends in average PISA scores – Mathematics, 2003–18

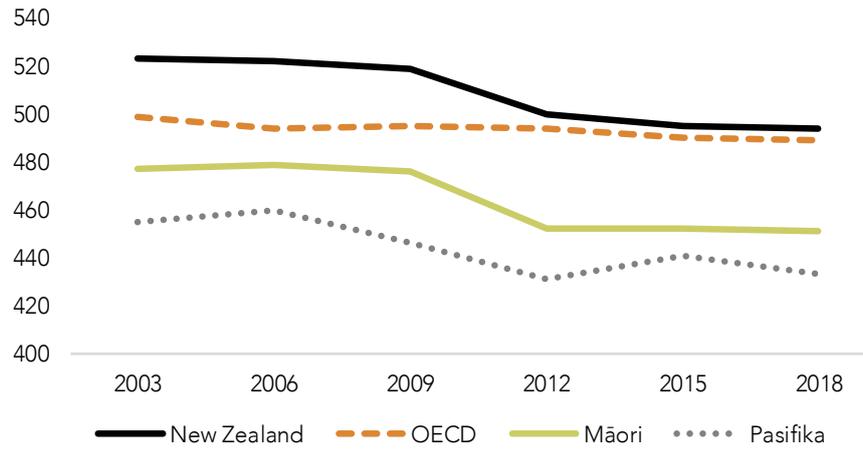
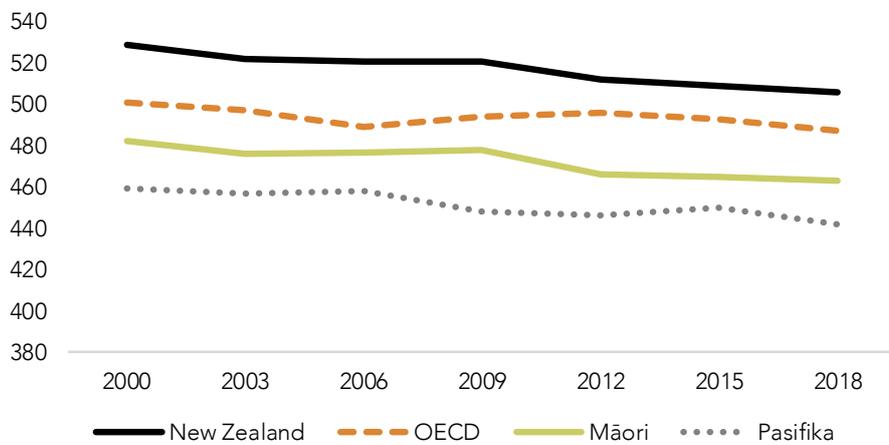
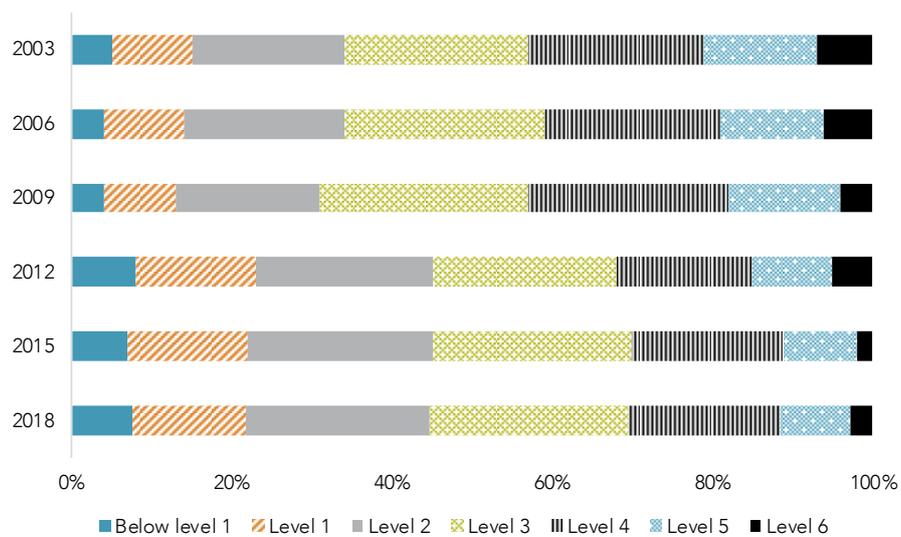


Figure 2.3 Trends in average PISA scores – Reading, 2000–18



Source: May, Jang-Jones and McGregor (2019).

Figure 2.4 Trends in New Zealand mathematics proficiency in PISA, 2003–18



Source: May, Flockton and Kirkham (2016); OECD (2019a).

Notes:

1. Higher levels denote greater mathematics proficiency.

Explanations have been advanced for this fall in achievement in New Zealand. These include student wellbeing within the school environment, cultural responsiveness (especially for Māori and Pasifika students), and pedagogical approaches to teaching core skills (Gerritsen, 2019; Long & Te, 2019).

Yet, other countries have also experienced relative declines in their own performance year on year. Figures 2.5, 2.6 and 2.7 show long-term declining trends in PISA for other OECD countries such as Finland, Australia, Iceland and the Netherlands. Other explanations advanced for this decline (including New Zealand's) include a lack of direct preparation for PISA testing (compared to focusing on nationally important tests like NCEA) and low completion rates of the survey itself (Akyol et al., 2018; Gerritsen, 2018).

Nevertheless, the year on year decline is an issue of concern for several countries. For New Zealand, "substantial change [to improve PISA scores] will take a few years to come about and it will need ongoing, concerted attention" (Wylie in Gerritsen, 2019).

Figure 2.5 Long-term trends in performance PISA, selected countries – Science

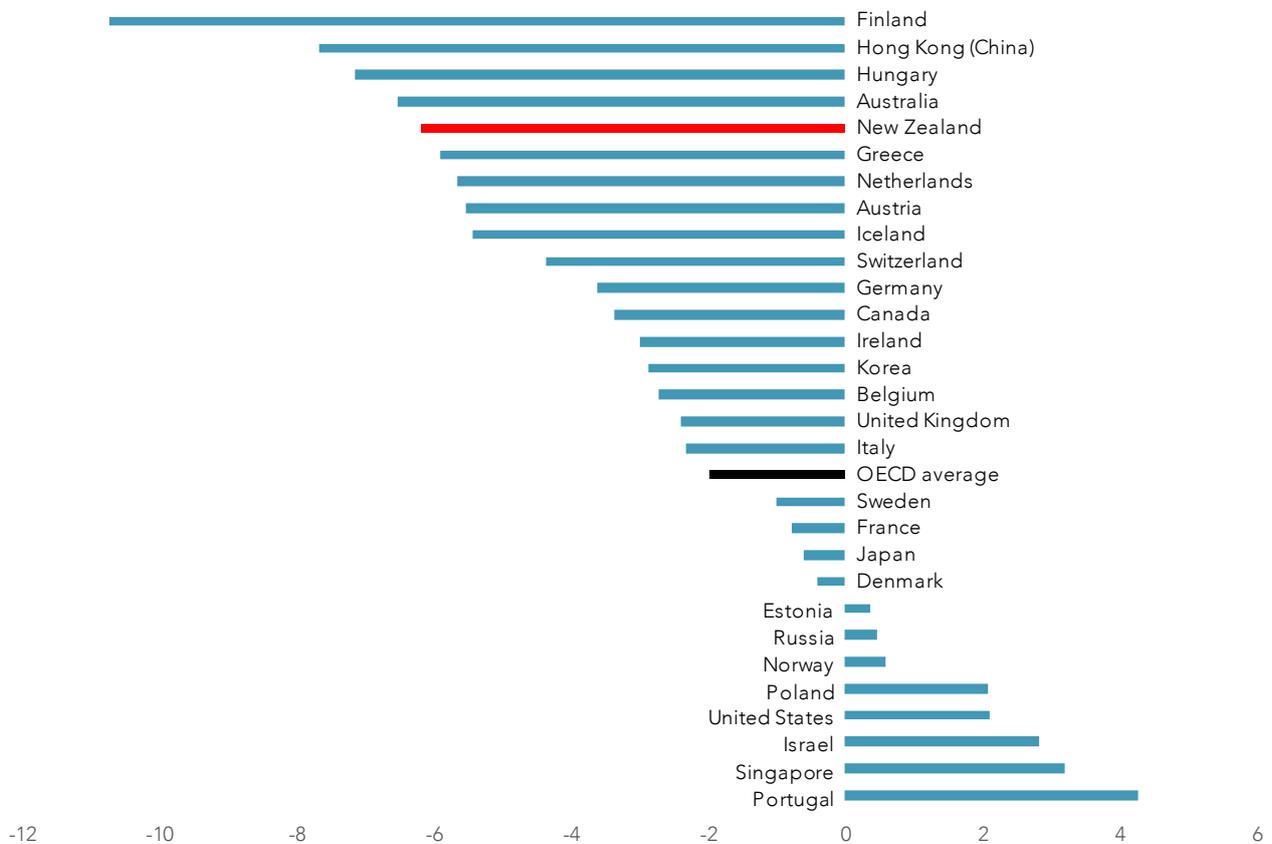


Figure 2.6 Long-term trends in performance PISA, selected countries – Mathematics

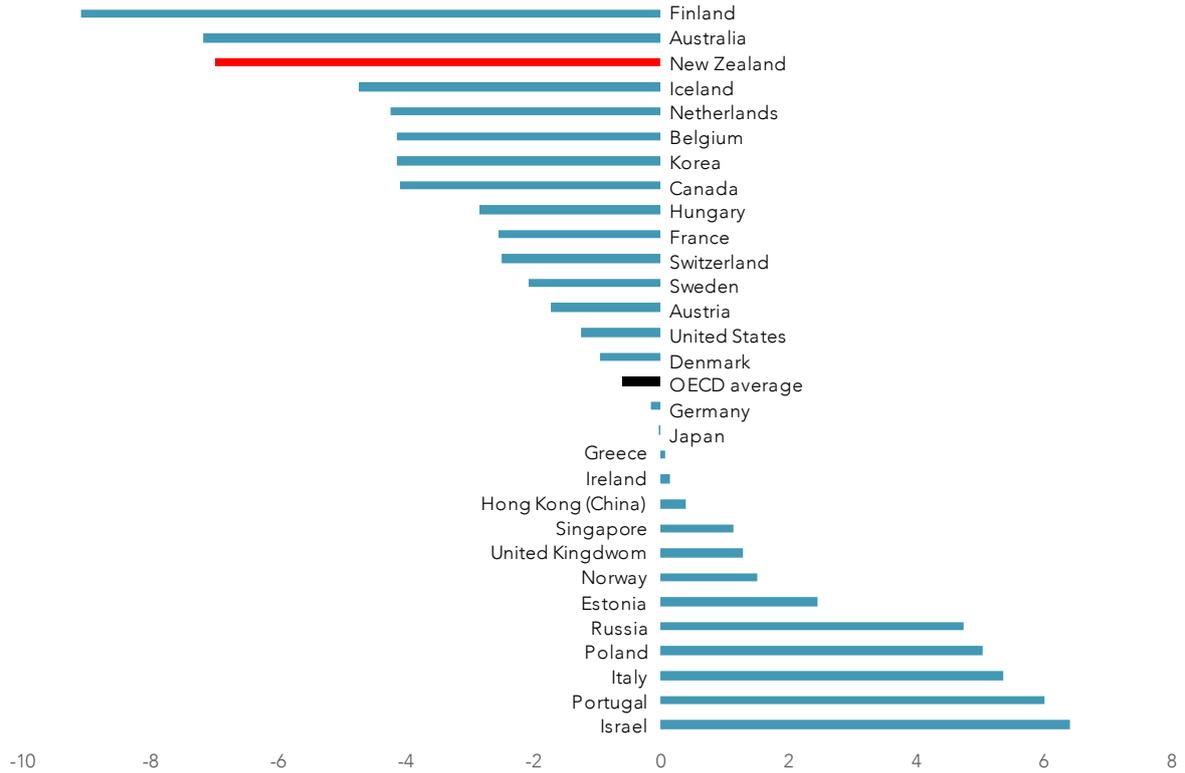


Figure 2.7 Long-term trends in performance PISA, selected countries – Reading



Source: OECD (2019c, p. 17).

Notes:

1. Long-term trend shows the average rate of change in performance, per three-year-period by score performance (ie, the country is measured against itself, not against other countries).
2. Long-term trends are reported for the longest available period since PISA 2000 for reading, PISA 2003 for mathematics and PISA 2006 for science.

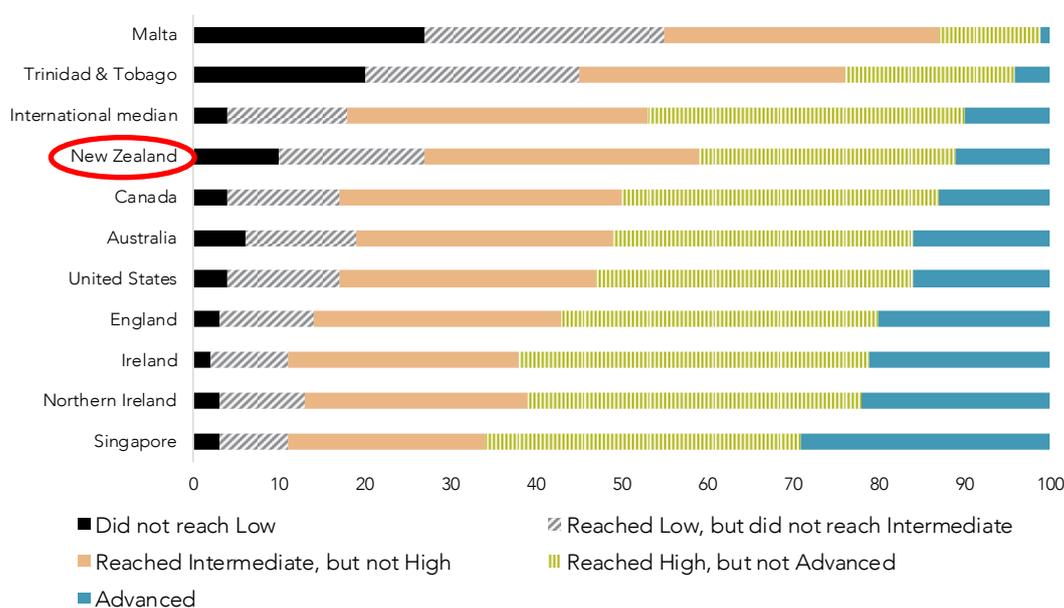
A widening achievement gap ...

The system is also struggling to address a persistent “long tail of underachievement” between the highest and lowest performing students (Ell & Grudnoff, 2013, p. 74).

In the PISA study, compared to countries with similar average scores in both science and reading, New Zealand has a larger proportion of students at the top (advanced thinking ability) and bottom (relatively basic tasks) on each achievement scale (May et al., 2016).

In the PIRLS study, New Zealand also has a relatively large share of very poorly performing learners and a small share of students reaching more advanced benchmarks at year 5 (Figure 2.8). The NEMP and NMSSA studies show little progress in closing achievement gaps, or the available data shows a gap between achievement and expected outcomes.

Figure 2.8 Percentage of students in English-language countries who reached the PIRLS 2016 international benchmarks



Source: Ministry of Education (2017b, p. 15).

... and persistently poorer outcomes for some

The New Zealand education system also produces persistently poorer outcomes for some young people, especially children in socio-economically disadvantaged communities, and Māori and Pasifika learners:

- Māori and Pasifika children are less likely (68% and 75% respectively) to participate in ECE (compared to 82% of all five-year-olds) (Ministry of Education, 2019a).¹² New Zealand mothers living in higher deprivation areas are almost twice as likely not to use an ECE service (Meissel et al., 2019).
- Despite reporting higher student wellbeing, Māori and Pasifika students perform more poorly in surveys such as PISA. For example, 30% of Māori and 44% of Pasifika students perform below level 2 in mathematics, compared to 22% across all students (May et al., 2019).¹³
- Controlling for prior school achievement, Māori students are less likely than Pākehā students to participate at the higher levels of tertiary education that deliver the best financial return. When they do participate at higher levels, their educational and labour market outcomes are persistently poorer than

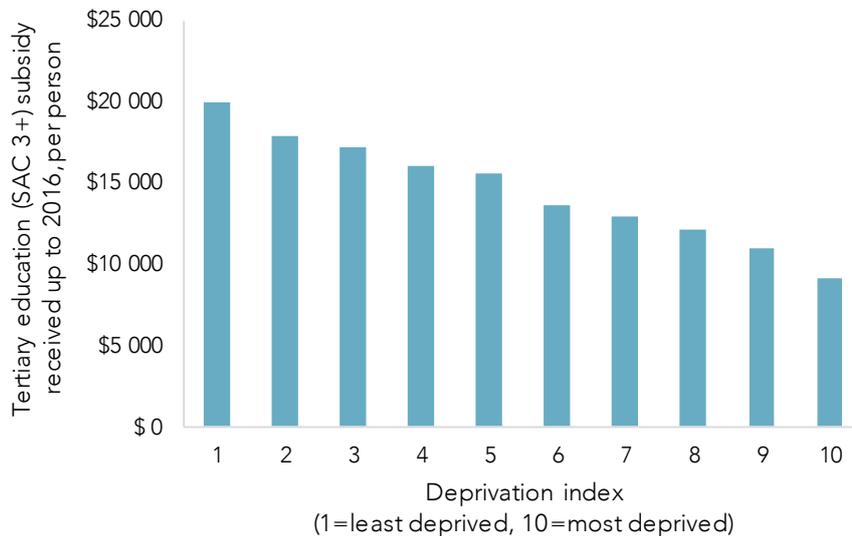
¹² Known participation barriers include a lack of cultural responsiveness to Māori and Pasifika children, affordability, and basic service access (Te One, 2012).

¹³ Noting that achievement gaps for Māori and Pasifika students are compounded by factors such as home resources (Song et al., 2014) and comparatively lower teacher expectations than for Asian and Pākehā students (Turner et al., 2015).

those of Pākehā students. Māori and Pasifika students are also much less likely to complete a bachelors degree, 52% and 49% respectively, compared to 69% for Pākehā (Meehan et al., 2017).

Funding priorities reflected in patterns of public spending also contribute to poorer outcomes for the disadvantaged. Young people born in 1990 from the most socio-economically advantaged households received, on average, more than twice the government subsidy for study above NCEA level 3 than did students from the most deprived households (NZPC, 2017). Figure 2.9 shows the average tertiary tuition subsidy received per person born in 1990, by deprivation decile.

Figure 2.9 Average tertiary tuition subsidy received by people born in 1990, by deprivation decile



Source: NZPC (2017, fig. 3.5).

Notes:

1. The population for this analysis is those people whose records in the Integrated Data Infrastructure (IDI) database show they were born in 1990; attended a New Zealand school during ages 15 and 16; had an address at that age; and were in New Zealand for 300 days during the 15th and 16th years. People are included whether or not they undertook subsidised tertiary education.
2. Deprivation index for each person is the deprivation index for the meshblock containing their address (when aged 15–16).

F2.1

The performance of New Zealand school students is declining over time and there are persistent (on some measures widening) gaps between high and low achievement. The New Zealand education system produces persistently poorer outcomes for some young people, especially children in socio-economically disadvantaged communities, and Māori and Pasifika learners.

2.2 Digital literacy

Digital skills are increasingly considered core outcomes, and as key to success across the curriculum. Martin (2018, p. 13) argued that young people with “low competences in the key information-processing skills and digital skills that are in strong demand in the labour market” can be understood as a “lost generation”.

Many New Zealand school-age children do not have home internet access, although the exact number is unclear and estimates are trending down. Citing Laurence Millar of the 20/20 Communications Trust, the Digital Inclusion Research Group (2017) estimated that 150 000 school-age children lived in 62 000 households with no home internet connection at the time of the 2013 Census, and that 100 000 children in 35 000 households lacked home internet access at the end of 2016. In a May 2019 interview, Millar estimated that 80 000 school-aged children in approximately 25 000–30 000 households still lacked internet access (Collins, 2019).¹⁴

¹⁴ These estimates imply a high average number of school-aged children per household. The Commission has not investigated the veracity of the estimates.

68% of teachers consider that digital technology creates some difficulties in the classroom because not all students can access digital technology at home (Bolstad, 2017). This so-called “homework gap” leads to situations where all students in a classroom, not just those without home access, can miss out on a coherent programme of digital teaching and learning. These difficulties are more prevalent in lower socio-economic neighbourhoods, with “teachers from lower decile 1–2 schools mostly likely to strongly agree that this was an issue (41%), compared with decile 7–8 (18%), and decile 9–10 (9%)” (Ibid, p. 24).

2.3 Poor curriculum implementation

Each level of the New Zealand education system has statements about the skills and knowledge that young people are expected to acquire. These include the ECE curriculum *Te Whāriki*, the national curriculum covering schooling education, and a diverse set of graduate profiles and other learning objectives for tertiary qualifications. This report highlights problems facing the implementation of the national curriculum in the primary and secondary education system.¹⁵

What is the national curriculum?

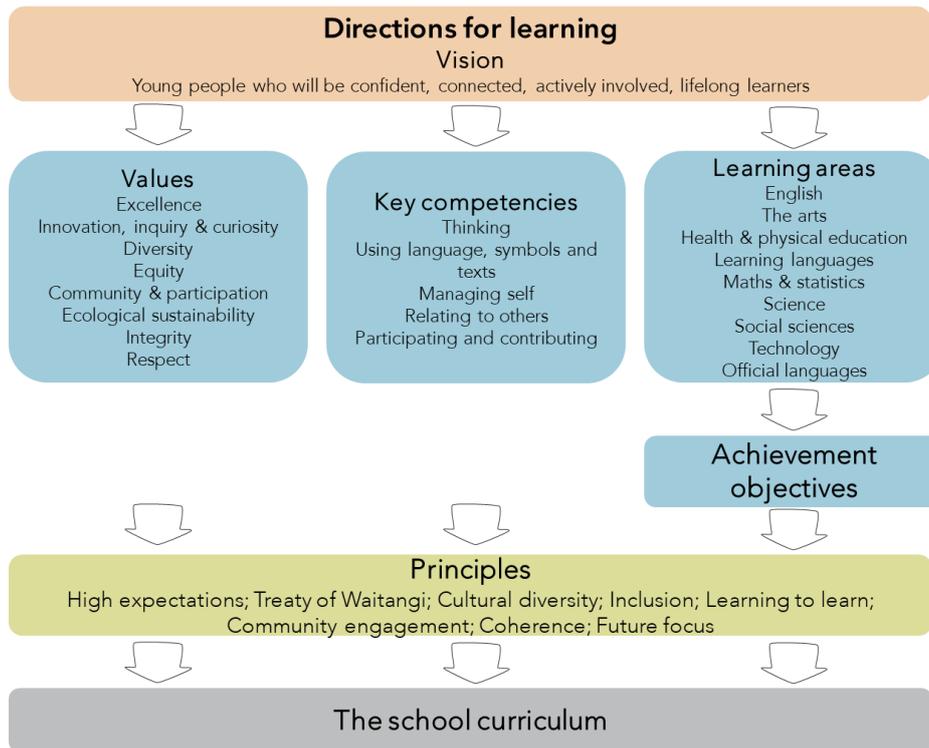
The national curriculum is an umbrella term for both the *New Zealand Curriculum* (NZC, for English-medium education, published in 2007 and implemented from 2010) and *Te Marautanga o Aotearoa* (for Māori-medium education, published in 2008 and implemented from 2011). The overarching intent of the national curriculum is to help “students acquire the taste and skills for engaging in lifelong learning” with the “acquisition of a broad range of skills ... meant to facilitate the development of dispositions towards lifelong learning” (Lamb et al., 2017, p. 34).

In order to achieve this objective, both curricula incorporate learning areas (eg, arts, English, science), aspirations/vision statements, and key competencies/graduate qualities. These are designed to be interwoven together in the classroom.¹⁶ Hipkins and Vaughan (2019) noted, however, that not all subjects offer the same opportunities to develop competencies. Nevertheless, evidence suggests that competency-based learning is well-suited to an uncertain future, as it is intended to develop a learner’s ability to “deal with new situations and environments, including those with high degrees of complexity, fluidity and uncertainty” (Bolstad & Gilbert, 2012, p. 2).

The NZC identifies five key competencies: thinking; using language, symbols, and texts; managing self; relating to others; and participating and contributing (Figure 2.10).

¹⁵ Across the 2 530 schools in New Zealand, the vast majority (97.5%) of students are enrolled in English-medium schools, with 2.5% enrolled in Māori-medium schools (Ministry of Education, 2019b).

¹⁶ Following the OECD (2005), Buchanan et al. (2018, p. 4) explain that competencies “are often best acquired in the context of mastering specific disciplinary, trade or professional expertise.” For example, Williams (2019) explains this approach: “[W]e can all agree that teaching a kid Python isn’t necessarily going to help them get a job in 10 years because Python will probably not be the hot language in a decade. But if we are just teaching Python, that’s the real problem. A Python class should teach concepts and develop intuition about how computers solve problems. That’s a durable skill.”

Figure 2.10 The New Zealand Curriculum

Source: Adapted from Ministry of Education (2007b).

Te Marautanga o Aotearoa identifies the most important qualities and characteristics of a graduate of Māori-medium education as high levels of educational and socio-cultural success, a wide range of life skills, and a wide range of career choices.

Evidence of a systematic implementation failure

Both curricula are intended to be applied at each individual school level as the school sees fit, and schools are encouraged to revise their application of the curriculum on a continuous basis. As a result, teachers and schools shoulder significant responsibility for curriculum development (Haig, 2018). In simple terms, the national curriculum does not detail *what* teachers should teach. Rather, it focuses on the outcomes that should be achieved, meaning that teachers have a high degree of autonomy in determining teaching content.

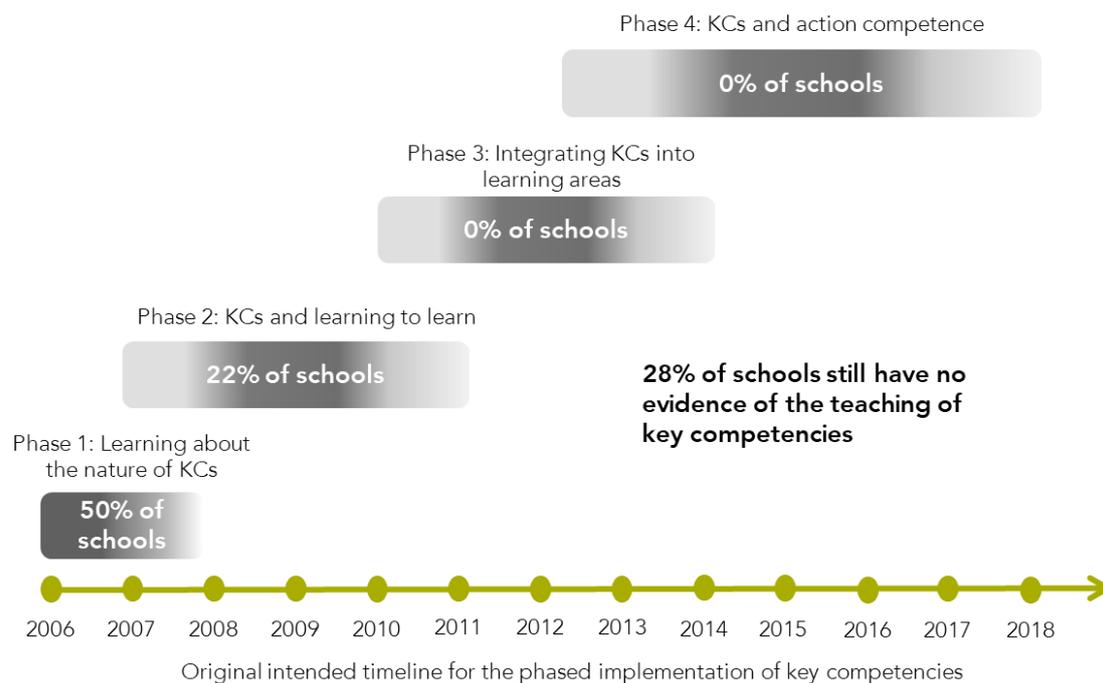
Competency-based approaches, such as the national curriculum therefore “differentiate themselves from content- or discipline-based approaches, focusing instead on what students learn to *do* with knowledge rather than on the knowledge itself” (Anderson-Levitt 2017, p. 50, emphasis in the original).

An implication of this approach to teaching and learning is that it requires sophisticated teacher capability underpinned by well-resourced professional learning and development (PLD) to implement well. Yet, in New Zealand there is evidence of highly variable teacher capability and inadequate provision of the PLD and guidance to “facilitate the desired transition between ‘traditional’ and 21st century learning” (Lamb et al., 2017, p. 34).

The variability in teacher capability and inadequate teacher support can be seen in the implementation of the key competencies in the NZC. As Hipkins & Vaughan (2019, p. 35) explained, the key competencies “are developed patchily in some subjects and schools, and are essentially ignored in others”. The Education Review Office (ERO, 2019d, pp. 17–18) noted that the NZC “provides insufficient detail to help teachers understand what the KCs [key competencies] mean for students and how to integrate them in their practice” and that “Ministry support for schools and teachers to develop their students’ KCs has been limited in recent years.”

ERO (2019a) also found that most schools with year 1–8 students (ie, primary and intermediate schools) are still only in the beginning phase of learning about key competencies, with just over a quarter not even in phase 1 (Figure 2.11). This phase was to have been completed over a decade ago.

Figure 2.11 Where schools with years 1–8 students are in the teaching of key competencies, 2018



Source: ERO (2019a); McDowall and Hipkins (2018).

F2.2

Implementation of the New Zealand Curriculum's key competencies is far behind its intended timeframe. There is no evidence of the teaching of key competencies in 28% of schools.

Schools that are less able to devote adequate time and resources to curriculum development share several characteristics. They tend to have fewer resources (often those schools catering for students who come from disadvantaged homes), are smaller (including those in rural and isolated areas), and have had recent leadership changes (Tomorrow's Schools Independent Taskforce et al., 2018).

Poor implementation of the curriculum can contribute to inequitable student outcomes. In "some cases students might miss out on their basic educational entitlements" (Hipkins & Vaughan, 2019, p. 9).

A further example of the challenge in implementing the curriculum across all schools can be seen in a lack of readiness to implement the new digital curriculum (Box 2.2).¹⁷

¹⁷ Similar to the experience of the revised digital curriculum, an evaluation of the ECE sector's preparedness to implement the updated version of *Te Whāriki* by the Education Review Office in 2018 found it to be sub-optimal. Less than half of all ECE centres were prepared to implement the revised curriculum, and only 13% were considered well prepared (ERO, 2019c). While most leaders and/or kaiako had been involved in some form of relevant PLD, for half of the ECE services this PLD "was limited and lacking the depth of engagement ... needed to understand the shifts required to effectively implement the updated curriculum" (ERO, 2019c, p. 6).

Box 2.2 Implementation of the digital curriculum

As outlined in section 2.2, digital skills are increasingly recognised as core skills. Digital technology was recently strengthened within the national curriculum to “ensure that all learners have the opportunity to become digitally capable individuals” (Ministry of Education, 2018).¹⁸ Underneath the wider technology learning area, both the NZC and *Te Marautanga o Aotearoa* now include two new “technological areas”:

- *Computational thinking for digital technologies* – enabling students to express problems and solutions in a way that means a computer could be used to solve them.
- *Designing and developing digital outcomes* – understanding that digital applications and systems are created by humans for humans.

Schools are expected to fully integrate the revised content into their curricula by the start of the 2020 school year, supported by a national digital readiness programme, *Kia Takatū ā-Matihiko*.

However, a 2018 survey (ERO, 2019b, p. 16) found that:

- only 7% of schools reported a “quite good understanding, and enough knowledge and skills” to start to implement the content; and
- over one-third (38%) had “no understanding at all” of the relationship between the digital technologies content and the NZC and how this would inform their local curriculum design.

Two further issues have contributed to the failure to fully implement the national curriculum.

First, the largely devolved and autonomous schooling system creates barriers to good practice and resources being shared across the system (Tomorrow's Schools Independent Taskforce et al., 2018).

Second, there is a tension between teaching and learning based on the national curriculum and teaching and learning for the attainment of NCEA. Schools aim to have all students achieve minimum NCEA standards to bolster students' future study and employment prospects. However, a focus on NCEA attainment has resulted in the balance of curriculum and achievement being “tilted towards achievement, with less regard for meaningful student pathways and for development of key competencies” (ERO, 2018, p. 32). Ananiadou and Claro (2009, p. 6) foreshadowed this problem in a report for the OECD, explaining that competencies risk “being irrelevant to schools unless ... [they become] the very core of what teachers and schools should care about, and this can only be done by incorporating them into the national education standards that are enforced and assessed by governments”.

F2.3

The national curriculum, in its expressed intent, is well-suited to prepare young people for the future of work. However, there is clear evidence of a systematic implementation failure of the national curriculum. For many students, their experience of the national curriculum falls far short of its intent.

2.4 Clear learning and career pathways, but only for some

New Zealand's schooling system is explicitly designed to be flexible and responsive to student interests and preferences. However, academic, university-focused routes are the “well-lit” pathway, gaining more attention, respect and resources than others (Hipkins & Vaughan, 2019).

Some schools can and do develop alternative, work-focused pathways (ERO, 2018). However, the ability to do so depends on several factors, including community demographics, the expectations of parents and the

¹⁸ Digitally capable is explained as moving solely from being users and consumers of digital technologies, to being creators.

attitudes of school staff. While many schools have abandoned explicit streaming by ability, common in earlier times, student aspirations are still being implicitly curtailed by parent and teacher perceptions of ability. Communities that are largely professional and middle-class tend to be “more familiar and comfortable with the traditional view of schooling as a path to university study” and in some schools, staff “reinforce and perpetuate a traditional culture” (Eyre & Hipkins, 2019, p. 5).

Timetabling constraints and regulatory requirements – especially those related to UE (Box 2.3) – add to the difficulty of developing and maintaining alternative pathways. In focus groups commissioned for this inquiry, secondary school staff identified timetabling structures as a strong influencing factor in providing learning pathways. A timetable can

underpin the bias towards academic, university-oriented study. The traditional timetable for the senior years tends to be clustered around groups of subjects in order to allow students to meet the requirements of UE. This in turn affects the ability of the school to offer viable alternative pathways. For example, with a traditional timetable, it can be difficult to accommodate students studying partly in school and partly in work-based or vocational programmes outside of school. Because they are out of school for 1 or 2 days a week, they may miss learning in key areas. (Eyre & Hipkins, 2019, pp. 5–6)

Box 2.3 What is University Entrance and what does it require?

University Entrance (UE) is “the minimum requirement to go to a New Zealand university” (NZQA, n.d.). To qualify, students need to achieve a package of measures, including NCEA level 3, three subjects at level 3 of 14 credits each from the list of “approved subjects”, and 10 credits respectively in literacy (level 2 or above) and numeracy (level 1 or above).

Schools, teachers, the Ministry of Education or other stakeholder organisations can apply to the New Zealand Qualifications Authority (NZQA) to make changes to the list of approved subjects for UE, and NZQA conducts periodic reviews every four years to assess whether the list is still “relevant and meets the sector’s expectations” (NZQA, 2018, p. 4).

While the Education Act 1989 establishes UE and defines its role (s. 247), the Act also empowers university councils to set their own enrolment rules for any course (s. 194). So achieving UE offers no guarantee of entrance to a university.

Other comments from these focus groups help to illustrate the problems that UE can create by acting as a barrier to learning pathways for some students.

In a school with 440 in a cohort, it actually gets quite hard for us to make a really boutique kind of programme for all of our students. To not go, “Oh ****, you’ve actually cut out one of your three 14s.”¹⁹

There are those students that are going to be engineers or whatever, and universities dictate that they must be doing these subjects, and they must be getting so many credits in these subjects at Level 3 ... But then there’s the other bunch of kids who are not down [with] that – you know the other 80% – [we need to find a way to provide] the flexibility so that we’re meeting their needs. (Eyre & Hipkins, 2019, pp. 10–11)

Variability in practice in careers advice

Students require good guidance about their career options to help ensure that future pathways are not closed off to them by the choices they make at school. Effective provision of careers advice starts early, exposes young people to the world of work, challenges stereotypes while making sure aspirations are realistic, and targets young people from the most disadvantaged backgrounds for the greatest levels of intervention (Musset & Kureková, 2018).

¹⁹ As noted in Box 4, to qualify for UE, students need to achieve, among other requirements, three subjects at level 3 of 14 credits each from the list of “approved subjects”.

However, careers education and guidance in New Zealand schools is of varying quality and too often inadequate. While some schools and teachers “give broad advice about keeping options open, check that students aren’t ‘falling through the cracks’, and keep an eye on their subject choices and timetables” others still revert to careers advice that “reinforces traditional pathways, with university study as the preferred goal” (Eyre & Hipkins, 2019, p. 8).

Research into careers guidance and advice in New Zealand schools conducted in the 2000s found “haphazard” delivery, and divergent views within career staff and school leaders about the purpose of careers education.

Only around half of careers staff strongly agreed with *helping students develop self-awareness* and only about a third strongly agreed with *teaching students decision-making strategies* – two aims spelt out in the [Government policy document] *Careers Education and Guidance in New Zealand Schools*. (Vaughan & Gardiner, 2007, p. 3)

In the Commission’s report on *New models of tertiary education* (NZPC, 2017), submitters highlighted the need for good quality advice for young people on pathways and careers – both in education and relating to future work (Box 2.4).

Box 2.4 Tertiary sector views on advice for school students about pathways and careers

Whitireia Community Polytechnic and Wellington Institute of Technology stated that young people from year 9 onwards need high-quality, individually tailored advice so that they are aware of the choices and the learning and career options available to them. NZQA submitted that some Māori and Pasifika learners are not provided with sufficient guidance and advice on clear pathways and may find themselves enrolled in low-level or foundation programmes and this limits their choices and access to tertiary study.

Universities New Zealand said that assistance, especially for Māori and Pasifika learners in Years 9 and 10, needs to happen in the schooling system. The submission argued for shaping aspirations, planning, and supporting teaching and learning experiences in order to put more students on a university pathway who may otherwise not have considered it as suitable for them.

The submission from Te Mata o Te Tau, the Academy for Māori Research & Scholarship at Massey University, stated that Māori students do not often enter university with the same cultural capital as other students, and that Māori students can find tertiary study alienating without support.

Other submitters contended that the well-lit pathway was diverting some students from vocational education. For example, the Metro group and NZITP submission said that the pathway from school to university route is well-marked and clearly understood by school and career advisers (as well as by most families). The submission said that school-based advisors tend to regard polytechnics as a destination for less able and successful learners. Wintec also commented in its submission that this public perception “creates a barrier to many students who would otherwise gain enormously from participation in ITP [institute of technology and polytechnic] education and training”.

F2.4

The “well-lit” pathway or route from secondary school to university works well for some students, but not for all. Variability in careers advice, timetabling constraints and regulatory requirements – especially those related to University Entrance – add to the difficulty of developing vocational-focused pathways in schools.

In July 2017, Careers New Zealand was merged into the Tertiary Education Commission (TEC). The TEC now has a legislative mandate:

- to provide a publicly available careers information service that includes a database of information about occupations and tertiary education and training; and
- to facilitate and strengthen the connections between schools, employers, and tertiary education organisations to ensure students are better prepared for employment and further education and training, or both (Education Act 1989, s 159F).²⁰

The Ministry of Education retains responsibility for the funding, regulation and oversight of careers information, advice and guidance services in schools, including funding and staffing arrangements. The Ministry for Business Innovation and Employment also has functions linked to careers services – especially in the provision of information on labour market outcomes and employer demand.

Since the merger of Careers New Zealand into the TEC, the TEC has been developing a new strategy (currently referred to in the public domain as the Careers System Strategy and Action Plan) as well as new careers initiatives and tools. A key aim is to support every New Zealander – from age 7 to 70+ – to have a personalised lifelong career plan, to help them understand and navigate career options and learning pathways throughout their lives. The TEC will start working with primary schools in 2020 and develop new tools for use in schools, for those in and out of work, and across government agencies, anticipated for release in 2021 (TEC pers. comm., 16 January 2020).

2.5 Barriers to changing course

As students move through the education system it is inevitable that some future possibilities become closed off, based on choices made. But it is important not to winnow possibilities too far or too early. Keeping options open, along with enabling students to change course as needed, is an important attribute of an education system.

Barriers to changing course in secondary education

The importance of being able to change course is not a trivial concern. Several of the secondary school leaders who participated in focus groups coordinated for this report “talked about the difficulty of choosing a pathway at a young age; interests and passions can change and develop over many years. Early specialisation can cut down future possibilities” (Eyre & Hipkins, 2019, p. 17).

It can be challenging for both learners and those supporting them to understand what it might mean to keep their options open – a traditional view is that subject choices at school directly map onto careers (eg, STEM subjects leading to STEM careers). But “this conventional alignment is increasingly challenged as different kinds of jobs arise, knowledge bases change, and interdisciplinary subjects emerge” (Hipkins & Vaughan, 2019, p. 27).

The Commission heard that learners are not always well-placed to make sense of and understand the significance of information about pathways and choices even when it is available (NZPC, 2017). This can be a particular issue for learners from communities that have lower levels of pre-existing educational capital, as they are less well-positioned to make sense of the range of information with which they are presented. Helping learners to develop the skills and competencies that enable them to make their own decisions is likely to be the most practically useful strategy. This would involve helping learners to identify what information is relevant to them, to make sense of that information, and then make realistic choices to take a pathway that meets their goals and aspirations.

In theory, the New Zealand education system offers a lot of flexibility. As well as the personalised learning available under the national curriculum, the assessment framework provided by NCEA is intended to be shaped to individual student needs. But the same issues that have made it practically difficult to create alternative pathways for students, such as UE requirements, has also created barriers to students changing

²⁰ Delivery of careers development services to schools, and related school resourcing, is the responsibility of the Ministry of Education.

course in the school system. For example, some participants in the focus groups raised concerns that two recent NCEA review decisions could make it harder to develop non-traditional pathways or enable students to change course. These decisions are to shift to fewer, larger standards, and to require 50:50 splits between internal and external assessment (Eyre & Hipkins, 2019; Ministry of Education, 2019e).

Barriers to changing course in tertiary education

There are also substantial barriers to changing course in tertiary education. The Commission found that while some “students may want to leave or transfer away from their current course or provider”, the “current system makes it hard for students to do this. Students bear high costs from making initial mistakes or from changing their minds” (NZPC, 2017, p. 368).

This is despite evidence showing that many students change their mind during their course of study. While somewhat dated, a Ministry of Education study from 2008 tracking New Zealand students between 1997 and 2006 found that changing qualification and changing provider is relatively common. For example, 40% of bachelors students, 34% of diploma students and 25% of certificate students changed qualification before they completed, and 52% of students who completed a qualification and progressed to higher-level study transferred to a new provider after completing their first qualification (NZPC, 2017).

Yet, the Commission noted that there are many barriers that discourage switching. For a provider, no enrolment means no funding. For example, if a learner applies to university to do an engineering degree, and is not accepted, the university has incentives to encourage them to do a science degree at that university, rather than an engineering technician qualification at a polytechnic, which might be a better match with the learner's aspirations.

There are funding-related incentives for tertiary providers not to recognise credit gained from other providers but instead to require learners to repeat their learning. Joint delivery of programmes between institutions (which might provide the best combination of study that suits the learner) is also disincentivised, as only one provider can award the completed qualification. Both these factors mean that switching can be costly for students who want to change their study path.

Credit transfer arrangements between tertiary institutions can be a barrier. These may be epistemological in nature, that is, institutions may teach similar topics in qualitatively different ways, making credit transfer options difficult. However, the Commission found that tertiary institutions can block or stymie credit transfers to defend their own interests, and that they provide little information about credit transfer arrangements or make it time consuming and costly for students to negotiate (NZPC, 2017).

Improving mobility and consistency for learners is a key objective of the government's current vocational education and training reforms. These reforms include the merger of New Zealand's 16 polytechnics and institutes of technology into a single New Zealand Institute of Skills and Technology, the transfer of Industry Training Organisations' “arranging training” function to the new institute and other tertiary providers, and new Workforce Development Councils with oversight of qualifications and standards for all vocational education – both for on-job training and provider based education programmes. This is to be supported by a new funding system covering both on-job and provider-based training (NZPC, 2019c).

In future therefore, learners enrolled in polytechnics or as workplace trainees should be able to move between work and study, between different jobs and around the country without facing the same barriers that they do now. No similar progress is however yet apparent to improve flexibility and mobility for students across the university sector.

F2.5

Keeping options open, along with enabling students to change course as needed, is an important attribute of an education system. But barriers exist to changing course and provider, especially in tertiary education.

3 Opportunities for reform

Key points

- New Zealand is in a period of significant education system reform. There is an opportunity to make changes that would better prepare young people for the future of work.
- The establishment of an Education Service Agency within the Ministry of Education; the direction for the Education Review Office to spend more time on system-level evaluation and review; and specific changes within the reform of vocational education (such as the establishment of Centres of Vocational Excellence) provide opportunities for better identification and diffusion of good practice within the education system.
- To improve the implementation of the national curriculum, more and better-quality professional learning and development for teachers and school leaders is needed. The proposed Curriculum Centre to provide curriculum leadership and expertise could help to provide for more sophisticated curriculum implementation.
- There is an opportunity to reconsider the rationale for continuing with University Entrance. Its purported benefits appear overstated, and the costs in terms of narrowed choices, foregone opportunities, and wasted student effort are significant.
- The Tertiary Education Commission's work leading the development of careers information, advice and guidance will require ongoing and focused effort, leadership and coordination.
- Learners should be able to change course more easily in tertiary education. The vocational education reforms could offer more flexibility and mobility for learners currently in polytechnics and industry training. However, in the university sector, barriers to credit transfer and switching should be removed to improve flexibility and mobility.
- The implementation of the digital curriculum in 2020 provides an opportunity to consider how digital inclusion for young people can be addressed.

As noted in section 1.2, the New Zealand education system is undergoing a period of major reform. Such periods of change occur infrequently, and so should be seen as a moment of significant opportunity. Changes could be made that would better prepare young people for the future of work.

3.1 Improve the promotion of innovation and good practice

There is no shortage of innovative practice in New Zealand's education system. Research conducted by the New Zealand Council for Educational Research (NZCER) to inform this report highlighted examples in areas such as timetable and programme design, and the organisation of career and study guidance within schools (Eyre & Hipkins, 2019). A challenge is to diffuse this innovation and good practice widely across the education system.²¹

The education system already has institutions in place to identify innovative practice, such as the Education Review Office (ERO), and Ako Aotearoa, the national centre for tertiary teaching excellence. But there are challenges in the promotion and uptake of these practices. In response to the review of Tomorrow's Schools, the Government has decided to establish an Education Service Agency (ESA) within the Ministry of Education, which will "deliver more responsive, accessible and integrated support by delivering functions

²¹ Poor diffusion is not an issue exclusive to education. The Commission has previously commented on problems with diffusion within the state sector (NZPC, 2018) and wider economy (Conway, 2018; Conway & NZPC, 2016), and noted its negative impacts on productivity growth. Poor diffusion in education constrains the ability of the system to deliver better outcomes for young people, especially those from disadvantaged communities.

relevant to the needs of teachers, leaders, students, whānau and their wider communities, to support equity and excellence of learning outcomes” (Ministry of Education, 2019h, p. 14).

The Government has also indicated that it wishes to free up more ERO resources over time to devote to “system-level evaluation and review” (Ministry of Education, 2019h, p. 15). These changes could provide the basis for greater identification and diffusion of good practice within the education system.

The vocational education reforms include proposals to develop new Centres of Vocational Excellence (COVEs) that would lead the development of teaching and standards in specific fields. Academic leaders in the New Zealand Institute of Skills and Technology will face the challenge of achieving increased standardisation and consistency of programmes nationally, while also creating space for innovation, local responsiveness, and scaling up innovative practices that have proven successful.

3.2 Support better curriculum implementation

More and better-quality PLD for teachers and school leaders for curriculum development is needed to improve national curriculum implementation. This should include more concrete guidance on the key competencies and how they can be integrated with learning areas.

Lamb, Maire and Doecke (2017, p. 4) have argued that many jurisdictions struggle to achieve a widespread transformation of classroom practice and assessment towards competencies. Successful implementation must be “accompanied by strategic investment in building the capacity of all teachers, across school and classroom contexts”.

Practical templates and guidance on how to develop key competencies in teaching practice, and better measure student progress and achievement against competencies, could be developed. This should by no means limit the ability of teachers and schools that are successfully developing their own approaches to the national curriculum, to continue to do so. Successful approaches should be considered as exemplars for other schools to understand how to adapt the national curriculum to their own circumstances. The ability to take up and spread successful approaches is a feature of a good education system (section 1.4).

The Curriculum, Progress and Achievement Ministerial Advisory Group (CPAMAG) suggested that greater clarity and guidance is needed about the purposes of the national curriculum and the learning outcomes to be achieved for all students.²²

Flexibility for local responsiveness is necessary in a system that strives to be inclusive and value diversity. However, flexible curriculum frameworks require those implementing them to be clear about the learning outcomes that cannot be left to chance to avoid local decisions leading to inequitable learning opportunities. We need more clarity about the National Curriculum, local curricula, and how they relate to one another. We also need to set up processes that give us clarity about how our National Curriculum will remain relevant over time. (CPAMAG, 2019, p. 7)

CPAMAG also recommended identifying and spreading examples of good local practice, and developing “curriculum progress maps”, which would

set out the disciplinary knowledge and competencies that are important for all ākonga [students], and that need to be deliberately included in curriculum design and noticed in ākonga learning. They would encompass Years 0–13, and be coherent with Te Whāriki and any markers of progress in early learning. The maps would highlight key transitions, and incorporate the existing literacy and numeracy Learning Progression Frameworks. (CPAMAG, 2019, p. 35)

The devolved nature of the school system itself may be a barrier to curriculum implementation. The Government’s decision, in response to the review of Tomorrow’s School, to establish a nationally based Curriculum Centre to provide curriculum leadership and expertise (Ministry of Education, 2019h), offers an opportunity to aggregate some responsibility for curriculum development, particularly for those schools and teachers who are struggling. Its intent is to “provide advice on what it would take to create a much clearer

²² CPAMAG was formed in 2018 to provide advice on strengthening the use of the national curriculum in years 1–10 of the compulsory education system.

and larger critical mass of expertise that leads, develops and supports curriculum development and delivery” (Ministry of Education, 2019h, p. 33).

These steps provide an opportunity to take a more coherent approach to implementation, and to address implementation challenges in schools in disadvantaged communities. There is also an opportunity to address the alignment between the national curriculum and the assessment system.

3.3 Remove constraints on learning pathways

University Entrance

Research into school practice conducted for this inquiry finds that UE acts as a constraint on the ability of schools and learners to forge relevant learning and career pathways. UE limits subject choice, complicates timetabling, constrains the introduction of innovative new courses and acts counter to the more flexible objectives of NCEA (Eyre & Hipkins, 2019).

The purported benefits of UE – ie, a single standard that permits entrance into university – are overstated, since many university faculties set additional entry requirements for specific courses and programmes, and the costs in terms of narrowed choices, foregone opportunities, and wasted student effort are significant. Current reforms in education offer an opportunity to reconsider the rationale for UE.

Careers advice

The TEC’s current work leading careers information, advice and guidance is an opportunity to improve New Zealander’s future employment outcomes and productivity through more efficient skills development and matching. To succeed, this work will require continued and focused effort, leadership, and coordination with other government agencies, employers, schools and tertiary institutions.

Challenges facing the TEC in delivering the Careers System Strategy include:

- how information and support for secondary school students can be integrated with the options and learning pathways offered in schools (including careers advice);
- the myriad players with overlapping responsibilities involved (despite the TEC’s mandate to lead in this area). Crown Entities such as the TEC can face particular challenges trying to lead work with the Departments that fund and oversee them; and
- other major work pressures, including implementing the Government’s current vocational education reforms, which may limit TEC’s capacity to follow through and achieve the intent of the strategy.

3.4 Improve learners’ ability to switch in tertiary education

In *New models of tertiary education* (NZPC, 2017), the Commission considered policy options to promote easier credit transfer, including funding incentives and improved information to students. It recommended that, in its review of credit transfer guidance, The New Zealand Qualifications Authority (NZQA, 2017, p. 373) should set expectations that providers

- have credit transfer policies and practices, at both the institutional level and (where appropriate) sub-institutional levels, that both support student mobility and minimise repeated learning;
- integrate enrolment and credit transfer application processes;
- make available information to students about transfer processes in an accessible, clear and consistent way; and
- use terms consistently and collect data about transfer applications and outcomes of students who have transferred to support data analysis at a provider and system level.

NZQA has since completed its review. The revised NZQA guidelines require tertiary organisations to

- integrate CRT [credit recognition and transfer] and RPL [recognition of prior learning] into their overall systems, regulations, policies and practices, eg programme development, assessment and moderation, organisational self-assessment
- approve appropriate quality assurance and academic regulations, policies and procedures for CRT and RPL that apply across all learning areas of the organisation
- promote to learners, through all relevant means, information about CRT and RPL
- provide accessible academic advice and support to assistance learners to apply for credit through CRT and RPL
- ensure decisions about CRT and RPL are timely, transparent, robust, consistent, and defensible and for the maximum benefit of learners. (NZQA, 2017, p. 4)

However, the guidelines do not place any obligation on providers to use common terms or promote more consistent approaches across the system. Nor is it clear if there will be any data collection to better support policy development around credit transfer.

While the vocational education reforms offer an opportunity to increase flexibility and mobility for learners currently in polytechnics and industry training, barriers to credit transfer and switching remain between sectors (eg, polytechnic to university, university to wānanga, private training establishment to polytechnic, etc.) and between individual institutions. The ability to transfer credits requires further attention.

The strongest levers Government has for encouraging credit recognition and transfer systems that work in the interests of learners and employers, rather than in the interests of tertiary education providers, are conditions attached to government funding and (for all providers except universities) rules for programme approval and quality assurance. The Government should explore options to use these levers (especially funding conditions for universities) to improve flexibility and mobility for learners.

3.5 Address digital inclusion for young people

The terms of reference for this inquiry asked the Commission to investigate the question how to address the digital divide in New Zealand. Section 2.2 emphasises the importance of digital skills, and notes that many New Zealand school-age children do not have home internet access. Box 2.2 highlights the challenges schools are facing in implementing the digital curriculum.

At a workshop on this topic (NZPC, 2019a), the Commission heard that “digital inclusion” is a more useful term than the “digital divide”. There are factors beyond just access to the internet that are important for digital literacy (Elliott 2018; Internet NZ, sub. 024), including the following.

- *Motivation* is why people bring digital technology into their homes, such as wanting to connect with family in other locations, or for children to access homework or other educational resources online. Workshop participants also named being able to access the last census as a significant motivator.
- *Skills* is the ability to use technology, from hardware such as laptops and other devices, to being able to use software and applications. The Blind Foundation (sub. 017) also noted the important role of training for different groups of people to be able to use digital technology, and workshop participants highlighted the need for “digital resilience” – meaning the ability of families and teachers to continue to support learning as technology changes and evolves.
- *Trust* is understanding what digital technologies offer (ie, that going online can be fun *and* educational, and being able to discern between trustworthy and untrustworthy sources of information). It includes knowing about the costs of, and contractual arrangements associated with digital access.

The Department of Internal Affairs (DIA) wrapped these together in its definition – that a “digitally included person, whānau or community has convenient, reliable access to affordable, accessible digital devices and an internet connection, and can confidently use them in their day-to-day life” (DIA, 2019, p. 10).

The DIA noted that Māori are less likely to be digitally included than the wider population. In response, DIA are developing *Te Whata Kōrero*, a “call to action for tāngata whenua to provide leadership on digital inclusion-related issues, alongside government” (DIA, 2019, p. 8).

The Commission is also aware of other initiatives aiming to increase digital skills among young Māori. For example, Code Avengers directly targets some of their computer coding, digital literacy and design courses to young Māori (Code Avengers, pers. comm., 2 December 2019). Ngāti Whātua Ōrākei is developing an “iwi algorithm” to embed New Zealand’s unique cultural values at the heart of artificial intelligence. Incorporating diverse cultural views could better empower young people in both culture and learning.

Access, however, remains an important prerequisite for digital inclusion. Workshop participants emphasised the importance of improving home internet access for school-aged children.²³

The Commission is aware of two proposals that could address access to the internet at home for young people.

- The Ministry of Education proposes to achieve home internet access for all young people in New Zealand by building on the existing Network for Learning (N4L, 2019) to provide uncapped (but content-filtered) internet access (Ministry of Education, 2019c). The approach is being trialled in several pilots across New Zealand using different technological approaches (eg, fibre to home Wi-Fi, 4G to home Wi-Fi, or urban community Wi-Fi). The total cost of a national roll-out is approximately \$200 million over five years. This includes establishment funding (eg, including for hardware), ongoing community engagement and “significant investment in change management and training to support and maintain uptake” (Ministry of Education, 2019c).
- Another option is to use the mobile network (eg, 4G and 5G, and future 6G, networks) to cover those households currently without access via an extension of the current unfiltered but capped access model offered by Spark Jump.²⁴ This may avoid families feeling stigmatised due to access being limited to the Network for Learning, and recognises the potential of the mobile network as a technology alternative to fibre.

Differences between these proposals include the availability of training and ongoing support for users, and who bears the cost of access – either solely by government in the Ministry of Education proposal, or with a user-pays component in Spark Jump proposal.

3.6 Take a “future of work” perspective on education reform

This report has emphasised the importance of a “future of work” perspective in this period of reform to the education system. It has also highlighted opportunities for improvement that would better prepare young people for the future of work.

Q3.1

This report identifies challenges and opportunities for reform to the education system in preparing young people for the future of work. What other constraints, issues, challenges and opportunities should the Commission consider?

²³ The issue of home internet access (as opposed to at a public space like a library) was highlighted as particularly important at the Commission’s workshop. This engages parents in students’ learning, and enhances safety (ie, children staying home rather than going out because they can go online).

²⁴ Spark Jump offers 30GB for \$10 a month for eligible families (those with children under 18 without a broadband connection).

Summary of findings and questions

Chapter 1 – Education for the future of work

F1.1

Desirable characteristics of an education system for the future of work are its ability: to empower people to learn new skills and knowledge throughout life; and to help people make well-informed choices and avoid closing off viable options inadvertently, unnecessarily or too early.

Chapter 2 – Challenges facing the education system for the future of work

F2.1

The performance of New Zealand school students is declining over time and there are persistent (on some measures widening) gaps between high and low achievement. The New Zealand education system produces persistently poorer outcomes for some young people, especially children in socio-economically disadvantaged communities, and Māori and Pasifika learners.

F2.2

Implementation of the New Zealand Curriculum's key competencies is far behind its intended timeframe. There is no evidence of the teaching of key competencies in 28% of schools.

F2.3

The national curriculum, in its expressed intent, is well-suited to prepare young people for the future of work. However, there is clear evidence of a systematic implementation failure of the national curriculum. For many students, their experience of the national curriculum falls far short of its intent.

F2.4

The "well-lit" pathway or route from secondary school to university works well for some students, but not for all. Variability in careers advice, timetabling constraints and regulatory requirements – especially those related to University Entrance – add to the difficulty of developing vocational-focused pathways in schools.

F2.5

Keeping options open, along with enabling students to change course as needed, is an important attribute of an education system. But barriers exist to changing course and provider, especially in tertiary education.

Chapter 3 – Opportunities for reform

Q3.1

This report identifies challenges and opportunities for reform to the education system in preparing young people for the future of work. What other constraints, issues, challenges and opportunities should the Commission consider?

Appendix A Contemporary reforms of the education system

Review of Tomorrow's Schools

The Tomorrow's Schools Independent Taskforce began the process of formally reviewing the Tomorrow's Schools model in early 2018. It released its report in September 2019 and the Government's response was released in November 2019.

The key elements of the Government's response are:

- More responsive, accessible, and integrated local support through establishing the Education Service Agency (ESA) as a separately branded business unit. This new ESA (as part of a redesigned Ministry of Education) is currently being designed.
- Stronger arrangements to underpin principal leadership of the schooling system. This includes establishing minimum eligibility criteria for principals and the establishment of new Leadership Advisor roles to, among other tasks, provide guidance and advice to Boards of Trustees.
- A better balance between local and national responsibilities for the network of schooling property and provision. This includes removing infrastructure management and maintenance responsibilities from boards and centralising key services, such as planned and preventative maintenance (Ministry of Education, 2019h).

Review of NCEA

The Minister of Education launched a "national conversation" on the future of NCEA in 2018. A draft NCEA change package was announced in May 2019. The final change package will be agreed by Cabinet by the end of February 2020, with final details subject to Budget 2020 decisions.

Table A.1 Proposed changes to NCEA, 2019

Change	Includes
Make NCEA more accessible	Ending NCEA fees and simplifying the process for those with special assessment conditions
Mana ōrite mō te mātauranga Māori	Building in te ao Māori and mātauranga Māori into achievement standards for use across both English- and Māori-medium settings (where possible and appropriate)
Strengthen literacy and numeracy requirements	New, externally graded literacy and numeracy requirements as a co-requisite for NCEA, making up a coherent package of 20 credits (and will not contribute to the 60-credit requirement for each level of NCEA)
Have fewer, larger standards	Each standard covering a broader range of knowledge, skills and capabilities, and more balance between the number of credits from internal and external assessment
Simplify NCEA's structure	Removing the ability to "carry-over" 20 credits from a lower level NCEA and introducing clear guidance on the number of credits a student should enter each year
Show clearer pathways to further education and employment	Creating a "graduate profile" for each level of NCEA, setting up a Vocational Entrance Award (similar to UE) and refining the Record of Achievement to be clearer and more comprehensive
Keep NCEA level 1 as an optional level	Keeping NCEA level 1 (taken in year 11) as optional and still allowing schools to adopt alternative approaches to year 11 as they see fit (note that for around 10% of students, NCEA level 1 is their highest qualification)

Source: Ministry of Education (2019d).

Reform of vocational education

Announced by the Minister of Education in August 2019, the reform of vocational education (RoVE) aims to create a single public vocational education system that:

- gives all learners the education and training they need for the workplace;
- gives employers greater access to a skilled, work-ready workforce across all regions; and
- ensures all regions have collaborative, flexible, innovative and sustainable providers.

Ministry of Education (2019g) outlines key elements of the reforms. These include:

- establishing the New Zealand Institute of Skills and Technology (NZIST) from April 2020, merging the 16 institutes of technology and polytechnics into one national institution;
- phasing out Industry Training Organisations, with the NZIST and other tertiary education providers taking over their role arranging work-based education and training;
- creating six workforce development councils to oversee and approve all vocational qualifications, and 15 regional skills leadership groups to advise on local skill supply priorities; and
- a new unified funding system, replacing the currently separate funding systems for work-based and provider-based vocational education and training.

These changes are currently underway. For example, the government is working with industry to set up the workforce development councils after 1 April 2020, with the aim of completing their establishment by June 2021.

Appendix B Student performance

New Zealand regularly participates in the following local and international assessments of student performance.

- The OECD's *PISA (the Programme for International Student Assessment)* tests representative samples of 15-year-olds from all over the world in reading, mathematics and science every three years. The most recent survey (2018) assessed around 600 000 young people from 79 jurisdictions (OECD, 2019a).
- *TIMSS (Trends in International Mathematics and Science Study)* assesses "achievement in mathematics and science at middle primary (year 5) and lower secondary (year 9) levels, and collects background information on student, classroom and school contexts" (Ministry of Education, 2019i). The tests are run every four years and are "designed to measure and interpret differences in national educational systems in order to help improve the teaching and learning and mathematics and science worldwide." (ibid)
- *PIRLS (Progress in International Reading Literacy Study)* assesses middle-primary school children's reading literacy (year 5 in New Zealand). The tests are run every five years, and New Zealand has participated in all four cycles. The most recent round (2016) included students from 50 countries.
- *NEMP (National Education Monitoring Project)* and its successor *NMSSA (National Monitoring study of Student Achievement)* are evaluation programmes funded by the Ministry of Education, which explore educational achievement by subject over Years 4 and 8.²⁵

Programme for International Student Assessment

As noted in section 2.1, New Zealand's average scores in the PISA surveys have fallen over time and there are large and persistent gaps in achievement by ethnicity (Figures 2.1 to 2.7).

Trends in International Mathematics and Science Study

Mathematics

New Zealand's performance on mathematics in the TIMSS surveys has been broadly stable over 20 years, while many other countries have improved.

- Average mathematics scores for year 5 students in 2014/15 were higher than those in the first TIMSS survey (1994/95) but "not significantly different from 2002/03, 2006/07, and 2010/11." (Caygill, Singh, et al., 2016a, p. 10)
- At the lower secondary level (year 9), New Zealand has had "no significant change" in mean mathematics score since the first survey in 1994/95 (Caygill, Hanlar, et al., 2016a, p. 16). By comparison, the "United States, Hong Kong SAR, the Republic of Korea, Slovenia and England have ... had increases of more than 20 score points in mathematics achievement" (ibid).
- New Zealand's average maths achievement for both year 5 and year 9 students in 2014/15 was significantly lower than all the other predominantly English-speaking countries that participated (Ministry of Education, 2017b).
- A large share of New Zealand year 5 students (16%) failed to meet the bottom benchmark of maths achievement in the most recent TIMSS survey, and a small share (6%) reached the top ("advanced") benchmark. In comparison, 50% of Singaporean and 27% of Northern Irish students were at or above the advanced level.

²⁵ In Māori medium settings, NEMP focused on the year 8 level only.

Science

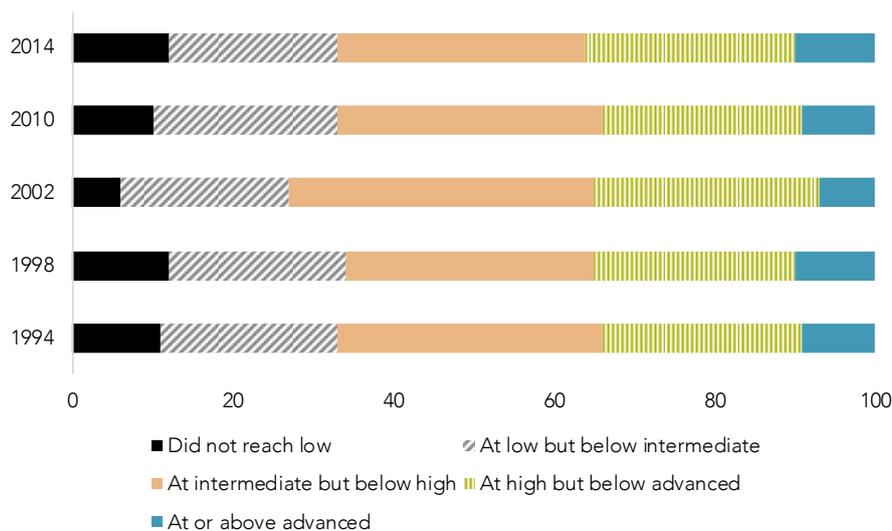
New Zealand's science performance in TIMSS has been somewhat more variable than that for mathematics, but the most recent average (2014/15) scores for year 5 and year 9 students were not statistically different from the first TIMSS survey in 1994/95.

- In the most recent survey, New Zealand's year 5 mean science score was lower than "all the other predominantly English-speaking countries who participated" (Caygill, Singh, et al., 2016b, p. 12).²⁶
- New Zealand has a relatively large share of poor performing students compared to other advanced economies.

Twelve percent of Year 9 students in New Zealand could not perform many of the simplest tasks TIMSS seeks to measure ... In comparison, only four percent or fewer of the lower secondary students in the highest-performing countries performed below this low benchmark. There were also fewer really *low* performing lower secondary students (those who did not reach the low benchmark) in Chinese Taipei (4%), England (5%), the United States (7%), and Australia (9%) (Caygill, Hanlar, et al., 2016a, p. 21)

- The share of New Zealand year 9 students who reached the "advanced" benchmark was higher than the international median (10% in New Zealand, as opposed to 7%) but much lower than the highest performing countries (42% in Singapore, 27% in Chinese Taipei and 24% in Japan). With the exception of the 2002 survey, this distribution of achievement has been a longstanding feature in New Zealand's year 9 TIMSS results (Figure B.1).

Figure B.1 Trends in proportion of New Zealand year 9 students at each TIMSS science benchmark, 1994–2014



Source: Caygill, Hanlar and Singh (2016b, p. 23).

Progress in International Reading Literacy Study

New Zealand's average reading scores in PIRLS have been consistently above the study's centre point, although its relative ranking has declined over time.

Like TIMSS, PIRLS sets four benchmarks, which assess the skill level of individual students and the overall distribution of skills across student cohorts.²⁷ Compared to other predominantly English-speaking countries, New Zealand had a high proportion of students who either only met the "low" benchmark or failed to reach this bottom benchmark and a relatively small share who achieved the "advanced" benchmark (section 0).

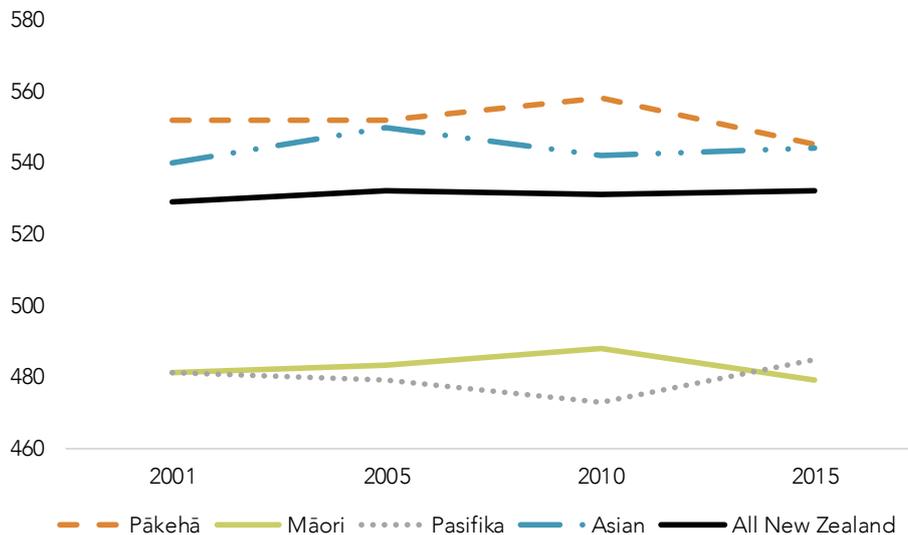
²⁶ Singapore, the United States, England, Canada, Australia and Northern Ireland

²⁷ Low, Intermediate, High and Advanced

This relatively large share of very poorly performing learners and small share of students reaching the “advanced” benchmark is a longstanding issue in New Zealand, and the distribution of skill levels has not significantly shifted since the first study in 2001.

As with PISA, PIRLS reveals persistent and large differences in achievement by ethnic group (Figure B.2).

Figure B.2 Mean reading scores in New Zealand by ethnic group, PIRLS, 2001–16



Source: Commission analysis of Ministry of Education (2017c, p. 26).

National Education Monitoring Project

NEMP ran from 1993 to 2010 and so provides the longest series of information.

- The 2010 report on writing, reading and mathematics found that “there is growth between year 4 and year 8 in achievement in writing, reading and particularly mathematics” but “no real change in the level of writing between 2006 and 2010” (Gilmore et al., 2010, p. 7).
- The 2009 report on information skills for inquiry learning found “a small gain in the performance on year 4 students over the 12 years between 1997 and 2009”, but at year 8, “the evidence suggests no change in information skills performance overall for that same 12-year period” (Smith et al., 2009, p. 4).
- The 2007 report on science noted overall that there has been “little change in science performance overall, for either year 4 or year 8 students, for the 12 year period from 1995 to 2007”. But also stated
 ... a more detailed look suggests some concern for year 4 students. In the two assessment cycles since 1999, the performance of year 4 students on trend tasks has dropped twice by 3% in the physical world strand, by 2% and then 3% in the material world strand, and by an average of 1% per cycle in the other two strands. (Crooks et al., 2007, p. 5)

National Monitoring Study of Student Achievement

NMSSA works on a five-year cycle and so inadequate information is available to report on trends in many subjects. However, several reports have queried how well achievement has matched expectations.

- In science, the 2017 survey found that most students “(94 percent) in Year 4 were achieving at or above curriculum expectations (Developed Level 1 and 2), while in Year 8 a minority (20 percent) were achieving at or above curriculum expectations (3 and 4).” (National Monitoring Study of Student Achievement (N.Z.) et al., 2018, p. 7)

- In reading, the 2014 assessments found that

Fifty-eight percent of Year 4 students scored above the minimum score on the KARE scale associated with achieving curriculum level 2 objectives. Fifty-nine percent of Year 8 students scored above the minimum score associated with achieving curriculum level 4 objectives. The curriculum expectation at Year 4 is that students will have, on balance, achieved level 2 objectives by the end of the school year. In Year 8, they will have, on balance, achieved level 4 objectives by the end of the school year. NMSSA assessment was carried out in Term 3. Therefore, we could expect a greater proportion of students at each year level to have met or exceeded the minimum score on the KARE scale for the appropriate curriculum level by the end of the year. (National Monitoring Study of Student Achievement (N.Z.) et al., 2015a, p. 3)

- In mathematics and statistics, the 2013 NMSSA survey found that a “mismatch at Year 8 between student achievement levels and curriculum expectations.”

The curriculum expectation at year 8 is that students will be working solidly at level 4. About 41% of year 8 students achieved at level 4 or higher on the knowledge and application of mathematical and statistical ideas (KAMSI) assessment. An analysis of KAMSI items indicates that in general, year 8 students are not having the success expected on level 4 items involving fractions, decimals, percentages, and pro-numerals. Performance at year 4 was more in-line with curriculum expectations. About 81% of students achieved within the curriculum level 2 band or higher. The expectation for students at year 4 is to achieve solidly in this band. (National Monitoring Study of Student Achievement (N.Z.) et al., 2015b, p. 7).

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